

Julien Morizot · Lila Kazemian *Editors*

The Development of Criminal and Antisocial Behavior

Theory, Research and Practical Applications

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*To Professor Le Blanc,
an innovative scholar and outstanding mentor*

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Introduction: Understanding Criminal and Antisocial Behavior Within a Developmental and Multidisciplinary Perspective

1

Julien Morizot and Lila Kazemian

In November of 2012, the Division of Developmental and Life-Course Criminology (DLC) was officially established by the American Society of Criminology (ASC). This event marked a progression in the changing perspective of criminologists over several decades a period during which, research on the development of criminal behavior has significantly proliferated. The number of researchers adopting a developmental perspective has increased not only in criminology but also in psychology, behavioral genetics, public health, and sociology. The developmental perspective has become highly influential in criminology and the field has grown increasingly multidisciplinary.

In this chapter, we first briefly discuss some definitional issues related to criminal and antisocial behavior, highlight the importance of the developmental perspective, and discuss the multidisciplinary character of developmental criminology. The practical applications of developmental research are also outlined. Finally, this book also represents a Festschrift underlining the scholarly contributions of Professor Marc Le

Blanc, who is recognized for his innovative work in developmental criminology. The last section of this chapter briefly summarizes his contributions to the field.

Defining Criminal and Antisocial Behavior

Criminal behavior, or offending, can be an ambiguous concept. It is generally defined as any overt or covert law-breaking conduct in a given country or state, punishable upon conviction. Arguably the main two broad categories are property crimes (e.g., fraud, theft) and violent crimes (e.g., domestic violence, robbery, homicide, and sex crimes). Other categories of crime include public order crime (e.g., public disturbance, illegal drug use, prostitution), or white collar crime (i.e., offenses committed by public officials, or offenses against a corporate entity by individuals who are employed by the corporation). The term delinquent behavior (or delinquency) generally refers to offenses committed by adolescents, while the term criminal behavior refers to adult offending. The definition of criminal behavior laid out above is limited in that it only makes reference to offenses that are detected by the criminal justice system. Delinquent and criminal behaviors can be measured using different sources. In addition to prison, court, and police data, these behaviors can also be documented with victimization surveys or self-reported interviews or questionnaires.

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Developmental criminologists are not only concerned with delinquent and criminal behavior but also various other analogous behaviors. Several studies of adolescent and adult samples repeatedly confirmed that numerous behaviors tend to co-occur with delinquent and criminal behaviors (Jessor & Jessor, 1977; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). The term *antisocial behavior*, typically used in psychology and psychiatry, refers to these analogous behaviors. It is a generic concept that encompasses criminal offending but also several related behaviors that are socially disruptive or go against established social and societal norms or rules. Sociologists refer to this concept as deviant behavior.

As emphasized by Le Blanc and Bouthillier (2003), researchers have traditionally used unidimensional measures or general scales labeled “delinquency,” even if they included various antisocial behaviors beyond delinquency. Factor analysis results generally show that the covariation among numerous specific delinquent and antisocial behaviors can be explained by four dimensions: *reckless behavior* (e.g., substance use, risky sexual behavior, risky motor vehicle use, gambling, etc.), *authority conflict* (e.g., at home, at school, etc.), *covert delinquency* (e.g., theft, fraud, etc.), and *overt delinquency* (e.g., violence, vandalism, etc.). In turn, the covariation between these four dimensions can be explained by a general factor or dimension, which is referred to as general deviance or antisocial syndrome (Le Blanc, 2009; Le Blanc & Bouthillier, 2003). Similar results are observed with adults (e.g., McGee & Newcomb, 1992). The distinction between different forms of antisocial behavior is important for developmental criminology due to the potentially distinct etiologies underlying these different behaviors (Tackett, Krueger, Iacono, & McGue, 2005) and the fact that their development may be intertwined across the life course (Le Blanc, 2012).

The Developmental Perspective: Its Value for Criminology

The criminal career approach (Blumstein, Cohen, & Farrington, 1988; Piquero, Farrington, & Blumstein, 2003) and the developmental perspective (Loeber & Le Blanc, 1990; Le Blanc & Loeber, 1998) have reached a paradigmatic stage in criminology. The central objectives of developmental criminology are to (a) describe within-individual continuity and change in criminal and antisocial behavior over time, (b) explain the parameters of its development (onset, activation, and aggravation) and termination, and (c) identify etiological factors (risk and protective factors) associated with its different developmental parameters. Table 1.1 presents the most important developmental concepts or parameters from the criminal career approach and the developmental perspective.

There are several reasons explaining the crucial importance of the developmental perspective in criminology. First and foremost, criminal behavior may take on distinct forms at different developmental periods. At the aggregate level, the age-crime curve has consistently shown that criminal behavior typically starts by early adolescence (between the ages of 9 and 14 years), reaches a peak in prevalence by the end of adolescence (between ages of 16 and 19 years), and then rapidly decreases during emerging adulthood (between ages of 17 and 29 years). There has been a great deal of debate about whether aggregate age-crime trends reflect the trajectories of active offenders (Blumstein et al., 1988; Gottfredson & Hirschi, 1986). It has been argued that the relationship between age and crime reveals changes in prevalence (participation) rather than in incidence (frequency) of offending. In other words, the number of active offenders peaks in late adolescence and declines thereafter, but individuals who remain active in offending tend to do so at a relatively stable rate across

Table 1.1 Concepts of the developmental perspective in criminology

Concept	Description
Descriptive parameters	
Prevalence/participation	Proportion of individuals in a population/sample who committed one or more crimes. Can be current (e.g., 1 year) or cumulative (i.e., lifetime prevalence)
Frequency/lambda	Number of crimes committed by an individual within a given time period. Can be annual or cumulative (i.e., the entire criminal career)
Crime mix	Number of individuals who have committed each of the different categories of crimes considered
Seriousness	Can be determined based on legal classifications (e.g., misdemeanor vs. felony) or by ratings of severity by experts or the population
Variety	Number of categories of crimes committed by an individual
Temporal boundary	
Age at onset	Age at which an individual commits his/her first crime
Age at termination	Age at which an individual commits his/her last crime
Duration	Time interval between the first and the last crime
Transfer	Transfer from one type of criminal activity to another or from juvenile delinquency to adult criminality
Dynamical mechanisms	
Activation	Process by which the development of criminal activities is initiated and stimulated
Acceleration	Increase in frequency over time
Diversification	Increase in variety over time
Stabilization	Increase in continuity of criminality activities over time
Aggravation	Process by which the development of criminal activities unfolds in a sequential, potentially orderly manner
Escalation	Increase in seriousness over time; the tendency to move from minor to more serious types of crimes
Developmental sequence	Progression of an individual in the initiation of different types of crimes, or different forms of antisocial behavior (e.g., from minor delinquency to substance use, to serious delinquency, etc.)
Desistance	Process leading to the cessation of criminality activity, either partially or entirely
Deceleration	Decrease in frequency over time
De-escalation	Decrease in seriousness over time; the tendency to move from more serious to less serious types of crimes
Ceiling	Reaching a plateau or ceiling in the seriousness of criminal activity
Specialization	Decrease in variety over time

Source: Le Blanc and Loeber (1998)

various periods of the life course (Blumstein et al., 1988; Farrington, 1986).

As a result of this perspective, scholars have proposed developmental-typological theories laying out the argument that the aggregate age-crime curve is composed of distinct groups of individuals, or types of offenders (e.g., Moffitt, 1993, 2006; Patterson & Yoerger, 2002). Each group is characterized by distinctive criminal careers and etiologies. Arguably, the best known theory of this nature is that of Moffitt (1993, 2006), which argued for the existence of two broad developmental types, the adolescence-limited and life-course-persistent offenders. For

the adolescence-limited offender, involvement in delinquent and antisocial behavior represents an ephemeral phenomenon, limited to adolescence, and resulting from affiliation with deviant peers and attitudes related to a maturity gap. In contrast, life-course-persistent offenders are characterized by at-risk profiles and early risk factors: neuropsychological deficits, impulsivity, exposure to harsh and erratic parenting styles, criminogenic environments, and early onset of delinquent behavior that tends to persist during adulthood. The popularity of developmental-typological theories has led to the rapid surge in empirical studies searching for developmental

trajectories of offending across the life course (Piquero, 2008). A *developmental trajectory* refers to the course of criminal activity over time for a particular individual (or a group of individuals). With longitudinal data spanning over several years, a developmental trajectory can chart the onset, development, and desistance of criminal activity based on the repeated measure of criminality activity (variety, frequency, or seriousness) over time.

The second reason for the importance of the developmental perspective in criminology relates to the idea that etiological factors (or causes) of criminal and antisocial behavior may vary across different developmental periods or phases of the criminal career. Loeber, Slot, and Stouthamer-Loeber (2006) argued that exposure to risk factors is generally gradual, starting early in life (sometimes before birth) and increasing over many years. The authors also argued that most significant risk factors appear in the first few years of life and during elementary school years, and that a smaller number of salient risk factors occur during adolescence. Moreover, it has also been argued that risk factors may act in a complex causal chain that begins early in life and that may be associated with increased risk of criminal behavior over time (e.g., Dodge et al., 2009). Finally, it is assumed that different explanatory factors are associated with different phases of the criminal career (Le Blanc & Loeber, 1998; Piquero et al., 2003). For instance, longitudinal studies support the notion that factors predicting onset are different from those related to desistance, a concept that Uggen and Piliavin (1998) have referred to as asymmetrical causation (see also Kazemian, 2007; Laub & Sampson, 2001).

Finally, the developmental model in criminology is important to inform prevention and treatment programs. A developmental model can answer fundamental questions such as when to prevent, when to treat, with whom to intervene, and which factors to emphasize. The developmental model can also inform criminal justice policy and practice. For instance, scientific knowledge from developmental criminology and psychology provides supports for separate

criminal justice systems for adolescents and adults (Scott & Steinberg, 2008). In addition, a better knowledge of the impact of various risk and protective factors at different stages of the life course can help to guide intervention efforts with the prisoner population and limit the length and intensity of criminal careers.

An Inherently Multidisciplinary Approach

After Beccaria and Lombroso, sociological theories became dominant in the field of criminology. The most influential criminological work of the last century was produced by the Chicago School scholars (e.g., Thomas & Znaniecki, Park & Burgess, Shaw & McKay, Sutherland, Cressey, to name a few). It is only decades later that the psychological and propensity approaches would emerge again as a dominant paradigm. However, these individual-level approaches have not traditionally been integrative, although this has been less true in the last 15–20 years. Most contemporary developmental and life-course theories of crime have grown increasingly multidisciplinary (see Farrington, 2005; Hawkins, 1996; Thornberry, 1997). Nonetheless, more integration is needed, particularly in light of recent psychological and biological research.

Understanding behavioral development requires a holistic-interactionist perspective of the synergic interplay between its different determinants: biological, psychological, environmental, and cultural dimensions (see Magnusson & Stattin, 2006). The same determinants are involved in the development of criminal and antisocial behavior across the life course (e.g., Robinson & Beaver, 2009). Developmental psychology aims to study these determinants across the life course. There are intrinsic connections between contemporary developmental criminology and developmental psychopathology, a sub-discipline of developmental psychology. Sroufe and Rutter (1984) defined developmental psychopathology as “the study of the origins and course of individual patterns of behavioral maladaptation, whatever the age of onset, whatever

the causes, whatever the transformations in behavioral manifestation, and however complex the course of the developmental pattern may be” (p. 18). Cicchetti (2006) noted that “developmental psychopathologists strive to engage in a comprehensive evaluation of biological, psychological, social, and cultural processes and to ascertain how the interaction among these multiple levels of analysis may influence individual differences, the continuity or discontinuity of adaptive or maladaptive behavioral patterns, and the pathways by which normal and pathological developmental outcomes may be achieved” (p. 2). Clearly, these objectives are in line with those of developmental criminology, although the latter focuses on a more specific outcome (i.e., crime).

In the last few years, various other subdisciplines of psychology have contributed to our understanding of the development of criminal and antisocial behavior. Perhaps the best example can be drawn from behavioral genetics (Plomin, DeFries, Knopik, & Neiderhiser, 2013). This discipline integrates concepts from the behavioral sciences and genetics in order to better understand the roles of genes in behavioral development. This has led to the growing recognition of the biosocial perspective in criminology (Beaver, 2013; Walsh & Beaver, 2009). This perspective emphasizes the importance of both genetic and environmental influences and perhaps more importantly, their complex interplay in the explanation of criminal and antisocial behavior. According to the biosocial perspective, recognizing that genetic factors play an important role in the onset and development of criminal behavior does not negate in any way the role of the environment. Emerging research suggests that genetic factors may be linked to the onset of criminal behavior, but only in the presence of particular environmental risks (i.e., gene–environment interaction; see Caspi et al., 2002). Moreover, recent research in genetics and biochemistry suggests that genetic factors may increase the risk of criminal behavior through epigenetic changes caused by environmental risk factors (Tremblay, 2010).

Sociology remains important in developmental criminology through its connections to the life-course paradigm. Sampson and Laub’s reanalysis of the Glueck data and theories that developed as a result of these works (see Sampson & Laub, 1993; Laub & Sampson, 2003, and other associated publications) emphasized the importance of social structure and life events (or “turning points”) in the explanation of desistance from crime. While Sampson and Laub regard the life-course perspective as distinct from the developmental approach (namely because the latter model emphasizes early risk factors), these perspectives, along with the criminal career approach, share many commonalities.

Finally, the developmental approach is also growing increasingly prominent among economists, offering systematic assessments of the financial burden of criminal and antisocial behavior on society (McCollister, French, & Fang, 2010) as well as the potential economic gains of early prevention efforts (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004; Doyle, Harmon, Heckman, & Tremblay, 2009).

Disentangling the Terms of Risk/ Vulnerability and Promotive/ Protective Factors

One of the key objectives of developmental criminology is to identify early risk and protective factors associated with criminal and antisocial behavior. The key risk domains typically relate to the individual, family, peers, school, and community (Farrington & Welsh, 2007; Tanner-Smith, Wilson, & Lipsey, 2013). Each of these risk domains can be categorized into different subdomains. Because several chapters in this book provide reviews of the different domains of risk, we wish to briefly discuss key concepts related to risk/vulnerability and promotive/protective factors. Table 1.2 presents the different types of risk and protective factors.

The key difference between a correlate and a risk factor is the temporal precedence of the latter (see upper part of Table 1.2). However, not all

Table 1.2 Different types of risk and protective factors

Type of factor	Description
Correlate	A factor that is shown to be correlated with antisocial behavior
Risk factor	A correlate that is shown to precede antisocial behavior; predicts increases in, or the occurrence of, antisocial behavior through a direct or main effect
Static risk factor (or fixed marker)	A risk factor that cannot change or be changed
Dynamic risk factor (or variable risk factor)	A risk factor that can change or be changed
Dynamic marker (or variable marker)	A risk factor that can change or be changed, but researchers have not (yet) shown that changing it alters the risk of antisocial behavior
Causal risk factor	A risk factor that can change and, when changed, has been shown to alter the risk of antisocial behavior
Vulnerability factor (or precipitating factor)	A factor acting as a moderator that increases the magnitude of a predictive relationship between a risk factor and antisocial behavior
Promotive factor (or compensatory factor)	A factor predicting a decrease in, or the non-occurrence of, antisocial behavior through a direct or main effect
Protective factor	A factor acting as a moderator that decreases the magnitude of a predictive relationship between a risk factor and antisocial behavior
Proximal risk factor	A risk factor present closer in time to antisocial behavior than other risk factors
Distal risk factor	A risk factor separated by long period of time from antisocial behavior
Activation factor	A factor associated with increases in both the frequency and variety of antisocial behavior over time
Aggravation factor	A factor associated with increases in seriousness in antisocial behavior over time
Desistance factor	A factor associated with decreases in frequency, variety, or seriousness in antisocial behavior over time

Sources: Fergusson, Vitaro, Wanner, and Brendgen (2007), Kraemer et al. (2005), Loeber and Le Blanc (1990), Rutter (1985), Stouthamer-Loeber, Loeber, Wei, Farrington, and Wikström (2002)

risk factors are the same. It is important to assess whether a risk factor can change or not (static risk factor/fixed marker versus dynamic risk factor) (see Kraemer, Lowe, & Kupfer, 2005; Loeber & Le Blanc, 1990). A static risk factor is useful for screening procedures (i.e., to identify at-risk individuals), but not for preventive interventions because it cannot be changed. Change should only be encouraged if it is demonstrated that the risk factor is causally related to the outcome. Kraemer et al. (2005) argued that it is important to distinguish between a dynamic (or variable) marker and a causal risk factor. This distinction is fundamental because in principle, only causal risk factors should be used as a basis for preventive interventions designed to reduce the risks of involvement in delinquent and criminal behaviors. Farrington and Welsh (2007) noted that three criteria are generally used for determining if a risk factor is causal: the factor “(1) is associated with the outcome (e.g.,

offending), (2) precedes the outcome, and (3) predicts the outcome after controlling for (or independently of) all other variables” (p. 19). Although well-crafted observational longitudinal studies without randomization can be useful, many have argued that randomized controlled trials (RCT) are the most effective method in establishing causality (Farrington & Welsh, 2007; Kraemer et al., 2005).

Risk and protective factors can influence each other in various ways (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). This can complicate the identification of risk factors (Farrington & Welsh, 2007; Kraemer et al., 2005). The most common processes are moderation (or interaction) and mediation (or intervening effect). These conditional processes lead to other important distinctions between terms related to risk and protective factors. For instance, a risk or protective factor will not be considered the same depending on whether it exerts its impact directly

(i.e., through a main effect) or by moderating (i.e., interaction) the effect of another factor. Risk and vulnerability factors are both associated with increased risks of criminal and antisocial behavior, but in different ways. Likewise, promotive and protective factors are both uniquely associated with reduced risks of criminal and antisocial behavior (see the two bottom parts of Table 1.2). Moreover risk factors can be proximal or distal, but can also be associated with different developmental parameters or phases of the criminal career (activation, aggravation and desistance) (Le Blanc & Loeber, 1998; Piquero et al., 2003).

Risk and protective factors will generally exert a cumulative effect (see Loeber et al., 2006; Rutter, 1979; Sameroff, 2000; Sameroff, Gutman, & Peck, 2003). The *cumulative risk principle* posits that as the number of risk or vulnerability factors increases the probability or likelihood of criminal and antisocial behavior also rises. Similarly, the *cumulative protection principle* suggests that as the number of promotive or protective factors increases the probability or likelihood of criminal and antisocial behavior decreases.

Equifinality and multifinality are two other important concepts in risk and protective factor research, borrowed from developmental psychopathology (Cicchetti & Rogosch, 1996). *Equifinality* refers to the idea that different causes (or risk factors), such as impulsivity, low parental supervision, and affiliation with antisocial friends, predict the same outcome (e.g., delinquent behavior). Conversely, *multifinality* denotes the idea that a single cause (or risk factor), such as low socioeconomic status, predicts different outcomes (e.g., delinquent behavior, substance use, low academic achievement, unemployment, etc.).

The concepts of equifinality and multifinality underline the importance of using a process-oriented and person-centered approach to understanding the different pathways linking risk factors to delinquent and criminal behavior

(Magnusson & Stattin, 2006). This is particularly important because risk factors may differ for different individuals (Farrington & Welsh, 2007; Moffitt, 1993). It is also essential to distinguish between variable- and person-centered approaches. These two approaches are based on different epistemological postulates and analytic methods (Magnusson, 1998). The *variable-centered approach* focuses on understanding relationships between variables. The focus is on quantitative differences between the constructs of interest. In this approach, it is postulated that the population is homogeneous and, that the relationship between a given risk factor and criminal and antisocial behavior applies to everyone in the population. The *person-centered approach* focuses on the differences between individuals with regard to the constructs of interest. This approach stipulates that the population is heterogeneous and, that the relationships between the constructs of interest will not be the same across different subgroups of the population. Different subgroups of individuals can potentially have different patterns (or combinations) of risk factors that are related to criminal and antisocial behavior in distinct ways. Farrington and Welsh (2007) noted that the overwhelming majority of risk and protective factor studies are based on the variable-centered approach. Yet, the implications of the person-centered approach are crucial for research on risk and protective factors. For example, a risk factor may be identified as significant for the population as a whole, but only be significant for a subgroup of individuals. It is also possible that a risk factor that is identified as nonsignificant for the population as a whole is in fact significant for a small subgroup. To this date, there have been very few empirical studies using a person-centered approach to identify different profiles of risk factors (but see Lanza, Cooper, & Bray, 2014; Parra, DuBois, & Sher, 2006).

In sum, clear definitions and detailed analyses about trends in subgroups of populations of interest would enable us to develop a better

understanding of the influence of risk, vulnerability, promotive, and protective factors.

Practical Implications of Research on the Development of Criminal and Antisocial Behavior

Although advancing knowledge on the development of criminal and antisocial behavior is important for theory, it can also be translated into effective tools for clinicians and practitioners working with children or adolescents at risk of developing criminal and antisocial behavior, as well as with juvenile and adult offenders.

There is little doubt that research on the development of criminal and antisocial behavior has served as a foundation for creating various preventive interventions and treatment programs. The movement toward evidence-based practice is perhaps the best case in point. *Evidence-based practice* refers to the idea of developing intervention programs on the basis of high-quality empirical research that has demonstrated effectiveness. Evidence-based practice is now recommended by various professional organizations and scientific disciplines such as medicine (Institute of Medicine, 2001), psychology (APA Presidential Task Force on Evidence-Based Practice, 2006), criminology and criminal justice (Crime and Justice Institute at Community Resources for Justice, 2009; Mihalic & Irwin, 2003), and social work (Chaffin & Friedrich, 2004). Evidence-based practice is also sometimes referred to as empirically-based treatment, best practice, or blueprints. Despite some subtle distinctions between authors and disciplines, all terms have one key feature in common: they aim to develop criminological, psychological, psychosocial, or psychiatric interventions on the basis of solid scientific theories and high-quality empirical evidence. The evidence-based approach favors interventions that have shown to be effective in reducing the risks of developing criminal and antisocial behavior (prevention) and reducing the severity, variety, or frequency of antisocial behaviors among individuals active in offending (treatment). The rationale for evidence-based

practice applies to both preventive interventions and treatment as well as assessment (e.g., screening and risks/needs assessment).

Evaluation research on the prevention and treatment of criminal behavior over the course of the last two decades has suggested that it is never too early or too late to intervene. The early identification of risk and protective factors enables researchers to identify individuals (or families or communities) who are most at risk of developing delinquent and criminal behavior later in life. The knowledge base on risk and protective factors is essential to develop valid and reliable screening instruments (Le Blanc, 1998). Once at-risk individuals are identified, a preventive intervention can be developed and carried out. Some prevention programs implemented during infancy and early childhood have been shown to be effective in reducing the risks of delinquent and criminal behavior, although the effect sizes are typically rather small (Tremblay & Craig, 1995; Yoshikawa, 1994). These programs have theoretical foundations, often social learning theories, but they have also been influenced by empirical research; recent scientific knowledge has informed burgeoning research on the prevention of criminal behavior (Welsh & Farrington, 2012).

We also know that it is never too late to intervene. Most researchers in criminology and psychology would agree that it is better to prevent than to cure. Early prevention is valuable, but prevention is not always effective. On one hand, long-term predictions are flawed and imperfect, and early risk factors do not always predict long-term criminal career outcomes (see Laub & Sampson, 2003; Kazemian, Farrington, & Le Blanc 2009). As such, prevention efforts may not always target those who need it the most. On the other hand, some at-risk children may be unresponsive to preventive interventions and go on to develop delinquent and criminal behavior later in the life course. This highlights the need for post-onset intervention efforts.

With regard to treatment, we have come a long way since Martinson's (1974) famous—or perhaps infamous—quote: “Nothing works with offenders.” Meta-analytic investigations of more

than 500 evaluative studies of different treatment programs for juvenile offenders have confirmed that many treatment programs (typically cognitive-behavioral in nature) have shown positive effects in reducing recidivism, even for serious and violent offenders (Lipsey, 2009; Lipsey & Cullen, 2007). Recent research has also informed us about which interventions exert no significant, or even iatrogenic, effects. For instance, meta-analyses have suggested that deterrence-oriented and punitive interventions either have no impact or undesirable effects on recidivism (Lipsey, 2009). Studies assessing the impact of programs that group deviant peers together have suggested iatrogenic effects (Dishion, McCord, & Poulin, 1999; Dishion & Tipsord, 2011). These findings have led to the development of intervention programs that avoid interactions with deviant peers (Chamberlain, 2003). There is growing empirical evidence suggesting that family-based treatments are among the most effective for juveniles engaged in delinquency and substance use (Henggeler & Sheidow, 2012). These programs were directly informed by findings from criminological and psychological research.

In sum, there is little doubt that empirical research on the development of criminal and antisocial behavior has informed preventive and treatment programs. The question has shifted from *whether* to *how* empirical evidence should inform interventions, clinical practice, and policies (Chorpita et al., 2011). Future research should assist in the development of innovative and improved intervention programs targeting adolescent and adult offenders. In the end, as argued by different scholars, embracing a developmental approach to criminal and antisocial behavior should ideally inform criminal justice practices. Scott and Steinberg (2008) argued that a “developmental model provides this rationale and thus may bolster policies grounded in scientific knowledge during times when political pressures to deal punitively with young offenders are intense” (p. 282). It is our hope that the rapidly growing body of scientific knowledge, such as the evidence presented in this volume, will continue to guide prevention and intervention efforts as well as criminal justice policies.

The Contribution of Marc Le Blanc to Developmental Criminology

Professor Marc Le Blanc is a French-Canadian criminologist who has conducted pioneering work in developmental criminology. The work of Marc Le Blanc has been influential among academic and applied criminologists in several parts of the world. Given his comprehensive and multidisciplinary approach to the study of criminal and antisocial behavior, his work has also been prominent among researchers in psychology, sociology, social work, and several other disciplines. His theoretical contributions are mainly represented by his work on the developmental perspective in criminology, which has exerted a paradigmatic influence on contemporary criminological research. Along with a number of his colleagues (such as Rolf Loeber and David Farrington), Marc Le Blanc was among the pioneers who developed some of the key concepts that have become the cornerstones of developmental and criminal career research. In his 1989 book (Le Blanc & Fréchette, 1989; *Male Criminal Activity*), he discussed important ideas about the development of criminal careers, many of which had not yet emerged in mainstream criminology. In collaboration with Professor Loeber, he published two influential papers outlining key concepts in developmental criminology (Loeber & Le Blanc, 1990; Le Blanc & Loeber, 1998). These two papers are now widely cited by criminologists and other social scientists. He also developed one of the most comprehensive explanatory theories of criminal and antisocial behavior (i.e., *Multi-layered Personal and Social Control Theory of Criminal and Antisocial Behavior*; Le Blanc, 1997, 2006). In recent years, he offered an innovative theoretical approach by borrowing concepts from chaos theory to better understand the developmental processes leading up to criminal behavior (Le Blanc, 2005, 2009). His various other theoretical contributions can be found in his 20 books and over 100 book chapters.

Marc Le Blanc has made significant empirical contributions to the field through his seminal

longitudinal study, the Montreal Two-Sample Longitudinal Study (MTSLS; Fréchette & Le Blanc, 1987; Le Blanc & Fréchette, 1989). This study of two samples of French-Canadian males is unique in many respects. It is one of the few studies in the world that has followed a sample of men adjudicated during adolescence as well as a comparison sample that is representative of the general population. The MTSLS collected extensive and detailed data on offending and various other social and psychological outcomes from adolescence up to age 50 for the two samples. Marc Le Blanc has produced a large volume of publications from these data. In collaborations with various colleagues and graduate students, he has published numerous papers aiming to better understand the development of criminal behavior and criminal careers (Fréchette & Le Blanc, 1987; Kazemian, Le Blanc, Farrington, & Pease, 2007; Le Blanc, 2002; Le Blanc & Fréchette, 1989), desistance from crime (Kazemian, Farrington, & Le Blanc, 2009; Morizot & Le Blanc, 2007), the methods of perpetrating crimes (Le Blanc, 1996; Kazemian & Le Blanc, 2004), pathways in delinquency and behavior problems (Le Blanc & Kaspy, 1998), the generality of deviance (Le Blanc & Bouthillier, 2003; Le Blanc & Girard, 1997), sex offending (Lussier, Proulx, & Le Blanc 2005), females offending (Lancôt & Le Blanc 2002), gang membership (Le Blanc & Lancôt, 1998), substance use (e.g., Le Blanc, 2009), familial influences (e.g., Le Blanc, 1992, 1994; Le Blanc, McDuff, & Kaspy, 1998), school misconduct and dropout (e.g., Janosz, Le Blanc, Boulerice, & Tremblay, 1998, 2000; Le Blanc, Vallières, & McDuff, 1993), and personality characteristics of offenders (Morizot & Le Blanc, 2003a, 2003b). These are only a few examples; Marc Le Blanc's repertoire of over 200 refereed scientific articles is a testament to his influential contribution to the field.

Marc Le Blanc has also been involved in applied and clinical work for more than 30 years. He has always been concerned with the idea that advances in criminological research must be translated into efficient tools for clinicians and practitioners working with

delinquent youths. He has worked extensively on the development and evaluation of one of the major residential treatment programs targeting juvenile delinquents in Québec (i.e., Boscoville Program; Le Blanc, 1983). The theoretical approach and practices developed over the years at Boscoville led to the development of a new discipline in Québec: psychoeducation (the American equivalent is "developmental psychopathology," with an emphasis on intervention science). With his wife Pierrette, he developed a comprehensive emotional-cognitive-behavioral treatment program for antisocial adolescents (Le Blanc & Trudeau-Le Blanc 2014). He has also been a senior consultant and has contributed in important ways to juvenile justice (Corrado, Bala, Le Blanc, & Linden, 1992) and to the development of treatment programs in juvenile facilities in different Canadian provinces. In short, in addition to his contributions to theoretical criminology, Professor Le Blanc is also recognized as a major contributor to the development of effective interventions with young offenders.

Marc Le Blanc has been involved in the development and validation of various psychometric instruments for the assessment of the behavioral, social, and psychological adjustment of adolescents. The *Measures of Quebecer Adolescents' Social and Personal Adjustment* (MASPAQ; Le Blanc, 2014), and its corresponding online tool, is now one of the most frequently used instruments for the clinical assessment of adolescents with behavior problems in various intervention settings (e.g., high schools, residential treatment centers in Québec, etc.). The MASPAQ has been so popular among researchers and practitioners alike that it has been translated into different languages and is used in different parts of the world (e.g., France, Belgium, Spain, Morocco, Brazil).

Because of his theoretical, empirical, and applied contributions, Marc Le Blanc received several distinctions and honors from scientific and professional organizations, as well as research universities, throughout his career. To name a few, he was appointed as a member of the Royal Society of Canada (Academy of Social

Sciences); he received the title of Doctor Honoris Causa from the University of Liège (Belgium) and was named Emeritus Professor by the University of Montreal, where he worked for the duration of his career. In 2012, he was granted the Sellin-Glueck Award from the American Society of Criminology (ASC) for outstanding contributions to the field of criminology by an international researcher. In 2014, he was honored with the Lifetime Achievement Award from the ASC Division of Developmental and Life-Course Criminology. It is also noteworthy that among the numerous graduate students who have worked with Professor Le Blanc over the years, several went on to become professors in research universities (including the two editors of this book), high-ranking government employees working in public health and policing, as well as clinical criminologists and youth care workers.

In sum, we have high regard for the work and scholarly career of Professor Le Blanc. He has made important theoretical, empirical, and applied contributions to both academic and practitioner worlds. Among French-speaking criminologists, he is widely recognized as one of the most prominent and influential scholars of the last 35 years. He is also recognized by English-speaking criminologists and psychologists as one of the pioneering figures in developmental criminology. It is with great pleasure that we honor his career with this book.

Organization of the Book and Overview of Contributions

There are a number of existing books on criminal careers or developmental/life-course criminology. The content in most of these volumes is typically restricted to criminological research, and few adopt a multidisciplinary perspective. Because of the rapidly increasing contribution of other disciplines, particularly psychology and behavioral genetics, criminological research has become undeniably multidisciplinary. This book favors a developmental and multidisciplinary perspective. It provides up-to-date reviews of

research on several topics related to the development of criminal and antisocial behavior. The book is divided into four parts: (1) theoretical and methodological foundations of developmental criminology, (2) risk, vulnerability, promotive, protective, and desistance factors, (3) special themes in developmental criminology, and (4) practical applications of developmental criminology research.

In the first part, Farrington and Ttofi present a brief overview of different contemporary developmental and life-course theories of offending, and present recent research that is relevant to these models. In his chapter, Tremblay presents evidence of the developmental origins of antisocial behavior, which are typically omitted in analyses of the age-crime curve and criminal career approach. DeLisi provides a discussion of the age-crime curve and criminal career approach drawing on recent research in various disciplines, such as psychology and behavioral genetics. In their chapter, Loeber, Byrd, and Farrington argue that biological factors have been largely neglected in the study of the age-crime curve and criminal careers. Piquero, Reingle, and Jennings review recent research on developmental trajectories of criminal behavior across the life course. Finally, Menard provides an overview of the benefits and challenges of longitudinal and experimental research designs in the study of the development of criminal and antisocial behavior.

The second part of the volume reviews the main domains of risk and protection that are known to be linked to criminal and antisocial behaviors. Most studies have focused on risk factors; research on protective factors is more limited. In each chapter in this section, the authors focus on longitudinal research that has investigated risk factors associated with delinquent and criminal behavior. However, when relevant, some authors discuss whether the domain of risk and its associated factors are related to more specific forms of antisocial behavior (e.g., theft, violence, substance use, conduct disorder, externalizing problems, etc.). The authors also address whether risk factors are associated with different developmental parameters

(e.g., onset, activation, aggravation, persistence, desistance) as well as their mechanisms of action (i.e., whether they are moderated by (or interact with) or are mediated (indirect relations) through factors from other domains of risk). Beaver, Schwartz, and Gajos discuss the contribution of genetics and its interplay with the environment. Séguin, Pinsonneault, and Parent provide a review of research on the role of intelligence and executive functions. In his chapter, Morizot discusses the contributions of temperament and personality traits in the development of criminal and antisocial behavior as well as desistance. The following two chapters cover different forms of early trauma or strain: Tibbetts and Rivera review research on the role of prenatal and perinatal factors, while Kerig and Becker discuss the role of early abuse and neglect. The next four chapters cover key factors from social learning models or social control theories. Pardini, Waller, and Hawes provide a review of research on familial influences. Vitaro, Brendgen, and Lacourse discuss the role of affiliation with deviant friends, emphasizing the importance of selection effects and genetics. Payne and Welch present research on the role of education and school-related factors. Elliott, Dupéré, and Leventhal discuss the influence of the neighborhood context on the development of criminal and antisocial behavior. Miranda, Blais-Rochette, and Borisevich present research findings on the role of different sources of media (e.g., television, videos games, Internet, music). The last two chapters of this section focus on favorable outcomes: Glowacz and Born discuss the contribution of resilience, promotive, and protective factors, while Kazemian provides an overview of the state of knowledge on desistance from crime.

In the third part, special themes in developmental criminology are discussed. Many of these topics remain understudied in criminology. Consistent with the general theme of the book, authors draw on various disciplines (particularly criminology and psychology) to stress the developmental issues related to each of these special themes. In his chapter, Paquette stresses the

importance of the evolutionary perspective in the explanation of criminal behavior. Leiber and Peck discuss the role of race, ethnicity, and immigration in the development and maintenance of criminal behavior. Melde reviews research on gang membership. Corrado and McCuish provide an overview of research on the role of mental health disorders, such as externalizing and internalizing problems. White reviews longitudinal research exploring the connections between criminal behavior and substance use over time. Lanctôt outlines the state of knowledge on the development of antisocial behavior in adolescent girls. Finally, Lussier discusses the implications of the developmental perspective in the explanation of sex offending.

In the fourth part, some practical applications of developmental research are reviewed. These applications were all, to varying degrees, influenced by research on the development of criminal and antisocial behavior. Most can be regarded as evidence-based practices. Schindler and Black summarize some of the best known infancy and childhood prevention programs. Kim, Gilman, and Hawkins discuss effective school- and community-based preventive interventions during adolescence. Henggeler's chapter reviews family-based treatment programs for adolescents with serious antisocial behavior; these programs have been shown to be the most effective interventions for young offenders. Drawing on meta-analyses of evaluation studies, Manchak and Cullen summarize what we have learnt about what works and what does not work with juvenile offenders. Davis and DiClemente provide a review of the most prevalent health problems among justice-involved and adjudicated youths, and discuss some preventive interventions designed to reduce the risks of HIV in this population.

Finally, the book closes with an epilogue chapter by Marc Le Blanc, in which he provides a critical discussion of the research reviewed in this volume, shares his thoughts on the past of developmental criminology, and offers some suggestions for future research.

Recommended Readings

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Part I

**Theoretical and Methodological Foundations
of Developmental Criminology**

David P. Farrington and Maria M. Ttofi

Introduction

Marc Le Blanc has made many outstanding contributions to developmental and life-course criminology (DLC), which is concerned mainly with three topics: (a) the development of offending and antisocial behavior from the womb to the tomb; (b) the influence of risk factors and protective factors at different ages; and (c) the effects of life events on the course of development (Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990). Marc's two longitudinal studies, of adolescents and delinquents, are especially noteworthy, in following people up from adolescence to the 40s. However, he has also proposed one of the most important DLC theories. As a small tribute to Marc's theoretical work, some of the most significant DLC theories are reviewed in this chapter. Eight theories were reviewed in Farrington (2005), and in this chapter a ninth theory is described: the developmental pathways model of Rolf Loeber and his colleagues (1993).

DLC theories aim to explain offending by individuals (as opposed to crime rates of areas, for example). Whereas traditional criminological theories aimed to explain between-individual differences in offending, such as why lower class boys commit more offenses than upper

class boys, DLC theories aim to explain within-individual changes in offending over time. "Offending" refers to the most common crimes of theft, burglary, robbery, violence, vandalism, minor fraud, and drug use, and to behavior that in principle might lead to a conviction in Western industrialized societies such as the USA and the UK. These theories aim to explain results on offending obtained with both official records and self-reports. Generally, DLC findings and theories particularly apply to offending by lower class urban males in developed countries in the last 80 years or so. To what extent they apply to other types of persons (e.g., middle class rural females) or offenses (e.g., white collar crimes or sex offenses against children) are important empirical questions that will not be addressed here.

In conducting research on development, risk, and protective factors, life events, and DLC theories, it is essential to carry out prospective longitudinal surveys. For example, the Cambridge Study in Delinquent Development is a prospective longitudinal survey of over 400 London males from age 8 to age 56 (Farrington et al., 2006; Farrington, Coid, & West, 2009). The main reason why developmental and life-course criminology became important during the 1990s was because of the enormous volume and significance of longitudinal research on offending that was published during this decade. Particularly influential were the three "Causes and Correlates" studies originally mounted by the US Office of

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Juvenile Justice and Delinquency Prevention in Denver, Pittsburgh, and Rochester (Huizinga, Weiher, Espiritu, & Esbensen, 2003; Loeber et al., 2003; Thornberry, Lizotte, Krohn, Smith, & Porter, 2003). Other important longitudinal projects that came to prominence in the 1990s were the Seattle Social Development Project (Hawkins et al., 2003), the Dunedin study in New Zealand (Moffitt, Caspi, Rutter, & Silva, 2001), the Montreal Longitudinal-Experimental study (Tremblay, Vitaro, Nagin, Pagan, & Seguin, 2003), the further analyses by Laub and Sampson (2003) of the classic Gluecks' study, and of course the Montreal Two Samples Longitudinal Study (Le Blanc & Frechette, 1989).

Developmental and Life-Course Theories

Some of the key features of eight leading DLC theories are now described, ordered roughly from the more psychological to the more sociological. More details about all of these theories can be found in Farrington (2005, 2006), Farrington and Ttofi (2012), and Farrington and Loeber (2013). The postulates of these theories were compared point by point by Farrington (2006). Thirty topics were addressed, including key underlying constructs, factors promoting and inhibiting offending, explaining changes in offending with age, explaining continuity and versatility, explaining onset and desistance, explaining the commission of crimes, and implications for preventing onset and encouraging desistance. The main aim of the present chapter is not only to describe the theories but also to review key empirical research on them.

Lahey and Waldman

Lahey and Waldman (2005) aimed to explain the development of conduct disorder and juvenile delinquency, focusing particularly on childhood and adolescence. Their developmental propensity theory is influenced by data collected in the Developmental Trends Study (Loeber, Green, Lahey, Frick, & McBurnett, 2000). They do not

address adult life events or attempt to explain desistance in the adult years, for example. They assume that it is desirable to distinguish different types of people, but they propose a continuum of developmental trajectories rather than only two categories of adolescence-limited and life-course-persistent offenders, for example.

Their key construct is antisocial propensity, which tends to persist over time and has a wide variety of behavioral manifestations, reflecting the versatility and comorbidity of antisocial behavior. They postulate that the most important factors that contribute to antisocial propensity are low cognitive ability (especially verbal ability), and three dispositional dimensions: prosociality (including sympathy and empathy, as opposed to callous-unemotional traits), daring (uninhibited or poorly controlled), and negative emotionality (e.g., easily frustrated, bored, or annoyed). These four factors are said to have a genetic basis, and Lahey and Waldman discuss gene-environment correlations (see also Beaver, Schwartz, & Gajos 2015; Morizot 2015).

In an important empirical test of this theory, Lahey, Loeber, Waldman, and Farrington (2006) analyzed data collected in the Pittsburgh Youth Study and found that prosociality (negatively), daring, and negative emotionality at age 7 independently predicted self-reported delinquency between ages 11 and 17. Furthermore, these predictions held up after controlling for major demographic predictors of delinquency such as family income, the mother's education, and ethnicity. In a later test, Lahey et al. (2008) developed the Child and Adolescent Dispositions Scale (CADS) to measure the three dimensions and showed that these predicted conduct disorder in three samples in Georgia, Chicago, and Pittsburgh.

Waldman et al. (2011) analyzed the Tennessee Twin Study (of over 2,000 twin pairs) and concluded that a substantial proportion of the genetic and environmental influences underlying conduct disorder were shared with the three socioemotional dispositions. Further analyses by Tackett, Waldman, Van Hulle, and Lahey (2011) and Tackett et al. (2013) indicated that the most important of these dispositions was negative emotionality. For example, after

accounting for genetic influences on negative emotionality, genetic influences on male twins who had comorbid conduct disorder and major depressive disorder were not significant.

Moffitt

Moffitt (1993) proposed that there are two qualitatively different categories of antisocial people (differing in kind rather than in degree), namely life-course-persistent (LCP) and adolescence-limited (AL) offenders. As indicated by these terms, the LCPs start offending at an early age and persist beyond their twenties, while the ALs have a short criminal career largely limited to their teenage years. The LCPs commit a wide range of offenses including violence, whereas the ALs commit predominantly “rebellious” non-violent offenses such as vandalism. This theory aims to explain findings in the Dunedin longitudinal study (Moffitt et al., 2001).

The main factors that encourage offending by the LCPs are cognitive deficits, an undercontrolled temperament, hyperactivity, poor parenting, disrupted families, teenage parents, poverty, and low SES. Genetic and biological factors, such as a low heart rate, are important. There is not much discussion of neighborhood factors, but it is proposed that the neuropsychological risk of the LCPs interacts multiplicatively with a disadvantaged environment. The theory does not propose that neuropsychological deficits and a disadvantaged environment influence an underlying construct such as antisocial propensity; rather, it suggests that neuropsychological and environmental factors are the key constructs underlying antisocial behavior.

The main factors that encourage offending by the ALs are the “maturity gap” (their inability to achieve adult rewards such as material goods during their teenage years) and peer influence (especially from the LCPs). Consequently, the ALs stop offending when they enter legitimate adult roles and can achieve their desires legally. The ALs can easily stop because they have few neuropsychological deficits.

The theory assumes that there can be labeling effects of “snares” such as a criminal record, incarceration, drug or alcohol addiction, and (for girls) unwanted pregnancy, especially for the ALs. However, the observed continuity in offending over time is largely driven by the LCPs. The LCPs are mainly influenced by utilitarian motives, whereas the ALs are influenced by teenage boredom. Adult life events such as getting a job or getting married are hypothesized to be of little importance, because the LCPs are too committed to an antisocial lifestyle and the ALs desist naturally as they age into adult roles.

Possibly because it is arguably the most famous DLC theory, there has been more empirical research on this theory than on any others. Moffitt (2006) published a very impressive review of 10 years of research on her theory. While many of the predictions were confirmed, she discussed the need for additional categories of individuals: abstainers (who were overcontrolled, fearful, sexually timid, and unpopular), low-level chronics (who were undercontrolled like the LCPs, with family adversity, parental psychopathology, and low intelligence) and adult-onset offenders (whose existence was doubtful according to Moffitt). She argued that the abstainers in adolescence did not become adult-onset offenders and further considered that those who were first arrested or convicted as adults had previously offended but had not been caught.

McGee and Farrington (2010) tested these ideas in the Cambridge Study. They concluded that only about one-third of the official adult-onset offenders who had been self-reported delinquents in their teenage years and were realistically in danger of being convicted. The adult-onset offenders tended to commit different types of crimes compared with the earlier onset offenders: sex offenses, theft from work, and fraud. In the same project, Zara and Farrington (2009) concluded that adult-onset offenders tended to be qualitatively different from earlier onset offenders, since they had generally been nervous, had few friends as children, and were still sexual virgins at age 18.

Several trajectory analyses have been carried out to test the Moffitt theory. For example, in the

Dunedin study, Odgers et al. (2008) found adolescent-onset, childhood-limited, life-course-persistent, and low-level problem trajectories. However, Fairchild, Van Goozen, Calder, and Goodyer (2013) reviewed evidence on the theory and concluded that the differences between LCP and AL antisocial behavior were quantitative (in degree) rather than qualitative (in kind). There have been many independent tests of the Moffitt theory. For example, in analyses of a national (US) survey, Vaughn et al. (2011) found that 11 % of people were abstainers, and Vaughn et al. (2011) found that 5 % of people were LCPs. Eme (2009) reviewed neurodevelopmental factors in LCP antisocial behavior, and Barnes and Beaver (2010) concluded that AL offending did indeed reflect a maturity gap.

Loeber

Loeber and his colleagues (1993) proposed a developmental pathways model. The study of developmental pathways aims to empirically identify the smallest number of pathways that best fit the development of antisocial behaviors in large numbers of youth. The question of whether there are single or multiple pathways to serious outcomes is important. Data on delinquency careers show that, by adulthood, offending outcomes of offenders are far from uniform. For example, a category of seemingly unspecialized violent chronic offenders emerge (Loeber & Farrington, 1998a, 1998b), as do more specialized adult-onset white collar criminals with little or no history of violent offenses, while a third group may consist of repeat property offenders without a history of violence but an onset in adolescence (Loeber, 1985).

Several different methods were used to identify developmental pathways. They are as follows, from the least to the most convincing (Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990): (a) a study of the average or median ages of onset of different behaviors; (b) prediction of the onset of one behavior by the commission of another preceding behavior; (c) prediction of the

change in one behavior by the change in another preceding behavior; and (d) the demonstration that individuals displaying one behavior have displayed one or more other behaviors earlier in life. A key issue is whether an early step in a developmental pathway is a *necessary condition* for a later step to occur (i.e., whether virtually all persons who display behavior B have shown behavior A at an earlier age).

Loeber and Schmalzing (1985) undertook a multidimensional scaling of externalizing behaviors based on 28 factor analytic studies covering over 11,000 children. Their main aim was to establish the extent to which two externalizing problems loaded on the same factor in factor analytic studies. The results showed a single externalizing dimension with two poles, one of overt, confrontational behaviors, and the other consisting of covert, concealing behaviors, with disobedience being situated at an equal distance between overt and covert acts. Since that time, the distinction between overt and covert externalizing behaviors has been accepted by many researchers (e.g., Vassallo, Smart, Sanson, Dussuyer, & McKendry, 2002).

Using the factor analytic evidence, pathways of different problem behaviors were created in these overt and covert externalizing dimensions (called the Overt and Covert Pathways). In addition, a pathway was constructed that included various forms of children's disobedience towards parents and teachers (called the Authority Conflict Pathway). The pathways are as follows:

- (a) An *Overt Pathway* that starts with minor aggression (e.g., bullying, annoying others), has physical fighting (physical fighting and gang fighting) as a second step, and serious violence (rape, attack, robbery) as a third step.
- (b) A *Covert Pathway* that starts prior to age 15 with minor covert acts (shoplifting and frequent lying), has property damage (e.g., vandalism and fire-setting) as a second step, has moderate delinquency (e.g., fraud, pick-pocketing) as a third step, and has serious delinquency (e.g., auto theft and burglary) as a fourth step.

- (c) An *Authority Conflict Pathway* prior to the age of 12, which starts with stubborn behavior, has defiance/disobedience as a second step, and has authority avoidance (e.g., truancy, running away from home, staying out late at night) as a third step;

Based on analyses using longitudinal data from the Pittsburgh Youth Study (PYS), Loeber et al. (1993) showed that the development of externalizing problems in boys took place systematically rather than randomly, and best fitted three pathways rather than a single pathway. The boys typically followed an orderly progression from less to more serious problem behaviors from childhood to adolescence (Loeber, Keenan, & Zhang, 1997; Loeber et al., 2005). Boys could be on each of the three pathways at the same time; thus, the pathways are not mutually exclusive. However, escalation in either the overt or covert pathway was often preceded by escalation in the authority conflict pathway (Loeber et al., 1993). In other words, conflict with authority figures was either a precursor or a concomitant of escalation in overt or covert acts. Also, an early age of onset of problem behavior or delinquency, compared to an onset at a later age, was more closely associated with escalation to more serious behaviors in the overt and covert pathways (Tolan, Gorman-Smith, & Loeber, 2000).

The pathways model was evaluated in several ways. First, the backward probabilities were computed, to establish the extent to which individuals who had reached a later step in a pathway had also gone through the preceding steps (vs. the forward probabilities). The results showed that most of those who reached a higher step in a pathway also had manifested problem behaviors characteristic of a lower step in the pathway. Second, the pathways model accounted for the majority of the most seriously affected boys, that is, the self-reported high-rate offenders and court-reported delinquents. The pathways model has been validated in four other longitudinal data sets (Loeber, DeLamatre, Keenan, & Zhang, 1998; Loeber, Wei, Southamer-Loeber, Huizinga, & Thornberry, 1999; Tolan et al., 2000).

Catalano and Hawkins

According to Catalano et al. (2005), the Social Development Model (SDM) integrates social control/bonding, social learning, and differential association theories. Their key construct is bonding to society (or socializing agents), consisting of attachment and commitment. The key construct underlying offending is the balance between antisocial and prosocial bonding. Continuity in antisocial behavior over time depends on continuity in this balance. The main motivation that leads to offending and antisocial behavior is the hedonistic desire to seek satisfaction and follow self-interest. This is opposed by the bond to society. Offending is essentially a rational decision in which people weigh the benefits against the costs. There is no assumption about different types of offenders. This theory aims to explain findings in the Seattle Social Development Project or SSDP (Hawkins et al., 2003).

There are two causal pathways, leading to antisocial or prosocial bonding. On the prosocial pathway, opportunities for prosocial interaction lead to involvement in prosocial behavior, and involvement and skills for prosocial behavior lead to rewards for prosocial behavior, which lead to prosocial bonding and beliefs. On the antisocial pathway, opportunities for antisocial interaction lead to involvement in antisocial behavior and involvement and skills for antisocial behavior lead to rewards for antisocial behavior, which lead to antisocial bonding and beliefs. Hence, the antisocial pathway specifies factors encouraging offending and the prosocial pathway specifies factors inhibiting offending. Opportunities, involvement, skills, and rewards are part of a socialization process. People learn prosocial and antisocial behavior according to socialization by families, peers, schools, and communities.

The SDM specifies that demographic factors (such as age, race, gender, and social class) and biological factors (such as difficult temperament, cognitive ability, low arousal, and hyperactivity) influence opportunities and skills in the socialization process. There are somewhat different

models for different developmental periods (pre-school, elementary school, middle school, high school, young adulthood). For example, in the first two periods, interaction with prosocial or antisocial family members is the most important, while in the next two periods interaction with prosocial or antisocial peers is the most important.

Most tests of the SDM have been conducted by its originators. Several structural equation modeling analyses have been carried out to investigate its applicability to drug use (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996), antisocial behavior (Catalano, Oxford, Harachi, Abbott, & Haggerty, 1999), alcohol misuse (Lonczak et al., 2001), and violence (Huang, Kosterman, Catalano, Hawkins, & Abbott, 2001). Generally, the fit of the SDM to the data is quite good. Two independent tests of the SDM, by Roosa et al. (2011) and Sullivan and Hirschfield (2011), have also yielded generally supportive results. However, in an analysis of Raising Healthy Children, Brown et al. (2005) found that not all relationships were fully mediated by SDM constructs. In particular, cognitive and socioemotional skills influenced antisocial behavior directly rather than through bonding and beliefs. The SDM has inspired an intervention program called *Communities That Care* or CTC (Hawkins & Catalano, 1992; Kim, Gilman, & Hawkins, 2015). The effectiveness of this program in reducing antisocial behavior has been tested in an ambitious experiment (the Community Youth Development Study or CYDS) in which 24 communities have been randomly assigned to experimental or control conditions. The results suggest that CTC is effective in reducing risk factors, drug use, and delinquency (Hawkins et al., 2009; Hawkins, Oesterle, Brown, Abbott, & Catalano, 2014).

Le Blanc

Le Blanc (1997a, 2005) proposed an integrative multilayered control theory that explains the development of offending, the occurrence of a criminal event, and community crime rates. This

is undoubtedly the most complex of the DLC theories. The key construct underlying offending is antisocial behavior. According to his theory, the development of antisocial behavior depends on changes in four mechanisms of control: bonding to society (attachment and commitment to family, school, peers, religion, marriage, and work), self-control (especially away from egocentrism and toward “allocentrism”: a hierarchical structure of personality traits), modeling (prosocial or antisocial routine activities and models), and constraints (external, including socialization methods, and internal, including beliefs).

Le Blanc’s theorization contributes to the understanding of the course of antisocial behavior throughout the life course. He proposed and tested a comprehensive hierarchical structure of antisocial behavior (Le Blanc & Bouthillier, 2003). He suggested and applied analytical tools for the description of the developmental course of all antisocial behaviors that includes career descriptors (onset, duration, offset, frequency, and seriousness) and quantitative and qualitative mechanisms, for example, activation, aggravation, and desistance (Le Blanc & Frechette, 1989; Le Blanc & Loeber, 1998).

Le Blanc’s (2009) latest statement of his theory applies the “chaos-order” paradigm of development. Accordingly, the complexity of antisocial behavior changes over time, from two types in early childhood to nine types at the end of adolescence, and to six categories during adulthood. At all ages, there are reciprocal and developmental relationships between types of antisocial behaviors, with one type leading to another. Analyses of the Montreal longitudinal survey of adjudicated males were presented to show how offending and substance use were interrelated within and between different ages.

In addition, Le Blanc (2009) proposed that the course of all antisocial behaviors could be represented by three meta-trajectories: persistent, transitory, and common. For offending, these trajectories and their subtrajectories are characterized by special social and psychological characteristics (Fréchette & Le Blanc, 1987; Le Blanc & Kaspy, 1998). Persistent offenders are

most extreme on general and violent offending and all other antisocial behaviors, and they display weak bonding, low self-control, antisocial modeling, and low constraints. Common offenders, the average adolescents who commit a few minor offenses and antisocial behaviors, are largely influenced by situational opportunities, while transitory or adolescence-limited offenders are in the middle (in having moderate control and being moderately influenced by opportunities).

Le Blanc's control theory of the development of antisocial behavior includes biological and neighborhood factors, but they are assumed to have indirect effects on antisocial behavior through their effects on bonding and self-control. Similarly, he assumes that life events have effects via these constructs and that official labeling influences constraints and offending. Le Blanc assumes that environmental factors (e.g., social class and neighborhood) influence bonding while biological capacity (including IQ and difficult temperament) influences the development of self-control. Changes in bonding and self-control modulate modeling and constraints, which are proximate influences on antisocial behaviors and hence on offending. There is continuity in antisocial behavior because the relative ordering of people on control mechanisms, after the initiation of a meta-trajectory, stays fairly consistent over time.

This theory was tested with data from the Montreal Two Samples Longitudinal Study, of a community sample (Le Blanc, Ouimet, & Tremblay, 1988) and of an adjudicated sample (Le Blanc, 1997b). Le Blanc (2006) elaborated his theory from a structural to a developmental perspective. He reviewed the psychological literature on the development of personality and self-control and identified four self-control trajectories in his samples of adolescent and adjudicated males (Morizot & Le Blanc, 2003a, 2003b, 2005). He then conceptualized and illustrated, with the chaos-order tools, an interactional model of the developmental course of antisocial behavior, social, and self-controls. This interactional model was tested with the sequential covariation strategy of analysis for longitudinal data (Loeber & Le Blanc, 1990).

Le Blanc's (1997a) theory of criminal events suggests that they depend on situational self-control, opportunities, routine activities, and guardianship. If at a particular time in the life of a person, self-control is weak, opportunities are numerous, routine activities are antisocial, and guardianship is weak, then a criminal event is more likely to be committed. The impact of these factors is modulated by conditions that are part of the other two layers of the theory, the level of community control that explains correlates and the individual control that explains the development of individual offending.

Kazemian and Le Blanc (2004) identified two patterns of perpetration of a crime between early adolescence and mid-adulthood. The organized pattern of perpetration of offenses is mainly characterized by a predominance of utilitarian motives, considerable planning, increased use of instruments, and a tendency to target anonymous victims. The disorganized pattern of crime perpetration shows a predominance of hedonistic motives, weak loadings for indicators of the level of organization (utilitarian motives, level of planning, instruments), and a greater propensity to drug and alcohol use before, during, and after the event; it is also more likely to involve a group of accomplices. The organized pattern showed signs of increased organization with time, whereas the disorganized pattern became more disorganized. Kazemian and Le Blanc (2004) concluded that the results suggested that patterns of crime perpetration are more dependent on situational components and criminal opportunities, which are more likely to vary across time, rather than on individual predispositions.

Thornberry and Krohn

The interactional theory of Thornberry and Krohn (2005) particularly focuses on factors encouraging antisocial behavior at different ages. It is influenced by findings in the Rochester Youth Development Study (Thornberry, Lizotte, Krohn, Smith, & Porter, 2003). The authors do not propose types of offenders but suggest that the causes of antisocial behavior vary for

children who start being deviant at different ages. At the earliest ages (birth to 6), the three most important factors are neuropsychological deficit and difficult temperament (e.g., impulsiveness, negative emotionality, fearlessness, poor emotion regulation), parenting deficits (e.g., poor monitoring, low affective ties, inconsistent discipline, physical punishment), and structural adversity (e.g., poverty, unemployment, welfare dependency, a disorganized neighborhood). They also suggest that structural adversity might be one cause of poor parenting.

Neuropsychological deficits are less important for children who start antisocial behavior at older ages. At ages 6–12, neighborhood and family factors are particularly salient, while at ages 12–18 school and peer factors dominate. Thornberry and Krohn (2005) also suggest that deviant opportunities, gangs, and deviant social networks are important for onset at ages 12–18. They propose that late starters (ages 18–25) have cognitive deficits such as low IQ and poor school performance but that they were protected from antisocial behavior at earlier ages by a supportive family and school environment. At ages 18–25, they find it hard to make a successful transition to adult roles such as employment and marriage.

The most distinctive feature of this interactional theory is its emphasis on reciprocal causation. For example, it is proposed that the child's antisocial behavior elicits coercive responses from parents, school disengagement, and rejection by peers and makes antisocial behavior more likely in the future. The theory does not postulate a single key construct underlying offending but suggests that children who start early tend to continue, both because of the persistence of neuropsychological and parenting deficits and structural adversity and because of the reciprocal consequences that earlier antisocial behavior creates. Interestingly, Thornberry and Krohn predict that late starters (ages 10–25) will show more continuity over time than those who start during adolescence (ages 12–18), because the late starters have more cognitive deficits. In an

earlier exposition of the theory, Thornberry and Krohn (2001) proposed that desistance was caused by changing social influences (e.g., stronger family bonding), protective factors (e.g., high IQ and school success), and intervention programs. In contrast, criminal justice processing has been shown to have a labeling effect, in enhancing future offending (Bernburg & Krohn, 2003; Krohn, Lopes, & Ward, 2014; Lopes et al., 2012).

Thornberry (2009) has extended this theory to explain both intergenerational continuity and discontinuity in antisocial behavior. He suggested that the impact of the parent's antisocial behavior on the child's antisocial behavior is largely indirect, mediated by the parent's prosocial or antisocial bonding, transition to adult roles, structural adversity, stressors, and ineffective parenting. In a series of papers Thornberry and colleagues have tested these ideas in the Rochester Intergenerational Study (e.g., Smith, Ireland, Park, Elwyn, & Thornberry, 2011; Thornberry, Freeman-Gallant et al., 2003; Thornberry, Krohn, & Freeman-Gallant, 2006; Thornberry, Freeman-Gallant, & Lovegrove, 2009a, 2009b; Thornberry & Henry, 2013). They have examined (a) different aspects of the parent's adolescent antisocial behavior and different aspects of the child's antisocial behavior such as delinquency, drug use, intimate partner violence, and child maltreatment; (b) different sources of stress for the parents including financial stress, parenting stress, negative life events, and depressive symptoms; and (c) different aspects of parent behaviors (attachment, monitoring, discipline, warm/nurturing parenting, and hostile/harsh parenting). Across these various analyses parental antisocial behavior increases the chances that the child will also be involved in antisocial behavior, especially for mothers and fathers who have ongoing contact with their children, but interestingly, not for fathers who were largely absent. It also appears that this effect is mediated by high levels of stress and by parenting behaviors. In general, these findings are consistent with their intergenerational theory.

Wikström

Wikström (2005) proposed a Situational Action Theory (SAT) that aims to explain moral rule breaking. The key construct underlying offending is individual criminal propensity, which depends on moral judgment and self-control. In turn, moral values influence moral judgment and executive functions influence self-control. Wikström does not propose types of offenders. He suggests that the motivation to offend arises from the interaction between the individual and the setting. For example, if individual propensity is low, features of the setting (persons, objects, and events) become more important. Temptations and provocations are the main motivators. Continuity or change in offending over time depends on continuity or change in moral values, executive functions, and settings.

Situational factors are important in Wikström's theory, which aims to explain the commission of offenses as well as the development of offenders. Opportunities cause temptation, friction produces provocation, and monitoring or the risk of sanctions has a deterrent effect. The theory emphasizes perception, choice, habits, rational deliberation, and human agency in deciding to offend. Learning processes are included in the theory, since it is suggested that moral values are taught by instruction and observation in a socialization process and that nurturing (the promotion of cognitive skills) influences executive functions. Life events also matter, since it is proposed that starting school, getting married, etc., can trigger changes in constructs such as moral teaching and monitoring and hence influence moral rule breaking.

Wikström (2009) tested his SAT theory in the Peterborough Adolescent and Young Adult Development Study (PADS+), which is a prospective longitudinal survey of over 700 children from age 11. He found that people with high criminal propensity (as measured by morality and self-control) and high exposure to criminogenic settings (e.g., peer delinquency, time spent unsupervised in areas with poor

collective efficacy) tended to commit more crimes. Later, Wikström (2012) found that the effect of poor collective efficacy on offending was fully mediated through its effects on criminal propensity. Wikström, Oberwittler, Treiber, and Hardie (2012) reported other tests of the theory, including the use of space-time budget methodology to show that crime-prone young people predominantly offended in criminogenic settings.

Sampson and Laub

The key construct in Sampson and Laub's (2005a) theory is age-graded informal social control, which means the strength of bonding to family, peers, schools, and later adult social institutions such as marriages and jobs. Sampson and Laub primarily aimed to explain why people do not commit offenses, on the assumption that why people want to offend is unproblematic (presumably caused by hedonistic desires) and that offending is inhibited by the strength of bonding to society. Their theory is influenced by their analyses of the Glueck follow-up study of male delinquents and nondelinquents (Laub & Sampson, 2003; Sampson & Laub, 1993).

The strength of bonding depends on attachments to parents, schools, delinquent friends, and delinquent siblings, and also on parental socialization processes such as discipline and supervision. Structural background variables (e.g., social class, ethnicity, large family size, criminal parents, disrupted families) and individual difference factors (e.g., low intelligence, difficult temperament, early conduct disorder) have indirect effects on offending through their effects on informal social control (attachment and socialization processes).

Sampson and Laub are concerned with the whole life course. They emphasize change over time rather than consistency and the poor ability of early childhood risk factors to predict later life outcomes. They focus on the importance of later life events (adult turning points) such as joining the military, getting a stable job, and getting

married, in fostering desistance and “knifing off” the past from the present. They also suggest that neighborhood changes can cause changes in offending. Because of their emphasis on change and unpredictability, they deny the importance of types of offenders such as “life-course persisters.” They suggest that offending decreases with age for all types of offenders (Sampson & Laub, 2003).

Sampson and Laub do not explicitly include immediate situational influences on criminal events in their theory and believe that opportunities are not important because they are ubiquitous (Sampson & Laub, 1995). However, they do suggest that having a few structured routine activities is conducive to offending. They focus on why people do not offend rather than on why people offend and emphasize the importance of individual free will and purposeful choice (“human agency”) in the decision to desist (Sampson & Laub, 2005b). They also propose that official labeling influences offending through its effects on job instability and unemployment. They argue that early delinquency can cause weak adult social bonds, which in turn fail to inhibit adult offending.

In the latest exposition of their theory, Sampson and Laub (2009) again argue against offender typologies and in favor of “noisy, unpredictable development.” They contend that long-term patterns of offending cannot be explained by individual differences or childhood or adolescent characteristics and that childhood variables are “modest prognostic devices.” They further argue against the concept of “developmental criminology,” which they take to mean a “predetermined unfolding,” and in favor of the idea of “life-course criminology,” which (they say) refers to the constant interaction between the individual and the environment.

Sampson and Laub’s predictions can be tested empirically. It seems that childhood risk factors are better than “modest” predictors of later offending. For example, in the Cambridge Study, the percentage of boys who were convicted increased from 20 % of those with no childhood risk factors to 85 % of those with five or six childhood risk factors (Farrington, Coid, &

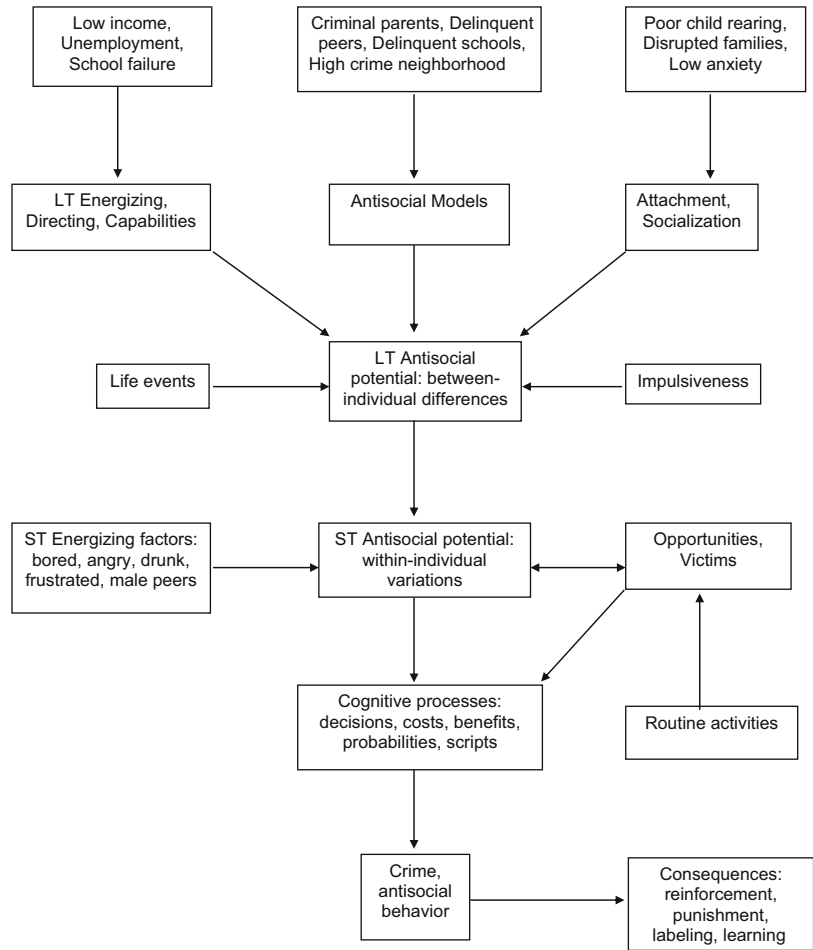
West, 2009). Similarly, in predicting adult offending, Sampson and Laub might expect that childhood variables would not predict independently of adult variables, but Farrington, Ttofi, and Coid (2009) found several age 8–10 variables that predicted either onset or persistence in offending after age 21. In addition, Sampson and Laub’s argument is based on the finding that, by age 40, the offending trajectories of individuals exposed to childhood risk factors converge with those of individuals who were not exposed to these adverse conditions early in the life course (Sampson & Laub, 2003). However, most individuals desist from crime after age 40 and thus childhood risk factors can help to identify high-rate offenders during the years of their active criminal careers.

ICAP Theory

The Integrated Cognitive-Antisocial Potential (ICAP) theory was proposed by Farrington (2005). It was primarily designed to explain offending by lower class males, and it was influenced by results obtained in the Cambridge Study. It integrates ideas from many other theories, including strain, control, learning, labeling, and rational choice approaches; its key construct is antisocial potential (AP), and it assumes that the translation from antisocial potential to antisocial behavior depends on cognitive (thinking and decision-making) processes that take account of opportunities and victims. Figure 2.1 is deliberately simplified in order to show the key elements of the ICAP theory on one page; for example, it does not show how the processes operate differently for onset compared with desistance or at different ages.

The key construct underlying offending is antisocial potential (AP), which refers to the potential to commit antisocial acts. The term “potential” is used rather than “propensity,” because propensity has more biological connotations. “Offending” refers to the most common crimes of theft, burglary, robbery, violence, vandalism, minor fraud, and drug use, and to behavior that in principle might lead to a

Fig. 2.1 The Integrated Cognitive Antisocial Potential (ICAP) theory. *LT* long-term, *ST* short-term



conviction in Western industrialized societies such as the USA and the UK. Long-term persisting between-individual differences in AP are distinguished from short-term within-individual variations in AP. Long-term AP depends on impulsiveness, on strain, modeling, and socialization processes, and on life events, while short-term variations in AP depend on motivating and situational factors.

Regarding long-term AP, people can be ordered on a continuum from low to high. The distribution of AP in the population at any age is highly skewed; relatively few people have relatively high levels of AP. People with high AP are more likely to commit many different types of antisocial acts including different types of

offenses. Therefore, offending and antisocial behavior are versatile, not specialized. The relative ordering of people on AP (long-term between-individual variation) tends to be consistent over time, but absolute levels of AP vary with age, peaking in the teenage years, because of changes within individuals in the factors that influence long-term AP (e.g., from childhood to adolescence, the increasing importance of peers and decreasing importance of parents).

A key issue is whether the model should be the same for all types of crimes or whether different models are needed for different types of crimes. Because of their focus on the development of offenders, DLC researchers have concluded that, because offenders are versatile

rather than specialized, it is not necessary to have different models for different types of crimes. For example, it is believed that the risk factors for violence are essentially the same as for property crime or substance abuse. However, researchers who have focused on situational influences (e.g., Clarke & Cornish, 1985) have argued that different models are needed for different types of crimes. It is suggested that situational influences on burglary may be very different from situational influences on violence.

One possible way to resolve these differing viewpoints would be to assume that long-term potential was very general (e.g., a long-term potential for antisocial behavior), whereas short-term potential was more specific (e.g., a short-term potential for violence). The top half of the model in Fig. 2.1 could be the same for all types of crimes, whereas the bottom half could be different (with different situational influences) for different types of crimes.

In the interests of simplification, Fig. 2.1 makes the ICAP theory appear static rather than dynamic. For example, it does not explain changes in offending at different ages. Since it might be expected that different factors would be important at different ages or life stages, it seems likely that different models would be needed at different ages. Perhaps parents are more important in influencing children, peers are more important in influencing adolescents, and spouses and partners are more important in influencing adults.

Long-Term Risk Factors

A great deal is known about risk factors that predict long-term persisting between-individual differences in antisocial potential. For example, in the Cambridge Study, the most important childhood risk factors for later offending were hyperactivity–impulsivity–attention deficit, low intelligence or low school attainment, family criminality, family poverty, large family size, poor child-rearing, and disrupted families (Farrington, 2003, 2007). Figure 2.1 shows how risk factors are hypothesized to influence long-

term AP. This figure could be expanded to specify promotive and protective factors and study different influences on onset, persistence, escalation, de-escalation, and desistance.

Measures of antisocial behavior (e.g., aggressiveness or dishonesty) are not included as risk factors because of the concern with explanation, prevention, and treatment. These measures do not cause offending; they predict offending because of the underlying continuity over time in AP. Measures of antisocial behavior are useful in identifying risk groups but less useful in identifying causal factors to be targeted by interventions. Similarly, variables that cannot be changed, such as gender or ethnicity, are not included in the theory. It is assumed that their relationships with offending are mediated by changeable risk factors.

A major problem is to decide which risk factors are causes and which are merely markers or correlated with causes (see Murray, Farrington, & Eisner, 2009). Ideally, interventions should be targeted on risk factors that are causes. Interventions targeted on risk factors that are merely markers will not necessarily lead to any decrease in offending. Unfortunately, when risk factors are highly intercorrelated (as is usual), it is very difficult to establish which are causes in between-individual research. For example, the particular factors that appear to be independently important as predictors in any analysis may be greatly affected by measurement error and by essentially random variations between samples. Within-individual analyses are more convincing (Farrington, 1988).

It is also important to establish how risk factors or causes have sequential or interactive effects on offending. Following strain theory, the main energizing factors that potentially lead to high long-term AP are desires for material goods, status among intimates, excitement, and sexual satisfaction. However, these motivations only lead to high AP if antisocial methods of satisfying them are habitually chosen. Antisocial methods tend to be chosen by people who find it difficult to satisfy their needs legitimately, such as people with low income, unemployed people,

and those who fail at school. However, the methods chosen also depend on physical capabilities and behavioral skills; for example, a 5-year-old would have difficulty in stealing a car. For simplicity, energizing and directing processes and capabilities are shown in one box in Fig. 2.1.

Long-term AP also depends on attachment and socialization processes. AP will be low if parents consistently and contingently reward good behavior and punish bad behavior. (Withdrawal of love may be a more effective method of socialization than hitting children.) Children with low anxiety will be less well socialized, because they care less about parental punishment. AP will be high if children are not attached to (prosocial) parents, for example, if parents are cold and rejecting. Disrupted families (broken homes) may impair both attachment and socialization processes.

Long-term AP will also be high if people are exposed to and influenced by antisocial models, such as criminal parents, delinquent siblings, and delinquent peers, for example, in high crime schools and neighborhoods. Long-term AP will also be high for impulsive people, because they tend to act without thinking about the consequences. Also, life events affect AP; it decreases (at least for males) after people get married or move out of high crime areas, and it increases after separation from a partner.

Figure 2.1 shows some of the processes by which risk factors have effects on AP. It does not show biological factors but these could be incorporated in the theory at various points. For example, the children of criminal parents could have high AP partly because of genetic transmission, excitement-seeking could be driven by low cortical arousal, school failure could depend partly on low intelligence, and high impulsiveness and low anxiety could both reflect biological processes.

Many researchers have measured only one risk factor (e.g., impulsivity) and have shown that it predicts or correlates with offending after controlling for a few other “confounding factors,” often including social class. The message of Fig. 2.1 is Don’t forget the big picture.

The particular causal linkages shown in Fig. 2.1 may not be correct, but it is important to measure and analyze all important risk (and promotive and protective) factors in trying to draw conclusions about the causes of offending or the development of offenders.

Explaining the Commission of Crimes

According to the ICAP theory, the commission of offenses and other types of antisocial acts depends on the interaction between the individual (with his immediate level of AP) and the social environment (especially criminal opportunities and victims). Short-term AP varies within individuals according to short-term energizing factors such as being bored, angry, drunk, or frustrated, or being encouraged by male peers. Criminal opportunities and the availability of victims depend on routine activities. Encountering a tempting opportunity or victim may cause a short-term increase in AP, just as a short-term increase in AP may motivate a person to seek out criminal opportunities and victims.

Whether a person with a certain level of AP commits a crime in a given situation depends on cognitive processes, including considering the subjective benefits, costs and probabilities of the different outcomes, and stored behavioral repertoires or scripts (Huesmann, 1997). The subjective benefits and costs include immediate situational factors such as the material goods that can be stolen and the likelihood and consequences of being caught by the police. They also include social factors such as likely disapproval by parents or female partners, and encouragement or reinforcement from peers. In general, people tend to make decisions that seem rational to them, but those with low levels of AP will not commit offenses even when (on the basis of subjective expected utilities) it appears rational to do so. Equally, high short-term levels of AP (e.g., caused by anger or drunkenness) may induce people to commit offenses when it is not rational for them to do so.

The consequences of offending may, as a result of a learning process, lead to changes in

long-term AP and in future cognitive decision-making processes. This is especially likely if the consequences are reinforcing (e.g., gaining material goods or peer approval) or punishing (e.g., receiving legal sanctions or parental disapproval). Also, if the consequences involve labeling or stigmatizing the offender, this may make it more difficult for him to achieve his aims legally and hence may lead to an increase in AP. (It is difficult to show these feedback effects in Fig. 2.1 without making it very complex.)

A further issue that needs to be addressed is to what extent types of offenders might be distinguished. Perhaps some people commit crimes primarily because of their high long-term AP (e.g., the life-course-persistent offenders of Moffitt, 1993) and others primarily because of situational influences and high short-term AP. Perhaps some people commit offenses primarily because of situational influences (e.g., getting drunk frequently), while others offend primarily because of the way they think and make decisions when faced with criminal opportunities. From the viewpoint of both explanation and prevention, research is needed to classify types of people according to their most influential risk factors and most important reasons for committing crimes.

Testing the ICAP Theory

The first independent test of the ICAP theory was carried out by Van Der Laan, Blom, and Kleemans (2009) in the Netherlands. Nearly 1,500 youth aged 10–17 completed a survey that enquired about long-term and short-term (situational) risk factors for delinquency. Nearly 300 of these answered questions about the circumstances of their last offense. In agreement with the ICAP theory, Van Der Laan and his colleagues found that long-term individual, family, and school factors correlated with serious delinquency, and the probability of serious delinquency increased with the number of factors. However, after controlling for long-term factors, short-term situational factors such as the absence of tangible guardians and using alcohol or drugs

prior to the offense were still important. While the results of this test are very encouraging, it would be useful in future to test the theory in a longitudinal survey.

The ICAP theory could be tested in the Cambridge Study by using antisocial attitude scores at different ages as measures of long-term antisocial potential. These could be related to individual, family, peer, and school risk factors, to investigate the relative strength of relationships at different ages. They could also be related to self-reported and official offending at different ages. Different causal models could be tested at different ages. For example, in the Pittsburgh Youth Study, Defoe, Farrington, and Loeber (2013) concluded that hyperactivity and low socioeconomic status led to low school achievement, which led to delinquency, which in turn led to depression. In the Cambridge Study, the importance of long-term risk factors and short-term situational influences should be compared.

Summary

- All theories presented in this chapter are plausible and explain key findings on the development of offending. However, it is extremely difficult to decide which theory is the “best,” or even whether one theory is “better” than another. This is because, in most cases, the theories have been tested by the theorists who proposed them. More independent tests of theories are needed.
- It is rare for researchers to carry out empirical tests of two or more theories simultaneously. However, Farrington, Coid, and West (2009) studied the development of adolescence-limited, late-onset, and persistent offenders from age 8 to age 48 in the Cambridge Study. They found that, contrary to Moffitt’s theory, adolescence-limited offenders had several of the same risk factors as persistent offenders. Contrary to Sampson and Laub’s argument, early risk factors were important in predicting which offenders would persist or desist after age 21. More efforts should be

made to compare and contrast the different theories in regard to their predictions and explanations of empirical results.

- Farrington (2006) compared and contrasted eight of these DLC theories (all except Loeber's) on their predictions about 30 topics. Farrington (2005) listed widely accepted conclusions about the development of offending that any DLC theory must explain, as well as a number of more contentious issues that needed to be resolved. He challenged DLC theorists to specify how their theories addressed 13 key empirical questions and 11 key theoretical questions. However, few of the theorists took up this challenge. It would be highly desirable to systematically compare how each DLC theory answers all these questions.
- It would also be highly desirable to specify crucial tests, where predictions from one DLC theory clearly differ from predictions from another DLC theory. Ideally, all DLC theorists should cooperate in specifying and testing their theories in the interests of developing better theories that explain and predict more empirical findings on within-individual changes in offending through life. Criminological theories typically make qualitative rather than quantitative predictions; they predict that X is related to Y or that X is greater than Y, but not the precise magnitude of relationships. DLC theories could build on the mathematical models of MacLeod, Grove, and Farrington (2012), which hypothesize three types of offenders with different rates of offending and different probabilities of desistance and try to derive exact quantitative predictions about features of criminal careers.
- Future longitudinal studies should follow people up to later ages and focus on desistance processes. Past studies have generally focused on onset and on ages up to 30 (Farrington & Pulkkinen, 2009). As mentioned, Marc Le Blanc's longitudinal studies are very unusual in following people up beyond age 40.
- Future studies should compare risk factors for early onset, continuation after onset (compared with early desistance), frequency, seriousness, later onset, and later persistence versus desistance. DLC theories should make explicit predictions about all these topics.
- Future studies should make more effort to investigate promotive and protective factors, and biological, peer, school, and neighborhood risk factors, since most is known about individual and family factors.
- Future research should compare development, risk factors, and life events for males versus females and for different ethnic and racial groups in different countries.
- Because most previous analyses of risk factors for offending involve between-individual comparisons, more within-individual analyses of offending are needed in longitudinal studies. These should investigate to what extent within-individual changes in risk and promotive factors are followed by within-individual changes in offending and other life outcomes. These analyses should provide compelling evidence about causal mechanisms.
- More information is also needed about developmental sequences and about the predictability of future criminal careers, in order to know when and how it is best to intervene.

Marc Le Blanc's work has been extremely important in stimulating the formulation and testing of DLC theories. The time is ripe to move these theories to the next scientific level: to compare and contrast how they explain and predict findings and to propose and test quantitative predictions derived from them.

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Future Research Needs

- In order to advance knowledge about DLC theories and test them, new prospective longitudinal studies are needed with repeated self-report and official record measures of offending.

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Antisocial Behavior Before the Age–Crime Curve: Can Developmental Criminology Continue to Ignore Developmental Origins?

3

Richard E. Tremblay

We here saw the native Fuegian; an untamed savage is I really think one of the most extraordinary spectacles in the world. —the difference between a domesticated & wild animal is far more strikingly marked in man . . . with difficulty we see a fellow-creature.

—Darwin (1832/1985, pp. 302–303)

Introduction

When the Belgian mathematician and astronomer Adolphe Quetelet (a contemporary of Charles Darwin) published the first statistical representation of the propensity to crime with reference to age (age crime-curve) in 1831 he clearly manifested his interest in prevention by putting the following phrase on the title page of the book: “There is a budget which is paid with frightening regularity, it is that of prisons, hulks, and gallows; it is that one especially which it would be necessary to strive to reduce.” (Quetelet, 1833)

Many countries have since made progress in the reduction of criminal acts and in the humane

treatment of criminals, but Quetelet would most probably be shocked to observe that the progress has been very slow and that the cost of the justice system has substantially increased (Alarcón & Mitchell, 2012). He would also be puzzled to see that the richest country in the world (United States), which produces the largest number of criminological studies, also produces close to three times more homicides than European countries, still uses the death penalty, and does so proportionally more with the descendants of its former slaves (DPIC, 2013; UNODC, 2013).

The man who pioneered the use of statistics to understand human physical, cognitive, and moral development would also be surprised by the huge differences in the scientific progress of these three research domains. While research on physical and cognitive development is unraveling developmental origins and mechanisms with technologically sophisticated genetic, neurological, and environmental (epigenetic) analyses, research on criminal development continues to be largely based on official crime statistics or self-reports of individuals that are or could be sanctioned by the law.

While large population samples are being followed from the prenatal period onwards with repeated bio-psychosocial assessments to understand the developmental origins of health and well-being, leading criminologists over the past 30 years have been arguing whether or not it would be useful to collect longitudinal data to understand the determinants of the age–crime curve, whether they should aggregate or

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disaggregate different forms of antisocial behavior, and whether there is a single or multiple determinants underlying the propensity to crime (see DeLisi 2015; Le Blanc & Bouthillier, 2003). Even those who argue for a developmental approach to multiple determinants of the age–crime curve generally fail to take into account biological factors and developmental origins of antisocial behavior. For example, in 1982 the John D. and Catherine T. MacArthur Foundation created a study group to answer the following question: “What ideas, what concepts, what basic intellectual framework are lacking” to prevent crime (Morris, 1986). The main conclusion was the need for more “ambitious longitudinal studies.” Four years later the U.S. Office of Juvenile Justice and Delinquency Prevention funded three relatively large longitudinal studies on the “causes and correlates of delinquency.” The youngest subjects (only males) were recruited at age 7 years: between 7 and 15 years for the Denver Youth Survey (Matsueda, Kreager, & Huizinga, 2006); between 7 and 13 years for the Pittsburgh Youth Study (Loeber, Lacourse, & Homish, 2005); between 13 and 14 years for the Rochester Youth Development Study (Krohn, Ward, Thornberry, Lizotte, & Chu, 2011). The development of antisocial behavior before “the age of reason” was thus ignored and no biological data was collected. Meanwhile, in 1988 the MacArthur foundation created a larger study group to plan coordinated large longitudinal studies which would start at birth and collect bio-psychosocial data. A series of papers and a book were published highlighting new methodological approaches, including the study of twins and siblings to understand environmental and genetic contributions to the development of antisocial behavior (Farrington et al., 1990; Tonry et al., 1991). The project was eventually implemented in Chicago (Project on Human Development in Chicago Neighborhoods, see Bingenheimer, Brennan, & Earls, 2005; Sharkey & Sampson, 2010). Although the aims of the study were to examine “the development of delinquency, criminal

behavior, and substance abuse from birth to young adulthood,” it focused largely on the assessment of neighborhoods and essentially excluded the collection of biological data to avoid public reactions to the association of biology, crime, and minorities. Furthermore, the developmental origins part of the study was limited to the assessment of less than 500 children a few months after birth, at 3 years, and finally at 7 years.

The Chicago project on Human Development is probably the best example of the enormous historical resistance of the social sciences, and criminology in particular, to take an integrated bio-psychosocial approach to the study of criminal propensity. Although the project was very generously funded and the planning stage included the best experts on the association between early childhood, biological determinants and later criminal behavior, it ended up putting most of the resources and focus on the neighborhood determinants of juvenile and adult antisocial behavior.

There is no doubt that environments (family, peers, neighborhood) play an important role in the development of antisocial behavior (see the different chapters in this volume). However, the assumption that the environment plays that role long before individuals have reached the legal age to be arrested needs to be taken seriously. The research described below indicates that the environment has already played a very important role before and during fetal life. The hypothesis is not that biology determines individual developmental trajectories; it is rather that the environment may determine very early on the development of biological structures that control behavior. By neglecting to prospectively study the development of antisocial behavior from early childhood onwards and to take into account biological mechanisms, developmental criminology will remain blind to the developmental origins of antisocial behavior. This problem may take at least one more generation to be solved because it may only be corrected by the bio-psychosocial training of the next generation of criminologists.

Development of Antisocial Behavior During Childhood

The 1993 report of the US Academy of Science Panel on Understanding Violent Behavior gave a good summary of the dominant hypothesis concerning the development of antisocial behaviors: “Modern psychological perspectives emphasize that aggressive and violent behaviors are learned responses to frustration, that they can also be learned as instruments for achieving goals, and that the learning occurs by observing models of such behavior. Such models may be observed in the family, among peers, elsewhere in the neighborhood, through the mass media . . .” (Reiss & Roth, 1993). Unfortunately, almost 10 years later, in its report on the prevention of violence, the World Health Organization used this same literature to conclude: “The majority of young people who become violent are adolescent-limited offenders who, in fact, show little or no evidence of high levels of aggression or other problem behaviors during their childhood” (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002).

This social learning hypothesis which began to be explicitly formulated in early 1960s (Bandura, Ross, & Ross, 1961) became the dominant explanation for most forms of antisocial behavior. Data on the development of physical aggression from a longitudinal study of elementary school children initiated in the early 1980s helped question this widespread social learning hypothesis of aggression when they indicated that the frequency of physical aggression was generally decreasing from school entry to mid-adolescence and that the most physically aggressive adolescents were the most physically aggressive in kindergarten (see Fig. 1 from Nagin & Tremblay, 1999). These results were then replicated in numerous longitudinal studies (Broidy et al., 2003) (Fig. 3.1).

The following developmental question was obviously “when do children learn to aggress if they are already at their peak in frequency during kindergarten?” Fortunately the study of social behavior development was included in large

birth cohorts during the 1990s. Results clearly showed that humans start to use physical aggression toward the end of the first year after birth when they have acquired the motor coordination to push, pull, hit, kick, etc. (Alink et al., 2006; Hay et al., 2011; Tremblay et al., 1999, 2004). Figure 3.2 illustrates the results of the physical aggression developmental trajectory analyses from 17 to 60 months with a population birth cohort (Côté et al., 2007). We can see that half of the children are in the middle trajectory of physical aggression frequency, a third are on a low trajectory, while 17 % are on a high trajectory. Similar developmental trends were observed in other large scale longitudinal studies (e.g., NICHD Early Child Care Research Network, 2004) and in an intensive observational study children’s response in a laboratory delay of gratification situation from 18 to 48 months. As can be seen from Fig. 3.3, the frequency of angry responses declined with age, while the frequency of calm responses increased (Cole et al., 2011).

The analyses described in Fig. 3.2 are based on prospective repeated assessments of physical aggressions reported by mothers over 4 years. From this perspective developmental trajectories should be a better estimate of a chronic behavior problem than an assessment at any given point in time, even if that assessment attempts to reconstruct past behavior. Longitudinal data has shown that within a year mothers do not recall the age of onset of their children’s physical aggressions (Tremblay, 2000). In a clinical study of boys between 7 and 12 years of age, the mean age of physical aggression onset retrospectively reported by parents was 6.75 years (Frick et al., 1993). Retrospective information collected in the Pittsburgh Youth Study (Loeber & Hay, 1997; Loeber & Stouthamer-Loeber, 1998) was compared to prospective data, and highlighted the problem with retrospective assessments of the onset of physical aggression. The subjects ($N = 503$) represented the Pittsburgh public schools’ male 8th graders and were close to 14 years old (mean age = 13.8; $SD = .80$) at the first data collection. The cumulative age of onset of physical aggression

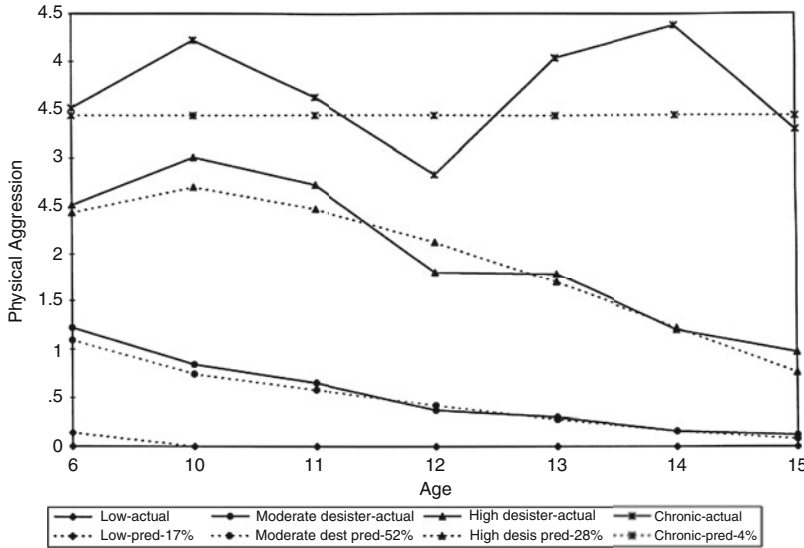


Fig. 3.1 Developmental trajectories of physical aggression from 6 to 15 years

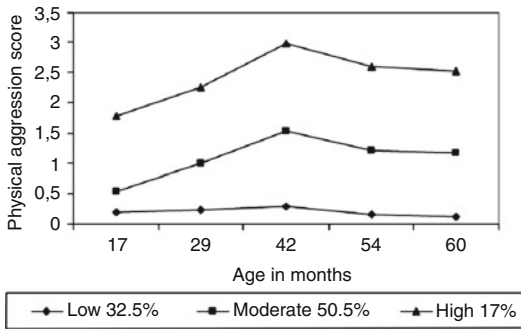


Fig. 3.2 Developmental trajectories of physical aggression from 17 to 60 months (Côté et al., 2007 AGP)

reported retrospectively by the mothers and the boys at the first data collection indicated that by age 5, less than 5 % of the boys had initiated use of physical aggression and almost none of the boys had initiated fighting. In sharp contrast, the prospective data represented in Fig. 3.2 on physical aggression from 17 months after birth indicate that children who did not initiate physical aggression before 3 years of age were extremely uncommon. These prospective studies suggest that the peak in the frequency of physical aggression for most humans is somewhere between 2 and 4 years of age (see Fig. 3.2 and NICHD Early Child Care Research Network, 2004). The

recall problem suggests that retrospective assessments of children or adolescents do not accurately identify the age of onset and developmental trajectories of physical aggression use or of chronic physical aggression.

From the available data on the development of physical aggression during childhood and adolescence, we can conclude that: (1) the vast majority of preschool children use physical aggression; (2) the vast majority also learn with age to use other means of solving problems; (3) some need more time than others to learn; (4) girls learn more quickly than boys; (5) most of the cases of chronic physical aggression during adolescence were chronic cases since early childhood; (6) attempting to use retrospective information to determine “age of onset” of physical aggression is futile because recall of a specific age is unreliable and in all cases, it will have been in early childhood.

Physical aggression is probably the easiest antisocial behavior to study among young children because of its salience. A few studies have also investigated other forms of antisocial behavior. Data on the preschool development of overt anger, opposition, defiance, and overt disregard for rules, which is admittedly thin (see Tremblay, 2010), leads to the following conclusions: (1) all

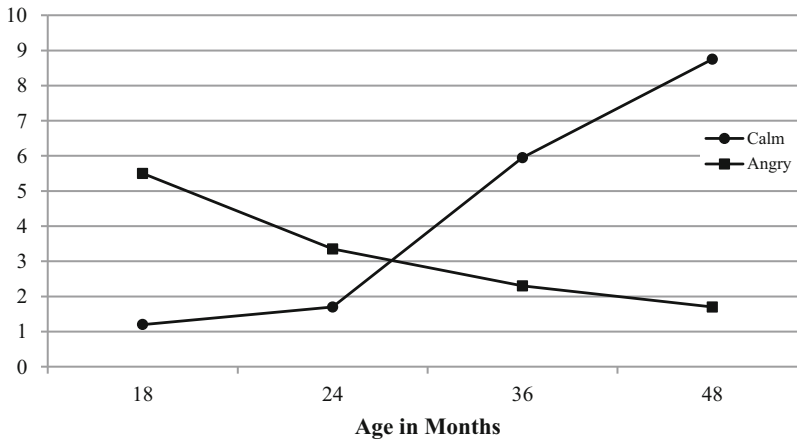


Fig. 3.3 Frequency of calm and angry bids about wait at each age point

children frequently manifest anger from the first month after birth; (2) the vast majority of preschool children frequently manifest opposition, defiance, and overt disregard for rules; (3) the vast majority also learn during the preschool years to use other means of solving problems; (4) some need more time than others to learn; (5) there does not appear to be substantial differences between females and males; (6) approximately 7 % of children could be considered chronic cases from childhood to adolescence.

The comparison between developmental trajectories of theft and physical aggression provides the best evidence that the developmental origins of antisocial behavior cannot be understood by aggregating the different forms of antisocial behavior. Frequency of physical aggression decreases substantially from the preschool years to the end of adolescence, except for a very small group, while frequency of theft apparently increases for all from 10 years onwards at the latest (van Lier, Vitaro, Barker, Koot, & Tremblay, 2009). This developmental difference makes it hard to understand why diagnostic categories, developmental theories, etiological studies, and studies meant to test preventive and corrective interventions aggregate physical violence and theft assessments (e.g., Lahey et al., 2008; Moffitt & Scott, 2008; Tremblay, Pihl, Vitaro, & Dobkin, 1994; Wilson

& Lipsey, 2007). Physical aggression and theft have different destructive consequences (person vs. property), are at opposite ends of the overt-covert continuum, and require different skills (brawn vs. brain). There are good reasons why infants start by physically aggressing to obtain property rather than commit simple theft: they do not have the cognitive control needed for the covert behavior, but they have the strong desire and enough impulsive brute force for the overt behavior. It seems obvious that physical violence and theft require different bio-psychosocial skills and different interventions are needed to prevent or correct these problems. Yet, they have been systematically aggregated to create antisocial behavior and conduct disorder scores and developmental taxonomies. Unfortunately, there is a paucity of studies on theft during the early years. We need to study theft more attentively before the age when self-reporting becomes reliable. It is clear that taking things from others (with and without force) starts during early childhood, and it is most likely that the individual differences in the frequency of this behavior are as stable as physical aggression. What is changing with time is the type of property which is stolen. The chronic stealer is likely to steal the stylish red Tonka car at 3 years and the stylish red BMW at 17 years. However, it appears clear that theft (without use of force or threat), like indirect aggression, substantially increases among

humans with increased cognitive ability and opportunity. Interestingly, although extremely disruptive for victims and society, the more skilled at these covert behaviors generally manage not to get caught.

Early Bio-Psychosocial Mechanisms for the Development of Chronic Antisocial Behavior

Research on the development of antisocial behavior during early childhood has helped understand the early environmental risk factors for chronic trajectories of antisocial behavior (Tremblay, 2010). Most of these risk factors can be identified prior to or at the start of pregnancy: mother's behavior problems during adolescence, mother's poor education, mother's first pregnancy at a young age, mother's depression, mother's smoking during pregnancy, dysfunctional relations between mother and father, and low family income.

There is also good evidence from quantitative genetic studies (mainly twin studies; e.g., Arseneault et al., 2003; Dionne, Tremblay, Boivin, Laplante, & Pérusse, 2003; Lacourse et al., 2014) and molecular genetic studies (Enoch, Steer, Newman, Gibson, & Goldman, 2010; Fergusson, Boden, Horwood, Miller, & Kennedy, 2011) that genetic factors are strongly implicated in differences of antisocial behavior observed during early childhood. For example, genetic factors accounted for 80 % of the variance in the frequency of aggression by twins at 18 months of age (Dionne et al., 2003) and a large part of the variance in frequency of aggression change over time (Lacourse et al., 2014).

New evidence from gene expression studies (epigenetics) suggest that the numerous environmental risk factors related to the mother may start to have their impact on the child's developing brain and eventual self-control problems during fetal life, and soon after, through their impact on gene expression. The first study to point in that direction was done with rats a decade ago (Weaver et al., 2004). We now have good evidence that the quality of the prenatal

environment impacts the expression of genes that are essential for the normal development of our brain (Meaney, 2010). Offspring of women who have a history of behavior problems, who smoke, drink alcohol, and are exposed to abuse, are at high risk of gene expression problems during the prenatal period. These gene expression problems, in turn, lead to brain development problems and self-control problems. Recent longitudinal studies of males and females from low socioeconomic environments show that those with chronic physical aggression problems during childhood have different gene expression profiles and different brain functioning profiles when compared to individuals from the same deprived economic background who did not have aggression problems (Guillemin et al., 2014; Provençal et al., 2013; Wang et al., 2012). Other studies have shown that children from low socioeconomic environments present a greater risk of brain development problems, but only if the family environment has serious deficits (Nelson, 2013). For example, Luby et al. (2013) showed with a longitudinal study that children growing up in poverty have reduced volumes of the hippocampus mainly if they were living in a family environment that lacked support and was hostile.

Summary

- The prevention of antisocial behavior should start at the beginning of life for at-risk children. Figure 3.4 presents a global summary of the potential mechanisms discussed above:
 - Developmental trajectories of antisocial behavior from early childhood to adulthood are the consequence of genetic and environmental endowment.
 - The early environment is created by the parents' own developmental history and has a major impact on antisocial behavior development through its impact on gene expression and brain development.
 - Mothers appear to have the greatest impact on early gene expression.

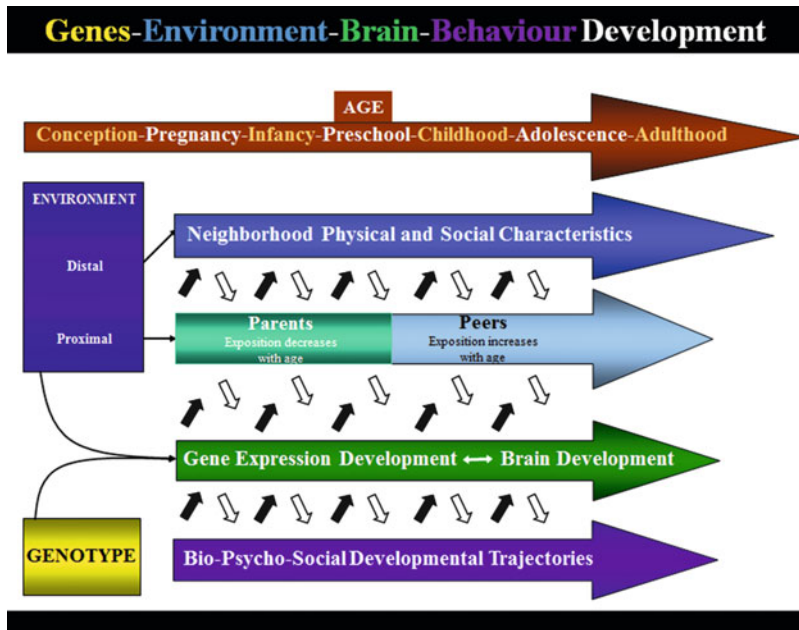


Fig. 3.4 Genes–environment–brain–behavior development

- As children grow older the larger environment (represented here by peers) has an impact on antisocial behavior, partly through gene expression.
- The genetic and environmental effects on antisocial behavior development also have numerous other negative effects, such as mood disorders, obesity, allergies, asthma, substance use, school achievement, and unemployment.
- The evidence presented above suggests that the easily identifiable early environmental risk factors for the different forms of antisocial behavior are similar and relate most strongly to the mother.
- Most of these risk factors can be identified prior to or at the start of pregnancy: mother's behavior problems during adolescence, poor education, first pregnancy at a young age, depression, smoking, dysfunctional relations with the father, and poverty.
- Although sex of the child, a genetic characteristic, is by far the most robust predictor, we need to completely revisit our thinking about prevention of chronic antisocial behavior:
 - males are much more affected, but females should be our prime target to prevent a new generation of males and females with chronic antisocial behavior.
 - It is clear that the perinatal bio-psychosocial environment that impacts gene expression is very largely related to pregnant women's health status and lifestyle. This epigenetic perspective suggests that successful prevention of antisocial behavior may be easier to achieve by ameliorating the early environment rather than chasing bad genes (Bernet, Vnencak-Jones, Farahany, & Montgomery, 2007; Gluckman, Hanson, Cooper, & Thornburg, 2008).
 - It is important to emphasize that mothers, fathers, and children should not be blamed for the genes and the environment that they inherit at conception. The main argument here is that we need to give intensive support to at-risk parents from conception, at the latest, to help children become more responsible citizens and prevent other generations of victims from these intergenerational transmission mechanisms.

Future Research Needs

- We need intergenerational studies that simultaneously focus on individual bio-psychosocial development, family development, and neighborhood development to understand the complex interactions between these three levels of causes. Twin studies are especially important to disentangle genetic and environmental factors.
- We especially need experimental preventive interventions with at-risk pregnant women and with “soon to be pregnant” adolescent and young women. These studies need to assess early and late developmental outcomes at the epigenetic, brain, and behavioral levels from early childhood to adulthood. These experimental studies should also include twin pairs.

Marc Le Blanc’s Contributions

From the content of this chapter the reader will understand that I am not well placed to discuss Marc Le Blanc’s contributions to developmental criminology that does not take into account developmental origins of antisocial behavior. However I am well placed to describe his contribution to the developmental origins studies described above. Marc and I started our academic careers at the University of Montreal in the early 1970s and studied juvenile delinquents in the same Montreal residential treatment center (Le Blanc & Tessier, 1978; Tremblay, 1976). Marc started his career in the School of Criminology and I started mine in the School of Psychoeducation. He initiated a longitudinal study of juvenile delinquents (Le Blanc, 1992) and I initiated a longitudinal-experimental study of kindergarten boys at high risk of juvenile delinquency (MLES; Tremblay, Vitaro, Nagin, Pagani, & Séguin, 2003). We eventually created a joint interdisciplinary graduate seminar on psychosocial development of delinquency. A few years later, when I became head of the School of Psychoeducation, Marc offered to leave the

School of Criminology as well as the International Centre for Comparative Criminology (CICC) to become a Professor in the School of Psychoeducation and a member of the Research Unit on Children’s Psychosocial Development (GRIP) that I was creating with a large interdisciplinary group of colleagues from different universities.

The timing was excellent because the MLES kindergarten boys were reaching age 10. This meant we could use the self-reported delinquency questionnaire that Marc and his colleagues had created for their study of juvenile delinquency based on Hirschi’s (1969) work. We also used the questionnaire for another longitudinal study of first grade children in Montreal schools (Le Blanc, Ouimet, & Tremblay, 1988; Tremblay, Le Blanc, & Schwartzman, 1988). I still remember vividly the discussion we had when Marc first analyzed the age 10 self-reported delinquency data of the MLES which included a retrospective component (At what age did you first do . . .?). Marc wanted to highlight the fact that many boys were reporting that they had started to commit delinquent acts 5 and 6 years earlier (age 4 and 5) and I argued that we could not rely on long-term retrospective information from 10 year olds because it was unlikely the children could remember accurately that far back, some were probably simply boasting and others may not have understood the question. However, these results (Le Blanc et al., 1991) contributed to my growing conviction that we needed a prospective study from birth onwards to understand when humans start to commit acts that are eventually “labeled” delinquent and understand the very early bio-psychosocial mechanisms that are involved.

A few years later, with an interdisciplinary group of colleagues, I initiated a series of large scale birth cohorts to study antisocial behavior from infancy onwards while Marc continued to focus on juvenile delinquency. I think that the converging and diverging paths of our careers are a good illustration that scholars who focus on a specific type of problem, such as crimes, or a specific age period, such as adolescence, find it very hard to go back to the developmental origins

of their initial area of interest, even for those who strongly believe in the importance of an interdisciplinary developmental approach. Part of the problem with criminology, even developmental criminology, is the lack of a life-span developmental bio-psychosocial approach to the training of criminologists. However, this problem is not specific to criminology. For example, in medical disciplines such as cardiology and oncology most investigators continue to limit their focus on the obvious disease period, although there has been accumulating evidence over the past 25 years that the developmental origins of many of the cardiovascular diseases and cancers can be found during pregnancy (e.g., Barker, 2012). Marc Le Blanc already made an important contribution to Criminology in the 1970s by integrating the psychological and social perspectives within a developmental context. In the 1980s he clearly understood the importance of early childhood development and even had the courage to leave the Criminology School that had trained him to join the rival Psychoeducation School and help create a research group that pioneered the bio-psychosocial developmental origins approach to antisocial behavior. The students that we trained in the “bio-psychosocial developmental origins perspective” in the past two decades have now become young professors even in the Criminology School. There is hope that very soon criminology will be a bio-psychosocial developmental science with a strong early childhood and intergenerational perspective. Merci Marc.

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Matt DeLisi

Introduction

Traditionally, criminologists have gravitated toward two general schools of thought when attempting to explain the causes and correlates of crime. One perspective is general and big picture and often relies on a single omnibus construct that serves as the primary cause of crime. It is believed that persons who have this omnibus construct or risk factor are more inclined to engage in diverse forms of criminal behavior irrespective of context and across life. Conversely, those who lack this omnibus construct, or who have much lower levels of it, are thus buffered from committing crime. The main champions of this approach over the past 30 years or so are Gottfredson and Hirschi (1986, 1987, 1990) and Hirschi and Gottfredson (1983). Most criminologists, however, take a more complex and specific perspective and point toward many constructs working together in multifaceted ways to explain crime. This second view is developmental, dynamic, and nuanced. Marc Le Blanc is a champion of this developmental perspective.

Just as there are theoretical debates about the causes and correlates of crime, there are also differences of opinion at understanding the

basic sociodemographics of antisocial behavior; for the current chapter, the sociodemographic variable of interest is age. To a generalist, the association between age and criminal offending is a brute fact. It does not require explanation because it is a constant seen in offending data across nations, across historical periods, across data sources, across sample composition, and across forms of problem behavior.

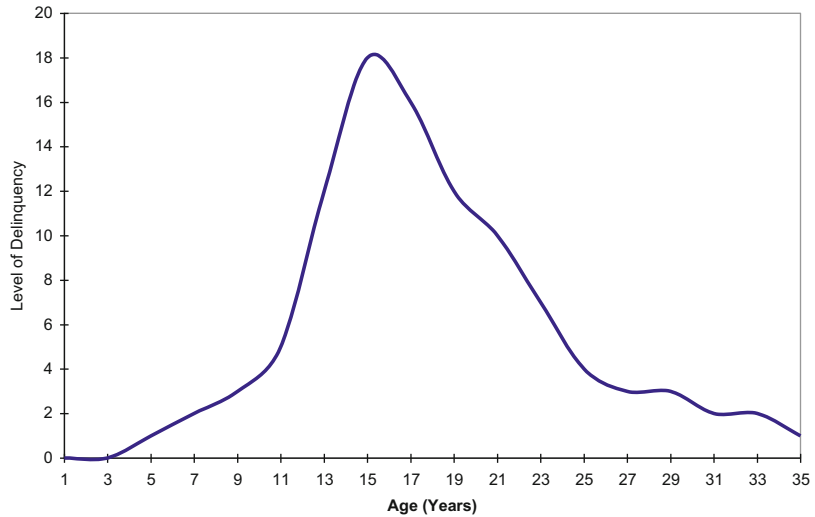
As illustrated in Fig. 4.1, the involvement in crime emerges in adolescence, increases sharply to a peak in late adolescence or early adulthood, and then plummets toward zero for the rest of the life course. The familiar age–crime curve reflects the prevalence of offending and is an aggregation of the individual offending pathways in a sample of population. What is remarkable about the age–crime curve, and what drove Gottfredson and Hirschi to theorize that it is invariant and inexplicable, is that the same general shape is found across historical eras, samples, and data sources.

Specifically, Hirschi and Gottfredson argued (1983, p. 581), “Age is everywhere correlated with crime. Its effects on crime do not depend on other demographic correlates of crime. Therefore it cannot be explained by these correlates and can be explained without reference to them. Indeed, it must be explained without reference to them.” From this vantage, the age–crime curve is both invariant and inexplicable.

In the three decades since their landmark paper, there have been many empirical reactions to it. At issue was the fundamental way to

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Fig. 4.1 The age–crime curve



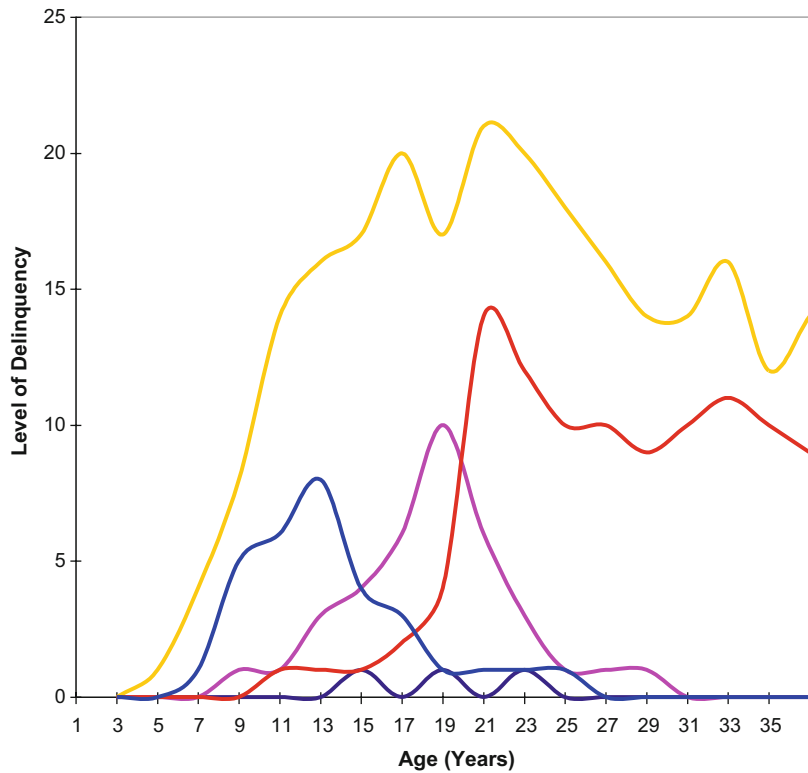
approach the understanding and study of crime—is it general or developmental, or both? Some studies have generally supported their invariance and/or inexplicable hypotheses (Britt, 1992; Le Blanc, 1997a; Steffensmeier & Streifel, 1991; Shavit & Rattner, 1988; Tittle & Grasmick, 1997; Wikström, 1990) using various sources of data. Other studies were equivocal (Brame & Piquero, 2003; Marvell & Moody, 1991; Shavit & Rattner, 1988; Steffensmeier, Allan, Harer, & Streifel, 1989; Tittle & Grasmick, 1997) about the age–crime relationship, while others were more critical (Blumstein, Cohen, & Farrington, 1988a, 1988b; Farrington, 1986; Greenberg, 1985).

Without question, the primary foils to the invariant, general, inexplicable approaches of Gottfredson and Hirschi have been criminal career researchers. In his own landmark paper, Farrington (1986) identified several weaknesses with the invariant hypothesis. First, Farrington observed that although aggregate age–crime patterns look very similar, there are subtle but important variations in age-offending patterns (see Fig. 4.2). Second, although the curve shows the importance of adolescence in terms of understanding delinquency, most crimes that are committed across the life course are committed by adults—offending that is not really captured by the curve. According to Farrington (1986, pp. 235–236, italics added):

Age–crime curves for individuals are likely to be very different from the aggregate curve since current evidence suggests that incidence does not increase or decrease systematically between onset and termination. The aggregate age–crime curve peaks at about sixteen to seventeen, with the peak age of acceleration at about fourteen to fifteen and of deceleration at about eighteen or nineteen. These peaks in acceleration and deceleration, which probably coincide with peak ages of onset and termination, *are likely to identify ages at which important developmental changes are occurring.*

The age–crime curve not only reflects the prevalence of antisocial behavior but also reflects legal responses to that offending. Recently, MacLeod, Grove, and Farrington (2012) studied 100,000 offenders from seven cohorts selected from the Home Office Offenders Index from the UK. They found two general categories of offenders, those who are low risk and offend at a low rate (most offenders are this type) and those who are high risk and offend at a high rate. They found no evidence of a low-risk, high-rate offending group. They also found residual evidence of a high-risk but low-rate offending group and in the summary chapter of their book, the authors acknowledge three groups of offenders: high-risk/high-rate, high-risk/low-rate, and low-risk/low-rate. According to MacLeod and his colleagues (2012), the proportion of offenders across cohorts is essentially constant and that the proportion of offenders in

Fig. 4.2 Individual age–crime curves or trajectories



each of the risk/rate categories is substantially constant across birth cohorts.

In an interesting theory, MacLeod et al. (2012) suggest that the offending behavior of criminals is assumed to remain the same throughout their active careers and only is reduced when offenders decide to cease offending after repeated convictions. They assert that the age–crime curve is more correctly reflecting the age–conviction curve and that the dramatic upsurge in offending during late adolescence, peak, and then sharp decline simply reflect the increased use of formal sanctions that are applied to adults as opposed to children and adolescents. Thus, the age–crime curve really is a criminal justice response curve to otherwise constant offending behavior. Interestingly, the authors report that cohort declines in offending reflect the proportion that have chosen to cease offending and do not reflect intrinsic reductions in the predilection toward offending. From a correctional perspective, prison wears down offenders to the point where they ultimately

decide to desist—they do not transform their moral behavior.

Although most of the scholarly debate about the age–crime curve has been just that, scholarly, there are also important policy issues. Recently, Loeber (2012) summarized the state of research on the age–crime curve and observed there are important issues relating to prevention and juvenile justice interventions. Three points are particularly important. First, since the age–crime curve presents the prevalence of offending, crime can be reduced by lowering the peak of the curve, reducing the base of the curve, or both. Lowering the peak and reducing the base of the age–crime curve reduce the number of active offenders; thus, policies that enhance desistance from crime not only create sizable reductions in the age–crime curve but also reduce offending generally. Second, most serious and violent offenders are located on the downslope of the age–crime curve. In this way, programs that lower the tail end of the curve will affect the volume of serious criminals in the population.

Third, the higher and longer downward slope of the curve reflects a larger part of the population who have not yet desisted from crime. This part of the curve also represents offenders who did not start offending until adulthood, which is a relatively new finding in the literature. Taken together, shrinking the age–crime curve has important real-world implications in terms of the magnitude of offending in a population.

Theoretical and Empirical Variations and the Age–Crime Curve

Despite the strength with which Hirschi and Gottfredson discussed the invariance of the age–crime curve, and the putative futility of using criminological constructs to explain it, there have in fact been many constructs offered as explanations of the age–crime curve. At times, however, these explanations are as contentious as the basic age–crime debate between Hirschi and Gottfredson and their critics. One example is delinquent peers. Based on data from the National Youth Survey, Warr (1993) examined the associations between differential association variables and self-reported delinquency among participants between ages 11 and 21. He found that exposure to delinquent peers readily explained the age–crime curve. Moreover, when various peer variables were statistically controlled, the effect between age and delinquency was largely rendered spurious.

Stolzenberg and D'Alessio (2008) produced very different findings about the role of deviant peers and the age–crime curve based on a massive sample of 466,311 criminal arrests from National Incident-Based Reporting System (NIBRS) data. Their analyses produced no evidence for the assertion that co-offending patterns between juveniles and adults (a behavioral indicator of antisocial peers) explain why crime explodes during adolescence, peaks in early adulthood, and then steadily declines. In addition, Stolzenberg and D'Alessio (2008) found that age–crime curves for solo offending and co-offending were not conditioned by sex, race, or offense type.

Another contentious interpretation of the age–crime curve centers on the role of economic status. Using aggregate data from California, some investigators (Brown & Males, 2011; Males & Brown, 2014) suggest that the age–crime curve is somewhat illusory in the sense that adolescence represents a significant developmental period that corresponds to delinquent behavior. Instead, they suggest that poverty is the ultimate determinant of criminal behavior and that the age–crime effect is primarily due to the poverty that youth experience. Their work has been sharply critiqued on methodological grounds (Shulman, Steinberg, & Piquero, 2014a, 2014b). In an empirical test, Shulman and her colleagues (2014b) analyzed data from the National Longitudinal Survey of Youth97, a longitudinal study of nearly 9,000 adolescents. Even when controlling for variation in economic status, they found that criminal offending peaked during late adolescence and declined, consistent with the age–crime curve and contrary to the claims of Males and Brown.

In a theoretical attempt to explain the age–crime curve, Kanazawa and Still (2000) utilized concepts from evolutionary psychology to understand both age and sex differences in offending. Evolutionary psychology is a discipline which suggests that adaptive problems occurring in human history lead to evolved psychological mechanisms that contribute to an organism's fitness or survival. Natural selection equips individuals with many psychological features—most of them subconscious—to solve various environmental problems, reproduce, and hence survive. These concepts relate directly to the association between age and crime because of the reproductive benefits and costs of competition for important resources.

Kanazawa and Still (2000) provide four central points in their evolutionary explanation of the age–crime curve. First, they argue that males will commit the overwhelming majority of all violent and property crimes in every society because evolved psychological mechanisms render them more competitive as males seek reproductive success through

interpersonal violence and the appropriation of resources (e.g., theft). Conversely, females do not compete as intensely for mates (Kanazawa and Still acknowledge that their theory cannot explain crime among females). Second, they argue that younger males overwhelmingly commit violent and property crime and suggest that males between ages 15 and 34 commit most of the incidence of crime in the world is an empirical fact. Third, Kanazawa and Still (2000) suggest that sexual competition increases male's tendency to commit crime. Since crime is a byproduct of attempts to compete with other men to gain reproductive access to women, then antisocial behavior should increase along with intrasexual competition (or during the steep incline in the age–crime curve). Fourth, the authors theorize that married men are less likely to commit all forms of crime because their marital status represents successful attainment of the goal to gain reproductive access to women. In this way, the marriage–desistance link is not indicative of changes in peer dynamics or daily activities, but instead is rooted in evolved adaptive mechanisms.

The age–crime relationship and the contours of the curve have also been explained from a neuroscientific perspective. Although youth has always been understood as a life stage characterized by poor decision-making, impulsivity, daring, and a lack of foresight, there are neurological reasons for this. In Steinberg's (2010, 2013) dual systems model, the sharp uptick in the age–crime curve corresponds to an adolescent behavioral repertoire that is characterized by impulsivity, risk-taking, sensation-seeking, and a strong interest in social and emotional rewards. These psychosocial traits overwhelm the self-regulatory capacity of juveniles whose prefrontal regions are not fully developed (compared to adults). In other words, adolescence is a period of life where the frontal/cortical regions of the brain are ill equipped to regulate drives and impulses from subcortical regions. However, in the early years of adulthood, frontal regions continue to mature which denotes increased capacity for self-

regulation, for impulsive control, and for inhibited inappropriate emotions and behaviors. Neurologically, adolescence is a perfect storm for the quick emergence of self-regulation problems and adulthood is the maturing process that dampens these problems.

It is clear from multiple theoretical perspectives that the age–crime curve does not represent a brute empirical unfolding where all forms of crime are equally likely to occur. Instead, the prevalence of crime is inversely related to its seriousness. Thus, the age–crime curve can be thought of as stepping stones toward a more serious and troubling behavioral repertoire. A general rule of thumb is there is progression in delinquency as individuals commit somewhat incrementally more serious forms of crime (although it is important to note this is by no means a linear process).

In their seminal work on developmental criminology using longitudinal samples, Le Blanc and Loeber (1998) and Loeber and Le Blanc (1990) have shown a general progression of minor delinquency, alcohol use, and cigarette use occurring prior to age 10 years. From these beginnings, youth tend to engage in more moderate and then serious forms of delinquency and “graduate” to marijuana use. During early to middle adolescence, the progression continues to include the use of harder drugs, such as cocaine, and drug dealing. For example, Kazemian and Farrington (2005) compared various measures of offending onset using data from the Cambridge Study in Delinquent Development. The average onset of offending was age 11 years. The average onset for vandalism was between ages 11 and 12 and for shoplifting was about age 11. Burglary emerged around age 14 and motor vehicle theft began between ages 15 and 16.

A hallmark of the developmental perspective is that constructs have differential predictive validity on various forms of crime at different ages. Loeber et al. (2012) found significant associations between cognitive impulsivity and more serious forms of delinquency, including violence, but did not find associations with minor forms of offending, such as theft.

A variety of other age–crime curves have been studied. Stolzenberg and D’Alessio (2008) found evidence that solo offending and co-offending follow the same general patterning across life, but that the height of the curve for solo offending is 2–4 times greater than for co-offending. Moreover, they found that the rate of growth in solo offending is 68 % faster than the rate of growth in co-offending between ages 8 and 18. They also found differences in the decline of the age–crime curve. Between the ages of 18 and 23, solo offending decreased by 14 % but co-offending decreased by 55 %.

In a study of 553 adult male sex offenders incarcerated at a maximum security federal institution in Canada, Lussier and Healey (2009) examined the age–crime relationship among persons convicted of a range of sexually based offenses. Their findings were mixed. Some largely countered the traditional age–crime curve and indicated that sex offenders curve is much later than other offenders. About 37 % of their sample had a self-reported criminal onset during childhood or adolescence, but nearly 63 % reported their first criminal acts during adulthood. The official age of onset for their criminal careers indicated a mean onset age of 30.5 years ($SD = 13.3$) with a range between 16 and 75 years. They also found that early-onset sex offenders engaged in more crime generally and desisted slower which is consistent with a propensity-based argument (also see, Cale & Lussier, 2012).

The age–crime curve among sex offenders is partially driven by sexually based constructs that serve to drive this particular form of offending. For example, Cale and Lussier (2011) found that higher levels of mating effort and higher levels of sexual drive were associated with early onset and higher frequency sexual offending into adulthood compared to offenders without these characteristics. In sum, although offenders as a whole tend to reduce their offending as they get older, the various points on the age–crime curve represent distinct forms of offending that emerge at various ages.

The Age–Crime Curve and Criminal Careers

In the middle to late 1980s, criminal career researchers (e.g., Blumstein, Cohen, Farrington, and others) were the primary opposition to an invariant, inexplicable hypothesis about the relationship between age and crime. Today, criminal career research is noteworthy in three ways in terms of advancing knowledge on the age–crime curve. First, criminal career designs often employ longitudinal data that allows for investigations into the developmental course of crime across critical stages of the life course. Second, criminal career research is closely allied with biosocial research (DeLisi & Piquero, 2011; see also Loeber, Byrd, & Farrington, 2015) that has shown how various biological, neuropsychological, temperamental, and social features unfold over the period of time that is captured by the age–crime curve. Third, and most importantly, criminal career studies are rooted in the very interdisciplinary, developmental approach that Le Blanc and his colleagues popularized (Le Blanc, 1997b, 2005, 2006; Le Blanc & Fréchette, 1989; Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990).

Criminal career researchers have also been somewhat successful at muting the alleged differences between the invariant view of the age–crime curve and the dynamic view of criminal careers. Indeed, recently investigators have noted that there is compatibility between “static” constructs like those espoused by Gottfredson and Hirschi and the developmental course of crime over the age cycle. For example, DeLisi and Vaughn (2008) fused these arguments by examining the effects of low self-control on various dimensions of the criminal career using data from a statewide near population of confined juvenile delinquents in the USA. They found that individuals who scored one standard deviation above the mean on a measure of low self-control were more than five times as likely to have a habitual criminal career. In addition, self-control was an effective classification variable of career criminality and effect

sizes for a linkage between low self-control and the criminal career were large.

The extremity of offending that is seen in the most severe offenders illustrates the unpredictable developmental course of the most serious criminal careers. In a matched samples comparison of 500 offenders with a minimum of 30 career arrests to 500 randomly selected adult arrestees, DeLisi and his colleagues (2014) recently showed that the most chronic of offenders continue to commit crime at high frequency and with high seriousness even decades into adulthood. In their data, the extreme career criminals committed crime at levels that were between five and nearly 50 times higher than “normal” criminals, themselves who were also a high-rate offending group. Moreover, the extreme offenders continued to commit crimes such as murder, rape, kidnapping, and armed robbery throughout their 40s and 50s. The main point from their study was that although extreme offenders are less active at age 50 than they were at ages 17–25, they are still much more antisocial and violent than normal criminal offenders are at any age.

Without question, the clearest example of a compromise in the view of the age–crime curve as reflecting static or dynamics processes is Le Blanc’s integrated personal control theory. In a variety of works (Le Blanc, 1997b, 2005, 2006, Le Blanc & Bouthillier, 2003), Le Blanc’s theory substantiates the existence of both a general deviance factor and four developmental pathways that flow from this general factor. The first is a reckless behavior pathway that includes motor vehicle use, sexual activity, substance use, disorderly conduct, and gambling. The second is an authority conflict pathway that addresses disagreeable behaviors in school (e.g., defying authority, truancy, assaulting teachers, school suspension) and at home (e.g., defying parents, disobedience, staying out late, running away, assault against parents). The third is a covert pathway that encompasses theft behaviors (e.g., shoplifting, burglary, thefts from vehicles, receiving and selling stolen goods) and fraud behaviors (e.g., using false identification, lying, entering without paying, monetary fraud). The

fourth is an overt pathway that includes vandalism and violent acts, including fighting, assaults, gang fights, sexual assault, and intimidation. In more recent works (e.g., Le Blanc, 2005), Le Blanc added a sexual aggression element to the overt violence pathway.

Empirically, Le Blanc and colleagues have provided strong evidence for a general deviance syndrome as well as specific criminal behaviors that emerge at specific points during the life course. In other words, Le Blanc’s developmental approach is appealing to those who favor syndrome-based accounts of the age–crime relationship and to those who see multiple careers or pathways across the age–crime curve. There are many exciting examples of this criminal career approach using samples from a range of nations.

Using data from the Criminal Career and Life Course Study, which includes several decades of conviction data from approximately 5,000 offenders in the Netherlands, Petras, Nieuwebeerta, and Piquero (2010) reported evidence of declining offending with age across age, sex, and marital statuses. They interpreted these as being consistent with Hirschi and Gottfredson’s invariant explanation and not consistent with criminal career perspectives about different types of offenders.

Based on data from the Pittsburgh Youth Study, Fabio, Tu, Loeber, and Cohen (2011) evaluated the relationship between neighborhood disadvantage and the age–crime curve and produced several key findings. First, neighborhood disadvantage significantly influenced the shape of the age–crime curve. Boys from disadvantaged neighborhoods engaged in more violence and continued their offending for a longer period than their more affluent peers. At age 14, 11 % of boys from disadvantaged areas engaged in violence and the prevalence peaked at age 19 at 13 %. After, violent involvement declined.

In average neighborhoods, Fabio and colleagues found that the age–crime curve increased from 4 % in early adolescence to a peak of 7 % at age 18, and then a sharp decline to 1 % by age 24. In advantaged neighborhoods,

the age–crime curve peaked at age 13 (8 % prevalence) and decreased to 0 % by age 23. There was a clear gradation in the age–crime curve by neighborhood advantage. In disadvantaged areas, the involvement in violence is higher, peaks later, and takes longer to decline to one-half of its peak compared to more advantaged areas.

Another study employing data from the Pittsburgh Youth Study demonstrated the relevance of cognitive impulsivity and intelligence to the age–crime curve (Loeber et al., 2012). These constructs were found to variably relate to offending across adolescence and adulthood. Low intelligence and high cognitive impulsivity were associated with a more steep and rapid upslope in the age–crime curve and a more rapid decline into late adolescence and early adulthood. Low intelligence was linked to a higher probability of being charged with a crime across the parameters of the age–crime curve. However, impulsivity was linked to the age–crime curve only among boys with higher levels of intelligence. Overall, they found these psychosocial characteristics have their greatest impact on the age–crime curve during its peak in middle to late adolescence, but afterward the effects decline significantly (Loeber et al., 2012).

Substantively similar findings were found based on data from the Cambridge Study in Delinquent Development and the Montreal Two Samples Longitudinal Study. Kazemian, Farrington, and Le Blanc (2009) examined the predictive capacity of cognitive dispositional factors and social bonds in explaining crime through age 32. They found that it is difficult to utilize measures from ages 17–18—at the run-up and peak of the crime curve—to forecast the decline in offending into adulthood. Kazemian and her colleagues (2009) also found that improvements in self-control as reached in adulthood were significantly correlated with reductions in offending seriousness, and these effects were seen in both British and French-Canadian samples, and using self-reports and official records.

From a panoramic theoretical perspective, Sweeten, Piquero, and Steinberg (2013)

empirically re-examined the assertion that the age–crime curve is inexplicable using longitudinal data from the Pathways to Desistance Study. The authors were able to empirically control for a wide range of theoretically meaningful variables across the developmental period from ages 15 to 25. These measures included employment and marital status to evaluate social control theory, exposure to deviant peers and gang membership to evaluate social learning theory, costs, and rewards of crime to evaluate rational choice theory, perceptions about the fairness and legitimacy of the criminal justice/legal system (to evaluate procedural justice theory), victimization and relationship problems to evaluate strain theory, and self-regulation, moral disengagement, and impulse control to evaluate psychosocial perspectives.

Across the 10-year period, these variables explained 69 % of the decline in the age–crime curve—a resounding retort to the idea that the age–crime curve cannot be explained by criminological variables. Sweeten and colleagues (2013) also found that various theoretical perspectives were differentially associated with the crime decline. Social learning (49.2 %), strain (40.5 %), psychosocial (33.7 %), and social control (25.8 %) theories were the strongest explanations for its decline. Smaller effects were found for rational choice theory (18.1 %) and procedural justice theory (3.3 %).

The age–crime curve has also been resuscitated by the biosocial paradigm which is particularly active among criminal career researchers. A main contribution from this research area is the importation of “new” constructs from the biological sciences that correspond to the developmental course of the age–crime curve. For example, Collins (2004) suggests that the onset and sharp desistance of antisocial behavior that corresponds with the age–crime curve is readily explained by an understanding of various neurotransmitter systems, such as dopamine, serotonin, norepinephrine, and γ -aminobutyric acid, or GABA. Collins suggests that dopamine, an excitatory neurotransmitter that is associated with approach-oriented behaviors, increases during

adolescence and then declines around age 20 just as the age–crime curve is in its free fall. Similarly, the inhibitory neurotransmitter GABA declines during the first two decades of life and then reaches a steady state around age 20. Youth is characterized by increases in norepinephrine and declines upon adulthood.

Similarly, Walsh (2009) illustrates that the developmental course of the age–crime curve is compatible with hormonal and neurological changes that accompany the transition from childhood to adolescence to adulthood. And these biological developments conceptually correspond to a rapid rise in problem behavior followed by a rapid decline upon maturity. The aforementioned discussion of neurotransmitter systems is significant given their role in temperament and personality models (Cloninger, 1987; Cloninger, Svrakic, & Przybeck, 1993).

Neuropsychological development of personality traits is another biosocial approach to understanding the age–crime curve. For instance, Blonigen (2010) reviewed several longitudinal studies and found clear evidence that Neuroticism, Negative Emotionality, and Disagreeableness decline from late adolescence into early adulthood while there are moderate to large increases in Conscientiousness and self-control constructs, such as Constraint (see also Morizot 2015). These changes in personality equate to fewer opportunities or motivation to offend based on personality functioning. For example, Blonigen found that Negative Emotions, such as anger and hostility, declined from 10 % to 50 % across the span of the normal age–crime curve. Agreeableness increased from 9 % to 14 % and Constraint increased from 10 % to 34 %.

The age–crime curve has motivated scores of studies and attracted the attention of criminologists since Quetelet’s seminal observations about the effect of age on crime in the 1830s. It is important to note, however, there are real-world criminal justice implications of the age–crime curve. Several landmark United States Supreme Courts cases over the past quarter century utilized theory and research from studies of the age–crime relationship to revisit, and ultimately proscribe the most severe

criminal sentences for juveniles. In *Thompson v. Oklahoma* (1988) the Court held that capital punishment for persons under age 16 years was unconstitutional in part because of beliefs about the socio-emotional functioning and decision-making deficits of adolescents.

Over time, neuroscientific findings about the neurodevelopmental deficits among adolescents contributed to new assessments of their criminal responsibility. In recent years, the Court held that because of the logic of dual systems theory and related research, many criminal punishments were inapplicable to juveniles. The results were decisions to render capital punishment of juveniles unconstitutional (*Roper v. Simmons*, 2005), to render life imprisonment without parole for juveniles convicted of non-homicide offenses unconstitutional (*Graham v. Florida*, 2010), and to render life imprisonment without parole for any offense for juveniles unconstitutional (*Miller v. Alabama*, 2012). These decisions explicitly addressed the developmental issues that seem to make adolescents vulnerable to antisocial behavior. Implicitly, these decisions harken the sharp increase in problem behaviors and then its sudden decline that is embodied by the age–crime curve.

Summary

- The age–crime curve has served as the object of contentious debate among criminologists who variously view the age effect on crime as invariant and inexplicable to those who view age effects on crime as developmental and readily explained by theoretically meaningful variables.
- In the aggregate, the age–crime curve looks remarkably similar across data sources and historical periods, but individual offending trajectories can and often do look quite different from the aggregate curve.
- A host of constructs from sociology, psychology, neuroscience, and biosocial perspectives explain variance in the age–crime curve. These include personality

- developmental, fluctuations in neurotransmission, socioemotional functioning, and others.
- Prospective longitudinal studies and other methodological advances in criminal careers research have shown new ways to understand the effect of age on crime.
 - Basic findings about the effects of age and crime have found their way into criminal justice policy in recent years in US Supreme Court decisions that have reduced the severity of criminal punishments that can be applied to juvenile offenders.

Future Research Needs

- Le Blanc's integrated personal control theory was an early integrated theory that appealed to both syndrome and developmental perspectives about crime. However, theories of crime still tend to not integrate a personal control or propensity component into their explanatory perspective. New ideas are needed to complement the approach pioneered by Marc Le Blanc.
 - Criminal career scholars have identified an assortment of developmental trajectories in offending across the life course, but there is little scholarly agreement about the ideal number of trajectories, or whether there should be. More refinement on trajectories of crime is needed.
 - Although Gottfredson and Hirschi were sharply critical of longitudinal research, there is mounting evidence that self-control explains many life outcomes and behaviors over time. How do longitudinal studies support invariant arguments? In what ways can these studies highlight the developmental course of seemingly static constructs, such as self-control as theorized by Gottfredson and Hirschi?
 - Typological theories, such as Moffitt's developmental taxonomy, are in some ways compatible with research on the age-crime relationship and in some ways are different. Do typological theories challenge understanding of the age-crime relationship?
- In terms of public policy, criminologists need to articulate how much crime could be reduced or precluded by altering the peak and base of the age-crime curve. Monetization studies could be useful to quantify estimates of crime savings to give the age-crime curve a more criminal justice appeal.

Marc Le Blanc's Contributions

Marc Le Blanc's research is central to developmental criminology, criminal careers, the age-crime curve, and other areas, and in many respects, he was ahead of his time in his focus on criminal propensity and its biosocial etiology. Several of his contributions warrant additional consideration.

First, Le Blanc avoided the often polemical positions of earlier arguments about the age-crime curve and the relevance of criminal careers generally and understood that both general and developmental perspectives are salient to criminal careers. Le Blanc's comprehensive, hierarchical model contains both a general deviance construct that is consistent with syndrome-like explanations (e.g., Jessor and Jessor, Gottfredson and Hirschi, Wilson and Herrnstein, and others) and that is consistent with developmental pathways (e.g., Loeber, Farrington, Sampson and Laub, Patterson, and others) that recognize the various ways that youth begin and perpetuate their offending careers.

Second, Le Blanc's developmental perspective incorporated many quantitative and qualitative changes that typify criminal careers. His concepts included degree, direction, velocity, and decline that allowed a nuanced understanding of the growth, acceleration, deceleration, and shrinkage of the age-crime curve. His qualitative insights centered on the developmental sequences of offending careers, the innovation and retention of types of offending, the synchrony between types of antisocial behavior, and paths that persons follow along the course of their criminal career.

Third, Le Blanc's work was frank in its appraisal of the most serious offenders, and he is one of the few criminologists to explicitly discuss criminal propensity as a driving force of variation in criminal careers. Thus although he advocates a developmental position, he did not deny the challenges posed by the most persistent offenders (Le Blanc & Fréchette, 1989).

Fourth, Le Blanc's personal control theory makes use of reciprocal, directional, and even retroactive effect in articulating the ways that social status, biological capacity, bonds, allocentrism (personality generally), prosocial models, and constraints are associated with deviant behavior. His theory was multidirectional and multifactorial years before most criminologists thought about these issues (ironically, his work cites quotations from Quetelet who was similarly ahead of his time, see Le Blanc, 2005, p. 147).

Finally, criminal career scholars rely heavily on Le Blanc's work to empirically articulate ways that offending careers begin, gain velocity, continue, decline, desist, and terminate and bring much needed specificity to the age–crime curve seen nearly two centuries ago.

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Why Developmental Criminology Is Still Coming of Age: The Influence of Biological Factors on Within-Individual Change

5

Rolf Loeber, Amy L. Byrd, and David P. Farrington

With the founding in 2012 of the Division of Developmental and Life-Course Criminology, the study of the temporal dynamics of delinquent offending and its causes has come of age and a new impetus has been created to advance developmental studies of both offending and its causes. For the senior author of this chapter the origins of developmental study of offending started with the writing with Marc Le Blanc in 1988 of a first manifesto of developmental criminology inspired by many of our colleagues (“Toward a developmental criminology”), which was published two years later (Loeber & Le Blanc, 1990). Since that time, the chapter has been cited almost 500 times in the scholarly literature, which indicates how well other authors have, either positively or negatively, responded to the chapter. In a subsequent sequel, entitled “Developmental Criminology Updated,” Marc and the senior author further expanded the theme, which was published in 1998 (Le Blanc & Loeber, 1998). Reflecting on these publications, the senior author recalls with fondness working with Marc, his clear conceptualization of difficult concepts concerning changes over time, and his vision for the future of developmental criminology. Marc certainly taught the senior author very much, helped him to grow into

a developmental criminologist, and helped to develop the three longitudinal studies started by him and his colleagues, the Pittsburgh Youth Study, the Developmental Trends Study, and the Pittsburgh Girls Study.

Marc and the senior author’s initial approach to developmental criminology focused on the specification of dynamic outcomes, such as the age of onset, the continuity in, and the desistance from offending. With an eye on causation of within-individual change over time, we reviewed developmental theories in criminology and particularly focused on social influences in young people’s environment, including their parents, teachers, siblings, and peers. However, aside from establishing causation, insufficient focus was given to the role of biological factors on the development of individuals’ offending. In the present chapter, we will briefly discuss how to best estimate causation in developmental and life-course criminology because this will set the stage for the discussion on the influence of biological factors on individuals’ offending patterns, particularly the explanation of between-individual differences in offending compared to within-individual differences of offending with age. In the process of this review, we first seek to challenge biological studies to explain within-individual differences in offending as reflected in the age–crime curve. Second, we are interested in biological research that might explain changes in brain functioning as a result of systematic interventions. Third, we are interested to examine the role of biological

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factors to advance the screening of individuals at risk for serious delinquency, including violence.

Estimating Causes

Much has been written about the study of putative causes of offending (e.g., Farrington & Loeber, 2013; Murray, Farrington, & Eisner, 2009; Sampson, Winship, & Knight, 2013); in this chapter, we focus on some key biological elements. The major threats to the interpretation of causes come from the following:

- Reliance on correlates rather than predictors of offending.
- Not taking into account third factors that predict outcomes but which are not causal.
- For between-group comparisons of putative causes, the presence of inadequate comparison groups.
- Establishing causes between individuals instead of causes within individuals, with studies on between-individual differences suffering from more potential confounds than studies on within-individual differences. The advantages of the search of causes of within-individual differences lie in the fact that many factors associated with a given individual are controlled (or are the same) in these analyses, but this is not true for between-individual analyses.
- Along that line, examining by means of within-individual analyses whether events (such as marriage, having children, entering the work force) experienced by some individuals are followed by a change in their offending frequency.
- Choice of sample, with inferences about causation being very different when based on a normative sample (e.g., community sample) compared to a select sample (e.g., prisoners). Normative samples are best for the study of causes of the onset, continuity, and desistance from offending. In contrast, select samples, such as known delinquents, population samples, or individuals on parole, are best for the study of the causes of reoffending, or

the causes of desistance among former offenders.

It is well known that key demonstrations of causality are difficult to achieve even with carefully executed longitudinal data. Superior tests of causality are quasi-experimental analyses or, even better, randomized trials in which some participants receive a particular intervention consisting of the modification of putative causal factors, while randomized controls receive no intervention. It should be understood, however, that most interventions attempt to change more than a single target, and that for that reason, inferences about causality in randomized intervention trials are not always conclusive.

Biological Factors

There is a flourishing literature on the biological bases of delinquency. Among the most recent overviews of biological factors are Adrian Raine's *The Anatomy of Violence* (New York, 2013) and Susman and Polak (2013), which extend to other major publications such as Hodgins, Viding, and Plodowski's *The Neurobiological Basis of Violence* (Oxford, 2009), and Raine, Brennan, Farrington, and Mednick's *Biological Bases of Violence* (New York, 1997). In this chapter biological factors include brain functioning (Séguin, Pinsonneault, & Parent 2015), neurotransmitters, physiological arousal, neurotoxins, genetic influences, and gene-environment interactions (Beaver, Schwartz, & Gajos, 2015). Raine (2013) succinctly summarized that genes influence brain structures and brain structures influence violence. More directly, genes influence neuroreceptors and neurotransmitters (such as serotonin, MAOA, and 5-HT). The major brain structures relevant to violence are frontal and limbic/subcortical, with the latter operating through the amygdala and the hippocampus, and the anterior cingulate insula. Where we (Loeber & Pardini, 2008) differ from Raine (2013), pointed out that the relationship between biological factors and violence at the behavioral level is not always direct, but that the impact of biological factors on

violence often is mediated by underlying factors such as impulsivity or anger (e.g., Blair, 2012), and at early stages of development, less serious forms of aggression.

Critique of the Nonintervention Biological Studies

The promise of biological factors explaining delinquency and violence, although often touted, has only been partially realized (e.g., Burt & Simons, 2014). Loeber and Pardini (2008) found that the vast majority of biological studies of delinquency and violence show cross-sectional associations between the two rather than being based on biological factors predicting later delinquency outcomes (but see Jennings, Piquero, and Farrington (2013) showing that resting low heart rate predicted total and violent convictions up to age 50 and Aharoni et al.'s (2013) error-related brain activity predicting subsequent rearrest). Whereas Ortiz and Raine (2004, p. 154) found that low resting heart rate was the best-replicated biological correlate of antisocial and aggressive behavior, a recent meta-analysis of 115 effect sizes of resting heart rate versus antisocial behavior by Portnoy and Farrington (2014) found that there were only 15 effect sizes based on prospective studies while *none* of the studies reported effect sizes based on within-individual changes in offending.

It is not uncommon that postdiction happens in studies, with biological factors linked to past rather than future delinquency outcomes (e.g., Pardini, Raine, Erickson, & Loeber, 2014). Moreover, Loeber, and Pardini (2008) reported that “if longitudinal analyses were executed, they usually focused on comparison between deviant and nondeviant groups rather than on developmental types of offenders (e.g., early versus late-onset offenders) or developmental change in offending (e.g., persistence versus desistance from offending). Thus, neurobiological studies that treat the dependent variable of violence as a dynamic phenomenon have been relatively rare” (p. 2492). This applies to the explanation

of the age–crime curve in offending, developmental pathways toward serious violence, desistance processes, and different developmental types of offenders (Loeber & Pardini, 2008, p. 2492).

Further, here is evidence for a GxE (gene–environment interaction), whereby exposure to early maltreatment was more likely to lead to antisocial behavior among those carrying a specific genotype (low activity MAOA) (e.g., review by Taylor & Kim-Cohen, 2007). In recent years the focus on identifying genes has shifted to the search for gene–environmental interactions. A recent meta-analysis by Byrd and Manuck (2014) focused on normative samples, and found no main effect for MAOA but that MAOA genotype moderated the association between early life adversities (maltreatment and other adversities) and later aggressive and antisocial outcomes ($p = 0.0044$). However, the authors failed to find replication for females. This may be linked to the fact that the gene encoding for MAOA is located on the X chromosome—since males only have one X chromosome and females have two X chromosomes. In addition, the results were much stronger for cross-sectional than for longitudinal studies ($p < 0.0045$ vs. $p = 0.019$). The available studies show that the interaction is specific to early maltreatment and does not hold for “environmental factors” or “early adversity” broadly speaking. It remains unclear why this would be the case. In addition, Duncan, Pollastri, and Smoller (2014) have pointed that replication has not always taken place in the largest samples, which would have the biggest statistical power to detect interaction effects.

In summary, studies have documented a single gene–environment interaction in several studies. These studies are based on comparisons between individuals and have not been studied yet on within-individual change in behavior over time. In addition, it is highly plausible that other genetic main or interaction effects remain to be discovered.

Most of the biological literature can be criticized for not being oriented to

developmental approaches to offending, and not explaining within-individual changes in delinquency. Instead, the focus of most biological studies of crime has been on between-individual differences and has assumed trait-like features of antisocial behavior or offending in those individuals who are thought to differ in their antisocial or delinquent propensity. Individual differences, also called the trait approach to the study of behavior (Morizot, 2015), is a key element in several theories, including Gottfredson and Hirschi (1990), Moffitt (1993), and Patterson, Reid, and Dishion (1992). Although understandable, there are major limitations to accepting the trait approach to offending. The key assumptions of the individual difference approach are that individual differences originate in childhood, that there is a relative high stability of behaviors over time, and that individual differences stay approximately the same over time. As we will elaborate below, the biological explanation of individual differences needs to be complemented by a biological explanation of within-individual changes over time.

Loeber and Pardini (2008) pointed out that scholars often have assumed that individual differences in neurobiological factors associated with violence are stable over time. The notion of stable individual differences is usually based on a rank ordering of individuals and whether such rank ordering is stable over time. Less often considered is whether the relative ranking between individuals remains constant with development. The relative proportional stability of individual differences is not supported by two types of data. First, the vast majority of trajectory models that distinguish between different categories of individuals, with each category following a distinct development outcome (Piquero, 2007; Piquero, Reingle Gonzalez, & Jennings, 2015), show distinct differences among categories of individuals who appear to be small at some ages and larger at other ages. Second, individuals tend to differ in terms of their age-crime curve, but these differences are not constant along the curve; instead, the differences are the largest at the peak of the curve, and much smaller in the upslope or

downslope of the curve. Thus, the notion of stable, unchangeable individual differences in offending is probably wrong and individual differences may be larger at the peak of the age-crime curve than in the upslope or the downslope. This means that individual differences do exist but may be initially modest, then increase, and later diminish over time.

What is less clear however, is to what extent, the *downslope* age-crime curve is reflective of other forms of development, particularly the growth of internal controls and the decrease of impulsivity and sensation seeking and how these changes are linked to changes in brain functioning. Loeber and Farrington (2012) postulated that changes in internal controls with increasing age can be gauged by the following:

- More mature judgment.
- Better decision making in offending opportunities.
- Better executive functioning, reasoning, abstract thinking, planning.
- Less influenced by immediate undesirable consequences than longer term possible desirable consequences.
- Better impulse control, less likely to take risks and commit crimes for excitement and more likely to make rational prosocial choices.
- Better emotion regulation and self-regulation.
- Less susceptible to peer influences.
- Avoidance of self-harm.

Thus, the idea is that the peaking and falling in offending is directly correlated with the rise, peaking, and fall in impulsivity, sensation seeking, and several forms of cognitive and emotional self-control and under-control. Monahan and colleagues (2009) postulated that improvement in self-control during adolescence may explain desistance from delinquent behavior, presumably in the downslope of the age-crime curve when most desistance takes place (Loeber & Farrington, 2012; Moffitt, 1993). Although this seems plausible, there is no doubt that desistance from offending can take place prior to adolescence, during the earlier part of the age-crime curve. Thus, there can be desistance from offending for early-onset cases who subsequently desist in late childhood, while also

desistance is known to take place during early adolescence (Loeber & Farrington, 2008). Loeber, Pardini, Stouthamer-Loeber, and Raine (2007), using longitudinal data from the Pittsburgh Youth Study, found that *none* of the cognitive, physiological, parenting, or community factors, measured at age 16, predicted young men's desistance from offending between ages 17 and 20. In summary, there are currently no known physiological predictors of desistance from offending, and the biological underpinning of desistance, if any, remains unknown (see Kazemian, 2015).

Scientists have focused much more on the explanation of the downslope rather than the *upslope* of the age-crime curve. For example, Steinberg and colleagues (Steinberg et al., 2006) postulated a maturity gap that emerges in adolescence, with the body maturing (as evident from sexual development), accompanied by heightened sensation seeking and risky behaviors but also accompanied by a delay in the maturation of the brain in producing control mechanisms. Steinberg referred to this as "starting the engines without a skilled driver" (Steinberg et al., 2006). This mom-and-pop "mechanism" requires a better scientific explanation and formulation of a testable set of hypotheses of the mechanisms involved. A cross-sectional comparison between adolescents and emerging adults using proton magnetic resonance spectroscopy in a small number of subjects suggested frontal lobe GABA receptors maturation in the frontal brain (Silveri et al., 2013). Although a promising finding, only repeated measurements of brain functioning can demonstrate that GABA maturation and no other plausible mechanisms operate.

Genetic research may provide a clue for developmental-phase specific changes because genetic effects do not necessarily operate over the full life span, but may become active in certain age periods such as adolescence. Burt and Mikolajewski (2008) presented some evidence that specific candidate genes are associated with adolescent-onset antisocial behavior. As another example, early exposure to stress affects the HPA (hypothalamic-pituitary-adrenal) axis—(Van Goozen, 2005). Although there are many

between-individual studies linking biological factors to delinquency and violence (see Raine, 2013), it remains unclear which biological factors can best explain the upslope and downslope of the age-crime curve for individuals. In addition, we do not know of biological factors that can explain escalation in the severity of offending that typically covaries with the shape of the age-crime curve.

The key question here is whether there are biological factors that are absolutely constant that can explain the age-crime curve or escalation patterns, or whether we need to think more about biological factors that change along the age-crime curve and influence its shape. Thus, most of the biological studies have not examined the extent to which biological factors emerge over time in individuals, change within individuals, and gradually exert their influence over delinquent behavior. Therefore, there is an urgent need for studies examining brain maturation in longitudinal follow-up samples. In addition, since interventions often focus on the reduction of impulsive behavior and the improvement of self-control, the impact of interventions on brain development is a very worthy topic of study (see below).

Although the age-crime curve appears universal, there are important variations of the curve which are associated with differences between individuals. Particularly, as we will see, the height of the curve is different for different populations, and the width of the curve is smaller in some populations and broader in other populations. The study of the variations in the shape of the age-crime curve is important because it tells us which possible causal factors are at play.

Almost all knowledge about the age-crime curve is based on cross-sectional data and rarely on the repeated measurements of delinquency of the same participants. Some important variations in the age-crime curve are: (a) the curves are higher for participants living in disadvantaged neighborhoods (Fabio, Tu, Loeber, & Cohen, 2011); (b) the curves tend to be higher for youth with cognitive impulsivity in early adolescence (Loeber et al., 2012); (c) the curve tends to be higher for youth of low intelligence (Loeber

et al., 2012); (d) the curves can be dramatically higher for some compared to other birth cohorts (Loeber & Farrington, 2008); and (e) the curves tend to peak earlier for females than males (Farrington, 1986).

Thus, there are important differences between individuals in the height and, possibly, the width of the age-crime curve. In that way, the age-crime curve represents both normative *and* deviant development. The normative development of the age-crime curve is that most youth appear to go through the age-crime curve. However, the deviant aspect of the age-crime curve is that some individuals experience a much higher and broader age-crime curve than others.

We want to conclude this section with one key other issue: the explanation of gender differences and within-gender explanations of antisocial behavior among girls. This neglected area needs to be advanced. For example, we need answers to the following questions: Why does the MAOA interaction with abuse not apply to girls? What is the genetic component of girls' antisocial behavior? What are the biological causes of the earlier peaking of the age-crime curve for females compared to males? Are there biological reasons for a larger proportion of adult-onset of antisocial behavior in females compared to males?

Interventions and Subsequent Brain Changes

To return to within-individual change over time, a key question in brain research is whether it is possible to demonstrate that specific functions of the brain change as a result of intervention to promote self-control and decrease offending. Thus, the key issue for interventions is whether there are possibilities to speed up decreased impulsivity and increased brain maturation, especially for vulnerable categories of youth. One of the advantages of the study of brain changes comparing pre- and posttreatment conditions is that they require data collection of within-individual differences over time and as

such are important to the study of biological mechanisms underlying antisocial/behavior.

There are a few projects that have examined neural changes associated with treatment of children, of which we will highlight the study by Woltering, Granic, Lamm, and Lewis (2011). The authors studied children undergoing SNAP Treatment (Stop Now And Plan), a program to stimulate self-control in acting out children. The study found that, prior to treatment, the boys referred for externalizing behavior problems tended to process more from the ventral region of the brain (the "threat" center). The post-treatment examination of the children after 12 weeks showed marked improvements in their behavior using standardized behavioral rating measures and the brain measurement no longer showed hyper-firing in the ventral region. The children also reported that they were more relaxed and were less anxious (not feeling as threatened). This improvement was also reflected in the boys' performance on the Go/No-Go Points task, which was formulated as an anxiety-inducing game with the promise that "You get an amazing prize if you win." However, anxiety induction was used by programming the game so that the boys lost all points halfway through the session. The researchers examined differences in brain activation when the boys tried to inhibit their impulses and expected dorsal activation to increase as a function of treatment (they're going to exert more "top-down" control of their emotions). The Woltering et al. (2011) study is one of Pre-Post Intervention Studies showing pre-post changes in brain function following interventions aimed at impulse control. What is less clear, however, is the exact mechanism involved in the pre-post changes, and to what extent they concern anger or anxiety, or a combination of these. There is much need for replication of these pre-post intervention studies using within-individual brain measurements over time.

In addition, Brody and colleagues (2013) have pointed out the need for intervention researchers to undertake genetically informed randomized prevention trials, which focus on GxI (gene/intervention interactions) and their effects on mediators and intermediate processes related to

deviance (Brody et al., 2013). Although the authors focused on drug use and psychopathology as outcomes, their conceptualization could also be applied to delinquency and violence.

Screening Using Biological Factors

If basic biological factors are as important as is often claimed (e.g., Raine, 2013), to what extent is such information useful for practical purposes? One of these purposes is the screening of youth at risk for serious forms of delinquency. To the best of our knowledge, there are no screening instruments that have incorporated information on MAOA, heart rate, or any other biological measure other than gender (see reviews by Hoge, Vincent, & Guy, 2012; Le Blanc, 1998).

Summary

- This chapter emphasized the role of biological factors in intraindividual changes in criminal and antisocial behavior. We focused on gene–environment interactions and the limitations of the research to date.
- Most biological studies to explain delinquency and violence relied on between-individual differences, have been cross-sectional, and have not sufficiently dealt with the within-individual changes in offending during development, including the age–crime curve.
- Currently, biological factors are not included in the most used screening instruments to identify youth at risk for reoffending.
- We also reported on how intervention studies can approximate changes in brain functioning and that there is a future for genetically informed intervention randomized trials. According to Raine (2013, p. 59): “We stand on the threshold of unlocking many untold secrets of our genetic makeup. . .” of antisocial and violent behavior. However, this promise has yet to be fulfilled.

Future Research Needs

We advocate research in the following areas of the interaction between biological and environmental factors:

- Explanation of the upslope and the downslope of the age–crime curve, particularly in terms of biological factors explaining within-individual changes in offending and changes in putative underlying factors such as impulsivity and sensation seeking.
- Replication of findings in females of biological factors that apply to males and better explanations of why in certain instances biological factors explain in one gender but not the other.
- Better pinpointing which areas of the brain show changes in functioning as a result of successful interventions.
- The use of genetically informed interventions that can shed light on crucial mediating processes.

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Developmental Trajectories and Antisocial Behavior Over the Life-Course

6

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Introduction

Since the origins of criminology as a discipline, researchers have taken a keen interest in not only the causes of crime, but more importantly when offending begins, why some persons continue offending—and for how long they offend, and why other persons desist. Focusing on the nature and patterning of criminal activity, then, necessitates a longitudinal orientation, one that describes the patterning of offending over the life-course.

Early research at the turn of the twentieth century provided important but much-needed basic evidence regarding what has come to be referred to as the age–crime curve (see DeLisi,

2015; Tremblay, 2015) or the observation that, in the aggregate, criminal activity begins to increase during the teenage years, peaks in late adolescence, and then declines thereafter. The development of new statistical modeling techniques and, most importantly, the collection and analysis of pivotal data sources (such as the Glueck Delinquent Study, the Cambridge Study in Delinquent Development, the Philadelphia Birth Cohorts, the Racine Birth Cohorts, the National Youth Survey, and the three Causes and Correlates of Offending Studies) have ushered in an exciting set of research findings regarding criminal careers over the life-course. As these findings took hold, theoreticians began to develop theoretical frameworks that paid close attention to the distinct life-course stages of development (infancy, childhood, adolescence, adulthood) and how and why externalizing and internalizing, antisocial, delinquent, and criminal behavior manifests across those periods. Finally, the past 20 years of criminology have brought about a new area of theoretical and empirical work, termed developmental/life-course criminology, that joins together advances in methods, theory, and data from several disciplines in order to better articulate and understand developmental patterns of antisocial and criminal behavior (see Farrington, 2003, 2005; Gibson & Krohn, 2013; Thornberry, 1997).

In this chapter, we provide a broad overview of developmental trajectories and antisocial behavior over the life-course by considering both recent

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theoretical work on developmental criminology as well as the methods used—and findings emerging from those methods—to study developmentally based offending patterns. We conclude with some thoughts on where priorities for future research should be placed over the foreseeable future, especially with respect to methodological and empirical work on assessing developmental trajectories of offending.

Overview of Developmental Criminology

Although social scientists have long studied the potential variation in the causes, correlates, and patterning of criminal behavior, the modern study of developmental criminology can trace its foundational roots to the seminal National Academy of Sciences report on criminal careers and career criminals. In that report, Blumstein et al. (1986) outlined a framework that partitioned an individual's criminal career from its onset to desistance, and all offending dimensions (such as offending frequency, specialization, co-offending, escalation, and career length) in between. Combined with a spirited set of discussions in the criminological literature over the relationship between age and crime (Hirschi & Gottfredson, 1983) that continue to the present day (Sweeten, Piquero, & Steinberg, 2013), insights from psychological and sociological thought regarding human development, and the "aging" of longitudinal studies, the research on criminal careers has brought about several theories and frameworks that were grounded in the idea that antisocial and offending behavior develops in methodical ways throughout the life-course. Further, this line of thought has led us to the understanding that the correlates of the onset of delinquency or offending can be different from the correlates of persistence and desistance from criminal behavior. Therefore, there may be such great variation in these correlates of offending, continuity, and desistance, within the overall offending population such that a general theory of crime (e.g., one that presumes that the causes of crime are the same among all offenders

in all contexts and periods in the life-course) overly simplifies the actual patterning of offending developmentally.

Developmental (and life-course) criminology, as a theoretical framework, traces its post-criminal careers report to the works of Le Blanc and Fréchette (1989) and Loeber and Le Blanc (1990), both of whom sought to integrate insights from the larger field of development (mainly from psychology, but also sociology) and apply this knowledge to better understand antisocial, delinquent, and criminal behavior over time. Notably, Le Blanc and Fréchette's (1989) book, *Male Criminal Activity from Childhood through Youth*, was one of the earliest and most comprehensive investigations of criminal activity from childhood to adolescence using a sample of delinquent male youth and a comparison sample of non-delinquent male youth in Montreal. Most importantly, this work provided evidence regarding the importance of integrating empirical research on the offense, offending, patterns of offending, and parceling out various aspects (including the processes associated with acceleration, stabilization, and deceleration) of offending. Picking up on these themes, Loeber and Le Blanc observed that, at that time, the current state of criminological theory viewed the correlates and patterning of all offending and the various offending dimensions as static and not dynamic in nature. Importantly, although Loeber and Le Blanc did not dismiss the relevance of static influences or continuity in offending patterns, they did observe that *time* was also an important component of offending careers. That is, criminal careers are marked by changes or transitions that may occur at either age-graded periods of the life-course, or throughout the life-course in potentially unplanned and unpredictable ways. Since their review, subsequent theoretical work yielded an important array of developmentally based theories that serve to describe, understand, and predict offending over the life-course (see reviews in Le Blanc & Loeber, 1998; Thornberry, 1997). Before we review some of the more prominent perspectives, we begin first by highlighting what we believe is a strong theoretical backdrop for

these perspectives that emanated from the influential work of Le Blanc.

One important recognition made early on by Le Blanc's theoretical (Loeber & Le Blanc, 1990) and empirical (Le Blanc & Fréchette, 1989) research was that the developmental course of offending involved both qualitative and quantitative processes (Le Blanc, 1997, p. 272). Qualitative differences in the mechanisms of activation (or onset) of offending, escalation of criminal behavior, and the decline from participation in crime occur within and between individuals, and, as a result, distinct patterns of offending can characterize criminal behavior over the life-course. As noted by Le Blanc (p. 272): "...criminal activity... is activated through an acceleration of the frequency of offending, a diversification of the types of offenses committed, and a stability of offending across time. In addition, individual offending becomes increasingly severe for persistent offenders, they move from minor offenses, to average and then major property offenses, then to serious personal offenses. Finally, there is a gradual desistance through a deceleration of the frequency of offenses, a de-escalation and a diminution of the variety of offenses committed." Additional processes are believed to facilitate transitions across various stages of criminal behavior, including maturation, adaptation, and socialization, and development is hypothesized to be either "chaotic" or "ordered" in nature (Le Blanc, 1997, p. 273). Le Blanc's work has not only been influential for the delineation of his own developmental theory of crime but also in informing other developmental theories that consider unique typologies of offenders (Le Blanc & Loeber, 1998; Loeber & Hay, 1994). With this historical background information in hand, we review two of the most influential developmental theories, one typological and one general: Moffitt's (1993) developmental taxonomy and Laub's and Sampson (1993) age-graded informal social control theory.

Moffitt's (1993) developmental taxonomy argues that the commonly depicted relationship between age and crime masks important variation within the population of offenders. In the

original statement of the theory, she hypothesized that there are two distinct types of offenders (and a group of non-offenders, termed abstainers), each of whom offend for different reasons and each of whom display different pathways of offending. The largest type, adolescence-limited offenders, closely follows the aggregate age-crime curve, beginning their offending in early adolescence, rising to a peak in late adolescence, and desisting as they enter early adulthood. The reasons given for adolescence-limited offending can be located in the interaction between what Moffitt referred to as the "maturity gap," or the recognition that adolescents look and feel like adults; however, they are not permitted adult-like privileges, and the adolescent peer social context, which is comprised of similarly-situated youth all of whom covet the outcomes (status, money, excitement), associated with "adult"-like behaviors. Thus, involvement in offending among this group is centered primarily around drug and alcohol use, theft, and vandalism—all acts that bring about a display of autonomy. Importantly, as adulthood ensues, former adolescence-limited offenders are granted the roles (and outcomes) they once coveted and thus turn away from delinquency and crime. In stark contrast to this more normative group of adolescents, a very small group of life-course-persistent offenders begin their offending careers early in the life-course, oftentimes in infancy and early childhood (see Tremblay et al., 1999). These youth engage in age-appropriate aggressive behaviors such as hitting and kicking and continue exhibiting delinquent behaviors throughout the remainder of childhood and into the teenage years (theft, drug use). Upon entering and throughout adulthood, life-course-persistent offenders turn toward more common, age-appropriate crimes (violence, fraud, etc.). Unlike their adolescence-limited counterparts, life-course-persistent offenders engage in antisocial behavior as a result of an interaction between neuropsychological deficits, as well as disadvantaged familial and socioeconomic environments. This personality/environment interaction goes largely uncorrected and becomes a prominent feature of the

life-course-persistent person's personality; one that begins to infiltrate other life domains such that the individual suffers in education, employment, relationships, and so forth. As a result of these deficits, the prospects for change among life-course-persistent offenders are minimal.

One extension and one modification to Moffitt's original typology are worth highlighting. Regarding the former, Moffitt (1994) has provided some level of expectations regarding the manner in which sex and race/ethnicity differences would characterize placement across the two offending typologies. Specifically, she argued that adolescence-limited offending would be open to both males and females as well as to all race/ethnic groups equally; however, life-course-persistent offending would be mainly limited to males, as they tend to suffer from more neuropsychological deficits compared to females. Minorities—especially African Americans—are also at elevated risk for life-course persistence in their offending patterns because, as a group, they tend to suffer from the most disadvantaged familial and economic environments (see Piquero, Brame, & Moffitt, 2005). Most recently, Moffitt (2006) has observed, based on research conducted since the publication of her theory (e.g., Nagin et al., 1995), that a third offender group, low-level-chronic offenders, is also present in many longitudinal studies. This group offends at a steady rate but does not evince the high frequency of offending that is anticipated among the life-course-persistent offenders.

There has been much research on Moffitt's typology. In general, these findings have provided some support for the two-group typology in that, in many longitudinal analyses, seems to support the presence of offending patterns that resemble those anticipated by Moffitt, and that the taxonomy-expected correlates are able to distinguish between them. At the same time, empirical research also offers some challenges to the taxonomy. For example, some studies show that there are more than two or three groups of offenders that are unanticipated by Moffitt's taxonomy and that some life-course-persistent offenders either recover from their early high-

rate offending in early adulthood and/or desist in mid-adulthood. Extensive reviews of empirical research assessing Moffitt's developmental taxonomy may be found in Moffitt (2006), Piquero and Moffitt (2005), and Piquero, Diamond, Jennings, and Reingle (2013).

Lastly, we present Laub and Sampson (1993) age-graded informal social control theory. Unlike the typological approaches that have characterized much of developmental criminology, these authors expect that offending careers are marked by both stability and change, but importantly they do not allow for the complexity of unique offending groups to be part of the processes underlying crime over the life-course. In this regard, their theory is developmental but not typological, and can be viewed as a middle-ground approach with developmental/typological theories being the more complicated and static/non-typological theories (e.g., Gottfredson & Hirschi, 1990) being the least complicated.

Beginning with classic social control, which predicts a higher likelihood of offending when an individual's bond (to friends, family, society) becomes weak or broken, Sampson and Laub emphasize the role of age-graded informal social control both early and especially later in the life-course. Specifically, these theorists recognize the importance of stability in offending across developmental periods but also stress that the majority of delinquents do not continue their offending into adulthood. In attempting to explain this pattern of change, they turn to the importance of informal social bonds in adulthood, such as employment and especially marriage, as potential transitions (or "turning points") that redirect previously criminal paths. Thus, both stability and change are key features for Sampson and Laub, but most importantly they offer their age-graded informal social control model as a general theory in the sense that the same theoretical framework should explain the offending patterns of most persons, recognizing of course that different offenders may experience different types of life events, and/or that the effect of these salient life events may have different meaning (and, therefore, have different effects) at different stages of the life-course.

Subsequent to the original depiction of their theory, Sampson and Laub have outlined two additional theoretical processes. First, they integrated aspects of labeling theory into their overall theory by considering how societal reactions (e.g., arrest, conviction, incarceration) to early antisocial behavior can help inhibit prosocial opportunities (e.g., employment) to exit crime, and thus, the process of cumulative disadvantage linking offending over the life-course develops (Sampson & Laub, 1997). Second, as a result of their detailed interviews with several former delinquents in late adulthood (Laub & Sampson, 2003), the authors noted the importance of human agency for offenders taking an active role in persistence or desistance from crime. One key feature of these two modifications is the continual relevance of developmental processes reflective of both continuity and change throughout the life-course.

As can be seen, these and related theories, especially those that anticipate the existence of multiple groups of offenders each of whom offend for unique reasons (Le Blanc & Morizot, 2000; Loeber & Hay, 1994; Patterson, DeBaryshe, & Ramsey, 1989), require longitudinal data and innovative methodological techniques that offer the ability to visualize offending over the life-course. Next, we provide an overview of those approaches and focus on one particular method that was developed primarily to assess heterogeneity in offending throughout the life-course.

Methodological Advances for Studying Longitudinal Patterns of Offending

The traditional analytic approach that would be used to measure criminal behavior over time had centered on “hard-coding” individuals as either “offenders” or “non-offenders” at each time period. Using this method, a researcher would make a post hoc decision as to how to group the different patterns he or she observed. There are several limitations to this method. For instance, it is possible that some individuals

will be chronic offenders¹; however, their data may not be consistent over time (e.g., they stop offending for a year, so the data reflects inconsistent offending), and not all groups of offenders may be present in the data (for instance, chronic offenders may be more likely to have missing data due to incarceration or high rates of residential mobility). Therefore, the analyst relies on placing individuals into groups that probably do not accurately reflect their behavior. By extension, individuals may be grouped by a researcher as “non-offenders” or “offenders,” entirely ignoring the developmental differences in frequency and severity of offending. These decisions may lead to inconsistencies and misclassification of individuals in their offending over time. Of course, this does not imply that these approaches are not useful in many circumstances; in fact, sometimes more advanced modeling techniques are unavailable to a researcher due to a small sample size or insufficient number of follow-up time points. Nevertheless, recognizing that criminal behavior is not stagnant and varies within individuals over time, researchers have developed several methods that permit a more accurate characterization of the patterns of criminal offending over time. In this regard, most recently the modeling of crime longitudinally has been referred to as “person-centered,” because the models specifically focus on the behavior of individual persons over time. This is in contrast to the more common “variable-centered” analyses that assess the relationship between two variables over time (e.g., self-control and violence). There are several methods for person-centered analyses, including latent transition analysis, structural equation modeling incorporating “mixtures” (or differential groups), latent group-based

¹ There are many ways to characterize chronic offending and chronic offenders, but it often involves a mixture of high offending frequency, and in some cases, involves a constant but low offending frequency. As this chapter is concerned with developmental trajectories, their modeling, and their use in criminology, resolution of the precise terminology is not dealt within this chapter (see Piquero, Sullivan & Farrington, 2010).

trajectory analyses, and growth mixture modeling. Importantly, the decision regarding which of the methods to use lies squarely with the research question at hand and the researcher's hypotheses about how the phenomenon is believed to change over time (or age) (Nagin, 2005).

Structural Equation Modeling

Another example of using unmeasured, or latent, variables to predict an outcome is referred to as structural equation modeling (or covariance structure modeling). This type of statistical model can incorporate many unmeasured constructs into a single model, accounting for the independent effects of each. This model can also be conducted without latent variables (using measured or manifest variables only). This manifest model is known as a path model, because it can test the effect of multiple pathways of criminal behavior on one outcome simultaneously. This method can also be adapted to test the life-course perspective by including measures of each typology (e.g., chronic, desistance, escalation) over time, and is highly flexible in the number of groups (e.g., typologies of offenders) that may be included in each analysis.

Structural equation models (SEM) are relatively complex and require multiple stages of analysis before the final model is complete. First, one needs to have a very strong theoretical model that specifies exactly how all variables are interrelated (in our case, the different predictors associated with each typology—abstainer, chronic offender, desister, and/or persister) in the developmental life-course model). A depiction of this model is often useful, with arrows connecting variables that are hypothesized to be related to one another. SEM models should be iteratively fit to the data. For instance, one might develop a model specifically to test their hypothesis. Then, based upon model fit, the model may be adjusted to better fit the data. The new hypothesis should then be informed by the newer model.

Different statistical tests and model fit indices are computed to inform the analyst of how well a

model fits the data (see West, Taylor, & Wu, 2012). Again, these tests of indices may conflict. In that case, theoretical and empirical literature should support the choice of the appropriate model. However, it is important to remember that when testing these models, multiple iterations increase the likelihood that one may be capitalizing on chance (and the relationship one is observing is an artifact of statistical chance).

SEM models are useful in assessing crime over the life-course, as there are many influences at multiple levels that are interrelated to one another, and different offending typologies may have different correlates and predictors. These models allow researchers to test pathways, indirect and mediated relationships, as well as the direct effects of theoretical constructs on criminal behavior over time. SEM models also allow researchers to move closer to determining causal relationships, as the consideration of multiple direct and indirect influences simultaneously reduces the potential for confounding. New developments in SEM allow generalized modeling integrating covariance structure modeling with multilevel and mixture modeling, which may prove quite useful for testing important developmental theories.

Latent Transition Analysis

Latent transition analysis (LTA) is used to measure change in criminal behavior over time. The term "latent" refers to an unmeasured construct, usually antisocial or criminal behavior at each point in time. This variable is constructed from measured variables (known as "manifest variables") at each time point, typically created using factor analytic procedures. These latent variables are measures of the probability that each person is an offender, or belongs to one or more groups, such as abstainers or escalators. For instance, if the manifest variables in the model suggest that a participant was very violent, using multiple indicators of violent behaviors over multiple time points, the probability that this individual will be analytically considered a "chronic offender" is very high. These latent

variables are created at each time point at which one has measures of criminal behavior, and then probabilities of transitioning from one group of offenders (for instance, chronic offenders) to another (non-offender) are calculated. This calculation is computed for each of the possible transitions that may occur for each time point in which data are available. These models are especially useful in predicting escalation or desistance from criminal behavior.

The cross-sectional version of this method is Latent Class Analysis (LCA), and LTA is simply the longitudinal extension of latent *classes* measured at two (or more) time points. Specifically, the “groups” of offenders, known as *classes*, are created at each wave.² For example, an LTA analysis identifies three distinct groups of offenders, one of whom offends at a very high frequency for a long period of time, a group of adolescence-limited offenders, and a group of abstainers (an offending style reminiscent of Moffitt’s (1993) characterization of a “life-course-persistent” offender). Then, descriptive labels, such as “life-course persistent,” are applied post hoc if the probability of *transition* to a non-offender group is low over time (or if it is very unlikely that the individual’s behavior reflects some other offending pathway). Similarly, one would be identified as a “desister” if their behavior were correlated with a high-level offending class in early waves, and then had a high probability of transition to a low-level or non-offending group. The life-course component of this methodology is based upon the ability of one person to change their behavioral patterns over time.

² It is important to note that the “groups” or “classes” that emerge from these (and other methodological techniques) are not meant to verify the true existence of such constellations in the real population. They are merely a heuristic device meant to offer aid in describing unique patterns of behavior.

The Latent Trajectory Methodology

The focus of this review, group-based trajectory modeling, is an easily accessible analytical method that is appropriate for modeling differences in a person’s criminal behavior over the life-course. Specifically, this procedure analytically groups individuals in a dataset into homogeneous categories that best represent their longitudinal offending patterns. In other words, this is an iterative, data driven approach that aids a researcher in determining the number of groups (and the shape of offending patterns) that best represent the data. Two types of trajectory methods, latent group-based trajectory modeling and growth mixture modeling, will be discussed in greater depth.

Latent Group-Based Trajectory Modeling

Several developmental/life-course theories of antisocial and criminal behavior suggest that the aggregate age–crime curve hides distinct groups of offenders, each of whom follows a different longitudinal offending pattern (and for whom the correlates of such patterns vary between the different pathways). In order to empirically assess such hypotheses, there is a need for a methodological technique that permits such an investigation, which is precisely what Nagin and Land (1993; Nagin, 2005, 2010) introduced with their latent group-based trajectory method. Group-based trajectory models (GBTM), which are also sometimes known as latent class growth analyses, group individuals into offending trajectories based upon their patterns, frequency, and/or severity of criminal behavior over time. These model the heterogeneity (e.g., within- and between-person differences) in offending patterns over time. Further, GBTM assigns each individual in the data set to the trajectory to which they have the highest probability of belonging to. Thus, there is always the potential for mis-assignment to occur. These models may be used when there are at least three waves of

data (however, the results are more stable and informative when more waves of data are collected; Eggleston, Laub, & Sampson, 2004), with identical measures of criminal behavior over time. Since its development, this method has been one of the most widely used approaches for investigating longitudinal patterns of offending (Jennings & Reingle, 2012; Piquero, 2008).

Like the other methods discussed above, determining the final solution regarding the number of groups is both a science as well as an art. For instance, an analyst will iteratively conduct multiple trajectory analyses with different numbers of groups and different shapes for each group (for details, see Nagin, 2005). For instance, a researcher may estimate several models in order to determine whether two, three, four, or five unique groups of offenders best characterize the offending patterns observed in the data. Once a researcher has determined the number of groups that best fits the data, s/he can test whether each trajectory shape is properly represented (e.g., is the trajectory linear, quadratic, or cubic?). The optimal number of groups, as well as the appropriate shape of each group, can be informed by different statistical tests and fit indices (see Tofighi & Enders, 2008). Again, as is the case for SEM models, sometimes these statistics may conflict. In those instances, the more parsimonious model might be selected, or the final model is the one that best approximates one's hypothesis or the informing body of literature.

Latent trajectory models are rarely used alone in statistical analysis. They are inherently exploratory in nature, and simply describe the shape of different types of offenders in a specific dataset. Analyses with these variables usually proceed by using these trajectory groups to predict an outcome, or using other variables to predict or distinguish between the observed trajectory groups. In this way, GBTM and regression analyses can work together to incorporate developmental changes (or longitudinal data) into one integrated analytical plan.

Another form of trajectory modeling is known as growth mixture modeling (GMM). In fact, the GBTM just described can be thought of as a special case of GMM where there is no variation within each latent trajectory class. Specifically, "mixtures," or homogeneous groups of offenders who exhibit similar behavior over time, will be characterized similar to the trajectory analysis described above. These mixtures are frequently placed as latent variables into structural equation models, or they may be used alone as independent or dependent variables in a model. A more formal explanation of these models may be found elsewhere (see Petras & Masyn, 2010).

As detailed in this chapter, there are many different options available for studying the longitudinal patterns of offending that have emerged as a result of the work by Le Blanc, Moffitt, Sampson, and Laub. For a researcher today, many analytic options are available to study criminal behavior longitudinally, and selecting the most appropriate option discussed above (latent GBTM, SEM, LTA, and GMM) depends entirely upon the hypothesis and the complexity of the research question. Some models are better able to powerfully model covariates simultaneously with the trajectories (e.g., growth mixtures, LTA), while covariates are handled differently in SEM and latent group-based trajectory analysis. These models also vary substantially in their ease of use (for instance, trajectory analysis is very user friendly). Yet, it is important to bear in mind that the use of any of these particular techniques in and of itself absent an informed research question is not advisable. All decisions regarding which of the available methods to use depends squarely on the research question at hand as well as what the guiding theoretical hypotheses articulate regarding the longitudinal behavior of interest. In sum, each of these methods are useful tools to employ when examining between- and especially within-person heterogeneity in offending over the life-course.

Findings from Developmental Trajectory Research

Developmental life-course trajectory models have been applied in criminology for two decades. While there is considerable variability in the results across studies largely based on differences in samples, measurement, developmental phase of the life-course captured, length of observation, and geographical context, there are some strong consistencies and important summary observations that can be made. The most notable way to synthesize these results center around (1) the number of trajectory groups identified, (2) the types of trajectory groups identified, and (3) the risk and protective factors associated with identified trajectories. The review that follows below draws heavily from the works of Piquero (2008) and Jennings and Reingle (2012) who have conducted summaries of the trajectory-based literature in criminology. It is not meant to catalog every available study and its findings, but instead is designed to provide a broader sweep of key findings.

Number of Trajectory Groups

With regard to the number of trajectory groups identified, prior studies have reported as few as two (Barker et al., 2007; Blokland & Nieuwebeerta, 2005; Broidy et al., 2003; Underwood, Beron, & Rosen, 2009; Yessine & Bonta, 2009) and as many as seven (Bushway, Thornberry, & Krohn, 2003; Jennings, & Maldonado-Molina, & Komro, 2010) developmental trajectory groups. But, the overwhelming majority of the developmental trajectory-based studies have identified four trajectory groups followed by three trajectory groups (see Higgins & Jennings, 2010; Higgins, Jennings, & Mahoney, 2010; Jennings, 2011; Jennings et al., 2010; Jennings, Higgins, Tewksbury, Gover, & Piquero, 2010). Furthermore, the most frequent outcome among those studies that identified four trajectory groups were studies looking at

aggression followed by delinquency and official records of arrest or conviction. By and large, self-report studies tend to identify more trajectory groups than those based on official measures of crime (see e.g., Broidy et al., 2003; Jennings & Reingle, 2012; Piquero, 2008).

Types of Trajectory Groups

Concerning the types of trajectory groups identified, there is a large degree of consistency in identifying trajectory groups described in Moffitt's (1993) developmental taxonomy, e.g., trajectories that resemble the hypothesized shape of adolescent-limited and life-course-persistent trajectories. At times, these trajectory groups are described as "desisters" (adolescent-limited) or "chronics," "persisters," or "high-rate" (life-course persistent) depending on the age of the sample, the characteristics of the sample, and the duration/time period of observation. For example, many studies have not had a sufficient amount of follow-up time to track desistance or identify "life-course-persistent" offenders (e.g., see Barker et al., 2010; Boers, Reinecke, Seddig, & Mariotti, 2010; Bongers, Koot, van der Ende, & Verhulst, 2004; Brame, Nagin, & Tremblay, 2001; Campbell et al., 2010; Connell, Klostermann, & Dishion, 2011), and others than have extended the follow-up into adulthood have found evidence of life-course-persistent trajectories including some that have identified more than one trajectory of life-course-persistent offenders (D'Unger, Land, & McCall, 2002; D'Unger, Land, McCall, & Nagin, 1998; Eggleston et al., 2004; Huesmann, Dubow, & Boxer, 2009; Jones, Nagin, & Roeder, 2001). And at the same time, Laub and Sampson (2003), who studied the offending activity of former delinquents followed to age 70, failed to provide evidence in line with Moffitt's life-course-persistent offender trajectory arguing instead that even the most crime-prone subjects in their sample desisted from crime in mid-adulthood.

Risk and Protective Factors for Distinguishing Trajectory Groups

Turning toward the risk factors that distinguish trajectory groups, there have been a host of developmental trajectory-based studies that have sought to determine the key risk and protective factors that significantly distinguish trajectory group membership. These studies are typically consistent with regard to their analytical strategy in the sense that they first identify the trajectory groups and then they evaluate the risk and protective factors that discriminate the trajectories from one another (e.g., apply the classify–analyze approach) oftentimes using a multinomial logistic regression framework. These types of studies and analytical approaches have produced results that often illustrate that the high-rate and chronic offending trajectory groups generally evince the most risk factors and the least amount of protective factors. Specifically, the high-rate and chronic offending trajectories usually have highest/worst scores on family, peer, school, and neighborhood risk factors and have the lowest/worst scores on protective factors that fall into these domains as well. Furthermore, there has also been evidence that other trajectory groups exhibit varying levels of differential risk and protective factors that can uniquely discriminate them from non-offending trajectories (e.g., Farrington, Piquero, & Jennings, 2013; Piquero, Farrington, & Blumstein, 2007). In addition, these findings have been replicated across gender, race, ethnicity, culture, and geographic location as well (for example, see Chung, Hill, Hawkins, Gilchrist, & Nagin, 2002; Jennings, Maldonado-Molina & Komro, 2010; Jennings, Maldonado-Molina, Piquero et al., 2010; Maldonado-Molina, Jennings, & Komro, 2010; Maldonado-Molina, Piquero, Jennings, Bird, & Canino, 2009; Reingle, Jennings, & Maldonado-Molina, 2011). Therefore, the body of research testing developmental models of offending provides consistent support for many but not all of the

predictions emanating from these theoretical explanations of crime.

In summary, developmental criminology has not only reinvigorated theoretical discussions but also, in part, the development of methodological techniques that provide a mechanism by which to study longitudinal offending patterns. This review has provided a broad swath of some of the main themes, theories, and especially empirical research surrounding the trajectories of offending and while much has been learned as is always the case, there are an array of important questions and topics to be considered.

Summary

- The trajectory methodology has been instrumental in helping criminologists visualize the nature and course of offending over the life-course—and even more importantly the extent to which identified trajectories vary over time.
- We must not lose sight of the fact that trajectories, as an analytic methodology, should serve as a descriptive piece of information about the longitudinal patterning of criminal offending, and that the groups that emerge should not be reified as “existing” in the population.
- Trajectory models can be powerful descriptors of the nature of offending and can help to assess important theoretical debates and offer important questions for future research.

Future Research Needs

- Much of the research drawing on the trajectory methodology has focused on identifying the number and shape of the trajectories as well as studying how different risk and protective factors distinguish between them. Yet, identification of groups can also hold predictive power in the sense that researchers can

take the groups identified and then consider how those groups differ on a variety of outcomes in the future.

- One example of this approach is an analysis that examined how five distinct offending groups identified from the Cambridge Study in Delinquent Development varied in how they related, 8 years later, to a measure of life success. Piquero, Sullivan, and Farrington (2010) and Piquero, Farrington, Nagin, and Moffitt (2010) found differences in this regard, with the most high-rate offenders having the poorest life outcomes. Other research using the Cambridge data has adopted this type of design to examine variation in psychopathy (Piquero et al., 2012) as well as early death (Piquero, Farrington, Shepherd, & Auty, 2014), and much more work can be done along these lines, including examining how trajectory groups perform in employment and interpersonal relationships for example.
- Most of the work on offending trajectories has concentrated on offending while in adolescence and adulthood, which is not surprising given criminology's long interest in delinquency. Yet, insights from psychology have shown that aggression is an important behavior to study in infancy (Tremblay, 2013). As a result, it would be useful to describe variation in antisocial behavior throughout infancy and then to link such trajectories to those considered in adolescence and even adulthood. An important question here is whether those persons identified as the most extreme in infancy also emerge as the most extreme in other periods of the life-course.
- Because many longitudinal data sources were initially based on white (often only male) subjects, there has been much less research undertaken regarding sex and race/ethnic variation in offending trajectories. Although there has been some progress in this area (D'Unger et al., 1998; Jennings et al., 2013; Maldonado-Molina et al., 2009; Piquero et al., 2005), the sex and race/ethnicity differences

that continue to exist necessitate further description and analysis.

- Two of the more interesting questions to emerge from developmental theories is the extent to which an individual's developmental history conditions their response to a turning point and whether the influence of a life event upon an individual's developmental course depends on the timing of the event. Unfortunately, minimal research has been centered on these two questions. One important exception was a study by Nagin, Pagani, Tremblay, and Vitaro (2003, p. 357), who found that a developmental history of physical aggression conditioned the child's response to grade retention, but mixed evidence emerged regarding whether the timing of retention influenced an individual's developmental course. There are a wide range of life events that may influence subsequent offending and these events may vary across sex and race/ethnicity as well.

Marc Le Blanc's Contributions

Le Blanc and Loeber (1993, p. 233) noted the overarching importance of the developmental and life-course-informed research on crime: "[cross-sectional research] has led to a near standstill in the identification of those correlates or risk factors of offending that are also most likely to be causes and hindered the development of another generation of new, empirically-based theories and the development of another generation of much-needed innovative intervention and prevention strategies for reducing delinquency." Fortunately, researchers have heeded to their recommendations such that longitudinal research has become the be-all-end-all for understanding the criminal behavior. The field of developmental/life-course criminology, then, owes a debt of gratitude to the pioneering work of Marc Le Blanc, for his major theoretical and empirical contributions.

Recommended Readings

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Longitudinal Research Designs for Studying Criminal and Antisocial Behavior Development: Lessons from Past and Present Studies

7

Scott Menard

Menard (2002, p. 2) defines longitudinal research as “research in which (1) data are collected for each item or variable for two or more distinct time periods; (2) the subjects or cases analyzed are the same or at least comparable from one period to the next; and (3) the analysis involves some comparison of data between or among periods.” The cases may be individuals, or aggregates of individuals such as organizations, neighborhoods, cities, or nations. In the study of the development of criminal and antisocial behavior, interest is primarily in changes that occur within individuals. At a minimum, any longitudinal research design permits measurement of differences or changes within cases (which, again, may be aggregate or individual) in a variable from one time period to another. By this definition, longitudinal data have been collected at the national level at least since the periodic censuses taken by New France (Canada) and continued in Quebec from 1665 to 1754 (Thomlinson, 1976). Collection of individual level longitudinal data began as early as 1759, primarily involving case-study and biographical data (Baltes & Nesselroade, 1979; Wall & Williams, 1970).

More specific to crime, systematic collection of longitudinal data at the national level, initially

focusing primarily on convictions, occurred at least as early as 1823 in France, 1857 in England and Wales, and 1882 in Germany (MacDonald, 1910). Aside from biographies and case studies, systematic collection of longitudinal individual level data on illegal behavior can reasonably be traced to the 1960s, with the use of official records to track individuals over time in the Philadelphia cohort study (Wolfgang, Figlio, & Sellin, 1972), and also including self-report data in the Cambridge Study on Delinquent Development (West & Farrington, 1973). Liberman (2008) documents the growth in longitudinal research on crime since then, noting that Farrington, Ohlin, and Wilson (1986) found only eleven longitudinal surveys with information about crime and delinquency that spanned at least 5 years, had at least two interviews, and had adequate sample sizes. Liberman’s (2008) review 22 years later reported findings from over 60 longitudinal data sets including 20 international samples (see particularly Tables 1 and 2, pp. 282–301).

Longitudinal research may best be understood by contrasting it with *cross-sectional* research. Cross-sectional research refers to research in which data are collected for a set of cases (individuals or aggregates) on a set of variables (for example, frequency of illegal behavior, attitudes toward marijuana use), and in which data collection occurs specifically (1) *at* a single time and (2) *for* a single time point or a single interval of time (hereafter both will be referred to as *periods*). Analysis of purely cross-sectional

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data can examine *differences BETWEEN cases at a single period* but not *changes WITHIN cases across two or more periods*. A variant on the pure cross-sectional design is the *time-ordered cross-sectional* design, in which the data are collected for different variables at different times, corresponding to the presumed causal order of the variables. In a time-ordered cross-sectional design, it is still not possible to measure change within aggregate or individual cases, but the design does avoid the criticism that commonly occurs when presumed causes are measured subsequent to presumed effects. As noted in Menard (2002), however, this does not guarantee correct time ordering. For example, even though attitudes are measured for a period prior to behavior, *change* in behavior may have occurred prior to *change* in attitudes.

Longitudinal research addresses this issue by collecting data *for* two or more periods of time, although not necessarily *at* two or more periods of time. Longitudinal data may be collected *prospectively*, *at* two or more periods *for* those periods (or for a short time prior to those periods), as in longitudinal panel designs such as the National Youth Survey Family Study (Elliott, Huizinga, & Menard, 1989; Menard, 2012); or *retrospectively*, *at* just *one* period but still *for* two or more time periods, as in life-history research, for example, the German Life History Study (Mayer, 2008). While it is possible to do purely prospective longitudinal research on behavior, for example using direct observation of behavior at the time it is occurring, as in much qualitative research, most longitudinal research, particularly survey research, on criminal and antisocial behavior is to some degree retrospective, asking respondents to recall and report on behavior in the past week, month, 6 months, year, or longer periods of time.

The Purposes of Longitudinal Research

Longitudinal research serves two primary purposes: to describe patterns of change, and to establish the direction (positive or negative, from Y to X or from X to Y) and magnitude (a

relationship of magnitude zero indicating the absence of a relationship) of predictive or causal relationships. Change is typically measured with respect to one of two continua, chronological time (for historical change) or age (for developmental change). Sometimes it is difficult to disentangle the two. If older individuals are less criminal than younger individuals, is this because crime declines with age, or is it possible that older individuals were always less criminal (even when they were younger) and younger individuals will remain more criminal (even as they get older), or some combination of the two? A third possibility is that there is an interaction between historical time and age, in the form of a cohort effect, such that individuals who were a certain age during a certain period (for example, in school or eligible for military service at the time of a particular historical event such as an assassination or a terrorist attack) may experience relatively stable or permanent changes in attitudes or behaviors, while individuals of the same age at a different time, or a different age at the same time, may not be affected by that experience in the same way.

With cross-sectional data, it is not possible to disentangle the effects of age, period, and cohort effects. Age, period, and cohort are linearly related, and knowing any two completely determines the third. Even with longitudinal data, it may be difficult, but with data on the same individuals both at different ages and different time periods, it at least becomes possible. A commonly used statistical approach to disentangling age, period, and cohort effects has been to operationalize each of the three variables as a set of dummy variables, and then impose a limited set of constraints to prevent perfect collinearity among the three sets of dummy variables, a technique described by Mason, Mason, Winsborough, and Poole (1973). Examples of this in the study of crime and delinquency include Maxim (1985), Smith (1986), and Steffensmeier, Streifel, and Harer (1987). Glenn (1981) is critical of this approach as being mechanical and failing to adequately incorporate substantive information about the cohorts, and Rodgers (1982) and Greenberg and Larkin (1985) discuss potential methodological

problems in this approach including collinearity and the sensitivity of the approach to the constraints used to allow the model to be estimated.

Menard (2002) explains how age, period, and cohort are often proxies for other variables, and that the problem of disentangling age, period, and cohort effects may better be addressed not by a dummy variable accounting technique, but by replacing age, period, and cohort by the variables they represent. Operationally, measuring age may be more feasible and possibly more informative in practice than measuring the physiological and cognitive states for which age is a proxy, but using a suitable nonlinear function (e.g., a polynomial function) of age may help reduce collinearity and produce more stable estimates of the age effect. Historical time may similarly be transformed as appropriate, although linear period effects may be more common linear age effects. Menard (2002) argues that a cohort is more a unit of analysis than a variable itself. Rather than operationalize cohort as a variable or set of dummy variables, it is more appropriate to consider characteristics of the cohort itself. In particular, Easterlin (1987) has suggested that the size of a cohort, as indicated by average birth order or total number of births in the year of birth that defines the birth cohort, may be positively related to criminal behavior, economic disadvantage, and other undesirable outcomes for members of the cohort. Menard (2002) also notes that cohorts may be defined by other criteria than year of birth, for example, year of completion of education or entry into the labor force. In an application of this approach, Menard (1992) incorporated a nonlinear function of age, a linear function of time (a nonlinear function could have been used but there was no evidence of a nonlinear period effect), and relative cohort size, along with variables drawn from the integrated theory of Elliott et al. (1989), and found that age effects were reduced to nonsignificance by the inclusion of the theoretical variables, but there remained evidence for period and cohort effects.

Longitudinal data are important not only for describing changes in patterns of behavior but

also for describing changes in patterns of *relationships* among behaviors, and of the association between those behaviors and their theoretical predictors. For example, Menard (2012) notes that the strong relationship between victimization and offending in adolescence does not appear to persist into later adulthood, but declines with age; and looking at explained variance, the overall ability of theoretical, sociodemographic, and comorbid problem behavior variables to account for both victimization and offending declines by more than half from adolescence to middle adulthood. Longitudinal data are also important in the study of the onset, desistance or suspension or de-escalation, and resumption of crime, and of patterns of intermittency in victimization and offending. Welch (2012), Le Blanc and Fréchette (1989), and others have examined onset of offending over the life course. Welch (2012) in particular documented the rarity of truly late onset (after age 21) of offending when onset is defined with respect to a broad range of offenses, and found similar results for illicit drug use (but not alcohol use, for which there was more evidence of late onset). Kazemian, Farrington, and Le Blanc (2009) and Morizot and Le Blanc (2007) examined predictors of desistance and de-escalation in crime, and found that social control, generally a good predictor of onset, does not work as well as a predictor of desistance from criminal behavior.

Also of interest is the question of whether there are developmental sequences in behavior, and whether certain behaviors serve as gateways or prerequisites to other types of behavior. For example, Kandel and Faust (1975) examined the sequencing of different types of substance use, with the use of legal substances regarded as less serious in their effects (alcohol, tobacco) preceding illegal but “softer” substances (marijuana), followed only later by “harder” licit and illicit substances. A similar pattern was found by Elliott et al. (1989) with regard not only to substance use but also with regard to other forms of illegal behavior, and by Le Blanc and Fréchette (1989) with regard to progressively more diverse and serious forms of delinquent behavior.

Extending the study of sequencing to questions of causal influence, longitudinal studies are also able to examine whether the sequencing of changes in different behaviors is consistent with theories suggesting that one behavior is a cause of the onset or continuation of the other. Two examples involve the competing hypotheses of whether association with delinquent friends leads to the onset of delinquency, or delinquency leads to the onset of association with delinquent friends; and whether substance use leads to the onset of crime. The sequencing of onset of these behaviors is critical, since a cause must precede an effect. With respect to the first question, Menard and Elliott (1990) found a clear pattern of onset of association with delinquent friends preceding onset of delinquent behavior, ruling out the hypothesis suggested by Hirschi (1969) that the primary causal influence involved delinquent behavior leading to association with delinquent friends. At higher levels of both delinquency and association with delinquent friends, however, there may be an alternating sequence of escalation in one producing escalation in the other. Pertinent here is the research of Esbensen and Huizinga (1993), who found that prior to their joining delinquent gangs, individuals who eventually became gang members had higher levels of delinquency than their other nongang peers; but after joining the gang, their delinquency increased; and after leaving the gang, their delinquency decreased, suggesting both a selection effect (delinquency affecting the likelihood of gang membership) and a reinforcement effect (gang membership increasing the level of delinquency). With regard to the drugs–crime relationship, Menard, Mihalic, and Huizinga (2001) found that involvement in minor delinquency preceded involvement in substance use, particularly illicit substance use, ruling out illicit substance use as a cause of onset of crime; but in further analysis, they also found that hard drug users were less likely to suspend their illegal activity than nonusers. Thus while substance use was not a cause of onset of illegal behavior, it did appear to be implicated in the continuation of illegal behavior later in the criminal career.

Another advantage of longitudinal research for the testing of causal hypotheses is the ability to model *reciprocal relationships*. A reciprocal relationship is one in which two variables act as both cause and effect with respect to each other. For example, one may hypothesize that exposure to delinquent friends may lead to increased illegal behavior and also that increased illegal behavior may in turn lead to increased exposure to more delinquent friends. With cross-sectional research, it may be possible to use *nonrecursive* models (models which include direct reciprocal effects) to test for two-way causal influences between variables, but there remains the problem of consistency between causal order and temporal order of measurement (is one of the effects measured before its supposed cause?), and issues of model identification (the ability to estimate the model) pose greater difficulties for nonrecursive models than for *recursive* models (models in which there are no feedback loops or direct mutual causal effects). With longitudinal data, with appropriate measurement intervals (time between measurement of proposed cause and proposed effect), it is possible to reduce or eliminate the need for more complex nonrecursive models. Instead, a model can be constructed in which *earlier* exposure to delinquent friends influences *later* delinquent behavior, and *earlier* delinquent behavior influences *later* exposure to delinquent friends, with no direct causal effects between variables measured at the same time. The causal hypotheses in both directions can thus be tested with properly time-ordered data.

Types of Longitudinal Designs

Menard (2002) identifies four primary types of longitudinal research design, as illustrated in Fig. 7.1. In each part of Fig. 7.1, the columns represent years, while the rows represent subjects, grouped by time of entry into the study. Thus subjects enter the population or sample (“rows”) at different times (“columns”), and subjects who have entered the study at different times may be in the study at the same time (more than one row outlined in the same column),

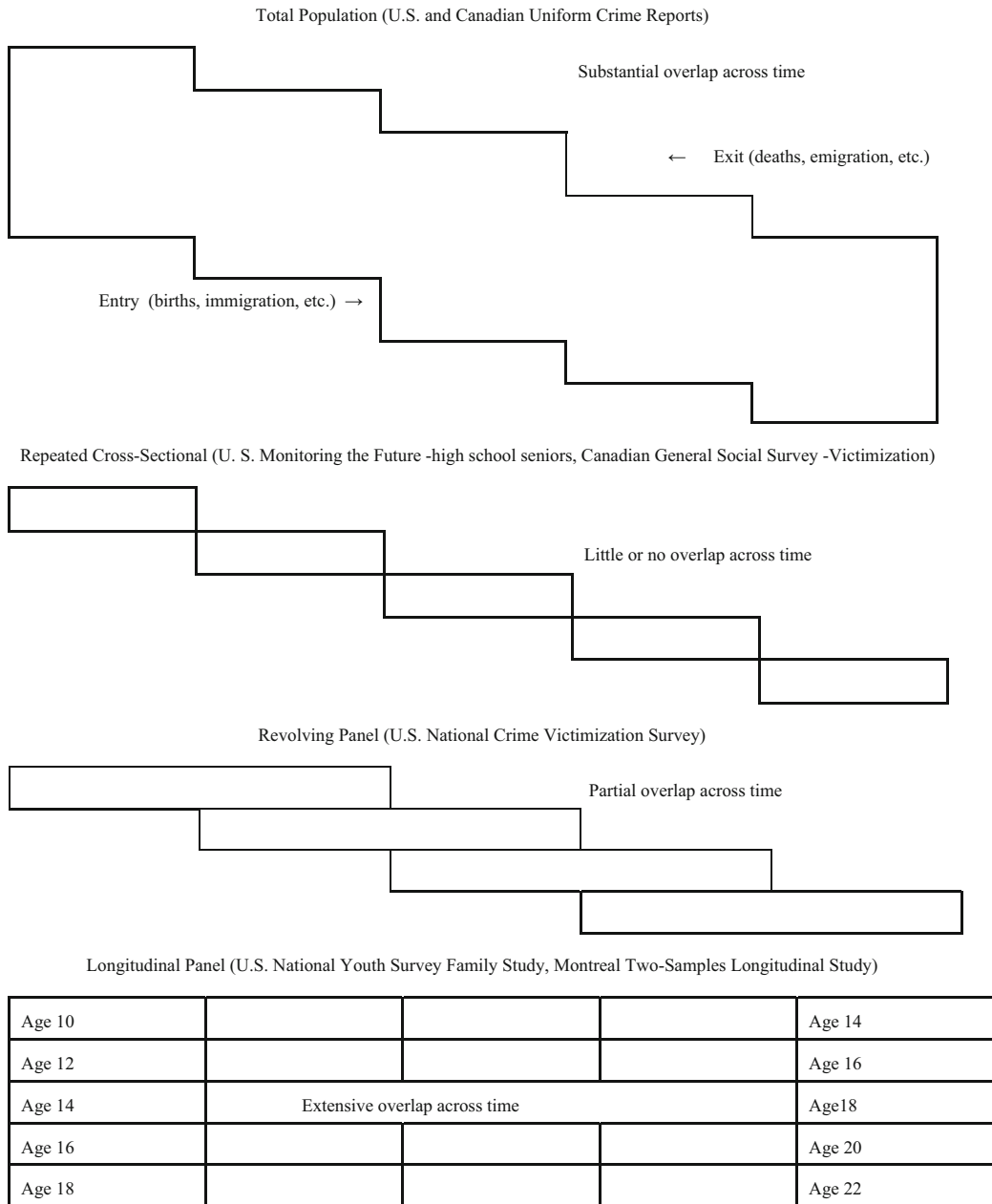


Fig. 7.1 Types of longitudinal designs [adapted from Menard (2002)]

except in the *repeated cross-sectional design*, in which different subjects are studied at each different time (no two rows outlined in the same column).

In a *total population design*, the attempt is made to collect data on the entire population at different time periods. Examples of total

population designs are the US and Canadian Uniform Crime Report (UCR) data on crimes known or reported to the police (Brennan & Dauvergne, 2013; Barnett-Ryan, 2007). Although coverage may not, in fact, be 100 % complete, the intent is to include data on the entire population. From year to year, individuals

enter the population (by birth or immigration) and exit the population (by death or emigration), so the individuals to whom the data refer overlap substantially, but differ at least slightly, from one adjacent time period to the next, and may differ substantially over a long time span (for example, from 1951 to 2001). These data, like census data (which are also intended to be, but never really succeed in being, 100 % complete), are used to measure aggregate rates of change or trends in crimes known to the police. In principle, data from total population designs could be used in developmental research, if individuals had identification numbers that could be linked from one wave of data to the next. In practice, total population designs play no direct role in developmental research, but do provide baseline data against which data on trends over time from other designs can be compared.

Repeated cross-sectional designs collect data on different samples in different periods. Because a new sample is drawn each year, there is in principle no overlap from 1 year to the next (although it is possible that independent samples will sample a few of the same individuals.) Good examples of repeated cross-sectional designs are the US and Canadian General Social Surveys (GSS) and annual general population surveys conducted in the USA by the National Opinion Research Center and in Canada by Statistics Canada (e.g., Smith, 2008; Statistics, 2013). These surveys cover a wide range of topics including health, education, work, and family. More specific to crime are the Victimization component of the Canadian GSS, which is included in the survey every 5 years, and the occasional inclusion of crime-related topics in the US GSS. Repeated cross-sectional designs can be used (1) to compare individuals at the same ages in different periods, to see whether there are trends in behavior over time; (2) to compare relationships among variables at different periods, to see whether, for example, the relationship between gender or ethnicity and crime is the same in 1980 and 2010; and (3) to disentangle age, period, and cohort effects, as described earlier. The repeated cross-sectional design is the design most frequently used in the

study of age, period, and cohort effects, although longitudinal panel data have also been used for this purpose. In repeated cross-sectional designs, the data are used to describe aggregates of individuals, rather than intraindividual change in the individuals themselves, to trace changes in behavior over both age and historical time.

Revolving panel designs are designs in which a set of respondents is selected, interviewed for more than one time period, and then replaced by a new set of respondents. The revolving panel design is used in the National Crime Victimization Survey or NCVS (Rennison & Rand, 2007). Households are selected and interviewed seven times over a 3-year period, once at the beginning, once at the end, and at 6-month intervals between entry and exit. At the end of the 3-year period, a new household is selected to replace the old household. Replacement is staggered, so every 6 months approximately one-sixth of the households in the NCVS are replaced. It is important to note that the NCVS has historically been a sample of households, not individuals; whenever an individual or a family moved from a household, interviews were conducted not with the original respondents, but with the (new) occupants of the original household. At the national level in the USA, however, the NCVS is one of the most widely used sources of data on aggregate changes over time in rates of crime victimization and, by implication, the rate at which those offenses included in the NCVS (limited to offenses with identifiable victims) are committed. Revolving panel designs like the NCVS can also be used to examine intraindividual change (e.g., Hotchkiss & Bachman, 2008), but only in the short term, because each household (and thus each individual) is replaced after at most 3 years.

The *longitudinal panel design* is the design most generally recognized in different disciplines as a true longitudinal design. Examples of the longitudinal panel design include the Montreal Two Samples Longitudinal Study (MTSLS; Le Blanc & Fréchette, 1989) and the National Youth Survey (NYS; e.g., Elliott et al., 1989), later renamed the National Youth Survey Family Study (NYSFS; e.g., Menard,

2012) in the USA. The MTSLs initially included two waves of data on self-reported illegal behavior, collected at a 2-year interval, for individuals who were initially 12–17 years old, and now has five waves of data for the adjudicated men sample and four waves for the representative sample (Morizot & Le Blanc, 2003, 2007). The NYSFS first collected data on self-reported illegal behavior including substance use *in* 1977 but *for* the preceding year, 1976. It then collected data at 1-year intervals, for 1977–1980, and thereafter at 3-year intervals, for 1983–1992, and then on the original respondents and their families in 2002–2004, for a total of twelve waves. Typically in longitudinal panel studies, there is no entry into the sample after the first year, unless a new replacement or supplemental sample is separately drawn, as with the children of the original respondents in the NYSFS. The respondents interviewed in the most recent year are a subset of the respondents interviewed in the first year. From one wave to the next, some respondents may be lost because of death, refusal to continue to participate, or failure to locate the respondent. In contrast to the GSS, UCR, and NCVS data, panel studies like the MTSLs and the NYSFS are used less to examine aggregate historical trends in crime than to examine intraindividual developmental trends, and to examine causal relationships to test theories of crime and antisocial behavior. In this latter context, the NYSFS in particular has been used to study the time ordering of the onset of different offenses and predictors of offending, and the NYSFS and the MTSLs have been used to construct cross-time causal models which can only be tested using longitudinal data (Le Blanc & Fréchette, 1989; Menard & Elliott, 1990).

There are several variants of the longitudinal panel design illustrated in Fig. 7.1. If we eliminate all except one age group (for example, keeping only individuals who are 12 years old in the first wave), we have a *cohort* design, like the one used by Wolfgang et al. (1972). Including multiple ages, whether directly contiguous (11, 12, 13, 14, 15) or skipping 1 or more years (11, 14, 17) gives us a *multiple cohort sequential design* (Baltes, Cornelius, & Nesselroade,

1979). The advantage to this design is that by tracing overlapping cohorts over time, we are able to examine changes across different stages (for example, from age 11 to age 18 and age 18 to age 25) in a shorter time span than would be the case with a single cohort. For example, with a single cohort, it would take us 14 years to be able to examine developmental patterns for both ages 11–18 and 18–25. In the design illustrated in the last panel of Fig. 7.1, that would only take 8 years (one for the youngest cohort first to reach age 11, then seven more to reach age 18; 7 years for the oldest cohort to go from age 18 to age 25). In addition, the multiple cohort sequential design allows us to examine development for those two age categories (11–18, 18–25) at the same time, reducing the potential confounding of historical with developmental change. This is similar to the process for constructing synthetic cohorts in demographic research on fertility, to calculate total fertility rates, and it has the same limitation. If we are interested in the experience of a cohort across the life course, then the experience of the older cohort as it moves from age 18 to age 25 may turn out to be dissimilar in some respects from the experience of the younger cohort in making that same transition.

Any of the aforementioned designs may be used in *correlational* research, which typically involves neither deliberate intervention nor manipulation of conditions nor assignment to distinct groups receiving (experimental or treatment group) or not receiving (control group) a particular stimulus (treatment). In some instances, the longitudinal panel design has been combined with *experimental or quasi-experimental research* to test the effectiveness of specific interventions (see, e.g., the review in Loeber & Farrington, 2008). Loeber and Farrington (2008) have recommended the incorporation of experimental interventions into longitudinal designs. This could be done particularly for studies begun in early childhood, as for example in Tremblay et al.'s (2001) parent training intervention. The combination of longitudinal and experimental designs has the potential to take advantage of both the greater strength of experimental research for making causal

inferences and the advantage of multiple-wave, long-term longitudinal designs for assessing not only immediate or short-term, but also long-term, effects of planned experimental interventions with random assignment to treatment and comparison groups.

As noted by Menard (2002) most experimental and quasi-experimental designs are inherently longitudinal, with measurement occurring both before (pretest) and after (posttest) the experimental treatment or intervention is administered (Campbell & Stanley, 1963), in order to ascertain whether differences at the posttest are attributable to the treatment or to preexisting differences between treatment and control groups. While typically not the focus of experimental research, this does allow for measurement of intra-individual change in both the treatment and comparison groups. The absence of pretest or baseline data has the effect of rendering uncertain whether differences after some treatment or intervention may be wholly attributable to the treatment or intervention, or to preexisting differences between the group that did and the group that did not receive the treatment or intervention. It also eliminates the possibility of examining intraindividual change, limiting the analysis to aggregate level group comparisons. In experimental designs, even when a pretest is not used, the researcher assumes that the randomization of the assignment of subjects to different treatments either produces groups that do not differ on any important variable, or whose deviations from equality are subject to known statistical distributions. Even a posttest-only experimental design thus includes a critical longitudinal assumption, namely that a difference between experimental and control groups at the posttest represents a change from the pretest, at which it is assumed, without possibility of proof or disproof, that there is little or no difference between the experimental and the control groups.

Longitudinal panel designs also allow the pooling of cross-sectional (each wave of the survey) and time series (repeated measurement on each respondent in the survey) data. Pooled cross-sectional and time series data need to be understood in two distinct ways: as a data

structure, and as an approach to analyzing longitudinal data (Menard 2002; Sayrs, 1989). The pooled cross-sectional time series data structure is the standard format for some of the more sophisticated techniques for analyzing longitudinal data, including latent growth curve models, multilevel growth curve models, and event history analysis. All of these techniques require substantial numbers of cases and/or periods to obtain reliable estimates of model parameters. As an independent approach to the analysis of longitudinal data, pooling cross-sectional and time series data offers the advantage of greater statistical power and greater reliability of estimation, coupled with the disadvantage that in any analysis, parameter estimation may be confounded by correlations between either or both of true scores or errors (1) within cases over time or (2) between cases measured at the same time.

Issues in Longitudinal Research

Longitudinal research potentially has all of the problems of cross-sectional research with respect to internal and external measurement validity, measurement reliability, sampling error, refusal to participate or nonresponse to particular items, the appropriateness of questions to the population being studied, effects of interactions between subjects or respondents and interviewers or experimenters or observers, relevance of the research, and research costs. Some of these issues are even more problematic for longitudinal research than for cross-sectional research. For example, biases in sampling may be amplified by repetition in repeated cross-sectional designs, and costs are typically higher for a multiple-year longitudinal study than for a single-year cross-sectional study.

As summarized in Menard (2002), there are also additional dangers. Respondents who are repeatedly interviewed may learn that giving certain answers results in follow-up questions, and may deliberately or unconsciously avoid the burden imposed by those questions, a problem known as *panel conditioning*. Relatedly, the potential problem of interaction between the

respondent/subject and an experimenter/interviewer/observer producing invalid responses (*experimenter, interviewer, or observer effects*) may be exacerbated when there is repeated contact between the researcher and the respondent in a prospective longitudinal design. In later waves of a prospective panel study, respondents may have died or become incapable of participating because of age or illness, or may refuse to continue their participation, or researchers may have difficulty locating respondents, resulting in panel attrition. In retrospective research, the corresponding problem is that individuals who should have been included to insure a more representative sample may have died or otherwise become unavailable before the study begins. Particularly in prospective longitudinal sample survey research, an important question is whether attrition is so systematic or so great that the results of the study can no longer be generalized to the original population on which the sample was based. While mortality is unavoidable, there are well-developed techniques for avoiding failures to locate respondents, and for encouraging their continued participation. For locating respondents, Laurie (2008) provides a useful summary of techniques such as tracking individuals through publicly available data sources, collecting additional contact details (contact information for individuals likely to be able to locate the respondent at a later date) at the time of the interview, and periodic mailings to respondents. For reducing the likelihood of respondent refusal to participate, it is important to consider how one can modify elements like the burden on the respondent (e.g., the length and complexity of the interview), saliency of topic coverage to the respondent, mode of data collection (allowing the respondent alternatives, such as face-to-face or telephone interviews), and of course incentives, to encourage participation (Laurie, 2008).

There is evidence that the length of the recall period is important. Early methodological research on the National Crime Survey (NCS; later renamed the National Crime Victimization Survey, NCVS) suggested that, balancing concerns for accuracy and respondent burden, a

6-month recall period produced the most accurate results, slightly better than a 1-year recall period (Lehnen & Skogan, 1981; Rennison & Rand, 2007). Longer time periods appeared to result in either telescoping (reporting behaviors that occurred prior to the period about which they were being asked) or underreporting. For self-report research, long-term recall data from both the Monitoring the Future study (Johnston & O'Malley, 1997) and the NYSFS (Menard & Elliott, 1990) produced a phenomenon described by Johnston and O'Malley (1997) as "recanting." Recanting is when respondents who had previously admitted to a particular form of illegal behavior using short-term (1 year) recall later denied ever being involved in that behavior using longer term recall. Menard and Elliott (1990) found that the reported prevalence of illegal behavior declined with an increase in the recall period from 1 to 2 to 3 years, less for illicit drug use than for other forms of illegal behavior; and that using a recall period up to 10 years resulted in respondents denying close to 50 % of behavior to which they had previously admitted. Covey, Menard, and Franzese (2013) similarly found that when respondents were asked at different times whether they had ever witnessed parental violence, approximately 40 % answered affirmatively at one time, then negatively at a subsequent time. Menard and Elliott (1990) concluded that the bulk of the evidence appeared to support errors in memory, rather than deliberate deception, and suggested that the combination of shorter recall periods combined with "anchoring" techniques (mentioning specific times or events during the past year) appeared to help reduce inaccuracy in reporting.

Measurement used at the beginning of a longitudinal study may come to be regarded as obsolete later in the study, but changing the measurement instrument means that the data may no longer be comparable from one period to the next. An example of this is the change in the way questions were asked in the NCVS in 1992 (Rennison & Rand, 2007). The new format produced a substantial increase in reported victimizations. A comparison was made between the rates of victimization reported using the old

and the new method, but only in a single year. Thus it remains uncertain whether attempts to “adjust” the victimization rates to produce a closer correspondence between the old and the new methods are really successful, especially for examining long-term trends in victimization. It is possible to use some latent variable scaling techniques (e.g., Item Response Theory) to compare scores from different measures of the same construct or measures/items which have changed during the course of a longitudinal study, but only in some conditions (Curran et al., 2008). In developmental research, a parallel problem is the inclusion of age-appropriate measures for the same concept (for example, prosocial bonding) across the life course. For example, in adolescence, bonding may occur primarily in the contexts of family of orientation (parents and siblings) and school, while in adulthood it may occur more in the contexts of family of procreation (spouse and children) and work. One is then faced with the dilemma of asking age-inappropriate questions, or of using different measures, whose comparability cannot be guaranteed, for different stages of the life course.

In cross-sectional research, we may have missing data because an individual refuses to participate in the research (missing subjects), or because the individual chooses not to provide all of the data requested (missing values). In longitudinal research, we have the additional possibility that an individual may agree to participate in the research and to provide the requested data at one or more periods, but may refuse or may not be found at one or more other periods (missing occasions). Some techniques for analyzing longitudinal data are highly sensitive to patterns of missing data, and cannot handle series of unequal lengths, thus requiring dropping all cases with missing data on even a single variable on just one occasion. This may lead to biased estimates, for example, the underestimation of self-reported delinquency, as illustrated by Reinecke and Weins (2013), unless the data are missing completely at random. Problems of missing data may be addressed in longitudinal research either by imputation of missing data using techniques such as full maximum likelihood estimation or

multiple imputation (e.g., Reinecke & Weins, 2013), or by using techniques such as multilevel modeling (e.g., Raudenbush & Bryk, 2002) that allow the use of partially missing data in the analysis.

Analysis of Longitudinal Data on Crime and Antisocial Behavior

Le Blanc (2002), in his review of research on escalation (increasing seriousness of crime) and de-escalation (decreasing seriousness of crime) of delinquent and criminal behavior over the life course, identifies six strategies to study qualitative and quantitative changes over the offending career: developmental sequence, transition matrices, ad hoc classification, group detection, growth curve, and cross-lagged analysis. The developmental sequence model has already been addressed in prior discussion of the sequencing of different types of substance use, the sequencing of substance use and other types of offending, and the sequencing of exposure to delinquent friends and one’s own delinquent behavior. It is worth repeating Le Blanc’s (2002) observation, however, that there has been relatively less examination of sequences leading to de-escalation or desistance than sequences involving onset or escalation, and there has been even less examination of the correlates of different patterns of sequences (for example, the correlates of deviating from the “main” sequence from licit to “soft” to “hard” substance use).

The use of transition matrices involves examination of illegal behavior at two or more periods, and calculating the probability of a transition from one type of crime or delinquency to another. Transition matrices have been used to study both purely qualitative shifts in crime, without specification of relative seriousness, and also to study shifts in crime that may be characterized as escalation or de-escalation. An example of the former is the use of transition matrices to examine movement among four drug/nondrug crime types, (1) neither serious offending nor serious substance use, (2) serious

offending but no serious substance use, (3) no serious offending but serious substance use, and (4) both serious offending and serious substance use, by Menard et al. (2001), who found that although serious substance use earlier in the life course was not implicated in the onset of serious offending, serious substance use later in the life course inhibited transitions out of nondrug crime. While this example poses no rank ordering between serious nondrug and serious drug crime, Le Blanc cites studies that examine transitions between relatively more and relatively less serious types of offending, and notes that the chief finding the relatively few studies in this area since 1985 has been the indication that there appears to be a large random component in the development of offending when studied crime by crime. While transition matrices may be used to study a relatively large number of alternative offenses, other techniques such as event history analysis or survival analysis (e.g., Box-Steffensmeier & Jones, 2004), which build on the Markov chain framework but extend it in important ways, may be better suited to study more limited sets of alternatives, particularly events such as onset, suspension, and resumption of criminal and antisocial behavior.

The ad hoc classification and group detection strategies are both dynamic classification strategies. In ad hoc classification, groups are defined based on observed characteristics such as frequency and seriousness of offending, as has been done with the MTSLs (Le Blanc & Fréchette, 1989) and the American NYSFS (Elliott et al., 1989). These studies produced similar estimates of the percentages of abstainers, transient delinquents, and persistent delinquents, but as noted by Le Blanc (2002) later studies have found higher percentages of abstainers. Both MTSLs and NYSFS results found support for peer influences and conventional beliefs as differentiating among the more and less serious delinquency groups. Another potential source of ad hoc classification, as noted by Le Blanc (2002), is age of onset, particularly in the context of the offending typology suggested by Moffitt (1993).

An alternative to defining groups on observed frequency, seriousness, or timing of onset of illegal behavior is to use such variables as the basis for models in which it is assumed that there are two or more heterogeneous groups in the population which are not directly observed, but which may be detected through the use of group-based trajectory models (e.g., Doherty, Laub, & Sampson, 2009; George, 2009; Nagin & Land, 1993; Piquero, Reingle Gonzalez, & Jennings 2015). To the extent that results are consistent across models, they do usually appear to identify the life-course-persistent and adolescence-limited offenders hypothesized by Moffitt (1993), along with a trajectory of abstainers or extremely low-level offenders, plus one or more trajectories that appear to be distinguished from life-course persisters mainly in having a lower average level of offending. When more than three or four groups are produced, some of the groups appear to differ only (and not by much) in their average levels of illegal behavior over time, not in their patterns of change over time. While there is some consistency across *most* studies using these models (Piquero, 2008), there are two important cautions. First, while there is broad consistency across most studies, there are studies which produce results distinctly at odds with “mainstream” findings. Second, as demonstrated by Skardhamar (2010), group-based trajectory modeling appears to do well at detecting heterogeneous groups when they are really present in the data—and also when they are not present at all. In simulation research, Skardhamar found that group-based trajectory modeling could produce groups even for purely random data with no real groups present, reinforcing previous warnings (e.g., Raudenbush, 2005; Sampson & Laub, 2005) against reification of the groups found in these models.

An alternative to group-based trajectory modeling for the analysis of antisocial behavior over the life course is the use of manifest (rather than latent) growth curve analysis. While less formal methods may be used, this approach is particularly amenable to the multilevel modeling framework described by Raudenbush and Bryk

(2002), with observations over time clustered within individuals. In this approach, the dependent variable may be prevalence (no or yes, a dichotomous variable indicating whether or not the individual engaged in the behavior) or frequency (how many times, the individual engaged in the behavior). A time dimension (typically age or historical time) is explicitly included as a predictor in some form (linear, polynomial, dummy variables), and both time-constant characteristics such as gender and ethnicity and time-varying characteristics such as attitudes or patterns of association can easily be included in the model (e.g., Jang, 1999; Johnson, Hoffman, Su, & Gerstein, 1997).

The final technique described by Le Blanc (2002) is cross-lagged analysis. Cross-lagged analysis, instead of focusing on the relationship of the outcome behavior with age (as in group-based trajectory modeling and growth curve analysis), focuses on modeling and estimating causal relationships among variables, most often with recursive models that include correct temporal ordering of presumed causes and effects, and one or more prior values of the dependent variable (lagged endogenous variables) as predictors of the current value of the dependent variable. Le Blanc (2002) limits his discussion to models including lagged endogenous variables because, in context, his concern is with the study of escalation and de-escalation of criminal behavior, thus necessitating measurement of criminal behavior at more than a single period. More broadly, ordinary least squares regression, logistic regression, or structural equation modeling (SEM) techniques (e.g., Kline, 2011) may be used, with or without lagged endogenous variables, to test theoretically specified causal relationships. Structural equation models for panel data, with or without lagged endogenous variables, are among the most frequently used models in research on criminal and antisocial behavior. Note also that there are other techniques for longitudinal data analysis, particularly time series analysis, that focus on the aggregate rather than the individual level, and are more appropriate for the examination of

historical than of developmental change (Menard 2002).

Recent Developments in Longitudinal Research and Developmental Criminology

The use of longitudinal research in the study of developmental criminology has been marked by two relatively recent developments. First, as respondents from some of the earlier longitudinal studies have progressed from adolescence to middle age, they have formed families of their own, including adolescent and adult children. Some surveys have taken advantage of this and expanded from their original respondents to include the children of those original respondents. Two examples of this are the expansion of the Rochester Youth Development Study to include the children of some of their original respondents in the Rochester Intergenerational Study (Thornberry, 2005), and the expansion of the National Youth Survey (e.g., Elliott et al., 1989) to the National Youth Survey Family Study (e.g., Menard, 2012) with the addition in 2003 of the current spouses and partners of the original respondents (11–17 years old when first interviewed, now in their late 30s and early 40s), a second interview of the surviving parents of the original respondents, and two waves of interviews (2003 and 2004) with their adolescent (ages 11–17, the same as the original respondents at the beginning of the study) and adult (age 18 and older) children. This permits not only intergenerational but also life course comparisons, for example, examining the impact of the substance use of the original respondents across and at different stages of the life course on the substance use of their adolescent children.

The second major development has been the integration of collection of molecular genetic data in the NYSFS and other studies, often by means of a relatively noninvasive method involving the collection of buccal cells using a simple cheek swab, in conjunction with the collection of longitudinal data. While there is a long

history of research on genetic correlates of criminal and antisocial behavior either at a particular stage of the life course or cumulatively across some span of the life course, this new combination of genetic and developmental criminological data allows the examination of potential genetic influences not only on behavior at a particular stage of the life course, but also on trajectories of behavior across the life course (see Beaver, Schwartz, & Gajos 2015). Most prominent among national surveys combining self-report and molecular genetic data collection has been the National Longitudinal Study of Adolescent Health (Add Health), begun in 1994 with a sample of adolescents in grades 7–12 (Udry, 2003), and continuing thus far into 2008, to ages 24–32. The Add Health data have been extensively used to study the interaction between specific genetic risk factors and the environment in predicting illegal behavior in adolescence and early adulthood (e.g., Boutwell & Beaver, 2008).

Conclusion

As described in Menard (2002), cross-sectional research cannot disentangle developmental and historical trends, and the description and analysis of historical change requires the use of longitudinal data. The description and analysis of developmental trends can be attempted using cross-sectional data, but the results will not necessarily be consistent with results based on longitudinal data. Testing for the time ordering or sequencing of purported causes and effects in developmental data can only be done with longitudinal data. Although there are cross-sectional methods for modeling patterns of mutual causation, more powerful models which allow the researcher to examine such relationships in more detail, including the explicit incorporation of the time ordering of cause and effect, require longitudinal data. Briefly, there are no analyses that can be performed with cross-sectional data that cannot (by analyzing a single cross-section) be performed with longitudinal data, but there *are* analyses that can be performed only with

longitudinal, not cross-sectional, data. Cross-sectional data remain useful for describing conditions at a particular period, but increasingly in the social sciences, and particularly for developmental criminology, longitudinal data are recognized as best for research on causal relationships and patterns of historical and developmental change.

Summary

- Longitudinal research has a long history in the behavioral and social sciences, but its use in the developmental study of crime and antisocial behavior has expanded greatly over the past 30 years.
- Unlike cross-sectional research, longitudinal research allows us to examine patterns and correlates of within-individual change over time.
- There are a variety of longitudinal designs for measuring and analyzing aggregate and individual change; the design most useful in the study of the development of criminal and antisocial behavior is the longitudinal panel design, which encompasses cohort studies and accelerated longitudinal designs, and which is a component of much experimental and quasi-experimental research.
- Many issues in cross-sectional research are also issues in longitudinal research, and longitudinal research raises additional issues that need to be addressed, including consistency of measurement over time, panel conditioning, length of the recall period required of respondents, and attrition and other sources of missing data.
- The ability to examine within-individual change over time has allowed us to examine onset, suspension, and resumption of behavior; the sequencing of different behavioral and attitudinal changes (allowing us to establish causal ordering); changes of behavior over age and historical time; and changes in relationships among behaviors, attitudes, and other individual characteristics over the life course.

- Newer directions in longitudinal research include multigenerational studies and the collection of molecular genetic data in conjunction with longitudinal data on crime.

Future Research Needs

- Laub and Sampson (2003) offer one of the very few studies to follow individuals from childhood or adolescence to old age. Unless we build upon existing longitudinal studies, particularly national or otherwise more representative studies than that of Laub and Sampson (2003), with more extensive data on self-reported illegal behavior and theoretically relevant predictors of prosocial and problem behavior, by following these respondents into the ages of grandparenthood and retirement, we will miss an irrecoverable opportunity for studying crime and antisocial behavior across the full life span.
- Raudenbush (2005) and others have raised the important issue of what we learn from group-based trajectory modeling that allows us to predict future behavior. The instability of group-based trajectory model results that occurs when additional data points are added, coupled with Skardhamar's (2010) simulation findings (that these models identify groups even when they do not really exist in the data), calls for serious evaluation of the utility, in terms of prediction and practical implications, of group-based trajectory modeling in the study of criminal and antisocial behavior. The focus needs to be on how well we can predict these trajectories, and how well early trajectories can predict later behavior.
- As suggested by Menard (2012), greater attention needs to be paid to how the relationships among different forms of criminal and antisocial behavior, and between criminal and antisocial behavior and its hypothesized causes and predictors, change within individuals over the life course, and also between

individuals in different cohorts (at the same age, but at different times).

Marc Le Blanc's Contributions

Marc Le Blanc's contributions to longitudinal research on criminal and antisocial behavior should be readily apparent in this chapter. First and most obvious is the very substantial body of work by Le Blanc and his colleagues emanating from the Montréal Two Samples Longitudinal Study (MTSLS), particularly on patterns of change (onset, desistance, and de-escalation) in criminal behavior. Second, as should be evident, I find his organization and description of the different types of studies of qualitative and quantitative change in criminal and antisocial behavior in Le Blanc (2002) to be informative and useful. While not directly relevant to or cited in this, a "methods" chapter, let me also note his contributions to criminological theory, particularly in his integrative personal control theory of deviant behavior. Finally, there is no denying the important role he has played in defining as well as pursuing research in the dynamic field of developmental criminology.

Recommended Readings

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Part II

Risk, Vulnerability, Promotive, Protective, and Desistance Factors

A Review of the Genetic and Gene–Environment Interplay Contributors to Antisocial Phenotypes

8

Kevin M. Beaver, Joseph A. Schwartz, and Jamie M. Gajos

During the past 10 years, there has been a significant shift in the degree to which biosocial studies are received by the criminological community. Prior to 2000, most discussions of genetic influences on criminal behaviors were censored, ignored, and ridiculed and the chance that a study showing a genetic influence on crime would be published in a mainstream criminology journal was virtually zero. Currently, however, it is commonplace for studies examining the intersection of biology, genetics, and neurobiology with an assortment of antisocial behaviors to be published. What is important about this new

line of research is that it is not a reification of the outdated nature versus nurture debate, but rather an entirely new perspective that highlights the dual influences of genetic and environmental factors in the etiology of crime and delinquency. This new perspective, widely referred to as biosocial criminology, has already had a significant impact on the field of criminology and leading scholars have argued that the biosocial perspective represents the future of criminology (Cullen, 2009).

Whether biosocial criminology actually becomes the engine of criminology remains to be determined. What has already happened in a relatively short period of time, though, is that there has been a tremendous amount of knowledge acquisition in relation to the biosocial underpinnings to antisocial behavior. This chapter is designed to provide an overview to some of the key findings that have emerged from the biosocial perspective during the past decade. Toward this end, the chapter is divided into two sections. First, findings culled from studies estimating genetic influences on antisocial behaviors will be reviewed. This discussion will center on studies that decompose variance in twin-based methodologies and it will also provide a brief overview to some of the findings from molecular genetic research. Second, a review of studies examining gene–environment interplay in relation to criminal and delinquent outcomes will be discussed. This section will focus on three types of gene–environment interplay: gene–environment interaction, gene–environment correlation, and epigenetics.

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Genetic Influences on Antisocial Phenotypes

Hundreds of studies have now been published that estimate the degree to which genetic influences are involved in explaining variation in measures of antisocial behaviors. Before moving into a discussion of these findings, it is first necessary to provide an overview of the methodologies that are used in these types of studies. Perhaps the most commonly employed research design to estimate genetic influences is the twin-based methodology. This approach exploits the naturally occurring process of twinning by comparing the similarity of monozygotic (MZ) twins to dizygotic (DZ) twins. MZ twins share 100 % of their DNA, whereas DZ twins share 50 % of their distinguishing DNA. Both types of twins, however, experience similar environments, such as being reared in the same families, by the same parents, and in the same neighborhoods. As a result, the environments of twins from the same MZ twin pair should be no more similar than the environments of twins from the same DZ twin pair. As long as this assumption is met—and there is empirical evidence to indicate that it is (Bouchard, 1994)—then the only reason that twins from the same MZ twin pair should be more similar than twins from the same DZ twin pair is because they share twice as much genetic material. The greater the similarity of MZ twins relative to DZ twins, the greater the influence of genetic factors. Similarly, if MZ twins are no more similar to each other than DZ twins, then genetic effects are likely to be near zero. Stated more formally, the proportion of phenotypic variance accounted for by genetic variance is called heritability. Heritability estimates can range between .00 and 1.00, with a heritability estimate of .00 meaning that none of the phenotypic variance is due to genetic factors and a heritability estimate of 1.00 meaning that all of the phenotypic variance is due to genetic factors.

Although twin-based studies (and extensions of them) might appear as though they only focus on genetic influences, they also provide accurate estimates of environmental influences. Unlike

criminological research that treats all environments as the same, the twin-based research design delineates between two types of environmental influences: shared environmental influences and nonshared environmental influences. Shared environments refer to environments that are the same between siblings/twins and that exert influences on the siblings/twins that make them similar to each other. For example, if poverty is a risk factor for delinquency, then all siblings residing in the same household should experience poverty, be negatively affected by poverty, and thus turn out more similar in terms of their delinquent involvement. Nonshared environments, conversely, refer to environments that are unique to each sibling/twin and that produce differences between them. To illustrate, if exposure to delinquent peers is a risk factor for delinquency, and if one sibling/twin is embedded within a delinquent peer group and the other sibling/twin is embedded within a prosocial peer group, then the former sibling/twin should become more delinquent than the latter sibling/twin. In line with heritability estimates, the estimates for the shared environment and for the nonshared environment can range between .00 and 1.00. It is important to note that the nonshared environmental component also captures all of the effects related to error. Together, heritability, shared environmental influences, and nonshared environmental influences will account for 100 % of the variance in any phenotype that is being studied.

Twin-based research designs are frequently used to estimate genetic influences on most behaviors and traits, with a significant number of studies focusing directly on antisocial phenotypes, such as crime (Lyons, 1996), delinquency (Edelbrock, Rende, Plomin, & Thompson, 1995), and antisocial personalities (Slutske et al., 2001). The estimates that have been produced by these studies tend to vary based on sample characteristics, the antisocial phenotype being measured, and other study-specific factors. Even so, what has been shown is that the point estimates for heritability all tend to converge and hover around 0.50. What this means is that about 50 % of the variance in

antisocial phenotypes is the result of genetic influences. These findings have been generated in hundreds of studies, they have been agreed upon by a number of scholars reviewing the existing literature (Beaver, 2013; Moffitt, 2005), and they have been substantiated in four meta-analyses (Ferguson, 2010; Mason & Frick, 1994; Miles & Carey, 1997; Rhee & Waldman, 2002). In short, a heritability estimate of .50 for antisocial behaviors is likely one of the most consistent and robust findings to emerge in the criminological research.

Critics of twin-based studies often point out that these findings are all due to a methodological artifact and thus cannot be believed. There are, however, a number of alternative research designs that can be used to generate heritability estimates. The twin-based research design, for instance, can be extended to include any type of sibling pair, such as full biological siblings, half siblings, and step siblings. In addition, adoption-based research designs represent a straightforward way to estimate genetic influences. If a child is adopted very early in life and has no contact with their biological parents, then the only reason that the adopted-away child should resemble their biological parents is because of the genetic material that they share. These and other alternatives to the twin-based research design have been used quite regularly to estimate genetic influences on antisocial behaviors (Cadoret & Stewart, 1991). Even though the research design is different, the heritability estimates remain quite consistent, hovering around .50 (Beaver, 2013). As a result, the argument that heritability estimates are nothing more than a methodological or statistical artifact appears to be relatively baseless.

The research reviewed above not only provides estimates of genetic influences but also of environmental effects. After all, if genetic influences account for approximately one-half of the variance in antisocial phenotypes, then that necessarily means that other half of the variance is accounted for by environmental influences. Keep in mind, though, that there are two different environmental estimates: one for shared environments and one for nonshared

environments. Of particular interest is that shared environmental influence tends to be relatively small, ranging between 0.00 and 0.15, which indicates that at most about 15 % of the variance in antisocial phenotypes is due to shared environmental influences. By logical extension that also indicates that almost all of the similarity that is seen in crime and delinquency among siblings is due to shared genes, not shared environments. This is a particularly important finding because there is a great deal of research showing that crime concentrates among siblings residing in the same household. Attempts to identify the factors that account for this finding have not been too successful, though there is a line of research focusing on shared environments found within the family. The findings discussed above suggest that if shared family environments are involved, their effects are minimal.

The findings in respect to nonshared environments may be the most surprising to criminologists largely because nonshared environments are not studied, examined, or discussed in criminological theories and research. Specifically, nonshared environmental estimates tend to range between 0.40 and 0.50, indicating that about 40–50 % of the variance in antisocial outcome is due to nonshared environmental influences. In order to study nonshared environmental influences, it is essential to examine differences between siblings/twins and most criminologists fail to analyze samples that include more than one sibling per household. As a result, the ability to integrate the significant influence of nonshared environments into criminological research has remained minimal.

To recap, genetic influences account for about 50 % of the variance in antisocial phenotypes, shared environmental influences account for about 10 % of the variance in antisocial phenotypes, and nonshared environmental influences account for about 40 % of the variance in antisocial phenotypes. While an important first step is determining the degree to which each component (i.e., heritability, shared environments, and nonshared environments) accounts for phenotypic variance, this is only a first step. The next step is to move inside these ambiguous variance

components estimates and try to identify the precise genes (and the precise environments) that are involved in the etiology of antisocial phenotypes. A rapidly growing body of research has attempted to address this gap by examining whether certain genetic variants might account for variation in antisocial propensities. These studies—known broadly as molecular genetic association studies—have identified a number of genes that might be involved in the development of antisocial behaviors. In order to understand these findings, however, it is first necessary to provide a brief tutorial on molecular genetics.

Molecular Genetics and Antisocial Phenotypes

There is often confusion over what a gene is, what it does, and how it might be able to affect variation in human phenotypes. Genes are created from strings of deoxyribonucleic acid (DNA) found in the nucleus of all cells except for red blood cells. DNA is frequently tagged as the blueprint for life and forms the basis for humans (and all other living organisms) to develop and live. All humans have their own unique sequence of DNA except for MZ twins and this variation in DNA has the capacity to account for many observable differences, such as height and eye color, as well as behavioral and trait outcomes related to antisocial phenotypes.

Genes represent nothing more than stretches of DNA sequences that work together to code for the production of proteins. Proteins are complex organic compounds, with some proteins being structural proteins, such as forming fingernails, and others being involved in the functions of the human body, such as enzymes that regulate certain biophysiological processes. Even though genes are frequently misrepresented as being all powerful, genes are only responsible for coding for the production of proteins; they do not actually manufacture the proteins nor do they actually cause people to act one way or another. The link between a single gene and a behavior is long, complicated, and far from direct.

Genes are inherited on threadlike structures called chromosomes. There are 23 pairs of chromosomes, 22 of which are referred to as autosomes and one of which is referred to as sex chromosomes. For the autosomes, all healthy humans receive one-half of the pair maternally and one-half of the pair paternally. As a result, for genes located on the autosomes, there are always two copies—a maternal copy and a paternal copy—and the two copies make up the entire gene. For the sex chromosomes, however, females inherit two X chromosomes and males inherit an X chromosome and a Y chromosome. What this necessarily means is that females have two copies of all genes located on the X chromosome (because they inherited two X chromosomes) but none of the genes located on the Y chromosome. Males, in contrast, possess one copy of all genes located on the X chromosome and one copy of all genes located on the Y chromosome (because they inherited an X chromosome and a Y chromosome).

Most of the genes that exist in the population do not vary which is why humans are all anatomically very similar. The genes responsible for the architecture of the human body, for instance, do not vary from person to person which is why all healthy humans have a heart, two lungs, two kidneys, and a liver. For some genes, though, there is variation which is why we observe variation in human traits, such as height, eye color, and hair color. Genes that vary in the population are referred to as polymorphisms and alternative copies of the polymorphism are referred to as alleles. To illustrate, suppose there was a single polymorphism that had the potential to affect height by a total of 1 in. (Note: this is a hypothetical example.) Suppose further that there were two alleles for this polymorphism: one allele that increased height by .5 in., which will be referred to as the P allele, and one allele that decreased height by .5 in., which will be referred to as the Q allele. Now consider that there are three different combinations of these alleles: PP, PQ (and QP, but they are the same biologically speaking so we will not distinguish between the order of PQ and QP), and QQ. For persons with the PP genotype,

they would have an increase in height of 1 in. (i.e., each allele increases height by 0.5 in.), for persons with the PQ allele, their height would be unchanged (i.e., the P allele increased height by 0.5 in., but the Q allele decreased height by 0.5 in.), and for persons with the QQ allele, they would have a decrease in height of 1 in. (i.e., each allele decreased height by 0.5 in.).

The above example should provide some of the basic information about genes, polymorphisms, and alleles needed to understand the molecular genetic studies examining antisocial outcomes. However, a few caveats are in order about this example. First, when it comes to single gene effects on behavioral phenotypes, genes work in a probabilistic fashion. What that means is that depending on the alleles that are inherited, the chances of the behavioral phenotype developing might increase or decrease, but the effect is not set in stone and deterministic. Second, and relatedly, the effect of any single allele tends to be relatively small, accounting for only a very small percentage of the overall variance. This might seem like somewhat of a contradiction because previously we noted that genetic influences account for about 50 % of the variance in antisocial phenotypes, but now we are pointing out that each allele has only a very small effect. Actually, these two findings are quite compatible. While single genes and alleles only explain a small percentage of variance, the common belief is that there are hundreds or even thousands of genetic polymorphisms implicated in the etiology of antisocial phenotypes. Consequently, any single gene will only account for a fraction of variance, but when all of the polymorphisms are aggregated together, they will have a much larger effect, likely accounting for about one-half of the variance. Third, the effects of genetic polymorphisms are often affected by exposure to environmental stimuli, with the genetic effect becoming stronger or weaker depending on the environment. This process is known as a gene–environment interaction and will be discussed later in this chapter. For now, just keep in mind that the association between any single gene and an antisocial phenotype is likely to be small and works in a probabilistic fashion, not a deterministic one.

Most of the genetic polymorphisms that have been found to be associated with variation in antisocial phenotypes are involved in the process of neurotransmission. Neurotransmission is the process by which neurons are able to communicate with each other. When neurons need to communicate, an electrical impulse from the cell nucleus of the transmitting neuron (also known as the presynaptic neuron) will travel down the axon and reach the synaptic terminal. From there, the impulse will be transmitted to the dendrite of the receiving neuron (also known as the postsynaptic neuron). However, before the message can be received by the postsynaptic neuron, the small gap separating the two neurons, known as the synapse, has to be crossed. This is the job of neurotransmitters, which are chemical messengers that relay information across the synapse. Once the electrical impulse reaches the synapse, the axon terminal of the presynaptic neuron will release neurotransmitters. These neurotransmitters will then move across the synapse, and lock onto the receptors of the postsynaptic neuron's dendrites. Once a sufficient number of neurotransmitters bind to the postsynaptic neuron, the electrical impulse will initiate an action potential in the receiving cell and the process will then be repeated.

After the neurotransmitters have locked into the postsynaptic neuron, they will detach from the receptors and they will float back into the synapse. In order to keep the process of neurotransmission working effectively, the neurotransmitters need to be removed from the synaptic gap. There are two key ways that this is accomplished. First is the process of reuptake, where transporter proteins are produced that enter the synapse, capture the neurotransmitters, and then return them to the axon terminal of the presynaptic neuron. The second way that neurotransmitters are eliminated from the synapse is through enzymes that are involved in the degradation of neurotransmitters. In this process, the enzymes will target neurotransmitters and break them down. It is important to note that both processes of reuptake and enzyme production are governed by specific genes, some of which are polymorphic.

A list of candidate genes related to antisocial phenotypes has been identified (Morley & Hall, 2003), with more being discovered each year. Here, we will focus on three general systems of genes that include genes from the dopaminergic system, genes from the serotonergic system, and genes that are implicated in the production of enzymes that metabolize neurotransmitters. To begin, dopamine is an excitatory neurotransmitter that activates postsynaptic dopamine receptors, therefore making an action potential more likely to occur in the postsynaptic neuron. Dopamine is part of the body's natural reward system, where the release of dopamine is accompanied by feelings of euphoria. Baseline levels of dopamine vary among individuals and in response to certain stimuli, but fluctuations in dopamine levels usually remain in the normal range of variation. However, when dopamine levels are very low or very high, these variations may be linked to various psychopathologies, such as depression (Dunlop & Nemeroff, 2007), ADHD (Waldman et al., 1998) and schizophrenia (Abi-Dargham et al., 2000). Levels of dopamine may vary for a variety of reasons, but genetic factors are of particular importance. Just like the genes we discussed earlier that aid in producing transporter and enzyme proteins, the genes that control for the production, transportation, and metabolism of dopamine are polymorphic.

Two types of dopaminergic polymorphisms are the dopamine transporter gene (DAT1) and the dopamine D2 receptor gene (DRD2). The 10-repeat allele of DAT1 has been found to be associated with an increased risk of displaying antisocial characteristics (Guo, Roettger, & Shih, 2007). The DRD2 gene has also been found to be related to maladaptive outcomes. For example, the A1 allele of DRD2 has been found to increase the risk of alcoholism (Uhl, Blum, Noble, & Smith, 1993) and drug use (Esposito-Smythers, Spirito, Rizzo, McGeary, & Knopik, 2009), as well as delinquent involvement (Beaver et al., 2007). Another group of dopamine receptor genes believed to be associated with antisocial phenotypes includes DRD3, DRD4, and DRD5. For example, research has reported an

association between DRD3 and impulsiveness among violent offenders (Retz, Rösler, Supprian, Retz-Junginger, & Thome, 2003). Other research has found support for the influence of DRD4 on children's ADHD (El-Faddagh, Laucht, Maras, Vöhringer, & Schmidt, 2004). In addition, an association has been found between the DRD5 gene and oppositional defiant disorder (ODD) among male and female children (Bachner-Melman et al., 2005).

Serotonin is another neurotransmitter that has been identified as a candidate gene for influencing the development of antisocial phenotypes. The release of serotonin is thought to reduce innate drives, control impulses, and regulate behaviors. Therefore, serotonin acts like the body's natural break system. Like dopamine, levels of serotonin vary from person to person due to environmental influences and because of the genetic polymorphisms that aid in the production, transportation, and degradation of serotonin. One type of serotonin polymorphism that has been found to be associated with antisocial phenotypes is the serotonin transporter promoter polymorphism (5-HTTLPR). This polymorphism is responsible for coding for the production of the serotonin transporter protein that aids in the reuptake of serotonin. The 5-HTTLPR has two different alleles: a long (L) allele and a short (S) allele. Evidence suggests that the transporter proteins coded for by the S allele may not be as efficient as transporter proteins coded by the L allele in removing serotonin from the synapse (Lesch et al., 1996). Furthermore, research has revealed the S allele to be associated with alcohol consumption (Herman, Philbeck, Vasilopoulos, & Depetrillo, 2003), nicotine dependence (Munafò, Roberts, Johnstone, Walton, & Yudkin, 2005), and childhood conduct disorder (Cadoret et al., 2003), as well as to be more prevalently carried among violent offenders than nonviolent offenders (Retz, Retz-Junginger, Supprian, Thome, & Rösler, 2004).

A number of serotonin receptor genes have also been identified as actors in influencing antisocial behaviors. For example, evidence finds support for a relationship between 5HTR2A and childhood-onset aggression (Mik et al., 2007),

5HTR1B and antisocial personality traits among alcoholics (Soyka, Preuss, Koller, Zill, & Bondy, 2004), and 5HTR2C and bipolar disorder (Mazza et al., 2010). In addition, research has investigated the relationship between the serotonin metabolite (5-HIAA) and antisocial behaviors, where a meta-analysis found an association between low 5-HIAA levels and an increased sensitivity to negative stimuli, as well as with a lack of self-control (Moore, Scarpa, & Raine, 2002).

Last, there are a small number of genes that are implicated in the production of enzymes that metabolize neurotransmitters and that have also been found to be associated with antisocial phenotypes. The first gene is the catechol-O-methyltransferase gene (COMT), which codes for the production of the COMT enzyme. This enzyme metabolizes the neurotransmitters of dopamine, epinephrine, and norepinephrine. The COMT gene has two different alleles: one known as the Met allele and one known as the Val allele. Evidence finds that the Met allele is related to increases in aggressive personality traits (Rujescu, Giegling, Gietl, Hartmann, & Möller, 2003). The second enzymatic breakdown gene is the monoamine oxidase A (MAOA) gene. This gene codes for the production of the enzyme MAOA, and is responsible for breaking down neurotransmitters, as well as the catabolism of neurotransmitters, such as dopamine and serotonin. Researchers have hypothesized that low MAOA activity may be related to increases in antisocial phenotypes due to insufficiencies at clearing neurotransmitters from the synapse. However, there is mixed evidence as to whether the MAOA genotype has a direct effect on antisocial phenotypes. It is possible that MAOA, and the other polymorphisms discussed above, may have their strongest effects when paired with certain environmental factors, a topic to which we will now turn.

Gene–Environment Interplay and Antisocial Phenotypes

Up until this point, much of the discussion has focused on genetics independent of any

environmental influences. Unlike the nature vs. nurture debate that dominated much of the genetic research in the past, today there is a large consensus view that genetic effects operate in tandem with environment influences, not against them. Much of the literature that is being produced recognizes this possibility and there has been a considerable amount of research emerging from psychology, psychiatry, and even sociology examining the linkage between genes and the environment. This close linkage between genetics and the environment is known broadly as gene–environment interplay and there are three main types of gene–environment interplay that will be discussed in relation to antisocial phenotypes: gene–environment interactions, gene–environment correlations, and epigenetics.

Gene–Environment Interactions

Perhaps the most well-known and most thoroughly researched type of gene–environment interplay is gene–environment interactions. Gene–environment interactions refer to the non-additive effects that genes have on phenotypes when they are paired with certain environmental factors (and vice versa). Stated differently, gene–environment interactions occur when genetic effects (environmental effects) are amplified or blunted based on exposure to certain environmental factors (genetic factors). To illustrate, a particular genetic polymorphism may have no influence on an antisocial phenotype when it is paired with an advantageous environment, but that same polymorphism might have a significant influence on an antisocial phenotype when it is paired with a criminogenic environment. Gene–environment interactions thus help to identify which environments moderate genetic influences and which genes moderate environmental influences.

There has been a rapidly growing body of empirical research examining gene–environment interactions on a range of antisocial phenotypes. This body of research has examined a significant number of different polymorphisms, different environmental moderators, and different

antisocial phenotypes. While some consistent findings have emerged, it is important to keep in mind that these gene–environment interactions have also been plagued by non-replication. Replication studies are therefore required on novel gene–environment interactions to ensure that they are not chance findings. With that said, perhaps the most widely studied gene–environment interaction is the MAOA–maltreatment interaction in the prediction of antisocial behaviors and traits. This interaction was first investigated by Caspi and his colleagues (2002) in a sample of males drawn from the Dunedin Multidisciplinary Health and Development Study. Their analysis revealed that a polymorphism in the promoter region of the MAOA gene was unrelated to antisocial phenotypes when they did not examine the moderating effects of maltreatment. After testing for interactions, though, they found that the low-activity MAOA alleles were associated with antisocial phenotypes for males who had been maltreated as children; there was no effect of MAOA on antisocial phenotypes for males who had not been maltreated as children. Of particular importance is that this gene–environment interaction has been examined extensively and a meta-analysis substantiated this significant interaction across a number of different studies (Kim-Cohen et al., 2006).

Other studies have also detected gene–environment interactions between different polymorphisms and different environments. While an exhaustive review of the literature is beyond the scope of this chapter, some of the more common gene–environment interactions in relation to antisocial outcomes have examined links between polymorphisms in the dopaminergic and serotonergic systems and environments related to families, parents, and peers. For instance, in one study, Beaver et al. (2009) examined data from the Add Health study to determine whether there was a gene–environment interaction between the 5HTTLPR polymorphism of the serotonin transporter gene and exposure to delinquent peers in the prediction of variation in levels of self-control. Their findings revealed a significant interaction, wherein 5HTTLPR interacted with a measure of delinquent peers to

explain variation in levels of self-control measured at three different time periods spanning a total of about 7 years. Other studies have reported similar results (Vaughn, DeLisi, Beaver, & Wright, 2009).

Until relatively recently, gene–environment interactions were explained using the logic of the diathesis-stress model. According to this model, individuals are differentially vulnerable to the effects of adverse environments based on their genetic predispositions (i.e., genetic risk) for antisocial behaviors. In this way, genes set the stage for antisocial behaviors and negative or criminogenic environments ultimately are responsible for allowing that genetic predisposition to reach its potential. A newer explanation, however, has been advanced by Belsky (Belsky, 1997; Belsky & Pluess, 2009) which is now referred to as the differential-susceptibility model. This model proposes that rather than being viewed as risk factors or vulnerability factors, genes should be viewed as plasticity markers. Genes that act as plasticity markers simply quantify how susceptible each person is to the environment; the greater the number of plasticity markers, the greater the degree of susceptibility. What is particularly unique about the differential-susceptibility model, though, is that it recognizes that a highly plastic individual would be just as likely to be affected by negative environments as positive environments. As a result, the most “plastic” individuals would score the highest on measures of positive phenotypes when exposed to the most positive environments and, at the same time, they would score the highest on measures of negative phenotypes when exposed to the most negative environments. This prediction made by the differential-susceptibility model is referred to as “for-better-or-for-worse” and is the finding that is able to delineate support for the diathesis-stress model versus the differential-susceptibility model (Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007). In recent years, there have been a number of studies attempting to examine whether gene–environment interactions are better explained by the diathesis-stress model or the differential-susceptibility model. Overall, there

is not a clear-cut consensus, with research findings providing support for both explanations of gene–environment interactions (Belsky, & Pluess, 2009). There can be little doubt that the amount of research devoted to testing these two perspectives will grow at a rapid pace over the next few years.

Gene–Environment Correlations

Gene–environment interactions are not the only type of gene–environment interplay that are directly applicable to antisocial phenotypes. A second type of gene–environment interplay is known as gene–environment correlation. Gene–environment correlation captures the processes by which genetic variation covaries with environmental variation. To understand more clearly what is meant by gene–environment correlation, let us revisit the twin-based methodology discussed previously. Recall that with this approach, phenotypic variance is partitioned into a heritability component, a shared environmental component, and a nonshared environmental component. This same methodology can be used with environmental measures, with the variance in these measures being decomposed into that which is explained by genetic versus shared environmental and nonshared environmental influences. Although this might seem a bit odd, there have been a significant number of studies using this strategy. The results generated from these studies have revealed that genetic influences are detected on virtually every environmental measure ever examined (Kendler & Baker, 2007). The magnitude of the genetic effect, however, tends to be significantly less than what is typically detected on phenotypic measures. For example, in their large review of the literature, Kendler and Baker (2007) reported that across studies, approximately 25 % of the variance in all different types of environmental measures is attributable to genetic factors.

What these findings tend to suggest is that the environments regularly studied by criminologists are likely under some level of genetic influence. However, these variance decomposition models

reveal nothing about how and why genetic factors covary with environmental measures. Fortunately, a number of scholars have identified the mechanisms that are likely at play for producing gene–environment correlations. These mechanisms help to shed some insight into the reasons why gene–environment correlations tend to emerge for virtually all criminogenic environments and for virtually all environments in general. Understanding these gene–environment correlations and how they relate to antisocial phenotypes is critical to theory development and to employing research designs that produce more stable and less biased parameter estimates. To date, three different types of gene–environment correlations have been explicated: passive gene–environment correlation, evocative gene–environment correlation, and active gene–environment correlation.

Passive gene–environment correlation occurs at birth and can extend forward in life as well. This type of gene–environment correlation occurs as the result of the birthing process in contemporary society, wherein children passively receive genes from their parents and an environment from their parents. Given that both the child’s genes and their environment are created by the same source—that is, their biological parents—it stands to reason that they will be correlated. To illustrate, parents who are violent, aggressive, and otherwise antisocial will pass along genetic tendencies to their children predisposing them to be violent, aggressive, and otherwise antisocial. At the same time, violent and aggressive adults typically do not provide the most effective rearing environments, with research showing that criminal parents are at risk for being cold, detached, neglectful, and even abusive to their offspring (Rutter, 1997). In this scenario, such children would be genetically predisposed to antisocial behaviors and they would also be environmentally socialized to be antisocial. Even before birth, then, it is possible to predict that the child’s genetic tendencies will correlate with the environmental conditions into which they are born.

The second type of gene–environment correlation is referred to as an evocative

gene–environment correlation. Evocative gene–environment correlation avers that environmental variation is often caused by how people act. Depending on unique personalities and behaviors, people will tend to elicit different responses from their environments and these responses, in turn, will tend to correlate with their genetic predispositions. For example, a child who is aggressive and violent is likely to elicit many more negative reactions from their parents than their sibling who is relatively well-behaved and obedient. In this case, the negative reactions from the parents would be driven, in part, by their child’s genetically influenced anti-social behaviors. The end result would be that the child’s environment (e.g., negative parenting) would be correlated with their genetic predispositions (e.g., a genetic predisposition for antisocial behaviors). Evocative gene–environment correlation can be thought of as a person-driven process, wherein the individual’s genetically influenced traits and behaviors are related to variation in environmental factors.

Last, active gene–environment correlation captures the process by which an individual’s genetically influenced traits and behaviors contribute to the selection of one environment over another. A person who is genetically predisposed to being a thrill-seeker, for example, is likely to seek out environments that are risky and sensational whereas a person who is relatively conservative will likely seek out environments that are not nearly as adventurous and risky. Environmental variation, as it applies to active gene–environment correlation, is therefore the result of individuals choosing environments that are compatible with their genetic predispositions (Hicks et al., 2013). Of particular interest is that active gene–environment correlation has application to many of the environments that are studied by criminologists, particularly those dealing with peers. If, for instance, variation in a measure of delinquent peers is shown to be under genetic influence, then the logic of active gene–environment correlation could be employed as an explanation suggesting that youth select peer groups based on their own

genetic influences. This type of approach would be useful at testing self-selection versus social causation explanations of human behavior, with a genetic effect falling in line with a self-selection argument.

Epigenetics

Unlike gene–environment interactions and gene–environment correlations that have been empirically studied in relation to crime, epigenetics is an emerging area of interest to human behavioral phenotypes, but it has not been studied in relation to antisocial phenotypes. To understand epigenetics, keep in mind that the entire sequence of DNA is referred to as the genome. What is particularly interesting about the genome is that the same sequence of DNA is found in all cells in the human body. The DNA found in a liver cell, for instance, is the exact same DNA that is found in a kidney cell. That obviously does not make complete sense because logically it would seem as though the DNA that is in a liver cell should be different from the DNA that is located in a kidney cell. After all, if DNA does not account for the difference between a liver and a kidney, then what would? The answer to this question is quite complex, but briefly, it appears as though that even though all cells contain the same DNA sequences, not all of the genes located in each of the cells are turned on; only those that are needed for that particular cell are active, with all others being silenced. So, in a liver cell only those genes related to the liver are turned on whereas in a kidney cell only those genes related to the kidney are active. Thus, while the DNA sequences may be identical across cells, the activity of the genes in each cell varies significantly.

Exactly how do genes get turned on and off in the genome? The answer to this question appears to be found in what is called the epigenome. The epigenome contains chemical markers that are attached to DNA. Depending on the precise chemical markers that are attached, gene activity can be enhanced, reduced, or even silenced without altering DNA sequences. What is particularly

interesting about the epigenome is that it is dynamic and changes throughout the life course in response to various factors, including environmental factors. In other words, epigenetic modifications change throughout life, in part, because of exposure to environmental stimuli. These epigenetic changes can then be passed on to the next generation. Returning back to the question about why liver and kidney cells are different even though their DNA is the same, it appears as though the differences in these cells are tied to differences in the epigenome. In liver cells, the epigenome silences in all non-liver genes, whereas in kidney cells, the epigenome silences all non-kidney genes. So even DNA sequences that appear to be identical can have very different effects depending upon the epigenetic markers that are present in each cell.

There are two main types of epigenetic processes that will be discussed in this chapter. The first is known as DNA methylation which is responsible for reducing and/or silencing gene activity. With methylation, an enzyme known as DNA methyltransferase tacks a methyl group (CH_3) to a particular DNA sequence (i.e., cytosine nucleotides, particularly those that are part of dinucleotide DNA sequences known as CpG islands). These regions of the gene are heavily involved in switching genes on and off via transcription factors. When a methyl group attaches, the transcription factors are deterred from turning genes on. The end result is that the DNA will not code for the production of the protein, thereby essentially silencing gene activity. The second epigenetic process is known as histone acetylation which is responsible for turning genes on. With histone acetylation, an acetyl group (CH_3CO) attaches to histones, which are the material around which DNA is strung. When an acetyl group is tacked to a histone, the DNA loosens from the histone and the gene is more likely to be turned on.

Why epigenetic modifications occur is not completely understood, but there is empirical evidence indicating that environmental factors are involved in the process. Precisely which environments are responsible for producing epigenetic changes is not well understood at this

point, but it appears that environments previously been found to be linked with criminal activity, such as high levels of chronic stress, early life rearing conditions, and even exposure to toxins, are involved in some capacity (Baccarelli & Bollati, 2009; Zhang & Meaney, 2010). To date, however, there is not any quantitative evidence based on human samples explicating the interrelationships among environmental factors, epigenetic modifications, and antisocial outcomes. Perhaps the most applicable evidence available comes from a landmark study conducted on rats. In this study, Weaver and colleagues (2004) were interested in examining maternal nurturing and the effects that it had on their rat pups. There is considerable variation in maternal nurturing behaviors among rat pups and Weaver et al. divided the rats into two groups, one of which was characterized as the high-nurturing group and one that was characterized as the low-nurturing group. The rat pups were then placed into stressful environments and were examined to see how they would adapt. Not surprisingly, the high-nurtured rat pups were relatively calm and adaptive whereas the low-nurtured rat pups were relatively skittish and non-adaptive.

Weaver et al. then attempted to determine whether this association was due to genetic or environmental processes. To do so, they cross-fostered the rat pups in which rat pups who were born to high-nurturing mothers were, at birth, switched to be reared by low-nurturing mothers (and vice versa). This procedure sort of mimics an adoption-based research design and allows the effects of genes and rearing environments to be disentangled. The results from this cross-fostering technique revealed that the rat pups acted in accordance with their nurturing environment, not their genetic lineage. What is particularly interesting about this study is that the researchers then examined the methylation patterns of the rat pups. They reported that rat pups reared by high-nurturing mothers, in comparison with rat pups reared by low-nurturing mothers, had less methylation of glucocorticoid receptor genes, genes which are involved in dealing with stressful environments. They also

detected significant acetylation differences for genes related to neuronal growth in the hippocampus. These epigenetic differences emerged during the very first few weeks of life and remained into adulthood. Perhaps the most incredible finding emerged when they administered the low-nurtured rat pups a drug (trichostatin) which removed the epigenetic differences between the low- and high-nurtured rat pups. After the epigenetic differences were removed, the behavioral differences between the two groups of rat pups also disappeared, providing substantial empirical evidence that epigenetic modifications were responsible for producing the observed behavioral differences.

The findings emanating from this study are probably among the most important when it comes to epigenetic processes and how they may mediate the link between environmental influences and phenotypic outcomes. Whether these findings would be applicable to humans, and whether they have direct relevance to the development of criminal outcomes, remains to be determined. Only through future research that directly examines epigenetic processes in humans as they pertain to antisocial phenotypes will a better understanding of the role of epigenetics in the etiology of crime and delinquency emerge. For now, though, epigenetics represents one of the more exciting areas of biosocial research when it comes to the causes, prevention, and treatment of antisocial phenotypes.

Summary

- Biosocial criminology has grown at an exponential rate over the past 10 years. The biosocial perspective has transitioned from being considered taboo and dangerous to being one of the primary guiding perspectives of research examining criminal and antisocial behaviors (Cullen, 2009).
- Based on an examination of the biosocial research that has been completed over the past decade, the substantial impact of the biosocial perspective on our understanding of antisocial behavior becomes quite clear. For example, besides genetic influences there is currently no criminological variable that explains 50 % of the overall variance in criminal behavior.
- The biosocial perspective has sparked a revolution in criminological research in which concepts, methodologies, and theories from the hard sciences are being integrated into how we study crime, criminals, and victims.
- Findings from molecular genetic research have identified certain genetic variants that are believed to relate to the development of antisocial phenotypes. Importantly, genes involved in neurotransmission are the most promising candidate genes for influencing antisocial behaviors.
- Genetic effects cooperate with environmental influences to produce variance in antisocial phenotypes—a concept known as gene–environment interplay.
- While biosocial criminology has “put the wheels in motion,” the field of criminology is only at the beginning of a long and difficult path. Despite being far more open to the biosocial perspective than ever before, only a handful of criminologists actually examine the biosocial influences of criminal behavior currently.

Future Research Needs

- In order for additional progress to be made, researchers who are clinging to purely sociological explanations of criminal behavior need to integrate the biosocial perspective into their current research agenda.
- Integrating biosocial concepts into traditional criminological theory will not be easy, but the benefits will likely result in a more thorough explanation of antisocial behaviors and, in turn, more effective and efficient public policy.
- The systematic study of gene–environment interplay can be used to establish true causal processes between genetic risks and behavioral outcomes (Jaffee & Price, 2012).

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Intelligence and Executive Function

A cognitive account of behavior can be produced by considering several levels of analysis. At a psychological level, there is some consensus to consider that *intelligence* refers to a broad range of abilities which stretch from vocabulary and general knowledge to verbal and visuospatial reasoning, comprehension and logical thinking, arithmetic abilities, and the capacity for abstract thinking (see Deary, 2012; Nisbett et al., 2012). Intelligence quotient (IQ) scores, which summarize these heterogeneous but related abilities, are typically referenced with a population mean of 100 and a standard deviation of 15 points. Although there are still debates as to the best way to conceptualize subgroups of intellectual abilities, some groupings have received much research attention, especially in the study of the relations between criminal and antisocial behavior (CAB) and intelligence. For example, the Weschler batteries, in addition to providing

global or full IQ and subscale scores, also provide summary indices of verbal (VIQ) and performance (PIQ) abilities. Although the use of intelligence tests is a frequent element of neuropsychological assessment, global or full IQ scores (as well as any linear combination of neuropsychological performance scores) obscure much valuable information and consequently have limited clinical use. Further, several abilities that are possibly involved in behavior regulation are better captured by other types of neuropsychological tests which attempt to break down cognitive functioning into more specific components (Lezak, Howieson, Bigler, & Tranel, 2012).

The ability to solve problems deliberately and meet objectives, for example, relies much on the *executive function* (EF) (Jurado & Rosselli, 2007; Miyake et al., 2000), which is a set of abilities not necessarily well captured by “*intelligence*” tests. There are three levels of analysis which are particularly relevant to the EF and that will come to bear on CAB. First, we understand that there are four major phases to problem solving: (1) representing the problem, (2) planning a solution, (3) executing the plan, and (4) monitoring and evaluating the adequacy of an attempted solution (Zelazo, Müller, Frye, & Marcovitch, 2003). Second, the phases are in turn supported by core processes such as selective attention (dynamic allocation of attentional resources), inhibitory control (stop ongoing behavior in the face of new demands), working memory (holding and manipulating information online), and

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cognitive flexibility (capacity to shift between task demands; Garon, Bryson, & Smith, 2008; Miyake et al., 2000; Stuss, 2011; Zelazo & Müller, 2010). Third, the EF function is invoked in “cool,” rational, as well as, “hot,” affectively charged contexts (Carlson, Zelazo, & Faja, 2013). Whereas traditional neuropsychological testing has examined abilities under affectively neutral conditions, a complete functional assessment also requires testing under emotionally arousing conditions, which are likely to invoke automatic responses and require greater self-regulation in order to provide adaptive responses. Although future research would benefit from this multidimensional level of analysis, the present chapter will not analyze the link between EF and CAB in that level of detail.

At another level of analysis, all of these psychological abilities rely on the integrity of several underlying brain structures and neural networks (Best & Miller, 2010; Carlson et al., 2013; Diamond & Aspinwall, 2003; Zelazo & Müller, 2010). These include the prefrontal cortex (Bunge & Zelazo, 2006), the dorsolateral cortex (working memory; Stuss, 2011), the cingulate cortex (inhibition and flexibility; Ordaz, Foran, Velanova, & Luna, 2013), and the ventromedial cortex (emotional regulation; Blair, Zelazo, & Greenberg, 2005; Stuss, 2011). Further levels of analysis involve neurotransmitters and neurohormones (Booij et al., 2010; Susman et al., 2010). This heterogeneity in cognitive functions and complexity of networks highlights the need to consider their specificity. Further, any functional link between brain and behavior will vary across development, as will be discussed below.

Intelligence, Executive Function, and Criminal and Antisocial Behavior

The relevance of a cognitive account of CAB has emerged in the nineteenth century with the first case studies of individuals who underwent significant personality and behavior changes following brain lesions. The 1868 report of the case of Phineas Gage is perhaps the most famous, though it is not unique. After a significant lesion

to what appears to be the orbitofrontal cortex, Gage began showing clinical impairments in mood, behavior, and capacities to manage his own affairs, despite normal intelligence (Harlow, 1993). This appears to be similar to what is seen in some incarcerated psychopaths—criminal behavior, but apparently intact intelligence. The parallel with psychopathy has been so compelling that such syndromes were named “acquired sociopathy” (also referred to as the “pseudopsychopathic syndrome”; for more details, see Séguin, Sylvers, & Lilienfeld, 2007). Intelligence has also been linked to criminality and antisocial behavior. Early studies (Goddard, 1914; Goring, 1913) had already noted somewhat lower general mental capacities in criminals, which were later found to be about 8–10 IQ points lower (1/2 to 2/3 of a standard deviation) than that of the general population (Hirschi & Hindelang, 1977; Parent, Larivée, Giguère, & Séguin, 2011; Quay, 1987; Wilson & Herrnstein, 1985), with an effect size that was greater than for lower social class (Herrnstein & Murray, 1994; Moffitt, Gabrielli, Mednick, & Schulsinger, 1981; West & Farrington, 1973), particularly for verbal as opposed to performance IQ (Isen, 2010; Parent et al., 2011).

Comorbidity, Heterogeneity, and Specificity

Although this review focuses on CAB, it is important to note that beyond a legal framework which focuses on delinquency and criminal behavior, and a mental health framework which includes Conduct Disorder and Antisocial Personality Disorder, many of the functions reviewed above may also be linked to comorbid clinical syndromes or disorders such as Attention Deficit Hyperactivity Disorder and Oppositional Defiant Disorder, Intermittent Explosive Disorder, as well as Schizophrenia Paranoid type and Bipolar Disorder with psychotic features (Séguin et al., 2007). We also need to consider the various substance use and gambling disorders as well as psychopathy, which is a serious clinical syndrome though not a psychiatric disorder. It is also

important to keep in mind that comorbidity is the norm rather than the exception (Beauchaine & McNulty, 2013). For a discussion of the neurocognition of externalizing behavior problems, see Pinsonneault, Parent, Castellanos-Ryan, and Séguin (*in press*).

We also note that clinically oriented research has been conducted using categorical measures of disorders or syndromes, such as those listed above, as well as dimensional approaches which may include physical aggression and violence, nonphysical aggression, non-aggressive conduct problems (vandalism, theft, truancy), bullying, indirect, proactive, and reactive aggression, impulsivity, hyperactivity, inattention, oppositional behavior, and a wide range of risk behaviors (e.g., gambling, substance use, sexual behavior, driving, self-harm; Eaton et al., 2012).

This heterogeneity of antisocial problems and associated comorbid conditions highlights the need to consider behavioral specificity (what is unique to each condition listed above) as well as core deficits (what is common across conditions, e.g., impulsivity; Beauchaine & McNulty, 2013). Impulsivity is characterized by poor self-control which is cognitively related to poor thinking or planning. At a “cool” process level, poor self-control would thus be related to working memory problems. Impulsivity is a cross-cutting dimension that also touches on many conditions including disruptive and conduct problems (American Psychiatric Association, 2013). Situational impulsivity could be increased under the effects of substances and results in greater “hot” decision-making problems in people who would otherwise have adequate “cool” abilities. This idea is not trivial when one considers that a large proportion of violence occurs while under the influence (Foran & O’Leary, 2008; Murdoch, Pihl, & Ross, 1990; Rossow, 2001), although the relation may not necessarily be causal (Room, Babor, & Rehm, 2005).

Developmental analyses have suggested several different trajectories of CAB (for a recent review of the development of antisocial behaviors, see Piquero, Reingle Gonzalez, & Jennings, 2015; Séguin & Tremblay, 2013). Trajectories are typically contrasted by differences in the “age of onset,” level of

frequency or variety, and course of CAB. When considering CAB globally, two of these many developmental trajectories have drawn much attention. The most problematic trajectory has been termed “early onset/persistent,” whereas a second trajectory has been termed “adolescence-limited” or “transitory” (Le Blanc, 2005; Moffitt, 1993). Research on these trajectories has led to the addition of subtyping based on age of onset to the diagnosis of Conduct Disorder in the Diagnostic and statistical manual of mental disorders (*DSM-5*; American Psychiatric Association, 2013).

Delinquency and Criminality Definitions of delinquency may vary but, on the whole, involve behaviors that go against societal rules. Recent reviews on IQ and delinquency and criminality indicate not only lower IQ in juvenile and adult offenders but also a greater difference between Performance and Verbal IQ ($P > V$) which is mostly associated to violent crimes and interpersonal difficulties (Ellis & Walsh, 2003; Isen, 2010; Manninen et al., 2013; Parent et al., 2011).

Beyond IQ, delinquency has been linked to several neuropsychological deficits (e.g., verbal skills, planning, inhibiting inappropriate responses, attention, and concentration) (Moffitt, 1990; Moffitt & Henry, 1991). This type of link has also been found prospectively between ages 13 and 18 years (Moffitt, Lynam, & Silva, 1994). Further, Moffitt and colleagues were the first to show that neuropsychological deficits have been greater in the early onset/persistent type of delinquency than with the adolescent-limited/transitory type. Overall, meta-analyses over the past 15 years that have examined various definitions of CAB, regardless of developmental history, noted that links with poor EF (mainly working memory) were greatest for criminality and delinquency (Morgan & Lilienfeld, 2000; Ogilvie, Stewart, Chan, & Shum, 2011), and moderate for disorders such as ADHD (Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005) and CD (Ogilvie et al., 2011).

Conduct Disorder Conduct disorder (CD) has been defined as a “repetitive and persistent pattern of behavior in which the basic rights of

others or major age-appropriate societal norms or rules are violated” (American Psychiatric Association, 2013, p. 469). Though they are generally addressed in a different literature, CD symptoms overlap considerably with characteristics of delinquency. Cross-sectional studies suggest that CD children and adolescents’ IQ scores are 1–2 SDs below the population mean (Golden & Golden, 2001; van der Meer & van der Meere, 2004). The $P > V$ differential is also at about $\frac{1}{2}$ SD points (Hodges & Plow, 1990; Rogeness, 1994; Zimet, Zimet, Farley, & Adler, 1994). Conduct problems in preschoolers are also linked with poor IQ and a $P > V$ difference (Speltz, DeKlyen, Calderon, Greenberg, & Fisher, 1999). One recent meta-analysis focusing on “cool” EF reported a moderate effect size ($d = 0.54$; Ogilvie et al., 2011). Studies of “hot” EF also support a link (Fairchild et al., 2009; Matthys, Vanderschuren, & Schutter, 2013). Studies of comorbid symptoms between ADHD and CD or CD linked with ODD have been mixed, sometimes suggesting an additive relation (e.g., Séguin et al., 2004), sometimes not (e.g., Barnett, Maruff, & Vance, 2009), while others have found behavioral and cognitive specificity. For example, in one study of preschoolers, Séguin, Parent, Tremblay, and Zelazo (2009) found that low VIQ was related to physical aggression whereas low PIQ was related to hyperactivity.

When considering either IQ or EF tests, one needs to consider that not only these constructs are multidimensional, but that they may relate to each other in more than an additive fashion. For example, typical IQ scores are derived by a linear combination of scores across tests, usually an addition of standardized scores. But considering the relative independence between cognitive dimensions may be helpful in better understanding CD subtypes. For example, one study found that verbal abilities and hot EF, assessed with a delay of gratification task, interacted in predicting physical aggression in school-aged boys; the link between verbal abilities and CD was greatest in boys with poor delay of gratification (Ayduk, Rodriguez, Mischel, Shoda, &

Wright, 2007). In a similar way, IQ scores interacted with inhibitory control in predicting an age-crime curve between ages 11–28 years (Loeber et al., 2012).

Antisocial Personality Disorder and Psychopathy

A “pervasive pattern of disregard for and violation of the rights of others” is the main feature of Antisocial personality disorder (ASPD; American Psychiatric Association, 2013, p. 659). Psychopathy is a related clinical construct, not an official disorder, which remains controversial but nonetheless seems to be characterized by poor behavior control and lack of remorse (Blair, 2003). The relation between ASPD and psychopathy is asymmetrical: Most psychopaths (as defined by the Hare Psychopathy Checklist; Hare, 2003) meet criteria for ASPD but the converse is not true. Although there is virtually no literature examining ASPD and intelligence (with the exception of one study showing no link; Simonoff et al., 2004), a dimensional approach to psychopathy suggests that intelligence is positively linked to the interpersonal (Salekin, Neumann, Leistico, & Zalot, 2004; Vitacco, Neumann, & Wodushek, 2008) and Antisocial dimensions (Vitacco et al., 2008), but negatively linked with the Affective and Lifestyle dimensions (Neumann, Hare, & Newman, 2007; Vitacco et al., 2008; Vitacco, Neumann, & Jackson, 2005). Such findings fuel a current debate about the adaptive and maladaptive characteristics of psychopathy (Lilienfeld et al., 2012). Findings with regard to EF reveal a very weak link with ASPD (Morgan & Lilienfeld, 2000). Finally, negative links with psychopathy vary in size (from 0.47 to 1.01) as a function of dimensions of EF: planning (Dolan & Park, 2002), verbal working memory (De Brito, Viding, Kumari, Blackwood, & Hodgins, 2013; Dolan & Park, 2002), cognitive flexibility and inhibitory control (Dolan, 2012; Dolan & Park, 2002), and hot decision-making (De Brito et al., 2013).

Substance Use Although substance use problems are typically included in antisocial behavior scales, they often constitute clinically

separate disorders. Substance use disorders (SUDs) involve pathological as opposed to recreational/social use with considerable functional impairments (American Psychiatric Association, 2013, p. 483). The link between substance use, in particular alcohol, and cognitive function in both the animal and human literature has been extensively studied and recently reviewed by Heinz, Beck, Meyer-Lindenberg, Sterzer, and Heinz (2011). The authors suggest a neurobiological model in which trait impulsivity plays a central role. In this model, impulsivity may be the developmental result of gene and environment interactions affecting the sensitivity of the amygdala, a fear processing system, and neurotransmitter systems. Impulsivity may not only predispose to alcohol consumption, but alcohol would acutely interfere with motivational (“hot” reward systems) and all executive (“cool”) processes to increase the likelihood of impulsive aggression, particularly in those with low sober EF. Consequently, links between cognitive functioning and SUDs require a more complex analysis and the assumption of directionality of effect may be more tenuous than it seems to be for other CAB (though we discuss that further below).

The assumption of an association between low EF and SUDs is supported by the acute effects of substances on cognitive function, which are often described as reversible lesions. However, the main challenge to that assumption is that, at least in adolescence, obtaining access to substances has been associated with higher cognitive abilities (Castellanos-Ryan, Séguin, Vitaro, Parent, & Tremblay, 2013; Johnson, Hicks, McGue, & Iacono, 2009; White & Batty, 2012). Cognitive abilities are therefore construed as providing an advantage for accessing resources, such as substances which have several motivational properties (Hyman, Malenka, & Nestler, 2006).

Most studies which suggest that heavy substance use precedes a cognitive decline (e.g., Fontes et al., 2011; Gruber, Sagar, Dahlgren, Racine, & Lukas, 2012) have typically not been controlled for pre-morbid cognitive abilities. When looking at chronic, heavier use, one recent prospective study shows that pathological use

with onset before age 18 years has been associated with a global decline in IQ over a period of 22 years (Meier et al., 2012). However, another recent prospective study of males, covering ages 13–20 years, suggests that cannabis-related impairments in this shorter term are not global, but rather limited to trial-and-error learning and to poor academic achievement (Castellanos-Ryan, Pingault, Parent, Vitaro, Tremblay & Séguin, 2014).

Aggressive vs. Non-aggressive Antisocial Behavior Whether we are using legal or clinical nomenclatures, the heterogeneity captured by global scales of antisocial behavior have prompted the study of subtypes. One major approach to subtyping consisted in separating aggressive versus non-aggressive conduct problems. This distinction may also be referred to the contrast between offenses against persons and property offenses, or to the contrast between overt and covert delinquency. A number of studies have shown that poor cognitive function was reliably reported for aggressive antisocial behavior, particularly for physical aggression, and that non-aggressive problems were either not associated or positively associated with cognitive function in both males and females (Barker et al., 2007, 2011; Giancola & Mezzich, 2000; Giancola, Mezzich, & Tarter, 1998; Hancock, Tapscott, & Hoaken, 2010; Larivée et al., 1994; Walsh, 1987), though the latter have been less studied.

Developmental Processes

Although there is considerable literature addressing links between CAB and cognitive factors, and much literature addressing the development of CAB and cognition, there is little empirical data addressing their joint development. Nonetheless, Parent et al. (2011) have reviewed several theoretical accounts for that joint development, which tend to fall under three broad categories: (1) antisocial behaviors as (direct or indirect) causes for cognitive impairments; (2) cognitive impairments as

(direct or indirect) causes for antisocial behaviors; and (3) the association between antisocial behaviors and cognitive impairments as the result of their association to a third variable. Essentially, the first model suggests that early manifestations of antisocial behavior would reduce adequate educational attention which could help children solve cognitive challenges. Conversely, the second model suggests that poor cognitive skills would increase the likelihood of academic failure and exposure to deviant peers. Finally, “third variables” such as SES, family adversity, ethnicity, informant, parental IQ and mental health, and impulsivity have all been implicated in the joint development of CAB and cognitive abilities.

Alternately, models which capture the organizational and transactional nature of joint developmental processes might hold more promise because they suggest that patterns of associations between CAB and cognitive function might be moderated dynamically by characteristics of the different developmental periods (i.e., genetic, physiologic, behavioral, psychological, relational, environmental, and sociological). For example, processes taking place in the perinatal period, in infants or preschoolers, may be different than those for school age children, adolescents, or young adults.

Several proximal factors may begin to operate during the perinatal period (Dick, 2005), such as exposure to teratogens that affect fetal development (Huijbregts et al., 2006; Huijbregts, Séguin, Zoccolillo, Boivin, & Tremblay, 2007), that affect epigenetic processes (Knopik, Maccani, Francazio, & McGeary, 2012), or that affect the developing infant postnatally (Bouchard et al., 2011; Bouchard, Laforest, Vandelac, Bellinger, & Mergler, 2007), as well as maternal stress during pregnancy and certain types of perinatal complications (Gatzke-Kopp, 2011). Other postnatal exposures such as abuse, neglect, or chronic stress may also affect brain development (Lupien et al., 2011) and may lead to early deficits in self-regulation (e.g., Ishikawa & Raine, 2003; Rothbart & Bates, 2006) which may, in turn, affect parent–child relations which are important for the acquisition of self-control

and social skills (Bridgett et al., 2009; Choe, Olson, & Sameroff, 2013). Such patterns are important to understand given that problem behaviors such as physical aggression peak around 2 years of age (Séguin & Tremblay, 2013), that the link between behavior problems and cognitive development becomes established later in the preschool period (Séguin et al., 2009), and that early exposure to day care (possibly through stimulation, guidance, and socialization) may offset familial risk factors in preventing the development of physical aggression (Côté et al., 2007) and help catching up cognitively by the time of school entry (Geoffroy et al., 2010).

Given that cognitive and behavior development appears to be linked early, a transactional approach to the further joint development of CAB and cognitive abilities may be best illustrated by the literature on school-aged children. Entry into the formal schooling system poses an important developmental challenge to children. Because socioemotional skills are closely linked to cognitive skills (Blair, 2002; Blair & Razza, 2007), children with poor abilities in social understanding might have limited opportunities to develop better cognitive skills. These children would consequently be at high risk for academic underachievement (e.g., Pagani, Fitzpatrick, & Parent, 2012). Academic underachievement has been linked to further problem behavior (Vaillancourt, Brittain, McDougall, & Duku, 2013), though the likelihood of CAB is more likely to be increased in those who already had aggression, impulsivity, or hyperactivity problems prior to school entry (e.g., Broidy et al., 2003). Conversely, sound school achievement has protective effects, especially for children at high risk of CAB, such as those who have been physically abused (Herrenkohl, Tajima, Whitney, & Huang, 2005; Lösel & Farrington, 2012).

Besides academic underachievement, these children’s difficulties in communication, inhibitory control, and other problem solving abilities would likely reduce their opportunities for positive socialization experiences and learning more complex social behaviors (Lösel & Farrington, 2012), leading them to resort to antisocial

behavior to resolve perceived conflicts. Short term gains may initially reinforce these maladaptive patterns, gradually leading to rejection by socially adapted peers and affiliation with other antisocial peers (Caspi & Moffitt, 1995; Patterson, Reid, & Dishion, 1992; Vitaro, Pedersen, & Brendgen, 2007).

Early problem behavior has also been linked with poor intellectual abilities (Huesmann, Eron, & Dubow, 2002) that might interfere with participation in academic activities and with learning opportunities (Brennan, Shaw, Dishion, & Wilson, 2012; Lanza, Rhoades, Nix, Greenberg, & Conduct Problems Prevention Research Group, 2010; Scanlon & Mellard, 2002; vanLier et al., 2012).

The transactional/reciprocal relation between cognitive and behavior development is likely to be moderated by social environmental factors, e.g., parental factors such as involvement in children's school activities (El Nokali, Bachman, & Votruba-Drzal, 2010) or genetic factors, e.g., genotypes such as those for COMT, an enzyme involved in the regulation of catecholamines such as dopamine, which is important for the reward system and prefrontal cortex function (Langley, Heron, O'Donovan, Owen, & Thapar, 2010). The social control mechanisms identified in criminological theories (e.g., social models, bonding, social constraints, see Farrington, 2005; Le Blanc, 2005) would be interesting moderating factors to explore.

Applying the transactional model to the adolescence literature, we note that a history of problem behavior is related to poor cognitive function (Séguin et al., 2004), that school dropout is predicted by earlier antisocial behavior (Hoffmann, Erickson, & Spence, 2013; Janosz, Le Blanc, Boulerice, & Tremblay, 2000) and, as mentioned earlier, that substance use appears to be linked causally to reduced cognitive function (Castellanos-Ryan et al. 2014; Meier et al., 2012). Adolescence is also a period where the influence of peers increases as the social network becomes less family based (Dishion, Nelson, & Bullock, 2004; Marschall-Lévesque et al., 2014). New opportunities and developmental challenges arise and so do demands for affective decision-

making (Albert, Chein, & Steinberg, 2013). The developing brain is, however, under increased influence from gonadal hormones linked to pubertal development. These appear to precipitate a rapid development of the limbic system which is heavily involved in reward processing (Casey, Jones, & Hare, 2008; Ernst & Mueller, 2008). Pubertal timing (age at which a certain stage of pubertal development is reached or pubertal status) and tempo (rate of growth through pubertal stages) both predicted increases in substance use and problems in mid to late adolescence (Castellanos-Ryan, Parent, Vitaro, Tremblay, & Séguin, 2013). This is a time where EF skills are expected to help adolescents resist deviant peer influence (Riggs, Jahromi, Razza, Dillworth-Bart, & Mueller, 2006; Steinberg, 2009). Here again, support from the social environment, whether they are significant adults (Anderson, Christenson, Sinclair, & Lehr, 2004; Graber, Brooks-Gunn, & Warren, 2006; Yang et al., 2007) or peers (Marschall-Lévesque et al., 2014), as well as genetic factors (DeYoung et al., 2006) may play an important moderating role.

Summary

- The link between cognitive functions and antisocial behaviors is established as early as the preschool years.
- The link may vary in direction according to the form of antisocial behavior; it appears to be negative for physical aggression and violence, but either nonexistent or positive for non-aggressive antisocial behavior.
- The joint development of cognitive functions and antisocial behaviors is likely reciprocal and transactional: poor sociocognitive skills may result in inappropriate behavior to solve perceived conflicts, and problem behavior may result in fewer opportunities for guided learning.
- The transactional process linking cognitive functions and antisocial behavior development is likely to be moderated by genetic and environmental factors.

- These genetic and environmental challenges may change across developmental periods such as pregnancy, infancy and preschool years, school years, adolescence, and early adulthood.
- Interventions aimed at the most likely modifiable environmental factors, such as early access to day care for at-risk families, may benefit both cognitive and behavior development.

Future Research Needs

- The first challenge to both this review and future research is the heterogeneity of both antisocial behaviors and cognitive functions. We have shown that studies using either global cognitive scales or global antisocial/delinquency/conduct disorder behavior scales may be missing crucial information. For example, much research linking cognition to antisocial behavior assumes that the association is constant across types of antisocial behaviors, which has now been demonstrated to be false. Similarly, there is specificity to some aspects of cognitive function.
- Only few studies use a developmental approach and not enough studies start during pregnancy. This is important because a growing number of studies are showing that some developmental origins of antisocial behavior may be found in utero, and this review highlights the importance of key developmental transitions.
- Further, many health economists have shown that very early prevention increases human capital, reduces disparities, and is economically more effective than later intervention (Doyle, Harmon, Heckman, & Tremblay, 2009; Heckman, 2006). Although several programs had an impact on criminality, with some exceptions (e.g., Schweinhart et al., 2005), very few early prevention programs have shown specific effects on physical aggression and violence [This is partly due to the fact that physical aggression is embedded in global conduct problem scales in

prevention studies, an unfortunate methodological artifact (Séguin & Tremblay, 2013)]. Although early childcare studies have shown lower physical aggression and higher cognitive function in at-risk children, more early intervention studies are needed. Other lines of prevention at later developmental stages are important but should probably be secondary when one considers a stepped care model. Intervention studies on cognition or behavior would also help disentangle directions of effects and support further a theoretical understanding of developmental processes.

- We also note that comorbidity is not often studied when it is the norm rather than the exception. It is already a problem in the conduct disorder and ADHD literatures, but it is particularly important for studies using legal definitions of antisocial behavior that may include a wide variety of mental health problems.

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The Contribution of Temperament and Personality Traits to Criminal and Antisocial Behavior Development and Desistance

10

Julien Morizot

During most of the twentieth century, the contribution of individual factors such as intelligence and personality was commonly disregarded by mainstream criminologists, who were holding the belief that environmental factors are more important and useful (Andrews & Wormith, 1989; Wilson & Herrnstein, 1985). This state of affairs has since changed. In 1990, with the publication of their book, Gottfredson and Hirschi provided a new impetus in criminological research by forcefully restating that the psychological dimension is a crucial explanatory factor of criminal and antisocial behavior (CAB). Their theory became one of the dominant positions in contemporary criminology (Cohn & Farrington, 2008; DeLisi, 2011). Today, hardly any criminologist would dispute that some psychological characteristics contribute, in one way or another, to the development of CAB.

This chapter reviews the contribution of temperament and personality traits to CAB development and desistance. Although human personality is much more complex than a series of traits (McAdams & Pals, 2006), they are the personality constructs that have been most studied in relations to CAB. This review focuses on general delinquent and criminal behavior but, whenever relevant, research on different forms

of antisocial behavior will be considered (e.g., conduct problems, externalizing problems, substance use). Due to space limitation, only a selective review of theories and empirical research is presented.

Like other scholars in psychology and criminology, in order to better conceptualize and study the relations between personality traits and CAB, I advocate for resting on comprehensive structural models of normal-range personality traits (Blonigen & Krueger, 2007; Caspi et al., 1994; Egan, 2009; Miller & Lynam, 2001), particularly the Big Five model (John, Neumann, & Soto, 2008; McCrae & Costa, 2008). There are a number of important theoretical and empirical advantages for criminologists to resting on such a structural model of personality traits. First, this can help integrate findings from various lines of research or theoretical traditions, and thus, helps look at the big picture. Indeed, a structural model of personality traits consists in a hierarchical taxonomy integrating several specific or lower order personality traits embedded in a limited number of broad or higher order traits. Second, resting on a structural model of normal-range personality traits allows researchers to link CAB with an established nomological network (Blonigen & Krueger, 2007). For instance, knowledge on the etiological factors, consequences, and developmental trajectories of personality traits can potentially be linked to knowledge on CAB development, thereby providing new guidelines for criminological research.

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Personality Traits: Definition and Characteristics

Most scholars in psychology consider that it is possible to recognize and measure individual differences in emotions and behavior early in human ontogeny, by the first few months of life (Kagan, 1994; Rothbart & Bates, 2006). Psychologists started using the term “personality” to refer to these individual differences since Allport (1937). He adopted this term because of its integrative aspect as well as because it eliminated confusions associated with other terms such as temperament and character. It should be noted that for many scholars, the distinction between temperament and personality has become questionable because empirical research showed that personality traits have essentially all the characteristic features purported to temperament (Caspi & Shiner, 2006). As such, these two terms are often used more or less interchangeably, temperament being generally used for research during infancy and childhood, while personality is used for research during adolescence and adulthood. Temperament traits can essentially be considered as early developing personality traits (Caspi & Shiner, 2006; Rothbart & Bates, 2006).

But what is personality exactly? There is no single consensual definition among scholars, but a general working definition that is accepted by most personality psychologists refers to personality as the psychological characteristics that contribute to an individual’s distinctive patterns of thinking (cognitions), feeling (emotions), and behaving (behaviors) that tend to be relatively pervasive across social situations and enduring across time (Allport, 1937, Cervone & Pervin, 2013). McAdams and Pals (2006) argued that personality can be conceptualized and measured according to three broad complementary domains: dispositional signature, characteristic adaptations, and personal narratives. The dispositional signature is the most stable and recognizable aspect of human personality and is constituted by the relatively decontextualized traits that describe people in their typical thoughts, emotions, and behaviors.

So what is a personality trait? Again, there is no consensus on a unique definition. According to Allport (1961), a trait is “a neuropsychic structure having the capacity to render many stimuli functionally equivalent, and to initiate and guide equivalent (meaningfully consistent) forms of adaptive and expressive behavior” (p. 347). Recently, Roberts (2009) proposed that “personality traits are the relatively enduring patterns of thoughts, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances” (p. 140). Roberts and Jackson (2008) argued that traits can be conceptualized by the repetition of similar states (i.e., a momentary cognition, emotion, or behavior expressed in a particular social situation) over time in functionally equivalent situations.

Even though the validity and even the very existence of traits was once questioned, contemporary empirical research has put most of these excessive critics to rest (Kenrick & Funder, 1988) and traits are now considered fundamental units of human personality (McAdams & Pals, 2006). Personality traits are not merely convenient psychometric aggregates of behavior consistencies, but are postulated as internal latent dispositions that explain the systematic covariation among different cognitions, emotions, and behaviors (Deary, 2009; Tellegen, 1991).

Traits of different levels of complexity are organized into hierarchical structural models (Markon, Krueger, & Watson, 2005). There appears to be a current consensus that a structure of five broad personality traits can help classify and account for the variation in most of the numerous existing primary traits (John et al., 2008; McCrae & Costa, 2008). A number of scholars rather argue for a structure of three broad traits (Clark & Watson, 2008; Eysenck, 1990; Tellegen & Waller, 2008). These two structural models have been identified in children, adolescents, and adults and have been replicated in several different cultures and countries. The broad and primary traits of these models are presented in Table 10.1. As can be seen, there are notable similarities between these structural models: they all have Extraversion (Positive Emotionality) and Neuroticism (Negative Emotionality), whereas Disinhibition

Table 10.1 Overview of different structural models of personality traits in childhood, adolescence, and adulthood

Big Three model (Eysenck & Wilson, 2000)	Big Three model (Tellegen & Waller, 2008)	Big Five model (McCrae & Costa, 2010)
Neuroticism	Negative emotionality	Neuroticism
Anxiety	Stress Reaction	Anxiety
Hypochondria	Alienation	Self-Consciousness
Unhappiness	Aggression	Depression
Inferiority		Vulnerability
Guilt		Angry hostility
Submissiveness		Impulsiveness
Obsessiveness		
Psychoticism/disinhibition		Agreeableness
Tough-mindedness		Tender-mindedness
Aggressiveness		Integrity
Manipulativeness		Trust
Risk-taking		Modesty
Impulsivity		Altruism
Irresponsibility		Compliance
Practicality		
	Constraint	Conscientiousness
	Control	Order
	Harm avoidance	Dutifulness
	Traditionalism	Self-discipline
		Deliberation
		Achievement striving
		Competence
Extraversion	Positive emotionality	Extraversion
Activity	Well-being	Activity
Sensation seeking	Social potency	Excitement seeking
Sociability	Social closeness	Gregariousness
Expressiveness	Achievement	Positive emotions
Assertiveness		Assertiveness
Ambition		Warmth
Dominance		
	Absorption	Openness
		Feelings
		Ideas
		Fantasy
		Novelty seeking
		Aesthetics
		Values

(or Psychoticism) can be thought of as a combination of aspects of Agreeableness and Conscientiousness.

The Big Five model is arguably the one that is most consensual in personality psychology because it represents a taxonomy that allows classifying a vast number of primary traits (John et al., 2008; McCrae & Costa, 2008). In

this model, Neuroticism refers to individual differences in the propensity to experience negative emotions such as anxiety, fear, depressed mood, and irritability and to have low self-worth; Agreeableness stands for individual differences in prosociality, empathy, collaboration, and helpfulness with others; Conscientiousness represents individual differences in the

propensity to be organized, to plan things ahead, to control impulses, and to respect and abide conventional social norms and rules; Extraversion reflects individual differences in sociability, assertiveness, activity level, appreciation of exciting activities, and the propensity to express positive emotions; Openness represents individual differences in intellectual curiosity, imagination, appreciation of different ideas and artistic expressions, and different social and political values. As will be noted in a subsequent section, many constructs popular in criminological theory and research can readily be integrated into the Big Five model.

Research on temperament and personality traits in infancy and early childhood (preschool age) suggests that certain primary traits identifiable within each of the broad Big Five traits are not yet developed at this early age. Indeed, most models of infant and early childhood personality suggest that there are three rather than five broad dimensions, namely, Positive Emotionality/Surgency, Negative Emotionality, and Effortful Control, which are conceptually similar to Extraversion, Neuroticism, and Conscientiousness, respectively (Rothbart & Bates, 2006). The broad and primary traits of Rothbart's structural model of temperament traits for infancy and early childhood are presented in Table 10.2. As can be seen, a number of primary traits from Extraversion, Neuroticism, and Conscientiousness can be recognized in early human ontogeny, but several traits related to both Agreeableness and Openness seem not to be developed at these early ages. There are a growing number of scholars relying on these early temperament traits to understand delinquent and criminal behavior development (DeLisi & Vaughn, 2014).

Personality traits are thought of as evolutionary characteristics and have been observed in nonhuman species (Nettle, 2006). Because of this, personality traits have traditionally been assumed as (at least partly) inherited characteristics. Several quantitative genetic studies confirmed that genetic variation among individuals explains approximately 45 % (more or less 10 %) of individual differences in personality traits (Krueger & Johnson, 2008). This

estimate is consistent across traits and genders and is similar to that observed for criminal and antisocial behavior (see Beaver, Schwartz, & Gajos, 2015). This does not mean, of course, that the environment is not important. Krueger and Johnson (2008) argued that genetic and environmental contributions to personality are better conceptualized as dynamic systems of gene-environment interplay in the form of gene-environment interactions (GxE) and gene-environment correlations (rGE). Relatedly, individual differences in personality traits are expected to be associated with differences in neurobiological structures and processes (DeYoung & Gray, 2009). Indeed, genes do not have direct effects on personality; rather, they have a direct effect on neurobiological structures and processes, which in turn have more direct effects on personality. A growing body of studies shows that individual differences in personality traits are related to the activation levels of different physiological processes, neural structures, and hormonal and neurotransmitters' functions (DeYoung & Gray, 2009; Zuckerman, 2005).

Personality traits are generally thought of as relatively enduring or stable across the life course (McCrae & Costa, 2008). However, a growing number of longitudinal studies show that there is both continuity and change in personality traits across the life course. This evidence led Roberts, Wood, and Caspi (2008) to propose a number of principles of personality trait development. For instance, the *plasticity principle* suggests that traits are open systems that can change and be influenced by the environment at any developmental period of the life course. The *cumulative continuity principle* contends that rank-order continuity increases across the life course. A meta-analysis by Roberts and DelVecchio (2000) observed that the mean correlation coefficient becomes stronger as the individuals' age increased and reaches a plateau only during old age. The *maturity principle* suggests that there are significant mean-level changes in personality traits from childhood to old age. A meta-analysis by Roberts, Walton, and Viechtbauer (2006) showed that individuals tend to steadily increase in Agreeableness,

Table 10.2 Overview of different structural models of personality traits in infancy and early childhood

Infancy (Gartstein & Rothbart, 2003)	Early childhood (Rothbart, Ahadi, Hershey, & Fisher, 2001)
Negative affectivity	Negative affectivity
Sadness	Sadness
Fear	Fear
Frustration	Anger/frustration
Reactivity	Discomfort
	Low soothability
Orienting/regulation	Effortful control
Low intensity pleasure	Inhibitory control
Cuddliness	Attentional focusing
Duration of orienting	Low intensity pleasure
Soothability	Perceptual sensitivity
Surgency/extraversion	Surgency/extraversion
Approach	Approach
Vocal reactivity	Low shyness
Stimulation seeking	Stimulation seeking
Smiling/laughter	Activity level
Activity level	
Perceptual sensitivity	

Conscientiousness, Emotional Stability (reverse of Neuroticism), and Social dominance (an aspect of Extraversion). Morizot and Le Blanc (2003a) used the Montreal Two-Sample Longitudinal Study (MTSLS) data and showed that this maturation in traits applies to a representative sample of men as well as to a sample of men adjudicated during their adolescence, even though the latter started with a more maladaptive personality profile that “matures out” more slowly. These mean-level changes suggest a normative maturation in personality traits (for reviews on the stability of Self-Control, see DeLisi, 2013; Piquero, 2009). In sum, contrary to a commonly held belief, personality traits are not developmentally static, but are rather dynamic or plastic constructs that can change across the entire life course.

Finally, there is extensive empirical evidence showing that personality traits can predict individuals’ concurrent and future adaptation. For instance, personality traits are related to evolutionarily relevant, socially adaptive outcomes such as mortality and longevity, mating strategies and sexual behaviors, cooperation, friendship, and aggression (Figueredo et al., 2005; Nettle, 2006). There is also extensive evidence that personality traits are related, both

concurrently and prospectively, to psychopathology (De Pauw & Mervielde, 2010; Malouff, Thorsteinsson, & Schutte, 2005; Widiger & Smith, 2008), but also to various positive consequential life outcomes (Ozer & Benet-Martinez, 2006).

Of course, personality traits are no simple “under the skin” phenotypes that determine adaptation; their effect on adaptation must be understood through their interaction with the environment (Roberts & Jackson, 2008). Caspi and Shiner (2006) described six mechanisms (sometimes called person–environment interactions) conceptualizing the complex interplay between personality and the environment across individuals’ development: (1) learning processes (differential sensitivity of learning processes such as punishment and reinforcement), (2) environmental elicitation (personality traits may influence the response of others), (3) environmental construal (personality traits may shape the way individuals interpret environmental stimuli and their experience), (4) social and temporal comparisons (personality may influence the ways individuals evaluate themselves relative to others, but also to themselves across time), (5) environmental selection (personality traits

influence the choices individuals make in their everyday life), and (6) environmental manipulation (personality traits can influence how individuals modify or change their environment).

Theories Postulating a Contribution of Personality Traits to Criminal Antisocial Behavior Development

Although psychological factors have been mostly ignored by theoretical criminologists during most of the twentieth century, a number of theories postulating a contribution of psychological factors for explaining CAB have been proposed (Andrews & Bonta, 2010). Psychological characteristics are also part of many contemporary developmental theories of CAB (Farrington & Ttofi, 2015). This section is limited to a brief overview of some major criminological theories positing a role of personality traits.

Psychological and particularly trait theories are generally known as propensity theories in criminology. There are three kinds of theories suggesting a connection between personality traits and CAB. First, there are those postulating that personality traits are essentially descriptive factors (i.e., they are covariates that correlate with antisocial behavior, or differentiate criminals and noncriminals). Second, there are theories positing that personality traits can influence the decision and perpetration of crimes. Third, there are theories suggesting that early dispositions (temperament or personality traits) have a causal or explanatory contribution, either direct or indirect, to increasing the risks of CAB onset. For these theories, personality traits are risk factors, not simply covariates.

Glueck and Glueck (1940, 1950) were arguably among the first scientific criminologists to suggest that personality traits are important explanatory factors in CAB onset and desistance. Essentially, translated in terms of the Big Five model, they argued that delinquents have higher levels on traits related to Extraversion (e.g., energy, sociability, assertiveness) and Neuroticism (e.g., irritability, alienation, anxiety) and lower levels on traits related to Agreeableness

(e.g., hostility, mistrust, narcissism) and Conscientiousness (e.g., impulsivity, opposition to conventional rules and authority), (see Wilson & Herrnstein, 1985, p. 178). Glueck and Glueck believed that when some of these traits manifest early in childhood, they are risk factors that increase the likelihood of becoming a delinquent. Glueck and Glueck also posited that delinquents eventually “mature out” of these maladaptive personality traits, meaning that there are decreases in levels of Extraversion and Neuroticism and increases in levels of Agreeableness and Conscientiousness. This psychological maturation is a key predictor of desistance from crime according to the Glueck.

Eysenck (1996) also proposed a criminological theory in which personality traits play a central role. He proposed that individuals inherit predispositions to behave or react in predictable ways in specific environmental conditions. Eysenck argued that individuals who commit crimes have been poorly conditioned during childhood (i.e., they have not been punished for their bad behaviors or rewarded for the good ones). Eysenck believed that the conscience’s conditionability is associated with three broad personality traits, which are related to the arousal level of the central nervous system and the autonomic nervous system (see Table 10.1). According to Eysenck, because they have not learned to react to antisocial urges with fear or anxiety, individuals high on Extraversion, Neuroticism, and Psychoticism (which should arguably have been labeled Disinhibition or Psychopathy) are more likely to commit crimes.

Gottfredson and Hirschi (1990) proposed a general propensity theory arguing that low Self-Control is the most important causal factor in explaining CAB across the life course.¹ These authors posit that people differ in their criminal propensity, evidenced by low Self-Control, and that this propensity tends to remain stable across the life course in antisocial individuals.

¹Gottfredson and Hirschi’s definition and operationalization of Self-Control has been recently modified (see Piquero, 2009). This chapter focuses on the original definition, which is more closely related to personality traits.

According to Gottfredson and Hirschi's (1990) view (see, pp. 89–91), people displaying low self-control tend to (1) search for easy or simple gratifications of their desires, regardless of social or societal norms, (2) have an “here and now” orientation and have difficulty in delaying gratification, (3) have difficulty to plan and have long-term goal, (4) be self-centered and insensitive to the suffering of others, (5) search for sensation or excitement, and (6) be gregarious or sociable. These characteristics can clearly be interpreted in terms of the Big Five model (see Table 10.1). The first three dimensions can be encompassed within Conscientiousness, the fourth within Agreeableness, while the last two are part of Extraversion. Thus, even though Self-Control is a very useful construct for theory because of its parsimony, it is a multidimensional construct from the perspective of personality psychology. Another problem is that Gottfredson and Hirschi's (1990) definition of low Self-Control did not propose any traits related to Negative Emotionality.

Apart from Eysenck and Gottfredson and Hirschi, a handful of recent criminological theories postulating a contribution of personality traits have been proposed. In his integrative theory, Agnew (2005) suggested that two broad personality traits are important factors related to antisocial involvement, namely low Self-Control and high Irritability (or Anger). Lahey and Waldman (2003) also proposed a developmental propensity model to explain the onset of CAB. The authors suggested that high Negative Emotionality and Daring (boldness, thrill seeking, and recklessness) and low Prosociality (helpfulness, sympathy of others) during childhood increase the risk of developing later antisocial behavior. Similarly, DeLisi and Vaughn (2014) proposed a personality-based propensity model for explaining the development of CAB. These authors proposed that children with low Effortful Control and high Negative Emotionality are not only at higher risk of developing a lifelong trajectory of antisocial behavior, but also of maladjustment and noncompliance with the justice system.

The theories of Agnew (2005), Lahey and Waldman (2003), and DeLisi and Vaughn (2014) posited that personality traits have independent effects, and may also interact, which should increase the risks beyond that of each trait considered independently. All of these theories postulate that environmental factors related to family, peers, school, and work adjustment are also important risk factors that interact and are even partially influenced by personality traits, which will either reduce or increase the likelihood of CAB onset. These theories also acknowledge that genetic and biological factors have indirect effects on behavior through the action of personality traits. As such, they implicitly recognized the role of rGE. Lahey and Waldman (2003) also suggested that a fair part of the sex differences in antisocial behavior could be explained by sex differences in personality traits.

Although not typically recognized as a developmental propensity theory, psychopathy theory is important for understanding the connections between personality traits and CAB (DeLisi, 2009; Lynam & Derefinko, 2006). Psychopathy is a complex construct encompassing personality characteristics. For example, factor analyses of Hare's (2003) Psychopathy Checklist-Revised (PCL-R) items suggested four correlated factors, namely (a) interpersonal functioning (narcissism, machiavellianism), (b) affective functioning (callousness, unemotionality), (c) impulsive lifestyle (impulsivity, stimulation seeking), and (d) antisocial behavior (past and current). The three first factors are clearly related to personality traits (Lynam & Derefinko, 2006). Some scholars argued that the antisocial behavior factor is more a correlate or a consequence of the personality profile, which is the core of psychopathy (Skeem & Cooke, 2010). In sum, Psychopathy theory suggests that traits related to Agreeableness, Conscientiousness, and Neuroticism should predict CAB.

Developmental-typological theories positing the existence of different antisocial trajectories either distinguished or predicted by personality traits have also been proposed (Moffitt, 1993;

Patterson & Yoerger, 2002). To simplify, theories argued that early temperament or personality traits during childhood constitute risk factors increasing the likelihood of an early onset and a persistent trajectory of CAB. Individuals following a persistent antisocial trajectory likely had a hard to manage temperament (i.e., low Effortful Control and high Negative Emotionality), which led to maladaptive parent-child relationships and inadequate or ineffective parenting practices. Individuals following an adolescence-limited trajectory do not have these early problematic personality traits and their antisocial behavior is mostly explained by poor parental monitoring and deviant peer affiliation.

Le Blanc (1997, 2005, 2006) proposed an integrative multilayered control theory in which personality characteristics are central factors explaining CAB. This theory explains three levels of criminal behaviors, each with its own subtheory: criminality (community control theory), criminal (personal control theory), and crime (event or offense control theory). According to Le Blanc, personality traits play a role in both personal control and offense control. For his personal control theory, Le Blanc referred to the concept of Allocentrism, a concept inspired by psychodynamic theories, which is the gradual movement away from the natural egocentrism of the individual. It is, according to Le Blanc, the unfolding disposition to think about and to behave in relation to others. Allocentrism is thus a developmental concept that is conceptually similar to personality traits maturation (Caspi & Shiner, 2006; Roberts et al., 2006). This unfolding is associated with antisocial behavior development: during the end of childhood and adolescence, which corresponds to the period of antisocial behavior activation and aggravation, individuals are more egocentric; by the end of adolescence and during emerging adulthood, which corresponds to the desistance period, individuals' Allocentrism increases over time and contributes to counter the continuation of CAB. For his offense control theory, Le Blanc (1997, 2005) refers to the concept of low Self-Control, in line with that of

Gottfredson and Hirschi (1990). An individual with low Self-Control will be more likely to prefer routine activities that offer excitement and thrills, which will in turn increase the number of occasions to perpetrate a criminal or antisocial act. Other theories have postulated that personality characteristics influence the decision and perpetration of a crime (Wikström, 2005; Wilson & Herrnstein, 1985). In line with other developmental-typological theories (Moffitt, 1993), Le Blanc (2005) suggested that persistent antisociality is primarily a question of early and stable antisocial propensity (personality) rather than opportunities, transitory antisociality is the result of weak propensity and opportunities, and common antisociality is mainly the result of opportunities.

In short, while personality traits are seldom considered in mainstream criminological research, criminological theories have, for several decades, drawn on psychological concepts that closely resemble those employed in personality theories and research.

A Note on Methodological Issues

In a number of reviews of early studies, criminologists evaluated if personality traits could distinguish criminals and noncriminals (Schuessler & Cressey, 1950; Tennenbaum, 1977; Waldo & Dinitz, 1967). These authors pointed out nontrivial methodological limitations of early studies, and thus, they were reluctant to conclude that personality traits actually differentiate criminals and noncriminals. Some of these methodological limitations included (1) the use of personality measures with dubious validity (e.g., projective tests), (2) the use of personality trait measures constructed by selecting items that distinguished offenders and non-offenders (i.e., criterion keying method) which raised the issue of tautological associations, and (3) the almost exclusive use of offender samples, particularly males, which represented only the officially detected criminals. Even if there are still methodological issues to be resolved (see future research needs section), the methodological

shortcomings pointed out in early criminological reviews have been, for the most part, dealt with in contemporary research. For instance, as noted before, a general consensus emerged about structural models of personality traits, which were constructed based on comprehensive sets of personality relevant descriptors and did not involve criterion keying. The validity and reliability of current measures of personality traits are generally quite satisfactory (see Boyle, Matthews, & Saklofske, 2008). Moreover, problematic measures such as projective tests are largely no longer used for studying the relations between personality and CAB. Finally, researchers now make use not only of offender samples but also of large community samples, birth cohorts, and nationally stratified representative samples (e.g., Caspi et al., 1994; Krueger et al., 1994).

Conceptual Models of the Relationships between Personality Traits and Criminal and Antisocial Behavior

A number of models conceptualizing the associations between personality and psychopathology have been proposed in psychiatry and developmental psychopathology (Klein, Kotov, & Bufferd, 2011; Krueger & Tackett, 2003; Widiger & Smith, 2008). Although they are not readily used in criminology, these models are relevant for conceptualizing the different ways personality traits (or Self-Control) can be associated with CAB. These models are listed in Table 10.3. Although the Correlate model is not typically presented along the other ones, it is nevertheless a relevant model that can be empirically tested. The Remission/Desistance model is introduced in this chapter because, as posited by the developmental perspective in criminology (Le Blanc & Loeber, 1998), desistance from CAB implies different processes, and thus, potentially distinct explanatory factors (see Kazemian, 2015). As can be seen in Table 10.3,

Table 10.3 Conceptual models of the relationships between personality traits and criminal and antisocial behavior

Model
Correlate
Predisposition/vulnerability
Direct effect
Environmental moderation
Personality moderation
Environmental mediation
Personality mediation
Transactional
Developmental cascade
Pathoplasticity/exacerbation
Remission/desistance
Complication/scar
Spectrum/continuum

the Predisposition model has a number of variants that include the interplay between personality and environmental risks (or any other form of risk). This chapter focuses on the Direct Effect model only; the other models are listed for completeness and to emphasize the potential complexity of this research domain. Although beyond the scope of this chapter, it can be stressed that there is ample evidence showing that environmental factors such as parenting practices can moderate temperament and personality traits of children and adolescents or that children's personality and parents' behavior actually evolve through bidirectional parent-child relations over time, as hypothesized by a Transactional model (Caspi & Shiner, 2006; Rothbart & Bates, 2006). A few recent longitudinal studies also support the idea that children's temperament and personality traits may play a role in a complex causal chain that infer increased risk of CAB onset, as hypothesized by a Developmental cascade model (e.g., Dodge et al., 2009; Martel et al., 2009).

In the following sections, the empirical evidence supporting each model is briefly reviewed. It is important to note that these models are not mutually exclusive and that, in fact, a single study can provide support for different models simultaneously.

Correlate Model

This model posits that certain personality traits are either concurrently correlated to CAB or distinguish criminals and noncriminals. According to this model, personality traits cannot be considered as antecedents to CAB, and certainly not as risk factors because their assessment obviously does not precede CAB onset (Kraemer, Lowe, & Kupfer, 2005). This model is tested using cross-sectional data and is by far the one that received the most attention from researchers.

Broad Personality Traits Studies showing correlations between broad personality traits and CAB have been summarized in two meta-analyses. In the meta-analysis of Miller and Lynam (2001), studies using different structural models of personality traits were considered. For the Big Five model, low Agreeableness and Conscientiousness were related to CAB, with moderate effect sizes of -0.37 and -0.25 , respectively. High Neuroticism was related to CAB, but with a small effect size of 0.09 . Extraversion and Openness were not significantly related to CAB. Concerning Eysenck's Big Three model, high Psychoticism (Disinhibition) and Extraversion were both related to CAB, with effect sizes of 0.39 and 0.13 , respectively. High Neuroticism was also related to CAB, but only with a small effect size of 0.09 . For Tellegen's Big Three model, high Negative Emotionality and low Constraint were related to CAB, with effect sizes of 0.27 and -0.26 , respectively. Positive Emotionality was not significantly related to CAB. This strong positive relation with Negative Emotionality can be understood in light of Aggression being part of this broad trait in Tellegen's model. In the meta-analysis by Cale (2006), studies using the Big Three models of Eysenck and Tellegen were summarized. High Disinhibition and Neuroticism were related to CAB, with effect sizes of 0.39 and 0.19 , respectively. High Extraversion was only weakly related to CAB.

Overall, Agreeableness and Conscientiousness are the strongest correlates of CAB. Neuroticism and Extraversion are also correlates of

CAB, but with smaller magnitude. Openness is the only trait of the Big Five model that is not clearly related to CAB. Interestingly, the same broad personality traits identified as correlates of criminal behavior are also related to various analogous antisocial behaviors such as smoking (Malouff, Thorsteinsson, & Schutte, 2006), alcohol involvement (Malouff, Thorsteinsson, Rooke, & Schutte, 2007), drug use (Ruiz, Pincus, & Schinka, 2008), risky sexual behavior (Hoyle, Fejfar, & Miller, 2000), unsafe and risky driving (Dahlen & White, 2006), and pathological gambling (Myrseth, Pallesen, Molde, Johnsen, & Lorvik, 2009).

Primary Personality Traits The results concerning broad traits are interesting, but they do not give information regarding which specific primary traits are related to CAB. Indeed, each broad trait comprises a number of more specific primary traits (see Table 10.1). Unfortunately, there are still very few studies documenting the relations between primary personality traits and CAB, particularly those of the Big Five model. It is important to study primary traits because, all things being equal, primary traits tend to provide better predictive capacities than broad traits (Paunonen & Ashton, 2001), in addition to the fact that interpretation of relations with primary trait is more straightforward. In a recent meta-analysis, Jones, Miller, and Lynam (2011) reproduced the results of Miller and Lynam concerning Big Five broad traits, but also extended these findings by summarizing the results of studies which used all primary traits from the NEO-PI-3 structural model (McCrae & Costa, 2010; see Table 10.1). This meta-analysis confirmed that low Agreeableness and Conscientiousness and high Neuroticism are related to CAB. More interestingly, Jones et al. (2011) showed that within some of the broad traits, a number of primary traits were related to CAB, while others were not. For Agreeableness, all its primary traits were negatively related to CAB, but the effects were larger for Straightforwardness, Compliance, and Altruism. For Conscientiousness, all its primary traits were also

negatively related to CAB, but the effects were larger for Deliberation (or Impulsivity), Dutifulness, and Competence. With regard to primary traits associated with Neuroticism, Angry Hostility (or Anger), Impulsiveness (or Compulsiveness), and to a lesser extent Depression were positively related to CAB, while Anxiety was negatively related to it. Perhaps even more interestingly, the meta-analysis of Jones et al. (2011) revealed that even though Extraversion was not significantly related to CAB, some of its primary traits in fact were. Indeed, Excitement Seeking was positively related to CAB, while Warmth was negatively related to it. Finally, even though Openness was also not significantly related to CAB, some of its primary traits were, but with rather small effect sizes. Indeed, Openness to Actions and Openness to Ideas were positively related to CAB, while Openness to Feelings was negatively related to it. In sum, analyses using a comprehensive structural model including several primary personality traits reveal that results based on assessment of broad personality traits only can be potentially misleading and hide complex patterns of results at the primary trait level. For instance, the contribution of Extraversion has typically been controversial in criminology because some studies found no relation with CAB, some found positive relations, and others found negative relations (Farrington, Biron, & Le Blanc, 1982). These conflicting results may potentially be the result of the different content coverage in different Extraversion scales.

Jolliffe and Farrington (2004) summarized the results of studies examining the relations between Empathy, a primary trait of Agreeableness, and criminal offending. The mean effect size between Empathy and criminal offending was -0.28 . The authors estimated the effect sizes for Cognitive Empathy (understanding of the emotional state of others) and Affective Empathy (sharing of the emotional state of others) separately, which were -0.48 and -0.11 , respectively. The difference between these effect sizes was significant, which supports the idea that offenders show more deficits in Cognitive Empathy than in Affective Empathy.

Blonigen and Krueger (2007) reviewed research on the relations between personality traits and violence more specifically. These authors showed that low Constraint and high Negative Emotionality from Tellegen's Big Three model are related to violence across different studies. Upon further examination of the primary traits, these authors suggested that violence might be particularly related to high Alienation (e.g., mistrust, feeling deceived, and pushed around), which is part of Negative Emotionality. Using the MTSLS data, Morizot and Le Blanc (2003a) also showed that high Alienation (mistrust, self-criticism, schizotypy) is one of the primary traits that best distinguished adjudicated and representative males, during both adolescence and adulthood.

Self-Control The results of studies using the Self-Control construct were also summarized in two meta-analyses. In Pratt and Cullen's (2000) meta-analysis, both attitudinal and behavioral measures of Self-Control were significantly related to CAB, with mean effect sizes of 0.25 and 0.27, respectively. The interaction between Self-Control and opportunities was also strongly related to CAB, with an effect size of 0.54. This confirms that the relation between Self-Control and CAB is partly dependent on opportunities. In a second recent meta-analysis on the contribution of Self-Control to predict a broad range of behaviors, de Ridder, Lensvelt-Mulders, Finkenauer, Stok, and Baumeister (2012) calculated the effect sizes of studies using three well-known measures. The relation between Self-Control and addictive and deviant behavior (which includes crime) was moderate, with mean effect sizes of 0.23 and 0.25 for the Barratt Impulsiveness Scale and 0.25 and 0.15 for the Low Self-Control Scale, respectively.

Typological/Person-Centered Studies A growing number of studies using typological or person-centered analyses identified three broad personality types: Adjusted, Overcontrolled, and Undercontrolled (Caspi & Shiner, 2006; Donnellan & Robins, 2010). Individuals from

one of these types, the Undercontrolled, have a personality profile characterized by low Agreeableness, low Conscientiousness, and slightly higher Extraversion. A number of cross-sectional studies with children, adolescents, and adults showed that the Undercontrolled are those who tend to concurrently show the lowest school achievement, the highest externalizing and conduct problems, as well as delinquent behavior and substance use (see Caspi & Shiner, 2006; Donnellan & Robins, 2010). The Undercontrolled are also those who tend to show the most comorbidity between internalizing and externalizing problems (Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996).

Predisposition/Vulnerability Model

This model postulates that high or low levels in some personality traits increase the probability of CAB onset or, in other words, make individuals more vulnerable. Personality traits must be clearly present before CAB onset; otherwise this is not a Predisposition model and they cannot be considered as risk factors (Kraemer et al., 2005). As stated before, even if there are a number of variants, only the Direct Effect model variant is considered in this chapter.

Direct Effect Model This model posits that personality traits exert a direct and independent causal effect increasing the probability of CAB onset. Among the Predisposition model variants, this is without a doubt the one that received the most empirical support from prospective longitudinal studies. Evidence that personality traits are risk factors of CAB comes from three lines of research where traits are assessed in childhood, typically before age 10.

Temperament Traits Evidence from longitudinal studies of different countries showed that temperament trait in early childhood is related to subsequent externalizing and conduct problems as well as delinquent behavior in elementary school or early adolescence (Bates, Pettit, Dodge, & Ridge, 1998; Chess & Thomas,

1984; Dick et al., 2013; Eisenberg et al., 2005, 2009; Guerin, Gottfried, Oliver, & Thomas, 2003; Maziade et al., 1985; Vassallo & Sanson, 2013). Although different trait names are used across studies, overall traits related to low Effortful Control and, to a lesser extent, high Negative Emotionality are related to subsequent externalizing and conduct problems as well as delinquent behavior.

Using the Montreal Longitudinal-Experimental Study data, Tremblay, Pihl, Vitaro, and Dobkin (1994) observed that boys' teacher-rated personality traits at age 6 predict self-reported delinquent behavior at ages 10–13. In order of importance, high Impulsivity, low Harm Avoidance (Anxiety), and low Reward Dependence (Prosocial Behavior) were significantly related to later delinquent behavior. Using the Dunedin Multidisciplinary Health and Development Study (DMHDS) data, Caspi, Henry, McGee, Moffitt, and Silva (1995) observed that temperament traits based ratings of laboratory observations in early childhood were related to later teacher- and parent-rated conduct problems during adolescence. Lack of Control (Impulsivity, Lack of Persistence, Irritability) at ages 3 and 5 was significantly related to attention problems and hyperactivity at ages 9 and 11, as well as attention problems, conduct disorder, and antisocial behavior at ages 13 and 15. Approach (good adaptation in new situations, self-confidence) and Sluggishness (passivity, shyness) were not related to subsequent behavior problems for boys, but Sluggishness was related to attention problems both at ages 9 and 11 and ages 13 and 15 for females.

There is also evidence that early temperament traits can predict psychopathy in adulthood. For example, using a sample of children from the island of Mauritius, Glenn, Raine, Venables, and Mednick (2007) showed that laboratory ratings of Inhibition and Fearfulness at age 3 were negatively related to self-reported psychopathy 25 years later, at age 28. Considering individuals with high psychopathy scores compared to those with lower scores at age 28, the former showed lower Inhibition and Fearfulness and higher Sociability at age 3.

Self-Control Another line of research supporting the direct effect model comes from longitudinal studies of Self-Control during childhood. Different longitudinal studies used measures of Impulsivity, Hyperactivity, Inattention, and Aggressiveness, which can be interpreted as temperament traits (see Tables 10.1 and 10.2). In adult models of personality traits, Impulsivity and Inattention are part of Conscientiousness, Activity is part of Extraversion, while Aggression is part of Agreeableness or Neuroticism. These characteristics are also dimensions of Self-Control (Moffitt et al., 2011). A number of prospective longitudinal studies showed that high levels of Impulsivity, Hyperactivity, Inattention, and Aggressiveness during early childhood are related to later delinquent behavior during adolescence and criminal behavior during adulthood (e.g., Babinski, Hartsough, & Lambert, 1999; Joffe & Farrington, 2009; Lynam, 1996; Moffitt, 1990; Tremblay, 2010). Importantly, these traits predict later delinquent and criminal behavior even after controlling for previous conduct disorder or other confounding variables such as socioeconomic status and intelligence, suggesting that these relations are not mere artifacts of antisocial behavior stability. This seems to hold true also for other forms of antisocial behavior such as substance use (Elkins, McGue, & Iacono, 2007) or intimate partner violence (Fang, Massetti, Ouyang, Grosse, & Mercy, 2010). Some scholars suggested that children characterized by the simultaneous presence of high Impulsivity, Hyperactivity, and Inattention are the most at risk for later CAB (Lynam, 1996; Moffitt, 1990, 1993).

Using the DMHDS data, Moffitt et al. (2011) showed that a multiyear (3–11 years), multimethod aggregate measure of Self-Control (Hyperactivity, Impulsivity, and Inattention) during childhood predicts several consequential outcomes in adulthood, such as wealth and health problems as well as antisocial behaviors. For instance, the authors showed that, after controlling for intelligence and socioeconomic status, as the level of childhood Self-Control

diminishes, the risk of an official criminal conviction and that of substance dependence increase. The authors tested if adolescent mistakes (“snare” factors, i.e., starting to smoke cigarettes, dropping out of school, unplanned teenage pregnancy) could explain the predictive relations between childhood Self-Control and later outcomes. Although these adolescents’ snares attenuated (mediated) the relations by 42 % for criminal convictions and by 63 % for substance dependence, the direct effect of childhood Self-Control on adult outcomes remained clearly significant. To complement their findings, Moffitt et al. (2011) also used the E-Risk study data, which includes data from siblings within families. Comparing children with differing level of Self-Control and raised in the same family provided a quasi-experimental design that isolates the effect of Self-Control from that of the family. Using a same-gender dizygotic pair design, the authors showed that siblings with the lowest Self-Control at age 5 were at higher risk of having poorer educational achievement, starting to smoke, and engaging in delinquency behavior at age 12, even after controlling for intelligence. Replicating the study of Moffitt et al., Fergusson, Boden, and Horwood (2013) used the Christchurch Health and Development Study (CHDS) data to show that a multimethod measure of Self-Control at ages 6–12 predicted several outcomes 30 years later. For example, after controlling for socioeconomic status, intelligence, and gender, low Self-Control in childhood was related to higher likelihood of self-reported property and violent offenses, arrests, and convictions, as well as alcohol, illicit drugs, and nicotine dependences during adulthood. However, after also controlling for childhood conduct problems, Self-Control was only related to violent offending.

Psychopathic/Callous-Unemotional Traits Frick, Ray, Thornton, and Kahn (2014) reviewed research on the contribution of Psychopathic/Callous-Unemotional traits (i.e., low empathy, low guilt, callousness) to predict later conduct disorder and delinquent behavior. In adult

models of personality traits, these traits are related to low Agreeableness. A number of the studies reviewed by Frick et al. used prospective longitudinal data, rested on multiple informants (parents, teachers, or clinicians ratings), used multiple methods of assessment for antisocial behavior (self-reports, official convictions), and controlled for some confounding factors, particularly previous conduct problems. Overall, these studies suggest that Callous-Unemotional traits in childhood are related to later conduct problems and antisocial behavior in adolescence or even early adulthood (Byrd, Loeber, & Pardini, 2012; Lynam et al., 2009; Lynam, Miller, Vachon, Loeber, & Stouthamer-Loeber, 2009; McMahon, Witkiewitz, Kotler, & The Conduct Problems Prevention Research Group, 2010; Pardini & Fite, 2010; Pardini, Obradovic, & Loeber, 2006). In different studies, it was shown that even among children and adolescents with serious conduct problems, high levels of Callous-Unemotional traits are predictive of the severity and stability of conduct problems and delinquent behavior (Frick et al., 2014). These traits also tend to be related to an earlier onset of conduct problems (Brandt, Kennedy, Patrick, & Curtin, 1997).

Typological/Person-Centered Studies A number of prospective studies showed that some temperament or personality types identified in childhood, well before the onset of CAB, are predictive of subsequent CAB in adolescence and adulthood (e.g., Asendorpf & Denissen, 2006; Caspi, 2000; Chess & Thomas, 1984; Kagan & Snidman, 2004). Caspi (2000) summarized findings from different studies on children personality types using the DMHDS data. Based on temperament traits identified from ratings of laboratory observations of children when they were 3 years old, person-centered analyses revealed five temperament types (Caspi & Silva, 1995). Caspi (2000) explained that the children from these types showed different profiles on various social and psychological adjustment outcomes when they reached adolescence and adulthood. Because they are the most

at risk for various forms of antisocial behaviors, the Undercontrolled are of particular interest. In early adulthood, these individuals had a personality profile characterized by the lowest levels of Constraint (Self-Control, Harm Avoidance) and the highest levels of Negative Emotionality (Aggression, Alienation, Stress Reaction). They were also the ones most likely to be diagnosed with antisocial personality disorder and alcohol dependence. At age 21, they were the individuals with the highest levels of criminal offending based on self-reports and official records.

Other long-term longitudinal studies support the notion that temperament or personality types in early childhood are differentially related to CAB later in their life. For example, longitudinal research by Kagan (1994; Kagan & Snidman, 2004; Schwartz, Snidman, & Kagan, 1996) identified two broad temperament types based on laboratory tasks and observation at 2–3 years old: the Inhibited and Uninhibited (sociable, bold, impulsive, thus similar to the Undercontrolled). In line with other longitudinal studies, compared to other children, the Uninhibited showed higher aggression and delinquent behavior more than 10 years later, at age 13.

In sum, longitudinal studies from different countries confirm that some temperament and personality traits manifested during childhood are prospectively related to subsequent externalizing and conduct problems during adolescence, as well as crime and various other antisocial behaviors (e.g., substance use) during adulthood. It is thus possible to state that some temperament and personality traits are risk factors of CAB.

Pathoplasticity/Exacerbation Model

This model is similar to the Predisposition/Vulnerability model, but it posits that personality traits exert an effect on the manifestation of antisocial behavior after onset. Personality traits may have an additive effect or interact with antisocial behavior and exert an effect on the processes of activation (increase in variety and frequency) or aggravation (increase in

seriousness). It is plausible that the same personality traits that are associated with the onset can also have an influence on worsening (activation and aggravation) the course of antisocial behavior. It is also possible that personality traits different from those associated with the onset exert an effect only on the course of antisocial behavior when present more proximally.

Compared to available cross-sectional studies, there are remarkably few longitudinal studies using a comprehensive structural model of personality traits to predict subsequent CAB. This is particularly true for the Big Five model. Still, a number of studies showed that some personality traits, assessed after the onset of CAB, are related to its subsequent manifestation (e.g., De Bolle, Beyers, De Clercq, & De Fruyt, 2012; Heaven, 1996; Huey & Weisz, 1997; Le Corff & Toupin, 2010; Leech, Day, Richardson, & Goldschmidt, 2003; Mottus, Guljavev, Allik, Laidra, & Pullman, 2012; Prinzie, van der Sluis, de Haan, & Dekovic, 2010; Shiner, 2000; Stein, Newcomb, & Bentler, 1987; White, Pandina, & LaGrange, 1987). Heaven (1996) showed in a sample of adolescents from Australia that high Disinhibition (Psychoticism) and low Self-Esteem were related to self-reported delinquent behavior 2 years later. However, Extraversion did not predict later delinquent behavior. Using a sample of sixth-grade American children, Shiner (2000) showed that after controlling for age, gender, intelligence, and initial level on the outcome, parent ratings of low Mastery Motivation (Conscientiousness) and Agreeableness predicted rule-abiding conducts assessed with different raters 10 years later, in emerging adulthood. Mottus et al. (2012) showed in a sample of Estonian adolescents that, after controlling for intelligence and school grades, low Agreeableness and Conscientiousness predicted official criminal records 8 years later. De Bolle et al. (2012) used the Personality and Affect Longitudinal Study (PALS) data, a combined sample of community and referred children aged 8–14 years at the first assessment and followed up for 2 subsequent years, to show that children's low Benevolence (Agreeableness) and Extraversion were related to

subsequent increases in externalizing problems. Using a sample of Canadian adjudicated adolescents and a measure of the Big Five including primary traits, Le Corff and Toupin (2010) showed that, after controlling for previous antisocial behavior and a count of antisocial personality disorder symptoms, low Compliance (Agreeableness) and high Activity (Extraversion) were predictive of antisocial behavior 5 years later.

There are also surprisingly few studies of the Self-Control construct using prospective longitudinal data to predict subsequent CAB (e.g., Beaver, DeLisi, Mears, & Stewart, 2009; de Kemp et al., 2009; Feldman & Weinberger, 1994; Kim & Brody, 2005; Longshore, Chang, & Messina, 2005; Polakowski, 1994; Steiner, Cauffman, & Duxbury, 1999). Feldman and Weinberger (1994) showed in a sample of sixth-grade American males that a multiple-rater measure of Self-Control predicted delinquent behavior assessed with different raters 4 years later. Using the Cambridge Study on Delinquent Development (CSDD) data, Polakowski (1994) showed that, after controlling for previous convictions, a multiple-method measure of males' Self-Control at ages 8–10 predicted both official criminal convictions and self-reported deviance in adulthood. Using males' data from the National Longitudinal Study of Adolescent Health (Add Health), Beaver et al. (2009) showed that a measure of low Self-Control during adolescence was positively related to the number of police contacts, number of arrests, age at first police contact, and arrest onset reported 5 years later, in early adulthood.

Studies of incarcerated adolescents showed that personality traits are related to recidivism. For instance, using a sample of inmate adolescents (age 13–20), Steiner et al. (1999) showed that high Distress (Negative Emotionality) and low Restraint (Conscientiousness) were related to official criminal recidivism 4.5 years later. Some longitudinal studies of offenders showed that high Psychopathic/Callous-Unemotional traits might also be related to an earlier recidivism after treatment (Gretton, Hare, & Catchpole, 2004; Salekin, 2008).

In sum, some longitudinal studies support the notion that personality traits measured after CAB onset are related to its subsequent course or manifestation. It is thus possible to state that personality traits are antecedents or precursors of CAB. It remains to be determined, however, what developmental process (activation or aggravation) may be influenced by personality traits.

Remission/Desistance Model

Although it has never been proposed, the developmental perspective of criminology suggests that it is important to consider a Remission/Desistance model (Le Blanc & Loeber, 1998). It posits that rather than having an effect on onset (i.e., Predisposition) or on activation and aggravation processes (i.e., Pathoplasticity), personality traits exert an effect on desistance from CAB. It may be that personality traits distinct from those associated with onset or activation/aggravation exert an effect only on desistance from CAB. These traits could either be manifested early in life or more contemporaneously. It is also plausible to assume that changes in the personality traits associated with onset or activation/aggravation can also have an influence on desistance.

A number of researchers have argued that the developmental period most characteristic of desistance from CAB (i.e., late adolescence and emerging adulthood) is also characterized by changes in personality traits (i.e., greater emotional and behavioral self-regulation and conventionality). As such, it has been hypothesized that personality may contribute to desistance (Blonigen, 2010; DiClemente, 1994; Glueck & Glueck, 1940, 1950; Jessor, Donovan, & Costa, 1991; Le Blanc, 1997, 2005; Moffitt, 1993; Morizot & Le Blanc, 2007). Glueck and Glueck (1940, 1950) were arguably among the first to show in their longitudinal study that the maladaptive personality traits of adolescent delinquents eventually “mature out” with time. Although these authors were not using contemporary measures of personality traits, in Big Five terms, this maturing out corresponds to increases

in Agreeableness and Conscientiousness and decreases in Neuroticism and Extraversion. In the last few years, a number of longitudinal studies using both variable- and person-centered analyses showed that trait changes characterized by psychological maturation correlate with or “parallel” the decline in criminal behavior and substance use and that the absence of such personality changes tends to be linked to persistence (Blonigen, Littlefield, Hicks, & Sher, 2010; Littlefield, Sher, & Wood, 2009, 2010; Monahan, Steinberg, Cauffman, & Mulvey, 2009; Morizot & Le Blanc, 2003b, 2005; White et al., 2011). For instance, using person-centered analyses in a sample of adjudicated adolescent males, Monahan et al. (2009) showed that those who followed a persistent antisocial behavior trajectory from age 14 to 22 tended to decrease in Psychosocial Maturity (Impulse Control, Suppression of Aggression, Consideration of others), while those who followed a declining trajectory in antisocial behavior increased in Psychosocial Maturity. Also using person-centered analyses in a community sample of males and females, Blonigen et al. (2010) showed that, compared to persisters, individuals who showed decreases in antisocial behavior from age 18 to 25 exhibited a significant decrease in Novelty Seeking and increase in Reward Dependence. Using person-centered analyses in the MTSLS, Morizot and Le Blanc (2003b, 2005) showed that, in both samples, males in a developmental personality type characterized by decreases in Disinhibition and Negative Emotionality from adolescence to adulthood tended to show less or decreasing antisocial behavior, while those in a developmental type characterized by higher and more stable levels in those traits tended to show more persistent antisocial behavior over time.

Littlefield et al. (2009) also showed in a college student sample of males and females that the decline in problematic alcohol involvement from age 18 to 35 was correlated with decreases in both Impulsivity and Neuroticism. Interestingly, these authors also tested if marriage and parenthood could mediate these correlated trajectories in alcohol involvement and personality traits. Their results showed that marriage and

parenthood did not account for the correlations in trajectories (i.e., they remained significant with the inclusion of these intervening variables). Still, they also showed that individuals who got married and/or had children during adulthood tended to show more important declines in both problematic alcohol involvement and Neuroticism, compared to those who never married, got divorced, and/or did not have children. These results are in line with Moffitt's (1993) theory arguing that social transitions such as marriage and parenthood are not unconditional factors explaining desistance from antisocial behavior. The individuals' perception and reaction to these transitions will depend on his or her personality. Change in coping motives may be a mediating mechanism of the relations between personality trait changes and desistance from alcohol involvement (Littlefield et al., 2010).

Another question to ask is whether personality traits can have long-term predictive effect on desistance. Using the CSDD and MTSLS study data, Kazemian, Farrington, and Le Blanc (2009) observed that Self-Control in adolescence was not predictive of desistance in adulthood, but that changes in Self-Control between adolescence and the early 30s were related to patterns of desistance from offending. Also using the adjudicated men sample of the MTSLS, Morizot and Le Blanc (2007) reported that personality traits in adolescence were not related to trajectories of desistance from age 15 to 40. However, these authors showed that after controlling for several confounding variables, personality traits can exert a contemporaneous effect during specific developmental periods: Extraversion was positively related (albeit only weakly) to desistance during adolescence, Negative Emotionality was positively related to desistance in mid-adulthood, and Disinhibition was negatively related to desistance during both adolescence and adulthood.

In brief, some longitudinal studies have shown that increases in Agreeableness and Conscientiousness and decreases in Neuroticism tend to be related to CAB desistance. It remains to be investigated, however, if these correlated changes are accounted by another third factor

(e.g., spectrum explanation) such as genetically driven developmental changes in brain maturation or biochemical activity (e.g., hormones) or age-graded social transitions (e.g., entering work force, parenthood, conjugality), themselves possibly influenced by rGE (Kazemian, 2015).

Complication/Scar Model

Compared to the Predisposition and Pathoplasticity models, the direction of causality is reversed in the Complication model. It posits that involvement in CAB exerts an effect on personality traits, either concurrently (contemporaneous model) or over a longer period (consequence model). The changes in personality traits are seen as a consequence or a "scar" that can compromise or complicate desistance from CAB. According to the corresponsive principle, the same traits that act as risk factors for CAB should also be those that are subsequently most influenced by involvement in CAB, while other traits should be less affected (Caspi, Roberts, & Shiner, 2005).

A handful of recent longitudinal studies tend to support this model (Chassin et al., 2010; De Bolle et al., 2012; Littlefield, Vergés, Wood, & Sher, 2012; Quinn, Stappenbeck, & Fromme, 2011; Shiner, Masten, & Tellegen, 2002; Stein et al., 1987; White et al., 2011). Shiner et al. (2002) showed in a sample of sixth-grade American children that low levels in parent ratings of rule-abiding conducts were related to lower Constraint and higher Negative Emotionality 10 years later. However, after controlling for the initial levels of personality traits, law abiding behavior only predicted Negative Emotionality. Using the PALS data, De Bolle et al. (2012) showed that children's high levels of externalizing problems at ages 8–14 were related to subsequent declines in Benevolence (Agreeableness), Conscientiousness, and Imagination (Openness), while they were related to increases in Extraversion. Using variable-centered analyses in a sample of adjudicated males from the Pathway to Desistance Study (PDS), Chassin et al. (2010) showed that higher alcohol and

cannabis use from age 15 to 21 was related to small but significant declines in Psychosocial Maturity (similar to Conscientiousness) 6 months later. Conversely, higher Psychosocial Maturity was related with lower marijuana use, but it did not predict later changes in alcohol use. In person-centered analyses, Chassin et al. (2010) also found that, compared to other groups, adolescents following an increasing alcohol use trajectory and those following a late adolescent-onset cannabis use trajectory showed significant decline in Psychosocial Maturity as they got older.

In person-centered analyses deriving different trajectories of Impulsivity from age 9 to 17 in a sample of adolescent males from the Pittsburgh Youth Study (PYS), White et al. (2011) showed that heavy drinking was related to subsequent declines in Impulsivity for adolescents following a moderate Impulsivity trajectory. Using latent change score analyses in a sample of college students, Quinn et al. (2011) also showed that heavy drinking during the sophomore year of college predicted subsequent increases in Impulsivity and Sensation Seeking. High levels in Impulsivity (but not Sensation Seeking), in turn, also predicted increases in drinking. The authors also showed that these results remained significant even after controlling for social group drinking norms (i.e., selection effect). However, some studies suggest that this effect of heavy drinking on subsequent personality traits could be limited to short time periods (Littlefield et al., 2012).

In sum, a handful of longitudinal studies seem to provide support to the Complication/Scar model. Most of the studies used alcohol and drug use, so it remains to be shown whether similar results would be observed with criminal behavior. This “scar effect” could potentially help explain the greater stability of personality traits in antisocial individuals (Gottfredson & Hirschi, 1990; Morizot & Le Blanc, 2003a) and also why some individuals stop committing criminal offenses but continue to be involved in other antisocial behaviors such as substance abuse or gambling.

Spectrum/Continuum Model

This model posits that personality traits and various forms of antisocial behavior exist on a common spectrum. In the logic of this model, there is a fundamental continuity between personality and CAB so that the predictive relations between personality traits and CAB are observed because both constructs come from the same spectrum. There is thus a conceptual overlap between personality traits and CAB; in other words, they are not distinct constructs, but are indicator of the same underlying spectrum. Because they exist on a common spectrum, this model assumes that both personality traits and CAB arise from one or a set of common (potentially undistinguishable) causal factors.

A growing number of studies tend to support the Spectrum model, particularly genetically informative studies (e.g., Agrawal, Jacobson, Prescott, & Kendler, 2004; Boisvert, Wright, Knopik, & Vaske, 2012; De Bolle et al., 2012; Hink et al., 2013; Krueger et al., 2002; Krueger, Markon, Patrick, Benning, & Kramer, 2007; Larsson et al., 2007; Tackett et al., 2013; Young, Stallings, Corley, Krauter, & Hewitt, 2000). To illustrate, using a combined sample of American male and female prisoners as well as undergraduate students, Krueger et al. (2007) tested different structural models based on indicators consisting in several forms of antisocial behavior (e.g., theft, fraud, drug use, physical aggression, etc.) and several relevant personality traits (e.g., Empathy, Planful Control, Excitement Seeking, Alienation, etc.). These authors showed that a hierarchical model with a common general factor, which they named the Externalizing Spectrum, can account for most of the individual differences in both personality traits and the various forms of antisocial behavior. Using the 17-year-old cohort of the Minnesota Twin Family Study (MTFS) data, Krueger et al. (2002) also showed that the same common factor accounts for most of the individual differences in diverse antisocial behavior indicators (conduct disorder, adolescent

antisocial behavior, alcohol dependence, drug dependence) and the broad personality trait of Constraint (reverse of Disinhibition). These authors also showed that additive genetic factors explained a large part of the variance (81 %) in the general factor, with the remaining variance attributable to nonshared environmental factors. Interestingly, of all indicators in the model, Constraint was the only one for which the specific genetic loading was significant, which suggests that some genetic factors uniquely influence personality traits, without influencing the general risk of antisocial behavior. These results converged fairly closely with those of similar studies (e.g., Young et al., 2000).

Other genetically informative studies tend to provide indirect support to the existence of a common spectrum mostly related to genetic factors. For instance, using twin data, Agrawal et al. (2004) showed that both Sensation Seeking and cannabis use are explained by a sizable proportion of genetic variance. More interestingly, the authors reported that over 70 % of the genetic liability for cannabis use is shared with that of Sensation Seeking, which again suggests that genetic liability is a strong common cause of both personality traits and CAB. All of these results can arguably be extended to various other factors of interest for criminologists. In an interesting study, Figueredo, Vasquez, Brumbach, and Schneider (2004) showed that a highly heritable higher order factor explains most of the individual differences in various social adjustment variables, mental and physical health, and personality traits.

In sum, a growing number of studies support the idea that a common spectrum or dimension can account for most of the individual differences in CAB and personality traits relevant to CAB. A number of these studies indicate that genetic factors explain a large part of the variation in this common spectrum. Nonshared environment also explains a substantial part of these variations, of course. Nonetheless, in order to ascertain that the predictive relations (concurrent or prospective) between personality traits and CAB are not largely explained by a common spectrum related to genetic factors (and thus, not spurious), it is important that more genetically

informative studies test this hypothesis. This is not a trivial issue because findings supporting the Predisposition, Pathoplasticity, and Complication models could potentially be accounted for by the Spectrum model (Krueger & Tackett, 2003).

Summary

The studies reviewed in this chapter clearly suggest that temperament and personality traits are related to CAB, both concurrently and prospectively. The key conclusions are as follows:

- The Correlate model has received the most attention from researchers. Evidence from cross-sectional studies is quite extensive in supporting the notion that broad personality traits are concurrent correlates of delinquent and criminal behavior. The same traits are also related to various analogous antisocial behaviors, such as substance use. Low Agreeableness and Conscientiousness and, to a lesser extent, high Neuroticism and Extraversion are related to CAB. There is some evidence that high Alienation is also related to CAB, perhaps more specifically to violence.
- There is also some evidence from studies resting on comprehensive structural models of personality traits showing that within each of the broad traits, not all primary traits are related to CAB. In fact, within some broad traits such as Neuroticism and Extraversion, the relations with CAB are significant for some primary traits, but not for others, making the relations look weaker or even nonsignificant at the broad-trait level.
- There is also evidence supporting the Predisposition/Vulnerability model (direct effect) because some personality traits are prospectively related to subsequent CAB. Longitudinal studies assessing temperament and personality traits in childhood, well before CAB onset, suggest that some traits can be considered as risk factors. These studies confirmed that temperament traits related to low Effortful Control (i.e., Impulsivity, Hyperactivity, Inattention), high Negative

- Emotionality (i.e., Anger, Irritability, Aggressiveness), and low Agreeableness (i.e., Psychopathic, Callous-Unemotional traits) during childhood are associated with subsequent CAB during adolescence and adulthood. A number of studies also showed that Self-Control assessed in childhood is negatively related to various antisocial behaviors in adolescence. The predictive relations are generally of small to moderate magnitude, but they remain significant after controlling for different confounding variables, particularly early conduct problems.
- The Pathoplasticity/Exacerbation model has also received some support because a number of longitudinal studies showed that some personality traits assessed after onset can predict changes in subsequent CAB.
 - There is limited but interesting evidence supporting the Remission/Desistance model. A number of longitudinal studies showed that increases in Agreeableness and Conscientiousness and decreases in Neuroticism seem related to decreases in criminal behavior and substance use.
 - There is also evidence supporting the Complication/Scar model, which suggests that involvement in CAB exerts a subsequent effect on some personality traits.
 - A number of recent studies, particularly genetically informative ones, tend to support the Spectrum/Continuum model. The available research suggests that a significant part—but not all—of the predictive relations between personality traits and CAB might be explained by a common spectrum, which seems related to genetic factors.
- *Prospective Longitudinal Research.* Most existing studies are cross-sectional. Clearly, more predictive studies using prospective longitudinal data are needed. They are essential to control for initial level of CAB and insure that the predictive relations are not accounted for by CAB stability. More fundamentally, in order to assume that personality traits are risk factors, longitudinal studies in which personality traits are assessed before CAB onset are needed.
 - *Controlling for Initial Level of Outcome and Other Confounding Factors.* Even though a number of longitudinal studies controlled for the initial level of CAB (or conceptually similar proxy variables), this methodological practice should be more routinely used. Moreover, most available studies did not control for the effect of other confounding factors, a series of known risk factors of CAB for instance. This would be necessary to insure that the observed predictive relations are not accounted for by third factors not included in the analyses.
 - *Experimental and Quasi-Experimental Research.* Based on available research, it is difficult to claim that personality traits have a causal role in predicting CAB. For this, experimental studies would be needed. Longitudinal-experimental studies can be particularly useful to test developmental theories (Lacourse et al., 2002). Thus, future research should use longitudinal studies with a nested preventive intervention explicitly targeting temperament or personality traits in order to test whether the relations between personality traits and subsequent CAB are actually causal (Conrod, Castellanos-Ryan, & Mackie, 2011). Quasi-experimental research designs could also help inform on the causality of these predictive relations (Jaffee, Strait, & Odgers, 2012).
 - *Genetically Informative Research.* Because both CAB and personality traits are partly explained by genetic factors, more genetically informative longitudinal studies are needed in order to explicitly test the causal

Future Research Needs

Even though the current research supports the notion that personality traits are related to CAB, both concurrently and prospectively, much research still needs to be done. A number of unresolved conceptual and methodological issues have to be addressed in future research:

effect of personality traits on CAB. More research is needed to determine if the observed predictive relations between these constructs could be explained by a highly heritable common spectrum, or even more likely by evocative, passive, or active rGE (e.g., Hicks et al., 2013).

- *Comprehensive Structural Models of Personality Traits.* There are still very few studies that used a measure for a comprehensive structural model of personality traits, particularly the Big Five model and its associated primary traits. Although there seem to be converging findings on the contribution of broad personality traits, much less is known about the primary traits that are most useful for predicting CAB. The use of (low) Self-Control measures—which is a multidimensional construct from the perspective of personality psychology—has perhaps the same pitfall as a broad personality trait, that is, it is still not clear which specific aspects of this construct are more strongly related to CAB (Piquero, 2009). More research using comprehensive structural models of personality traits or measures of more specific aspects of Self-Control are thus needed.
- *Conceptual Overlap between Constructs.* The issue of item content overlap between personality traits and antisocial behavior measures was raised by different scholars in criminology and psychology and it seems that this cannot account for the relations between the constructs (Caspi et al., 1994; Krueger et al., 1994). Still, there is a persistent concern among scholars that the relations between personality and CAB could be fallacious because some personality trait measures actually include items clearly tapping into antisocial behaviors. Ancillary analyses with potentially overlapping items removed from the personality scales should be routinely conducted in order to insure that there are robust and meaningful relations between personality traits and CAB (Uliaszek et al., 2009). For instance, the low end of the Agreeableness continuum is closely conceptually related to antisocial behavior. Longitudinal studies controlling for initial level of CAB in which the predictive relation of Agreeableness disappears could support the hypothesis of a fundamental conceptual overlap.
- *Multi-Method Assessment of Personality Traits.* Regarding personality traits assessment, studies during childhood are largely based on parental ratings (Rothbart & Bates, 2006), while studies during adolescence and adulthood are almost exclusively based on self-reports. For childhood assessment, other methods should be used, such as ratings of observation in home and laboratory settings or teacher and peer ratings. For adolescence and adulthood studies, because self-reports are potentially biased by response styles (e.g., acquiescence, social desirability) and are sometimes characterized by distortions in self-perceptions, significant others (e.g., conjugal partner, best friend, work colleague) should also be used (Vazire & Carlson, 2011). Of note, distorted self-perceptions are potentially even more problematic for clinical or forensic samples (i.e., offenders) (Walters, 2012) and levels of Self-Control can influence survey responses (Piquero, MacIntosh, & Hickman, 2000). Using informants other than the self is also obviously particularly important when CAB is assessed by self-reports, in which case the shared method problem is added.
- *Typological/Person-Centered Approach.* The large majority of available studies are based on variable-centered as opposed to person-centered, or typological analyses (Donnellan & Robins, 2010). The typological approach essentially emphasizes that the configuration of multiple personality traits within a person can be qualitatively different for different subgroups of persons. To give an example, the current research suggests that low Agreeableness and Conscientiousness are predictors of CAB, but this does not apply to some persistent offenders who are in fact highly organized, methodical, and planful and do not act impulsively (average or even high

Conscientiousness), even though they clearly are narcissistic and callous (low Agreeableness). More research is needed to better understand the different personality profiles of different types of offenders (Hicks, Markon, Patrick, Krueger, & Newman, 2004).

- *Testing Gender Differences.* Some of the aforementioned meta-analyses suggested the possibility of gender-specific relations between personality traits and CAB (Miller & Lynam, 2001; Pratt & Cullen, 2000). Different scholars have argued that a significant part of the gender differences in CAB could be explained by gender differences in personality traits (e.g., Lahey & Waldman, 2003; Moffitt, Caspi, Rutter, & Silva, 2001). However, few empirical studies have rigorously tested this hypothesis. Thus, rather than simply use gender as a control variable in predictive analyses, future studies should conduct more systematic tests for gender moderation in the predictive relations, by doing fine-grained analyses of gender-based moderation using multiple-group structural equation modeling for instance.
- *Testing Complex Conceptual Models.* Most scholars would agree that it is unlikely that personality traits increase the likelihood of CAB independently from the environment. Yet, the Covariate and Direct Effect models are surely the two models that received the most attention from researchers. However, just like it makes little sense to conceptualize the influences of genetic factors on personality without understanding its interplay with the environment (Krueger & Johnson, 2008), it makes little sense to conceptualize the contribution of personality traits to CAB without understanding their complex interplay with the environment (Caspi & Shiner, 2006; Roberts & Jackson, 2008). Even though they have not been reviewed in this chapter, research testing more complex conceptual models involving the interplay between personality traits and the environment is needed. Criminological theories offer a rich source of hypotheses for conceptualizing environmental risks for this future research.

Marc Le Blanc's Contribution

During a large part of the twentieth century, the contribution of individual factors such as intelligence and personality was mostly ignored by mainstream criminologists who were holding the belief that environmental factors are more relevant (Andrews & Wormith, 1989; Wilson & Herrnstein, 1985). Early in the second half of the twentieth century, along with some of his colleagues, Marc Le Blanc was among the few North American criminologists actively interested in the contribution of personality characteristics for explaining CAB (e.g., Farrington et al., 1982). For instance, when he launched the Montreal Two-Sample Longitudinal Study (MTSLS) in the early seventies, he included personality trait measures in order to better understand their role along with various social constructs from Hirschi's social control theory.

A number of interesting findings on personality trait development emerged from the MTSLS data (Kazemian et al., 2009; Morizot & Le Blanc, 2003a, 2003b, 2005, 2007). Apart from his empirical studies, Le Blanc gave an important role to personality in his theoretical work. As described before, in his integrative multilayered control theory (Le Blanc, 1997, 2005), individuals' personality characteristics are among the central factors explaining CAB. The role of personality characteristics in his theory clearly goes beyond most current criminological theories. In his offense control theory, Le Blanc uses the construct of low Self-Control, which is akin to that of Gottfredson and Hirschi (1990). For his personal control theory, Le Blanc uses the concept of Allocentrism (or unfolding). Even though this concept is somewhat ambiguous, the definition given by Le Blanc bears close similarity to research on personality trait development (e.g., Roberts et al., 2006). Le Blanc's theory would thus arguably benefit from resting on a structural model of personality traits such as the Big Five taxonomy, which largely makes consensus in personality psychology. In addition, Le Blanc's theory would benefit from integrating

the two other fundamental aspects of personality proposed by McAdams and Pals (2006), namely characteristics adaptation (e.g., motivations, goals, coping strategies) and life narratives (e.g., internally constructed identity).

Recommended Readings

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Prenatal and Perinatal Factors in the Development of Persistent Criminality

11

Stephen G. Tibbetts and Jose Rivera

Introduction

Various contemporary life-course theoretical models—such as those presented by Moffitt (1993) and Tremblay (2006)—have emphasized the importance of perinatal complications as risk factors in the development of future persistent criminality. This chapter will discuss the various prenatal, delivery, and postnatal factors on the development of such chronic offending. The first section will discuss prenatal risk factors, which will be limited to the factors that are present during pregnancy, but prior to the birth of the infant. The second section will discuss the risk factors that have been most implicated by empirical research regarding the acute stage of delivery of the infant. The third section will examine the various ways that perinatal factors influence the development of infants in their first year or so of life, with an emphasis on their interactions with disadvantaged early environments. Finally, we will provide some suggestions for policy in

trying to address and reduce the impact of these various factors on individuals' future criminality.

Prenatal Factors

Although prenatal and perinatal factors have become an important topic in the recent criminological literature, this attention was relatively limited until recent decades. Historically, there was notable attention (albeit relatively primitive) in the late nineteenth/early twentieth centuries given to early physiological factors present at birth or early development. However, such investigations took an extreme downturn after the midpoint of the last century, especially regarding the very early, perinatal factors that may influence future criminality in individuals; rather, sociological factors became the primary target for research in criminological literature.

One way to confirm this historical lack of attention given to perinatal factors, as well as to confirm the recent attention by research to this topic, is by examining all entries in the Criminal Justice Abstracts (CJA), which records most relevant published works going back to at least 1968. As reported by Tibbetts (2014), in this data source there were no entries for pre- or perinatal (or prenatal) factors until 1973, and the entire decade of the 1970s included only 7 entries. The 1980s were relatively better in examining perinatal factors, with 13 entries in CJA. Although this was an improvement, this

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still represented a relatively low amount of attention given to the topic of pre- or perinatal factors in criminality. Beginning in the early 1990s, pre- and perinatal factors began to receive more attention. Specifically, between 1990 and 1995, there were 20 published works cited by CJA on pre- or perinatal factors, which was the same amount in this 5 year period as that of the two previous decades. This pace remained relatively constant through that decade, and then dramatically increased in the new century, with the publications cited in CJA showing 72 publications between 2000 through 2007. Thus, it appears from examining the entries in the CJA database that the attention given to pre- and perinatal factors regarding crime has recently been growing at an exponential rate. A similar increase in studies on pre- and perinatal factors in the development of criminality or aggression can be seen in related disciplines, specifically that of psychology and sociology (see Tibbetts, 2014).

The various studies on perinatal factors as predictors of future persistent criminality have explored an extremely wide range of prenatal and birth complications. It is impossible to discuss all of the examined factors in this chapter, so we will focus on those that have received the most attention, or are likely to have the highest potential for influencing future criminal behavior, via interactions with environmental factors that cause persistent criminal propensity in youths (see Le Blanc, 2006).

Regarding the prenatal risk factors that are common to pregnant mothers of future offenders, a recent review by Raine (2013) concluded that some of the greatest effects are found for: mothers who consume alcohol (or other drugs); mothers who smoke during pregnancy; exposure to toxins, especially lead and manganese; malnutrition; and complications in fetal brain development. We will now review these various factors in more detail.

It has been well established at this point that pregnant mothers who consume excessive levels of alcohol can lead to fetal alcohol syndrome. This is largely due to the significant effects this substance can have on the brain development of the fetus (for a review, see Raine, 2013). Specifically, studies have consistently shown that high

exposure to alcohol during pregnancy predisposes the growing fetus to craniofacial abnormalities (e.g., thin upper lip, eyes widely spaced, middle part of face is relatively flat, etc.), and dysfunction in the central nervous system (e.g., learning disabilities, low IQ, etc.). Furthermore, Streissguth et al. (2004) found the long-term effects of fetal alcohol syndrome is strongly and consistently related to future antisocial behavior for such infants, such as juvenile delinquency, expulsions/suspensions from school, and inappropriate sexual behavior (e.g., incest, sex with animals, etc.). Such exposure has also been linked to actual structural damage, as measured by brain scans, as well as future clinical diagnoses of conduct disorder among such children (Raine, 2013).

Exposure to other illicit drugs, such as cocaine and methamphetamine, also has been found to have a significant effect on brain development and functioning by children born to mothers who use excessive amounts of drugs during pregnancy. Studies have supported the relationship between maternal substance abuse and perinatal complications, specifically infant physical abuse, such as one by Gessner, Moore, and Hamilton (2004) who examined a birth cohort of children born in Alaska from 1994 to 2000, and found much support for use of illicit substances during pregnancy and future criminal behavior among offspring. Such combination between such substance usage by the mother during pregnancy and infant abuse is the type of interaction that causes future criminality in the children, as this study found (Gessner et al., 2004).

Additionally, a study (Haller & Miles, 2003) of pregnant substance abusers found that the prevalence of abuse against the mother was even higher than expected; specifically, four times as many perinatal substance abusers reported physical abuse, as compared to average obstetrical patients. Derauf and his colleagues (2003) examined the prevalence of such usage during pregnancy in a sample in Hawaii and found that the prevalence of use of methamphetamine was relatively low, as compared to use of tobacco, alcohol, and other substances (Derauf, Katz, & Frank, 2003). Still, given the significant

findings, Derauf et al. (2003, p. 1001) concluded that "...it remains important to follow children with prenatal methamphetamine exposure."

Relatedly, *maternal smoking* (tobacco) during pregnancy is one of the most studied and supported links to future criminality among their infants. One study by Wu, Ma, and Carter (2004) that examined 15 perinatal and sociodemographic variables related to infant maltreatment found that one of the primary predictors of such maltreatment was mothers' use of tobacco while pregnant. Further, the combination of mothers' use of tobacco combined with other risk factors, especially early measures of aptitude/IQ, is a very strong predictor of future criminality (see Gibson, Piquero, & Tibbetts, 2001). Additionally, another study (Gibson & Tibbetts, 2000) showed that the interactive effect of maternal cigarette smoking during pregnancy and the absence of the father predicts an early onset of offending, which has been noted as one of the primary risk factors in developmental theory (Le Blanc, 2006). Other studies have also shown an effect in maternal cigarette smoking, especially when combined with detrimental obstetric and environmental factors, such as abuse in prenatal/early ages (Zelenko, Huffman, William et al., 2001).

A comprehensive review of the literature concluded that the relationship between maternal smoking and conduct disorder/delinquency was consistent across diverse contexts, strongly consistent with basic medical science, and independent of other variables (Wakschlag, Pickett, Cook, Benowitz, & Leventhal, 2002). Another recent review of studies on maternal cigarette smoking found a consistently significant, albeit modest, relationship with criminality/deviance (Pratt, McGloin, & Fearn, 2006). Thus, there is a consistent effect of mothers' use of tobacco during pregnancy on future criminality of their children, especially when coupled by other factors, such as weak family structure, low IQ, and additional obstetric risks.

Another key area of study on substances that affect the neurological development in the pre- or perinatal stage of development is that of lead exposure (for a review, see Wright et al., 2008).

A recent study on lead (Wright et al., 2008) found that such early exposure to this toxin significantly predicted future criminality (even when controlling for relevant variables), which provides further support for the influence of lead exposure as a strong predictor of future criminality. Furthermore, there are numerous other toxins that affect the neurological development of children in the prenatal or infancy stages, such as manganese exposure (Tran et al., 2002; for a review, see Bouchard, Laforest, Vandelay, Bellinger, & Merlglér, 2007). Additional studies have shown that infants who have a protein deficiency, and/or deficiencies in iron or zinc, are predisposed to offending (for a review, see Liu & Raine, 2006; Liu & Wuerker, 2005).

Malnutrition of pregnant mothers is also implicated in the development of persistent criminality. Specifically, studies have shown that malnutrition among pregnant mothers can have a significant impact on the future antisocial tendencies of their offspring, such as in a population of pregnant women in Holland, who were essentially starved during World War II (Neugebauer, Hoek, & Susser, 1999). This study showed that the offspring of pregnant women who were starved during a blockade by the Germans had offspring who had 2.5 times the rate of antisocial disorders by adulthood compared to a control group. Additional studies of nutrition in early development have found that infants/children who have dietary deficiencies of protein, zinc, iron, omega-3 fatty acids, as well as other micronutrients have consistently shown relations with future aggression and antisocial behavior (for reviews, see Liu & Raine, 2006; Raine, 2013).

Regarding early brain injury/trauma, one of the first cited studies in Criminal Justice Abstracts that dealt with pre- and perinatal factors involving a study of prenatal histories of labor and delivery problems revealed that certain complications of pregnancy and delivery tend to occur in a majority of children who show evidence of brain injury and various learning or behavioral disorders (Hippchen, 1978). This early work also discussed the link between violent behavior and structural brain damage caused

by oxygen deprivation (i.e., anoxia [see below]), especially when combined with nutritional/drug usage and environmental factors.

Additionally, another early study compared the medical histories of incarcerated and non-incarcerated delinquent children (Lewis, Shanok, & Balla, 1979), specifically comparing whether incarcerated youth were significantly more likely than the non-incarcerated delinquents to have sustained severe head or facial injury. Perhaps most striking is the finding that such differences in injury were evident by age 2. Lewis and her colleagues (1979) concluded that a combination of early central nervous system trauma along with parental problems and/or social deprivation is primarily responsible for serious, violent delinquency.

A review regarding head trauma (Liu & Wuerker, 2005, p. 233) concluded that “brain damage. . . is a robust finding in the field of the biosocial bases to antisocial and violent behavior. . . [e]vidence for this position converges together from studies of head injury, neuropsychological testing, and brain imaging” (see also, Raine, 1993; Fishbein, 2001). Most studies done on head injuries and brain functioning implicate trauma and/or reduced glucose metabolism to the frontal lobe, especially the prefrontal cortex, which is the region of the brain most responsible for higher level “executive” functions, such as problem-solving, decision-making, and inhibiting the impulsive drives of the lower brain/limbic system (for a recent review, see Séguin, Pinsonneault, & Parent, 2015; Wright, Tibbetts, & Daigle, 2015). Another brain region that head trauma/imaging studies find consistently linked to future chronic offending is that of the temporal lobe region, which is located just above the ear (for a review, see Raine, 2013). Other brain regions implicated by studies of head trauma/functioning in predicting chronic offending are the corpus callosum (which is responsible for communication between the two hemispheres) and the left angular gyrus (which is located at the junction of the temporal, parietal, and occipital lobes of the brain) that plays a key

role in integrating information from various lobes of the brain (Raine, 1993; Fishbein, 2001; Rowe, 2002). Additionally, studies have linked structural and/or activity abnormalities of several limbic/subcortical structures, such as the amygdala (which is responsible for emotional responses) and hippocampus (which is responsible for memory), to violent and persistent offending (Wright et al., 2015).

A number of recent studies have also found that antisocial tendencies are found in individuals with structurally lower amounts of gray matter (as a ratio to white matter) in their prefrontal region (see Raine, 2013; Rowe, 2002). Although this finding was made regarding adults, it likely applies to young offenders due to the emphasis on early brain structure and growth. This finding makes a lot of sense due to the idea that gray matter is more of the substantive, thinking portion of the brain, whereas the white matter is more of the communication of one region to another. Therefore, it is likely that the less the substantive portion of the prefrontal cortex, which is the region that inhibits the emotional responses of the subcortical structures, the less likely that impulsive behaviors will be inhibited or thought through in terms of consequences. Further, it is likely that this relatively lower volume of gray matter may help explain why studies utilizing electroencephalographic (EEG) data have consistently shown that chronic offenders/psychopaths have significantly slower brain wave patterns than non-offenders (for reviews, see Ellis, 2005; Raine, 2013). It also appears that the earlier the age that this head trauma occurs, the worse it is for the child in predicting future criminality (Bufkin & Luttrell, 2005; Raine, 2013; Wright et al., 2015). Likewise, as will be discussed later in this chapter, the greatest impact in terms of intervention can be made at the earliest point of development, namely during pregnancy or infancy/toddlerhood. The basic rule of thumb at this point is, the earlier the intervention, the better (Tremblay, 2006).

Perinatal/Delivery Factors

There are literally thousands of factors at the delivery stage that can impact the perinatal phase of a person's life. From whatever item a mother eats, drinks, or ingests into her body while she is pregnant, to the vitamins/nutrients she consumes, to the multitude of things that can occur close to the delivery/labor stages. In this section, we will discuss the primary risk factors that actually affect the birth/delivery and very early infancy phase, with the assumption and understanding that problems in the prenatal stage often tend to result in problems in the delivery and/or postdelivery stage. Thus, a mother who experiences problems in the prenatal stage of pregnancy is significantly more likely to experience complications in the birth/delivery phase, as well as the early infancy or postdelivery phase (see Raine, 2013; Tibbetts, 2011). So this section should be seen as an extension of the prior section on prenatal risk factors, especially in the sense of delivery complications interacting with various environmental factors, such as poverty, lack of maternal medical care, and familial/developmental aspects of early infancy.

Scientific studies, as well as reviews of such studies, have concluded that delivery complications appear to have even more serious implications for future criminality of the infant than the various problems and risk factors of the earlier prenatal stages (for a recent comprehensive review, see Raine, 2013). This is perhaps due to the vast amount of the acute, stressful nature of the delivery process itself to the mother and infant (for other reviews, see Arsenault, Tremblay, Boulerice, & Saucier, 2002; Beaver & Wright, 2005; Piquero & Tibbetts, 1999; Raine et al., 1995; Tibbetts, 2011). This emphasis on the relative importance of birth complications and criminality in children was noted many decades ago in the medical and psychological literature, yet has been largely neglected, with some exceptions, in criminological research and theory development.

One of the first notable studies on delivery/birth complications was displayed prominently in an early study by Pasamanick et al. in 1956,

which was one of the first notable articles in the medical field linking such birthing experiences with future developmental disorders in the children (Pasamanick, Rodgers, & Lilienfield, 1956). In this review, Pasamanick et al. (p. 613) reported that "The prenatal and paranatal records of children with behavior disorders... show significantly more complications of pregnancy and delivery... [t]hese associations are still present even when intellectual and environmental factors are controlled." Subsequent studies have found similar results in the association between delivery complications and behavioral problems in young children (Arsenault et al., 2002; Beaver & Wright, 2005; for a review, see Tibbetts, 2011), as well as supporting the higher risk of the birth/delivery phase than most of the earlier prenatal risk factors.

There are a couple of leading theories for why such birth/delivery complications impact the future criminality of infants is their impact on the central and/or autonomic nervous system development and functioning (Beaver & Wright, 2005). The first theory emphasizes how such birth complications can clearly have a significant influence on the brain and thus the central nervous system functioning. Such detrimental impact is likely to impact the various inhibitory structures of the brain (such as the frontal lobe, especially the prefrontal cortex), which would increase the likelihood that individuals would act on impulses from the other regions of the brain (e.g., hippocampus or amygdala) without the "brakes" that such inhibitory brain structures provide (see DeLisi, 2011). Further, it is interesting that the more inhibitory structures of the brain, mostly contained in the frontal lobes, are typically the last to develop, and thus the most vulnerable to damage in the perinatal stages (Raine, 2013), whereas some of the more emotional/impulsive structures of the brain are primarily located in the more embedded/developed structures of the limbic system (DeLisi, 2011).

Another leading theory of the association of birth complications predicting future persistent offending involves an interaction between such complications with disadvantaged environments

(Beaver & Wright, 2005; for a review, see Raine, 2013). Specifically, many of the more recent studies that have examined the link between birth complications and future behavioral problems have found that the link is highly dependent on environmental factors (for reviews of these findings, see Arsenault et al., 2002; Beaver, 2009; Raine, 2002; Tibbetts, 2011; Wright et al., 2015). A consistent finding appears to be that either parental or household conditions appear to enhance the risks of children who have experienced birth complications. For example, Raine, Brennan, and Mednick (1994) found that birth complications when combined with early maternal rejection in infancy significantly predisposed such youth to violent crime later on in their teenage years. Furthermore, Piquero and Tibbetts (1999) found that an index of birth complications interacted with a weak family structure in early life to predict violent offending, but not for nonviolent offending. Thus, it appears that the direct relationship between birth complications is often somewhat weak or moderate in terms of developing criminality, but there are highly consistent findings for the interaction between birth complications and environmental maladies in predicting early onset of offending (Tibbetts, 2009, 2011), as well as habitual, persistent violence among youth (for reviews, see Beaver, 2009; Raine, 2002, 2013).

Types of Birth Complications in Criminological Research

There exists a multitude of complications that can occur during pregnancy and delivery of an infant. Some of the more notable delivery complications that have been analyzed and/or implicated by recent criminological studies in terms of predicting future criminality include abruptio placentae, anoxia, APGAR scores, breech birth, Caesarean section births, eclampsia, fetal distress, low birth weight, meconium, placenta previa, and prolapsed or wrapped umbilical cord. In this section, we will review each of these complications, as well as review studies that have examined each.

Abruptio Placentae, also referred to as placental abruption, is a pregnancy complication in which the lining of the placenta has become separated from the mother's uterus, at some point between the half-way point (approximately 20th week) of pregnancy and birth (Tibbetts, 2011; for a review, see Denno, 1990). According to Usui et al. (2008), this type of abruption is one of the most common causes of bleeding in late pregnancy, not to mention the risk to the development of the fetus/infant. According to Denno (1990, p. 136), abruptio placentae "is one of the most serious accidents that can occur" in a pregnancy/delivery. Although the condition varies widely, from mild/partial detachment to complete detachment (which almost always in death of the infant), any form of such abruption is an extremely high-risk factor for the infant(s), especially for future criminality (Piquero & Tibbetts, 1999; Tibbetts, 2011). It should be noted that placental abruption occurs in only approximately 1 % of births worldwide, but when it does occur, it is extremely high risk in terms of both the infant and mother's mortality. Of course this depends on the degree of the separation of the placental lining from the uterus of the mother (Denno, 1990; Usui et al., 2008). If such problems are not resolved, the long-term issues are likely brain damage, largely due to a lack of oxygen getting to the brain (see *anoxia* below). In terms of the mothers, women who experience such complications tend to have more hemorrhaging, lack of blood clotting, uterus not contracting properly after delivery, and (in severe cases) a case of shock among other vital organs, such as the pituitary, kidney, and liver.

There are a number of risk factors that have been identified to provide warning signs and perhaps catch this condition prior to its occurrence. Some of these risk factors include (see Denno, 1990; Flowers, Clark, & Westney, 1991): heavy cocaine or other substance usage; maternal age (under 20 or older than 35); maternal hypertension (which is common in virtually half of all documented incidents); maternal trauma, such as falls, assaults, and driving accidents); previous abruption.

Anoxia is the common medical term used to describe a fetus/infant not getting enough oxygen to the brain, which is obviously very critical in terms of the development in the fetal/embryonic stages. It should be noted that anoxia generally refers to a massive (even total) decrease in oxygen levels, whereas a more mild form of oxygen deficiency is referred to as *hypoxia*. Hypoxia will not be examined in this chapter, but it is very likely that any form of low oxygen levels, no matter how mild (such as those categorized as hypoxia), are still potential risk factors in terms of embryonic/fetal and infant development. Regarding anoxia, Denno (1990, p. 157) claimed, "lack of oxygen to the brain, is suggested as the primary correlate of prenatal brain damage." Although lack of oxygen to the brain can occur throughout pregnancy, it is likely the time an infant/fetus is most vulnerable to anoxia is during delivery, due to the high level of shifting and movement of the fetus during the delivery. Denno also noted several birth or infant related factors (see below) that tend to increase the risk of anoxia/hypoxia, such as prolapsed umbilical cord, low birth weight, preterm deliveries, abruptia placentae, etc., but it is likely that most of the various complications that can occur during pregnancy are likely to result in lack of oxygen to the brain of the fetus/infant.

There have been few published criminological studies regarding the effects of anoxia on future offending by fetuses or infants that suffered from this perinatal disorder, and yet the small amount of research that has been done on anoxia is an obvious area for further study (Beaver & Wright, 2005; Tibbetts, 2011). Beaver and Wright (2005) used a sample from the Early Childhood Longitudinal Study-Kindergarten Class of 1998–1999, to predict which of the various birth complications predicted low self-control (one of the strongest predictors of criminality). They found that anoxia/hypoxia was the only birth complication (out of 7) that had a consistent and significant direct effect on such disposition after controlling for other factors.

APGAR scores are taken when an infant is born, which involves a series of diagnostic measures taken, which largely comprise the

infant's Apgar score. The APGAR is an acronym meaning: Appearance, pulse, grimace, activity, respiration. The score is a fast and efficient way to assess a newborn's health, as well as to simplify it so that it could be easily used by other medical staff at other hospitals. The Apgar score ranges from 1 to 10 (0 would likely be death). The range on the score of 7–10 is normal/good, 4–6 is low (infant at risk), and scores of 3 and below are very high risk. These scores are typically taken for each infant at 1 min of life, 5, 10, and 20 min after birth. Despite the Apgar score being used nearly universally in developed countries over the last few decades, there are very few studies of Apgar scores reported in the criminological literature. To date, perhaps the only study that has been done linking low scores on Apgar to future offending is that of Gibson and Tibbetts (1998). This study found that low 1-min scores on the Apgar were associated with criminal offending, particularly when the mother smoked during pregnancy. Another recent study found that in a cohort study of approximately 177,000 male infants born throughout Sweden between 1973 and 1976, infants with low Apgar scores were significantly more likely to have a low IQ score later in life, specifically at age 16 (Odd, Rasmussen, Gunnell, Lewis, & Whitelaw, 2008).

Regarding *breech birth* (or breech presentation), presentation refers to the "relation of the long axis of the fetus to the long axis of the mother" (Taylor, 1976, p. 188; see reviews in Denno, 1990; Tibbetts, 2011). The presentation can vary quite a bit, ranging from head first or vertex/occipital (which is typical and good), to partial face/skull presentation, to several types of being completely breeched, which is buttocks/pelvis or legs first, which is highest risk for complications (Taylor, 1976, p. 275; Denno, 1990, p. 129). Even within this category of breech, there are several categories: Footling Breech, in which feet/legs come out first; Frank Breech, in which the baby's bottom comes out first; or Complete Breech, in which the baby is crosslegged, with the knees and hips flexed. The majority of breech births are delivered via Caesarean section in the United States, which is

consistent with using C-sections for high-risk deliveries (Tibbetts, 2011; Vendittelli et al., 2008). Notably, about a quarter of fetuses are in breech position at close to 32 weeks of gestations, but only 3 % of full-term infants that are delivered are in such a position because the increasing size of the fetus typically makes the body turn head-downward, which is likely due to the weight of the baby's head and its natural fit into the mother's pelvis (Vendittelli et al., 2008). Preterm deliveries are more likely to be breeched because they have not had the time to naturally turn downward. Other risk factors for such breech births include the mother having a prior Caesarean section pregnancy, higher or lower volume of amniotic fluid, or multifetal pregnancy, such as twins, triplets, or more fetuses (Denno, 1990; Krebs, 2005). Such breech births contribute to a significantly higher risk of anoxia, or lack of oxygen to the infant, as well as many other factors, such as squeezing the baby's torso through the pelvis before the head has gone through and further opened up the passage, that predispose the child to a higher likelihood of developing criminality.

Caesarean section birth (also known as C-section or Cesarean) is the method of delivery that involves an incision through the abdominal wall and the uterus in order to extract the fetus (Denno, 1990, pp. 129–131). As mentioned above and below, caesarean section birth is almost always identified as a risk factor, and is also associated with other risk factors in the sense that when other primary risk factors exist close to the delivery stage (e.g., prolapsed cord) doctors typically advise a C-section. However, to a very large extent, it is not the actual cesarean birth that is the cause of risk, but rather a spurious, medically advised event that occurs due to other causal factors of risk (Beaver & Wright, 2005; Denno, 1990; Taylor, 1976). So, although cesarean section births should always be a "red flag" regarding high-risk births, it should be seen as only an indicator, and not necessarily a cause, of future development in terms of criminality (Tibbetts, 2011).

Varying degrees of seizures and coma present another risk factor in delivery, often referred to

as *eclampsia*. As with other disorders, eclampsia has a wide range of degrees, ranging from tonic to clonic seizures, and the distinguishing characteristic is that such seizures did not occur before pregnancy. Although virtually no studies have supported a direct effect of eclampsia on future offending by the infant, this factor should remain on the list of potential risk factors among birth complications being related to future offending until more studies can be performed to rule it out as an influence during the birth/delivery phase.

Low birth weight has been defined by virtually all medical professionals as being under 5.5 pounds (or the international equivalent) at the time of birth. It is obvious that infants that are under a healthy weight at the time of birth are likely at high risk of many developmental disorders, regardless of what caused such low weight at birth. It is also notable that this is one of the aspects of birth complications that has been studied directly along with interactional effects in the criminological literature. Specifically, empirical studies have closely examined not only the effect of low birth weight but also the interactional effects this factor has when combined with disadvantaged familial environments in which the child is raised. For example, Tibbetts and Piquero (1999) found in a cohort sample of close to 1,000 youth born in inner-city Philadelphia that the combination of low birth weight and lower socioeconomic class significantly predicted which youth would commit an offense at an early age (which is one of the strongest predictors of which individuals will become a chronic, violent offender in the future). Further, McGloin and Pratt (2003) found that the interaction between low birth weight and cognitive abilities was highly predictive of future delinquent behaviors. In addition, a recent study by Ratchford and Beaver (2009), using a sample from the National Survey of Children, showed that measures of birth complications and low birth weight had significant effects on levels of self-control, which is one of the key personality traits that have been linked to delinquency, and explicitly pointed out by Le Blanc (2006). However, virtually no criminological studies have examined the effects of extremely low birth

weight, defined as under 3 pounds (or the international equivalent), on future criminality.

Related to low birth weight, early gestational deliveries also are likely to influence future criminality, and notably there is an association between race and social class with the average gestational age of infants at delivery. Specifically, Denno (1990) found that among her sample, the mean gestational age was approximately 38 weeks for Blacks and over 40 weeks for Whites in her sample. As she stated (p. 154), “short gestational age has been linked to numerous prenatal and perinatal complications as well as adverse outcome for the fetus.” Furthermore, preterm (premature) birth medically refers to birth of a baby who is less than 37 weeks of gestational age. Before approximately 37 weeks, a baby has not entirely developed mature organs to allow normal postnatal development and/or survival. Thus, such infants are at much higher risk for both short- and long-term disabilities and complications (Steer, 2005; Tibbetts, 2011).

Although not technically a birth complication, meconium refers to infants’ stool samples in their earliest day(s), which represents the most sterile form of samples that can be used to see what the child has ingested during the final stages in the womb (Jimenez et al., 2008). Such stool samples can be used to check a variety of substances or fluids that can give much insight into both the ingestion of substances by the mother, as well as nutrients that were present or lacking while in the womb. Earlier definitions of meconium referred to the mucus or bile expelled by a fetus during delivery (Denno, 1990; Tibbetts, 2011), which was seen as a sign of fetal distress in terms of a severe irritant of the lungs. Relatedly, meconium is sometimes released into the amniotic fluid prior to or during birth (producing a distinctive brown color), but typically it is in the first stool produced by the infant after birth. Although meconium is not exactly a birth complication, it is a very good indicator of future criminality by the infant in terms of determining what the infant ingested in the womb just prior to birth/delivery. Like a C-section (discussed above), meconium is not considered a causal factor for the

development of future offending behavior, but it is an indicator for determining which infants are at high risk for criminality.

Placenta previa (or *placenta praeva*) is another major birth/pregnancy complication in which the attachment of the placenta to the lower uterine wall covers the cervix (either entirely or partially), thereby blocking a clear birthing passage of the infant during delivery (Denno, 1990; Naeye, 1977; Tibbetts, 2011). The primary risk of previa—especially with a vaginal delivery—is that it often requires trying to manipulate the head or a leg of the infant to try to pass through the cervix. In this process, there is a high risk for separating the infant from the placenta and, thus, increasing the amount of bleeding as well as cutting off the blood and oxygen/nutrient supply to the infant (e.g., anoxia). There is no established cause of this complication, but it is believed to be associated with prior trauma or infections in the embryonic/fetal stages, particularly those involving some form of scarring (Weerasekera, 2000), and the risk of damage from placenta previa matters by the degree to which it occurs. Specifically, there are at least four types identified by the medical literature (see Denno, 1990), ranging from Type I or the placenta being low lying but not infringing on the cervix, to Type IV meaning that the placenta completely blocks the top of the cervix (Bhide & Thilaganathan, 2004). According to Weerasekera (2000) some of the key risk factors of placenta previa involve mother’s smoking or drug usage, mothers who are older than 35 or younger than 20, mothers with a large placenta from previous births or having twins, or mothers with scarring from previous deliveries (such as a previous D&C or Caesarean delivery). Studies have shown that mothers who experience placenta previa tend to have a severe postpartum hemorrhage, sometimes requiring a total abdominal hysterectomy (Denno, 1990; Weerasekera, 2000). As with abruptia placenta discussed above, similar types of risk for the infant (and the mother) are typically experienced by those who have placenta previa, in terms of loss of blood pressure, heart rate, etc. Perhaps most importantly, previa can lead

to hypoxia/anoxia, and even seconds, let alone minutes, of such deprivation of oxygen in an infant can be detrimental. Such complications early in life are bound to have an impact on development and future criminality.

A *prolapsed cord* is when membranes are ruptured due to the umbilical cord lying below or alongside the presenting part of the fetus (Denno, 1990; Tibbetts, 2011). Like the other birth complications examined above, there are various degrees of prolapse, varying from the cord being near the pelvis but can't be reached, to the extreme of the cord protruding outside the vagina. When the fetus moves down through the cervix in this situation, there is a lot of pressure on the cord, which tends to cut off blood supply, which can result in an acute state of lack of oxygen, nutrients, blood, etc. Like other birth complications, it tends to be associated with other delivery complications (e.g., rupture of the amniotic sac), and if it is not readily identified and dealt with it can lead to death of the infant. However, if the prolapse is of a lesser degree or medical intervention prevents such tragedy, it is still likely that such prolapse will lead to other issues, such as anoxia, malpositions, issues regarding amniotic fluid, etc. (Denno, 1990; Taylor, 1976; Tibbetts, 2011). Typically, a Caesarean section is performed due to the obvious complications involved with a vaginal pregnancy, but even then there are inherent risks, such as breech delivery, fetal malpresentation, and pelvic tumors (Decherney & Nathan, 2007).

Wrapped umbilical cord is a similar type of birth complication that includes both tight forms (such as cases of up to eight loops around the neck) and more loose forms of wrapping. However, a review of studies concluded that "in most cases, loose loops around the neck are not harmful to the infant. However, loops may become tight enough to constrict blood vessels and induce...hypoxia, premature separation of the placenta, fetal distress..." (Denno, 1990, p. 133). The various risk factors involved in wrapped cords is very similar to those of prolapsed cords, but virtually no studies have specifically examined the association between such

wrapped cords and the development of criminality (Tibbetts, 2011).

Perinatal Complications Interacting with Environmental Factors in Infancy

Studies have shown that some of these perinatal complications interact with social/developmental factors in the first year(s) of life for infants, and have a profound effect on their future criminality (Beaver, 2009; Piquero & Tibbetts, 1999; Tibbetts, 2014). According to a review by Raine (2013), a number of studies have shown that infants who suffer birth complications are significantly more likely to develop delinquency, conduct disorder, and violence tendencies in adulthood, especially violent acts that are impulsive (Arsenault et al., 2002; McGloin & Pratt, 2003; Tibbetts, 2011). A previous review by Raine (2013, p. 62) also clearly pointed out the importance of not simply examining birth complications by themselves in predisposing antisocial and criminal behavior, but "may require the presence of negative environmental circumstance to trigger later adult crime and violence." Recent studies have supported this claim of a biosocial interaction between delivery complications and maladaptive environments (Turner, Hartman, & Bishop, 2007; Wu et al., 2004; for more recent reviews, see Beaver, 2009; Tibbetts, 2014).

There has also been a consistent finding of intimate personal violence, clearly an environmental factor, associated with various birth complications, such as low birth weight (for reviews, see Raine, 2013; Sharps, Laughon, & Giangrande, 2007). Other studies have provided strong support for the influence of intimate violence on both a variety of birth complications, as well as the strong association of such violence in postnatal stages with long-term disadvantaged household environments (for a review, see Tibbetts, 2011). Furthermore, studies have shown that infants having such birth complications—such as low birth weight—actually increase the risk that such young children will be abused or neglected (Raine, 2002, 2013;

Sidebotham & Hweon, 2006). This is likely to be a spurious effect from the pre-birth environment, but is also possibly due to some parents or caregivers being less patient (or even hostile) to infants who have such developmental disorders, which often make the children more incorrigible (or at least more difficult to be monitored or disciplined). Such coupling of both physiological and environmental problems obviously predisposes such infants to future criminality, a type of “double dose” in terms of risk factors. Even worse, given the nature of such biosocial interactive effects that tend to be nonlinear or exponential (i.e., the total risk is far greater than the sum of the parts, see Beaver et al., 2014; Tibbetts, 2014); so rather than a linear culmination (i.e., summation) of risk factors, it actually is more like a multiplicative (or exponential) effect, at least in terms of risk for future persistent offending.

Intervention Programs

There are a number of interventions that have shown promise in reducing the risk for such infants that show high risk for future criminality, due to their combination of perinatal factors and familial/environmental factors. Specifically, empirical evaluations have shown much promise with home visitations by nurses to households of high-risk infants and toddlers, many of whom had some (or many) of the birth complications reviewed above (Olds, Henderson, & Robert, 1998; see review in Raine, 2013). A comprehensive review of the positive aspects of such programs was reviewed by Olds (2007), and he provides some key insights on the type(s) of programming that can make a big difference in counteracting some of the negative effects of birth complications (see more recent reviews in Raine, 2013; Tibbetts, 2014).

Summary

- In this chapter, we reviewed the vital importance of prenatal risk factors, with an

emphasis on birth/delivery complications, and the profound impact they have on the future development of youth, especially in terms of habitual, persistent criminality.

- A variety of birth complications were reviewed in detail, largely for the purpose of informing criminologists and other researchers who have not been typically trained to understand what these disorders are exactly, as well as the risk factors and related issues involved with each.
- This chapter also summarized some of the key studies that have implicated birth complications in the development of chronic offending among such youth, especially when they are combined—and thus interact—with disadvantaged environments in their early life.
- Finally, we briefly discussed some promising intervention programs for such high-risk youth that have suffered from such perinatal complications.
- Although a significant amount of empirical research has been done in trying to understand the importance of such birth complications in affecting the development of an individual, it is obvious that much more research must be done to specify the various direct and indirect (as well as interactive) effects that these various complications have on future criminal behavior, particularly habitual, chronic criminality.

Future Research Needs

- There are many more birth/delivery complications that are warranted more attention and that have not been directly measured in terms of being risk factors for habitual, persistent criminality.
- Such perinatal birth conditions include: anesthetic shock during pregnancy; diabetic mother; forceps marks at delivery; neurological and psychiatric conditions of the mother; plurality of birth; sinus rapture; use of oxytocic during labor; use of sedatives during delivery; venereal conditions of the mother, and

fetal death or premature birth of siblings. We did not have space in this chapter to explore these other notable birth complications, but all of them warrant far more attention by criminologists in future research.

- More information is needed on various toxins/chemicals, especially those that aren't mentioned in this chapter but likely have a high chance of being present in disadvantaged environments.
- Far more research on the effectiveness of various implementation programs must be done, because they vary widely in terms of strategy on how they attempt to intervene and reduce criminality in young individuals who have perinatal disorders.
- Additional research should examine not just the direct effects of the various birth complications but also the conditioning and interactive effects with detrimental environmental factors.
- More theoretical development should be done—especially regarding life-course models—as empirical research better informs us of how perinatal complications affect (both directly and indirectly) the development of criminality.

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Early Abuse and Neglect as Risk Factors for the Development of Criminal and Antisocial Behavior

12

Patricia K. Kerig and Stephen P. Becker

Introduction

A wealth of research attests to the significant role that childhood abuse and neglect play in the development of criminal and antisocial behavior (CAB). From a developmental psychopathology perspective, these adverse childhood experiences deprive children of the “average expectable environment” (Cicchetti & Valentino, 2006) that is needed for adaptive functioning and thus leave youth vulnerable to the interpersonal, cognitive, emotional, and biological factors that contribute to antisociality. After first describing the many different forms that such maltreatment might take, this chapter reviews the empirical evidence regarding the underlying mechanisms linking early abuse and neglect to CAB, as well as the particular issues related to adolescence, gender, “crossover youth” involved with both the child welfare and juvenile justice systems, and juvenile psychopathy.

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Definitions

The term “child abuse,” also called maltreatment, encompasses a wide range of experiences and is defined differently in various cultures and legal jurisdictions. Thus, it is challenging to fix clearly in our sites the target of empirical inquiry in the research conducted on this topic. However, attempts to derive internationally agreed-upon definitions have been made, including the following widely accepted guideline from the World Health Organization (2006):

Child abuse or maltreatment constitutes all forms of physical and/or emotional ill-treatment, sexual abuse, neglect, or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child’s health, survival, development, or dignity in the context of a relationship of responsibility, trust or power (p. 9).

Noteworthy in this definition, as well as those in most legal statutes, is that these are kinds of harm that are perpetrated by adults in positions of care over children, such as parents, teachers, and religious figures, rather than hurtful experiences that children might undergo at the hands of peers.

Types of Abuse

Among the specific types of maltreatment that have been distinguished in the research on criminal and antisocial behavior (CAB) are *physical abuse* (e.g., beating, kicking, burning); *sexual abuse* (e.g., fondling, intercourse, exposure to

pornography); *psychological or emotional abuse* (e.g., rejecting, demeaning, terrorizing); *neglect* (e.g., failing to provide adequate food, shelter, medical care); *exposure to domestic violence*, which is found to negatively affect children even when they themselves are not the direct victims of violence in the home; and *exploitation* (e.g., burdening a child with demands beyond his or her developmental capacities, such as in child labor, child soldiering, indentured servitude) (Barnett, Manly, & Cicchetti, 1993; Graham-Bermann & Edleson, 2001; World Health Organization, 2006). Some forms of abuse cross categories in ways that may obscure them from view; for example, youth who are engaged in prostitution may be perceived by social welfare and juvenile justice systems as being perpetrators of crime rather than, more accurately, as victims of commercial sexual exploitation and abuse (Mitchell, Finkelhor, & Wolak, 2010).

Although some research has demonstrated that these specific forms of abuse have distinct associations with child outcomes, including CAB, it also is the case that the various types of maltreatment often co-occur, a phenomenon termed *polyvictimization* (Finkelhor, Shattuck, Turner, Ormrod, & Hamby, 2011). For example, Finkelhor, Turner, Ormrod, and Hamby (2009) conducted a telephone survey with a nationally representative sample of over 4500 US youth and found that almost two-thirds had experienced more than one form of abuse, and almost a third of those had experienced five or more types of victimization. A recent replication conducted in Canada (Cyr et al., 2013) found similar results, with over half of children reporting between 1 and 3 forms of victimization.

Dimensions of Abuse

As the examples of each type of abuse listed above suggest, children's experiences of each form of maltreatment may vary widely along a number of dimensions that determine how deeply and pervasively they affect children's development (Kerig, Ludlow, & Wenar, 2012; Trickett & McBride-Chang, 1995). These dimensions

include *frequency and duration* (e.g., whether the child endures a single episode versus chronic and repeated maltreatment), as well as *violence or threats of violence* and *severity* (e.g., whether physical abuse results in a bruise versus a need for hospitalization; whether sexual abuse involves visual exposure to an adult's genitals versus penetration). In addition, the *developmental period* in which children undergo maltreatment may moderate its effects on children's functioning, as may the *relationship with the abuser*. For example, children who experience maltreatment at the hands of an adult on whom they rely for trust and care, termed *betrayal trauma*, demonstrate the most negative outcomes (Freyd, 1996; Martin, Cromer, DePrince, & Freyd, 2013).

Theoretical Rationales for Linking Early Abuse and Neglect to the Development of Criminal and Antisocial Behavior

The Developmental Psychopathology Perspective

From a developmental psychopathology perspective, abuse and neglect are viewed as violations of the *average expectable environment* (Cicchetti & Valentino, 2006) that is needed to support a child's healthy biological, emotional, social, and cognitive development. In particular, the "safe base" provided by a secure attachment relationship is seen as fundamental to the child's ability to acquire a number of fundamental developmental capacities that, in interaction with one another, protect against the development of criminal and antisocial behavior. These include, among others, capacities for basic trust, ego resilience, self-control, emotion regulation, empathy, perspective-taking, social understanding, interpersonal problem-solving, mastery motivation, executive functions, and moral judgment, all of which are compromised by abuse and neglect (Cicchetti & Toth, 2005; Cicchetti & Valentino, 2006; Kerig, Ludlow & Wenar, 2012). Children who enjoy a secure attachment to a caregiver also

are less likely to engage in coercive exchanges with their caregivers or to provoke the caregivers' use of the kind of power assertive techniques that are predictive of antisocial behavior in the transition from infancy to school age (Kochanska & Kim, 2013). In this way, the transactional perspective inherent to the developmental psychopathology framework attunes us to complex ways in which risk factors interact, such as when maltreated children's dysregulated behavior provokes further ill-treatment at the hands of impatient and irritated parents. Or, to take another example, youth whose affect regulation skills have been disrupted by physical abuse or whose social skills have been blunted by neglect may be perceived negatively and rejected by peers (Kim & Cicchetti, 2010). Such peer rejection may, in turn, provoke youths' withdrawal from prosocial environments such as school (Ladd, Herald-Brown, & Reiser, 2008) and interfere with the development of the academic and interpersonal skills that could provide alternatives to antisocial behavior as a source of adolescent self-expression (Fergusson, Swain-Campbell, & Horwood, 2002). Moreover, in viewing the individual holistically as an integrated system, the developmental psychopathology perspective also highlights the importance of considering biological factors that are affected by maltreatment and contribute to the development of CAB—including genetic, neuropsychological, psychophysiological, neurochemical, and epigenetic variables—again, as these interact with environmental, social, and intrapersonal variables. We will return to discussion of these biological factors later in this chapter.

Stage-Salient Issues Another tenet of the developmental psychopathology perspective is that the impact of adverse experiences differs as a function of the developmental tasks or stage-salient issues that the child is navigating at that point in the life span and which are thus most susceptible to disruption (Cicchetti, 2006; Erickson, Korfmacher, & Egeland, 1992; Kerig,

Ludlow & Wenar, 2012). For example, in infancy, the effects of maltreatment have important implications for increasing insecurity and disorganization in attachment relationships with caregivers, whereas in toddlerhood the effects of maltreatment are seen particularly in deviations in the development of the self-system and capacities for autonomy. In the school-age years, maltreated children demonstrate difficulties in accomplishing the stage-salient tasks of forming positive peer relationships and achieving mastery in school and extracurricular activities. In turn, adolescents with a history of early abuse are more vulnerable to becoming pulled into a variety of high-risk behaviors, including engaging in substance abuse and entering precociously into sexually intimate relationships with antisocial and abusive dating partners. As Egeland and colleagues (2002) summarize: "Maladaptation represents a deflection in normal development that may initiate a deviant pathway toward a variety of problems. Thus the effects of maltreatment on stage-salient developmental issues and the notion of developmental pathways may help to explain the link between early maltreatment and psychopathology" (p. 250).

Social Learning Theory

Among the social learning principles proposed to explain the link between childhood maltreatment and delinquency are differential reinforcement and modeling (Akers, 2009). Children who are victims or observers of violence in the home may model their parents' behavior, particularly when they perceive that such violence is accompanied by rewards such as acquiescence to one's wishes and interpersonal dominance over others. The fact that fathers are disproportionately the perpetrators of family violence might inspire boys to differentially imitate the models they present (Kerig, 1999), thus contributing to an increased vulnerability to delinquency amongst maltreated boys.

Control Theory

Control theory proposes that self-control over natural human urges, including the use of force or immoral means to meet self-serving ends, is achieved through the fostering of bonds with others—initially with parents and then generalized to the wider society (Hirschi, 1969). Maltreatment may serve to disrupt those early bonds and interfere with the kind of empathically attuned attachment that has been empirically demonstrated to increase children's internalization of parental values and intrinsic motivation to behave prosocially (Kochanska & Aksan, 2007).

General Strain Theory

General strain theory (GST) (Agnew, 1985) has been widely utilized as a theoretical basis for understanding the mechanisms linking maltreatment and delinquency. GST posits that being born into an aversive environment, one colored by "relationships in which others are not treating the individual as he or she would like to be treated" (Agnew, 1997, p. 103), acts as a significant source of strain for young people, one to which they may have few skills to successfully adapt. Such experiences generate strong negative effect, particularly among adolescents who are more likely than younger children to respond to adversities with anger, frustration, and problem behavior (Agnew, 1997). Negative emotion, in turn, "increases the individual's level of felt injury, creates a desire for retaliation/vengeance, energizes the individual to action, and lowers inhibitions" against engaging in misbehavior or even violence (Agnew, 1992, p. 60). Delinquent behavior may arise as a function of adolescents' maladaptive attempts to cope with, or even to escape from, maltreating environments. Moreover, these disruptive behaviors generate additional strain through their negative effects on parent-child and peer relationships, decreased educational and occupational opportunities, and the increasingly likelihood of engaging in problem behaviors into adulthood. As described by

Haynie, Petts, Maimon, and Piquero (2009), "exposure to violence is likely to reduce social bonds, constrain the accumulation of human and social capital, and expose adolescents to scripts of behavior that facilitate future involvement in problematic behavior" (Haynie et al., 2009, p. 283). Support for this theory has been offered in a number of investigations showing that negative affect is both a common consequence of trauma and a predictor of delinquency (Aseltine, Gore & Gordon, 2000; Brezina, 1998; Haynie et al., 2009; Maschi, 2006; Maschi et al., 2008).

GST also has been used to explain the fact that there are gender differences in the prevalence rates of delinquency (Broidy & Agnew, 1997). The theory posits that, whereas the negative effect of anger is seen as the driving force behind antisocial behavior (Agnew, 1992), for girls anger "is likely to be accompanied by feelings of guilt, depression, and anxiety ... [which] reduce the likelihood of other-directed crime" (Agnew, 2001, p. 322).

Developmental Traumatology

Although in many respects integrated within the larger umbrella of developmental psychopathology, trauma-specific theories have been posited that target the ways in which posttraumatic reactions following experiences such as maltreatment might interfere with normative development in ways that lead to antisocial behavior specifically as opposed to psychopathology more generally (Ford & Blaustein, 2013; Ford, Chapman, Mack, & Pearson, 2006; Kerig & Becker, 2010). Posttraumatic reactions—including hypervigilance to cues associated with threat, traumatic re-experiencing, and attempts to avoid reminders of traumatic experiences, particularly through the numbing of emotional responses—have all been implicated in the dysregulation of affect and behavior that contribute to criminal and antisocial behavior (Bennett, Kerig, Chaplo, McGee, & Baucom, 2014; Kerig, Vanderzee, Becker, & Ward, 2013; Kerig, Ward, Vanderzee, & Arnzen Moeddel, 2009). Of particular interest are symptoms that are only

recently recognized in the diagnosis of posttraumatic stress disorder (PTSD), although in fact inspired by observations of delinquent youth (Pynoos et al., 2009), which are characterized by ways in which traumatized young people might throw themselves heedlessly into risky, dangerous, or self-destructive activities such as through engagement in violent, norm-violating, or antisocial behavior. Whether such behaviors emerge as a function of a posttraumatic defiance against the acknowledgement of vulnerability (Ford et al., 2006) or dysfunctions in the capacity to recognize risk amongst those who have been victimized (Orcutt, Erickson, & Wolfe, 2002) will be an important question for future research.

Empirical Evidence Linking Early Abuse and Neglect to the Development of Criminal and Antisocial Behavior

Before proceeding with our review, it must be acknowledged that the literature linking maltreatment to antisocial behavior is vast, with most large-scale longitudinal studies of developmental psychopathology including measures of related constructs of interest, including externalizing, aggression, conduct disorder, and problem behavior. In addition, major studies of the long-term sequelae of child abuse into adulthood measure other negative behaviors that might be precursors to or co-occur with criminal behavior, such as anger, substance use, and intimate partner violence (Anda et al., 2006). Thus, to keep to a manageable scale, the current review is selective to key studies that are illustrative or that have had an important impact on the field and favors those that include measures of criminal behavior per se such as involvement in the juvenile justice (JJ) or adult criminal systems, rather than self- or caregiver reports of adolescent misbehavior. In addition, there are large literatures related to the developmental consequences of children's exposure to violence or trauma as broadly conceived; however, in the present review, we focus on those studies that

allow us to differentiate child outcomes specifically associated with parental abuse or neglect.

Evidence from Longitudinal Studies

A large body of cross-sectional research provides evidence that abuse and neglect are correlated with delinquency and that rates of childhood abuse and neglect are disproportionately high among youth who are involved in the juvenile justice system (for reviews, see Kerig & Becker, 2010, 2012). However, more persuasive are prospective longitudinal studies that can establish that child abuse is a *precursor* and risk factor that increases the likelihood of CAB over the course of development. The most recent meta-analysis on this topic identified 18 studies, 9 of which were prospective and longitudinal (Wilson, Stover, & Berkowitz, 2009). The studies reviewed assessed a wide range of experiences associated with exposure to violence prior to age 12, including but not restricted to abuse and neglect. The results of the meta-analysis indicated overall large effect sizes amongst those studies assessing violence exposure and antisocial behavior concurrently but only small effect sizes amongst those involving prospective longitudinal research. However, closer inspection of the results indicates that, for studies examining direct victimization via physical or sexual abuse, the effect sizes were moderate rather than small, and were obscured by the inclusion of witnessing and victimization in the same category. For example, among the methodologically rigorous studies cited is that of Stouthamer-Loeber, Loeber, Wei, Farrington, and Wikström (2002) which followed 503 boys with substantiated maltreatment over the course of 7 years and found that almost 50 % were involved in serious persistent delinquency by age 13, in contrast to 19 % of the matched controls. It is also notable that the majority of studies included in Wilson and colleagues' meta-analysis assessed "delinquent" behavior via self-report than actual criminality or juvenile justice involvement.

Moreover, a number of notable studies were not included in Wilson and colleagues' meta-analysis and others have been published since it was conducted. Among these, Ryan and Testa (2005) examined official records collected on 18,676 children in the state of Illinois with substantiated reports of maltreatment who were followed from birth to age 18. Findings showed that abused children averaged 47 % higher rates of delinquency in adolescence than did their nonabused peers. In turn, Lansford et al. (2007) followed 465 children from kindergarten to adulthood and found that those with parent-reported abuse at an early age were more likely than their peers to be arrested in adolescence as well as to perpetrate violence in romantic relationships. Similarly, Mersky and Reynolds (2007) examined official records gathered on 1,404 youth tracked from ages 5 to 24 and found that maltreated youth had significantly higher rates of violent, but not nonviolent, delinquency. By a similar token, data from the Add Health Study following a large group of over 11,000 school-age children over 6 years indicated that each unit increase in family or caregiver physical abuse raised the probability of contact with the criminal justice system by 15 % (Haynie et al., 2009). Further, using data from a birth cohort of close to 1,000 children followed from birth to age 25 in New Zealand, Fergusson, McLeod, and Horwood (2013) found that exposure to self-reported sexual and physical abuse in childhood was associated with a wide variety of negative outcomes, including conduct disorder and antisocial personality.

In addition, studies focused on all-female samples have shown that childhood physical and sexual abuse are associated with an increased severity of delinquency over the course of 7 years (Cernkovich, Lanctôt, & Giordano, 2008) and that sexual abuse predicts girls' higher risk for later delinquency over the course of six (Trickett & Gordis, 2004) and even 23 years (Trickett, Noll, & Putnam, 2011) in comparison to their non-abused peers. Another study examined trajectories of offending among a sample of 499 girls who had been incarcerated in adolescence and whose case files provided information about

childhood victimization (Coleman, Kim, Mitchell-Herzfeld, & Shady, 2009). At a follow-up when the young women were age 28, the investigators found that the combined experience of physical and sexual abuse was a significant predictor of recidivism, particularly in combination with other risk factors such as family dysfunction and out-of-home placement.

An especially important program of research has been conducted by Widom (2003) and her colleagues, who have conducted a series of prospective studies using data collected from large cohorts of children with documented cases of neglect or physical or sexual abuse prior to age 11, compared with matched control groups. In follow-ups conducted when participants were approximately 33 years old, initial findings showed that those abused or neglected as children had 55 % higher rates of arrest for nonviolent crimes than did those in the control group whereas the risk of violent crime was increased 96 %; moreover, the maltreated children began their criminal careers on average a year younger than their peers and were more likely to become chronic offenders (Maxfield & Widom, 1996). Subsequent analyses based on a sample of 1,190 participants found that, after controlling for other risk factors, including parental substance abuse, criminality, poverty, and ethnicity, it was only the abused and neglected girls, not boys, who were at higher risk for engaging in violent offenses and abusing substances (Widom & White, 1997). A further replication and extension of this research based on a different geographical region found that those who were abused or neglected in childhood were 4.8 times more likely to be arrested as juveniles, 2 times more likely to be arrested in adulthood, and 11 times more likely to commit a violent crime, in comparison to those not maltreated in childhood (English, Widom, & Brandford, 2002). Further analyses also revealed gender differences in these effects. After controlling for other risk factors such as socioeconomic status and parental criminality, child maltreatment was found to be associated with adult criminal violence via different pathways for men and women (Widom, Schuck, & White, 2006). Whereas childhood

maltreatment had direct associations with adult violent offending for men, for women this relationship was mediated by problematic alcohol use. This is an important issue for future research to examine, and brings us to the important question of the intervening mechanisms that might account for the link between maltreatment and delinquency.

Intervening Mechanisms

In addition to Widom and colleagues, other researchers also have attempted to identify the intervening mechanisms that might explain the link between childhood maltreatment and later delinquency. For example, in studies following maltreated children from infancy through adolescence, Egeland, Yates, Appleyard, and van Dulmen (2002) demonstrated that physical abuse, but not neglect, was associated with alienation in preschool, which then predicted externalizing problems in elementary school, which ultimately predicted antisocial behavior in adolescence. In turn, using national survey data that assessed more than 2,000 boys over a period of 1.5 years, Brezina (1998) found that reduced commitment to school, increased deviancy-approving attitudes, and increased anger mediated the significant association between self-reported maltreatment and self-reported delinquent behaviors. In turn, the quality of relationships with both parents and friends was implicated in Salzinger, Rosario, and Feldman's (2007) 6-year follow-up of a sample of 100 children with substantiated physical abuse compared to matched controls. Their results indicated that lack of positive attachments to parents and ongoing parental verbal and physical abuse during adolescence mediated the association between childhood maltreatment and adolescent self-reported violent delinquency. In contrast, friendship quality acted as a moderator such that for abused—but not non-abused—youth, lower levels of delinquency among friends significantly decreased the risk of violent delinquency while physical and violent abuse by best friends exacerbated the risk. Turning to the

case of girls specifically, Feiring, Miller-Johnson, and Cleland (2007) found that, among sexually abused girls followed over the course of 7 years, abuse-related stigma, including shame and self-blame, was associated with delinquent behavior through the mediators of anger and involvement with antisocial peers.

Further, running away from home, which may represent a youth's way to cope with or escape from parental abuse, in and of itself appears to increase the risk of delinquency by thrusting youth into the company of antisocial peers and increasing the likelihood that they will resort to "survival crimes" such as theft, prostitution, and drug dealing in order to subsist on the streets (Chesney-Lind & Pasko, 2004; Kaufman & Widom, 1999; Kerig & Becker, 2012). Empirical research supports the hypothesis that running away mediates the association between maltreatment and delinquency (Tyler, Johnson, & Brownridge, 2008). For example, data from the Add Health study show that abuse in the home is associated with a greater risk of precocious exits from normative adolescent roles, including running away (Haynie et al., 2009). Moreover, Kim, Tajima, Herrenkohl, and Huang (2009) followed 416 youth from preschool to adolescence and found that parent and youth reports of physical and psychological abuse were predictive of youth's running away and that running away was predictive of later delinquency, as well as further revictimization.

In keeping with the multifaceted developmental psychopathology framework, Burnette, Oshri, Lax, Richards, and Ragbeer (2012) examined the intersections of temperament, emotion dysregulation, and peer relations as mediators of the association between harsh parenting (verbal and physical aggression) and antisocial behavior. The 1,639 youth were aged between 9 and 12 at the outset of the study and were followed over the course of three waves, each 2.5 years apart. Results showed that the combination of harsh parenting, a disinhibited temperament (low behavioral control and high sensation seeking), emotion dysregulation, and association with deviant peers predicted youths' involvement in antisocial behavior.

Posttraumatic Reactions As noted previously, theories derived from a developmental traumatology perspective propose that posttraumatic reactions play a role in the association between early maltreatment and later delinquency. Research to date has confirmed that youth who have experienced interpersonal traumas (Kerig et al., 2009, 2013) and polyvictimization (Ford, Elhai, Connor, & Frueh, 2010) are at increased risk for delinquency, and that symptoms of PTSD help to account for this association, particularly symptoms associated with emotional numbing (i.e., difficulty identifying or experiencing one's feelings) and dysphoric arousal (i.e., irritability, poor sleep, difficulty concentrating) (Bennett et al., 2014). However, for the purposes of the current review, major limitations of this research to date include the lack of specificity to parental maltreatment per se and reliance on a cross-sectional research design such that the necessary temporal associations are not established that would demonstrate PTSD to be causal in the maltreatment—posttraumatic reactions—delinquency chain.

Biological Processes as Mediators of the Association Between Abuse and CAB A growing body of research suggests that maltreatment-related trauma may have effects on biological systems that are involved in responding to stress, regulating behavior, and managing emotions in ways that directly increase the risk of CAB (Cicchetti, Rogosch, & Thibodeau, 2012; Davies, Sturge-Apple, & Cicchetti, 2011; Ford, 2009; Mead, Beauchaine, & Shannon, 2010). Markers of these effects may be seen at the level of genes, neuroendocrine functioning, neurotransmitters, and neuropsychological deficits. However, conceptualizations of the role of biology in behavior increasingly utilize complex interactional models that take into account not just genes, for example, but candidate gene \times environment interactions (see Beaver, Schwartz, & Gajos, 2015).

A landmark study based on the Dunedin longitudinal sample (Caspi et al., 2002) showed that a functional polymorphism in the gene encoding the neurotransmitter-metabolizing enzyme

monoamine oxidase A (MAOA) moderated the effects of maltreatment on boys' CAB. Maltreated boys with a genotype conferring low levels of MAOA expression were 2.8 times more likely to develop conduct disorder in childhood and 9.8 times more likely to be convicted of a violent crime in adulthood than were their peers; in contrast, among males with the high MAOA activity genotype, maltreatment was not associated with an increase in the likelihood of developing conduct disorder or committing a violent offense. Similarly, data utilizing retrospective reports from adults have shown that low-activity MAOA alleles predispose individuals to develop symptoms of antisocial personality disorder in the context of childhood maltreatment, whereas high-activity MAOA alleles are associated with symptoms of major depression (Beach et al., 2013).

Following up these results, Cicchetti et al. (2012) investigated gene \times environment interactions in a sample of 627 children with confirmed histories of parental abuse by collecting assays of three candidate genes previously implicated in antisocial behavior and/or maltreatment: TPH11, which is involved in the synthesis of serotonin; 5-HTTLPR, which also regulates the availability of serotonin in the brain; and MAOA. The results highlight the importance of gene \times environment interactions in that the genetic polymorphisms were related to an increased risk of antisocial behavior only among children who were maltreated. The developmental timing of maltreatment also emerged as important and interacted with 5-HTTLPR to predict the most negative outcomes, as did the type of maltreatment: among children who were homozygous for the short-short allele genotype of 5-HTTLPR, those who experienced sexual and/or physical abuse were at significantly higher risk for antisocial behavior than those who had experienced emotional maltreatment or neglect.

However, other research has indicated that, above and beyond the genetic transmission of antisociality—which accounts for as much as 50 % of the association between parental physical abuse and children's antisocial behavior—maltreatment predicts an increased risk for

CAB over and above the influence of genes. To demonstrate this, Jaffee, Caspi, Moffitt, and Taylor (2004) collected data on 1,116 twin pairs followed from ages 5 to 7. Results showed that physical maltreatment predicted an increased risk of child antisocial behavior, as measured by maternal and teacher report, in a clear temporal and dose-response association, and the effects were independent of genetic factors. Although there was evidence for a passive gene-environment correlation, in that antisocial parents were those most likely to maltreat their children and the children of these parents had the highest rates of antisocial behavior, the effects of maltreatment remained consistent when these factors were controlled.

One of the biological underpinnings to this research that is ripe for future exploration is that of epigenetics (Beach et al., 2013; Mehta et al., 2013). Newer biological models are evidencing that genes are not something that children “have” but rather that genes can be modified—turned on and off—by experiences. Thus, the picture may be a more complicated one in which maltreating parents set the stage for children’s vulnerability to developing CAB in the aftermath of abuse by rearing them in ways that increase the expression of genes associated with criminal and antisocial behavior.

Distinguishing Among Types of Maltreatment

With notable exceptions, relatively few of the studies we have identified compare the associations between CAB and diverse forms of maltreatment (e.g., physical versus emotional versus sexual abuse, exposure to violence versus exploitation or neglect), sometimes because the topic of investigation is limited to only one form of maltreatment, such as sexual abuse (e.g., Feiring et al., 2007; Trickett & Gordis, 2004), or at other times because various types of abuse are collapsed into larger categories (e.g., Cicchetti et al., 2012). Still other research has differentiated only between physical abuse and neglect, with findings sometimes supporting a slightly

increased risk of violent offending amongst children who suffered physical abuse (Widom, 2003), whereas other studies suggest that the effects of physical abuse and neglect are equivalent (Mersky & Reynolds, 2007).

One more finely discriminating comparative study was conducted by Cohen, Smailes, and Brown (2004), utilizing official Child Protection Agency and arrest records for a national cohort of individuals born between 1965 and 1974 and followed up 25 years later. Their results showed that the highest rates of adult arrest were among those with substantiated childhood physical abuse and the lowest rates amongst those who had been victims of neglect, whereas violent crimes against persons were most prevalent amongst those who had been sexually abused in childhood. A similar pattern emerged from Herrera and McCloskey’s (2003) follow-up of a sample of girls over 6 years, in which child sexual abuse was found to be the strongest predictor of both violent and nonviolent offending, whereas physically abused girls were those most likely to assault their parents. In contrast, witnessing domestic violence was not predictive of delinquency once the effects of physical and sexual abuse were accounted for. Most recently, data from a study of 195 children of Navy families referred for allegations of maltreatment were analyzed to create three distinct latent classes (Grasso et al., 2013). Those children who had experienced sexual abuse in combination with physical abuse and exposure to interparental violence committed three times the number of self-reported delinquent behaviors than children who had experienced physical abuse and/or interparental violence in the absence of sexual abuse.

Different forms of abuse also may have different effects depending on youth gender. For example, Tyler et al. (2008) followed a sample of 360 high-risk youth over a period of 6 years and found that adolescent self-reports of serious delinquency were predicted by childhood neglect for boys and by physical abuse for girls. The reasons for this gender difference are not immediately obvious, but this is a pattern that warrants further investigation and is in need of replication.

Timing Matters: Why Are Adolescents Especially Vulnerable?

Returning to the importance of stage-salient issues, some research suggests that maltreatment that begins or extends into the adolescent years has particularly malevolent associations with youth antisocial behavior (Ireland, Smith, & Thornberry, 2002; Stewart, Livingston, & Dennison, 2008). For example, youth who have reached adolescence when they first come to the attention of child welfare authorities are at higher risk of involvement with the juvenile justice system, both in regard to beginning their antisocial careers earlier with their first offense (Ireland et al., 2002) and for continuing on an antisocial pathway as recidivists (Ryan et al., 2013). Four hypotheses have been proposed to help explain why the timing of maltreatment matters in the development of delinquency. Smith, Thornberry, and Ireland (2004) propose two possibilities: that children may be more “developmentally resilient” than adolescents, in that the short-term negative effects of abuse and neglect may resolve once the maltreatment is redressed; or that child protection services’ interventions may be less available for and less effective with adolescents than younger children. In turn, Stewart et al. (2008) suggest that adolescence represents a time of particular vulnerability given the additional stresses and developmental challenges associated with that phase of life. Youth who endure the additional burden of maltreatment while attempting to navigate the difficult transitions of this stage may experience disruptions in important sources of resilience, such as academic functioning and peer relationships, which in turn increase their risk of antisocial behavior and delinquency. In contrast, Ryan and colleagues (2013) propose that maltreatment in adolescence is in fact a different entity from childhood maltreatment that itself has distinct implications for development. For example, in the case of neglect, the kinds of parental disregard that would draw the attention of child welfare authorities are likely to be more severe in the case of an adolescent than would be the typical

kinds of inadequate supervision that constitute neglect of a young child. In other words, whereas neglect of a young child might involve an act of omission—a parent failing to provide adequate food or care, for example—neglect of an adolescent—such as a parent locking the child out of the home after a heated argument—might be better construed as an act of commission. Furthermore, Ryan and colleagues point out, “at the agency level, social service systems would respond to these scenarios differently, as young children are often viewed as troubled and older children are more often viewed as troublesome” (p. 462).

Suggestive evidence to this effect is drawn by Ryan, Herz, Hernandez, and Marshall (2007) who found, in a large database drawn from records in Los Angeles County, that youth who entered the juvenile justice system from the child welfare system were significantly less likely to receive probation than their peers and were instead more likely to be sent to correctional placements, even after controlling for the severity of their offenses. Of additional concern was the overrepresentation of African-American youth amongst those involved simultaneously with child welfare and juvenile justice. This leads us to consider the increasingly recognized problem of “crossover” (Herz, Ryan, & Bilchik, 2010) youth who are dually involved in the child welfare and juvenile justice systems, and who also are disproportionately minority youth.

Crossover Youth: Child Welfare Involvement as a Risk Factor for Delinquency Among Maltreated Children

For many maltreated children, an additional conundrum that must be reckoned with is that reporting of the abuse to the authorities, and children’s subsequent involvement in the child welfare system, may have iatrogenic effects that increase subsequent delinquency. There are a number of potential reasons for this link, including children’s reactions to being removed from

their families, but one strongly implicated is the ensuing instability in placement that often characterizes children's experience in the foster care system, particularly when those children exhibit the kinds of challenging behaviors that often follow from abuse. In this regard, Jonson-Reid and Barth (2000a) prospectively followed 79,139 children first placed in foster care in California between the ages of 12 and 15. The investigators found that girls with foster care histories entered the JJ system at rates 10 times higher than girls in the general population, whereas boys who spent time in foster care entered JJ at rates 5 times higher than those in the general population. Those most likely to become incarcerated were those who had multiple placements and terms in care. Moreover, those who were supervised by probation had an increased likelihood of being incarcerated for a serious or violent offense. These authors also utilized official records on 159,539 California school-aged children who had been reported for abuse or neglect after age 6 and followed through their 18th year (Jonson-Reid & Barth, 2000b). Their findings showed that children reported for neglect were more likely to later be incarcerated for delinquency than were those reported for physical or sexual abuse. In addition, rates of incarceration for girls were highest amongst those who were placed in foster home or group care. Subsequently, Ryan and Testa (2005) found that, among a sample of 18,676 maltreated children referred to the foster care system, placement instability increased the risk of delinquency for boys, whereas, in their study, this effect did not hold for girls. Another suggestive finding from this large database is that, among crossover youth, only 8 % had experienced an arrest before becoming involved in the child welfare system, whereas 56 % recidivated, in contrast to only 41 % of their peers who were involved only in the juvenile justice system. Moreover, 32 % of dually involved youth had a subsequent referral for maltreatment following their first arrest, suggesting that involvement in the child welfare system was not a protective factor for them.

However, also important to note is that not all youth are referred to the child welfare system

because of maltreatment; some of these youth are placed into care due to severe behavioral problems, and evidence suggests that these youth are even more likely to go on to experience an arrest than those youth placed in care due to maltreatment (Ryan, 2012).

Unraveling Gender Differences in the Associations Between Child Abuse and CAB

Cross-sectional studies show that the prevalence of child maltreatment is particularly high amongst JJ-involved girls, who are more likely than their male peers to have been the direct victims rather than mere observers of family violence (e.g., Cauffman, Feldman, Waterman, & Steiner, 1998; Kerig et al., 2009, 2013). Moreover, some research suggests that maltreatment is more strongly predictive of delinquency amongst girls than boys (Widom & White, 1997). In attempting to understand this gender difference, one factor worth noting is that girls are vastly overrepresented amongst the detained youth who have experienced one specific form of maltreatment, and that is sexual abuse (e.g., Abram et al., 2004; Ford, Hartman, Hawke, & Chapman, 2008; Kerig, Arnzen Moeddel, & Becker, 2011; Kerig et al., 2013; Martin, Martin, Dell, Davis, & Guerrieri, 2008; Wareham & Dembo, 2007; Wood, Foy, Layne, Pynoos, & James, 2002; for a review, see Kerig & Becker, 2012). Longitudinal research, in turn, suggests that sexual abuse is a form of maltreatment with unique and pernicious effects on a young person's development (Fergusson et al., 2013; Fergusson, Boden, & Horwood, 2008; Trickett, Negri, Ji, & Peckins, 2011; Walsh, Galea, & Koenen, 2012), particularly CAB (Cohen et al., 2004; Grasso et al., 2013). As noted above, research also has substantiated that sexual abuse is a risk factor implicated in delinquency amongst girls (Feiring et al., 2007; Trickett, Noll & Putnam, 2011) and, although the comparisons are not always available, some research does suggest that sexual abuse is differentially predictive of girls' delinquency in comparison to other forms of

maltreatment (Herrera & McCloskey, 2003). A particularly compelling finding comes from the National Survey of Adolescents (Begle et al., 2011), in which telephone surveys were conducted with a national probability sample of mostly urban youth. Over the course of a 15-month follow-up, the investigators found that victimization (physical abuse, sexual abuse, and witnessing violence) was associated with delinquency and other high-risk behaviors but that this relationship was bidirectional for boys and unidirectional for girls. For boys, victimization early in life increased the likelihood of delinquency which, in turn, increased the risk for experiencing physical abuse or assault; in contrast, for girls, sexual abuse alone was associated with a 6 times greater likelihood of engaging in rather than refraining from delinquency and risky behaviors.

However, a complicating factor in drawing definitive conclusions about gender differences from studies of the association between child maltreatment and delinquency is that girls display delinquent behaviors at lower rates than boys and are thus underrepresented, and sometimes completely absent, from studies of juvenile justice-involved or incarcerated youth. Although rising arrest rates for girls have increased research attention to the factors underlying delinquency (Zahn et al., 2008), some of the research inspired by the gender-responsive movement has included only girls in the samples, and thus the question of whether there are gender-specific risks or protective factors for girls' and boys' antisocial behavior cannot always be answered (Kerig & Schindler, 2013). The question also has arisen as to whether we are capturing antisocial girls in our net. For example, CAB in girls may take a more covert form, such as relational aggression, which does not lead to legal sanctions and the identification of misbehaving girls as "antisocial" (Maccoby, 2004). Attention to other outcomes than overtly criminal behavior may be more relevant to the study of girls' antisociality, including perpetration of violence against intimate partners (Ehrensaft et al., 2003; Feiring, Simon, Cleland, & Barrett, 2012) or other forms of impulse under-control, such as

those implicated in self-harming behavior and borderline personality traits (Beauchaine, Klein, Crowell, Derbidge, & Gatzke-Kopp, 2009; Burnette & Reppucci, 2009).

On the other side of the coin is the argument that the misbehaviors for which girls often are labeled delinquent represent not so much a drive toward antisociality but toward survival in abusive contexts. Girls are disproportionately represented amongst those whose violations of the law are characterized as "survival crimes"—running away from home; living on the streets; participating in substance use and drug dealing; and engaging in prostitution or petty theft—problem behaviors which are, not coincidentally, predicted by an abusive or neglectful home life (Chesney-Lind & Belknap, 2004; Kaufman & Widom, 1999; Kerig & Becker, 2012; Kerig & Schindler, 2013). As Lanctôt and Le Blanc (2002) point out, girls and women tend toward misbehaviors that put their own safety at risk rather than the safety of others. Although risky behaviors, disregard of one's own safety, and self-harming have long been recognized as symptoms consequent to trauma (Pat-Horenczyk et al., 2007), particularly among victims of sexual abuse (Orcutt et al., 2002; Weierich & Nock, 2008), as noted previously, only recently has this dimension been included in the diagnostic criteria for PTSD. Of note, delinquent girls displaying elevated rates of PTSD symptoms are particularly likely to recidivate and have ongoing contact with the juvenile justice system (Becker, Kerig, Lim, & Ezechukwu, 2013).

Nonetheless, among youth identified as delinquent and adults involved with the criminal justice system, evidence suggests that certain risk factors are more prevalent for females than males. One of these is childhood abuse and neglect. As Lanctôt and Le Blanc (2002) point out, "The existence of a relationship between child abuse and juvenile delinquency is not a new idea. Despite this link . . . it is . . . disturbing, however, how little attention the child-abuse-victim-to-offender link has received and how it has often focused on boys. Consideration of the risk of abuse appears to be essential in order to improve our understanding of females'

involvement in deviance. This link between victimization and deviance has been nearly invisible in mainstream and gender-differences criminological theories” (p. 175).

Callous-Unemotional Traits and Juvenile Psychopathy

Another stream of research has revealed that one of the strongest predictors of serious, violent, and recalcitrant offending across the life span is the presence of psychopathic or callous-unemotional (CU) traits (Frick, Ray, Thornton, & Kahn, 2013), hence their inclusion in the newest diagnostic manual as a subtype of conduct disorder (Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012). Although high-CU youth represent only a small subset of those involved in the JJ system, they thus are an important group to identify and divert. The original conceptualization of CU traits suggested that such traits were inherent and arose independently of childhood adversity (Wootton, Frick, Shelton, & Silverthorn, 1997), and callous features have been shown to moderate the association between harsh parenting and antisocial behavior such that children with this affective deficit are relatively less impacted by parental abuse (Edens, Skopp, & Cahill, 2008). In contrast, other research suggests that there may indeed be an association between CU and childhood maltreatment. For example, both longitudinal (Lang, Klinteberg, & Alm, 2002; Weiler & Widom, 1996) and cross-sectional (Campbell, Porter, & Santor, 2004) studies have demonstrated higher levels of self-reported psychopathic traits amongst those with histories of childhood abuse. However, other investigations of detained youth have found the associations among abuse, callousness, and delinquency to hold only for boys and not girls (Krischer & Sevecke, 2008). Instead, it has been argued, it is victimization that accounts for the apparent link between psychopathic traits and violent offending amongst girls (Odgers, Reppucci, & Moretti, 2005).

An alternative perspective has focused on the construct of “secondary psychopathy” (Karpman, 1941; Porter, 1996) or “acquired

callousness” (Kerig & Becker, 2010) which proposes that in addition to the inherent affective deficits associated with “primary psychopathy,” there is a second pathway by which callousness traits might arise, and that is maltreatment. As Karpman originally suggested, individuals who have been maltreated may cultivate a mask of callousness and withdrawal of empathy as a kind of protective shield against their own painful emotions. However, unlike those in the inherently callous group, they are capable of a full range of feelings and in fact are differentiated by a quite uncharacteristically non-psychopathic-like level of anxiety. As Ford et al. (2006) have proposed, cultivating a callous veneer may begin as a strategy for “survival coping” among youth who have been chronically victimized but ultimately may lead in fact to reduced capacities for empathic engagement with others. Research to date differentiating this second group of high-CU youth has indeed found that they are more likely to have a history of victimization (Tatar, Kimonis, Kennealy, Skeem, & Cauffman, 2012; Vaughn, Edens, Howard, & Smith, 2009) particularly in the form of child abuse (Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012). Further, traumatic victimization has been demonstrated to be associated with CU traits among JJ-involved youth (Bennett & Kerig, 2014), and this association is mediated through the mechanism of emotional numbing (Bennett et al., 2014; Kerig, Bennett, Thompson, & Becker, 2012).

Summary

- A wealth of cross-sectional and prospective longitudinal research lends support to the idea that early abuse and neglect significantly increase the likelihood of CAB in childhood, adolescence, and adulthood.
- Gender differences have emerged in these findings, with some studies suggesting that girls might be more vulnerable to these effects, particularly when the type of maltreatment under study is sexual abuse and the form of CAB assessed is violence offending.

- Some research also suggests that adolescents may be especially vulnerable to the negative effects of maltreatment, particularly in regard to the outcome of CAB.
- Interventions for maltreatment that remove children from their homes and place them in the foster care system may be associated with an exacerbated risk of CAB.
- Although originally conceptualized an inherent quality that emerged independently from the qualities of a child's upbringing, new research indicates that childhood psychopathy or callous-unemotional traits also might arise through the secondary pathway of maltreatment.

Future Research Needs

- Prospective, longitudinal, multidimensional research is needed to test theories regarding the mechanisms of effect by which early abuse and neglect contributes to CAB.
- The inclusion of both genders in the samples investigated will contribute much-needed information regarding the extent to which the effects of childhood maltreatment are equally predictive of CAB, and via the same pathways, for girls and boys.
- Further fine-tuning is needed regarding the differential contributions to CAB of particular forms of maltreatment (e.g., physical abuse, sexual abuse, emotional abuse, neglect, exposure to family violence, exploitation) for boys versus girls.
- Further research also is needed that controls for other variables that might account for or obscure the associations between childhood abuse and CAB (e.g., parent antisociality, substance abuse, socioeconomic status, community violence, associations with deviant peers).
- Research on the gene \times environment contributions to the development of CAB is promising, particularly that from an epigenetic perspective which reveals how biological processes reciprocally influence and are influenced by adverse childhood experiences.

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Familial Influences on the Development of Serious Conduct Problems and Delinquency 13

Dustin A. Pardini, Rebecca Waller, and Samuel W. Hawes

Theoretical models and empirical research have consistently linked aspects of the family environment to the early emergence of conduct problems in childhood and serious delinquent behaviors during adolescence. Over the years, there has been significant variation across studies in the conceptualization and operational definitions of familial factors (Tolan, Dodge, & Rutter, 2013). This chapter is designed to provide a brief overview of studies that have linked aspects of family structure/functioning, caregiver characteristics, and parenting practices to the development of antisocial behavior in youth. Issues associated with the influence of childhood physical/sexual abuse and neglect on criminal behavior are addressed within a separate chapter (Kerig & Becker, 2015). A number of other family factors such as marriage/conjugalinity and parenthood are associated with desistance from antisocial behavior, which are also addressed in separate chapter (Kazemian, 2015). We conclude this chapter with a discussion of how research on the family environment has helped to inform the design of interventions aimed at preventing the early

emergence and persistence of antisocial behavior over time, and we outline some ongoing controversies and lingering questions that remain to be addressed in future research.

Key Family Factors Linked to Conduct Problems and Delinquency

This review of family factors will take a developmental criminology approach, consistent with the pioneering formulations outlined by Le Blanc and colleagues (Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990). Namely, we will focus on longitudinal studies that examine family factors as predictors of change in prodromal forms of delinquency (e.g., threatening others, rule-breaking) in childhood and more serious forms of delinquency (e.g., robbery, burglary, drug dealing) during adolescence. Other in-depth and more nuanced discussions of the role that family factors play in the development of conduct problems and delinquency can be found in several recent literature reviews and meta-analyses (Avinun & Knafo, 2014; Farrington, 2005; Hoeve et al., 2009; Hoeve et al., 2012; Tanner-Smith, Wilson, & Lipsey, 2013; Waller, Gardner, & Hyde, 2013).

Early Motherhood

Young maternal age at first childbirth has been consistently associated with a variety of

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maladaptive outcomes in children, including increased rates of conduct problems, of delinquency, and violence (Pogarsky, Lizotte, & Thornberry, 2003). Evidence also suggests that even subsequent offspring born to mothers who had their first child at a young age tend to be at increased risk for later problem behaviors and delinquent behaviors (Barnes & Morris, 2012; D'Onofrio et al., 2009; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Nagin, Pogarsky, & Farrington, 1997; Pogarsky et al., 2003; Tremblay et al., 2004). From a developmental perspective, early motherhood is often viewed as an "off-time" transition that interferes with women's ability to achieve important milestones (e.g., graduating high school), which can negatively impact later functioning (Pogarsky et al., 2003; Pogarsky, Thornberry, & Lizotte, 2006; Woodward, Fergusson, & Horwood, 2006). However, the precise nature of the association between early motherhood and later offspring delinquency is complicated by potential confounding and mediating processes, including increased family adversity, poor maternal education, poverty, maternal antisocial involvement, and maladaptive parenting (Jaffee et al., 2001; Pogarsky et al., 2003; Pogarsky et al., 2006). For example, several studies have suggested that ineffective parenting, low maternal education, and maternal drug use may, at least partially, account for the link between early age at childbirth and delinquency (Pogarsky et al., 2003; Pogarsky et al., 2006). Additional research suggests that the relationship between early motherhood and delinquent behaviors may be largely explained by the mother's history of antisocial behavior and her involvement with antisocial partners (Hagell, Rutter, & Giller, 1999). However, findings in this area are inconsistent and it remains unclear what factors may protect some children born to young mothers from developing delinquent behavior over time.

Family Size

Longitudinal studies have found that children and adolescents who live in overcrowded

homes with a large number of family members are at increased risk for exhibiting later delinquent behavior (Farrington & Loeber, 1999; Klovin, Miller, Fleeting, & Kolvin, 1988; Newson, Newson, & Adams, 1993). For example, one study found that boys who lived in a home with four or more siblings by the age of 10 were twice as likely to be convicted of a crime as a juvenile than those with fewer siblings (West & Farrington, 1973). However, the association between family size and juvenile delinquency may be accounted for by several mediating processes. Specifically, living in a large and crowded home may lead to increased frustration and familial conflict, which serves to facilitate subsequent engagement in delinquent behavior (Farrington et al., 2006). Children residing in larger families tend to be exposed to delinquent siblings who model and reinforce engagement in delinquent behaviors (Reiss & Farrington, 1991). It is also likely that parents caring for multiple children have a reduced capacity for engaging in consistent discipline and monitoring of their children's whereabouts. Although these potential mediating mechanisms seem plausible, prospective longitudinal studies directly examining the factors which best account for the association between family size and later delinquency still need to be conducted.

Single-Parent Households and Caretaker Transitions

It has been well established that children raised in single-parent households, as opposed to intact families, are more likely to engage in delinquent behavior (Henry, Caspi, Moffitt, & Silva, 1996; Henry, Hastings, & Freer, 1996; Klovin et al., 1988; Morash & Rucker, 1989), including serious violence (Henry, Caspi, et al., 1996). For example, one study found that 53 % of youth raised in households that experienced marital disruption prior to age 5 were charged with a criminal offense by the age of 33, compared to an offense rate of only 18 % among those raised in intact households (Klovin et al., 1988). Similarly, children who experience multiple caretaker

changes tend to have a host of adjustment problems, including increased levels of delinquency (Henry, Moffitt, Robins, Earls, & Silva, 1993; Loeber et al., 2005; Mednick, Baker, & Carothers, 1990). One large longitudinal investigation found that boys who experienced two or more caretaker changes prior to age 10 were 1.79 times more likely to engage in serious violence by young adulthood compared to boys who experienced fewer caretaker changes (Loeber et al., 2005). It has been posited that the association between instability in the caretaking environment and later delinquency may be due to disruptions in parent-child relationship, increased exposure to partner conflict, and emotional distress caused by moving houses/schools (Fergusson, Horwood, & Lynskey, 1992; McCord, 1982). However, the impact that multiple caretaker changes has on children's behavioral functioning may vary across development. For example, one study found that youth who experience multiple caretaker changes during adolescence (ages 13–18) were at higher risk for engaging in delinquent behavior than youth who experience a similar number of caretaker changes in early childhood (Herrenkohl, Herrenkohl, & Egolf, 2003).

Family Socioeconomic Status

Socioeconomic status (SES) is a multifaceted construct that encompasses factors such as level of income, receipt of financial public assistance, residential status (e.g., public housing, home ownership), level of education, and occupational standing. Several longitudinal studies have linked aspects of low SES (e.g., low family income, living in subsidized housing, low parental education) to the development of conduct problems (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Loeber, Green, Keenan, & Lahey, 1995; Magnuson & Votruba-Drzal, 2008; Velez, Johnson, & Cohen, 1989), especially serious delinquency (Bjerk, 2007; Elliott & Ageton, 1980). Importantly, studies have also found that the link between SES and youth antisocial behavior cannot be completely accounted for by

preexisting or time-constant confounds (e.g., low intelligence, family history of antisocial behavior). For example, one longitudinal study found that children displayed more conduct problems in years when their family income was lower than in years when their family income was higher (Dearing, McCartney, & Taylor, 2006). Furthermore, social service programs designed to increase parental income and employment have been found to reduce externalizing problems among youth residing within low SES families (Costello, Compton, Keeler, & Angold, 2003; Gennetian & Miller, 2002).

It is noteworthy, however, that children raised in low SES families are exposed to several other risk factors, which may account for their increased risk for engaging in serious conduct problems and delinquent behavior. For example, one study found that the association between low SES and childhood conduct problems was mediated by status-related socializing experiences, including exposure to harsh discipline, low maternal warmth, aggressive adult role models, family life stressors, peer group instability, and a lack of cognitive stimulation (Dodge, Pettit, & Bates, 1994). Other studies have reported that maladaptive parenting strategies and family stress may partially mediate the association between SES and the development of conduct problems (Conger, Ge, Elder, Lorenz, & Simons, 1994; Yeung, Linver, & Brooks-Gunn, 2002) and delinquent behavior (Larzelere & Patterson, 1990; McLoyd, 1998; Schonberg & Shaw, 2007; Tolan, Gorman-Smith, & Henry, 2004).

Familial Criminal and Antisocial Behavior

It is well recognized that criminal behavior appears to run in families. A large body of evidence exists from studies reporting that children raised by parents who have a history of criminal offending are more likely to exhibit serious delinquent behavior (Farrington, Barnes, & Lambert, 1996; Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001; McCord, 1979; Robins & Ratcliff, 1979). For example,

one study found that 63 % of male children who had a father convicted of a crime were themselves convicted offenders by young adulthood, compared to only 30 % among children without a convicted father (Farrington, 2003). Additionally, youth who have delinquent siblings have been found to be at increased risk for engaging in future antisocial behavior, particularly when the siblings are older and of the same sex (Farrington et al., 1996). Maternal antisocial behavior has also been linked to the development of serious conduct problems in youth, with some evidence suggesting that this effect may be mediated by increased levels of hostile parenting (Sellers et al., 2014). When parental criminal behavior results in incarceration it seems to have a particularly detrimental impact on children's behavioral functioning. For example, one study found that youth tend to escalate their delinquent behavior in the year following parental incarceration, which may be due in part to increases in maladaptive parenting by the non-incarcerated caregiver or heightened levels of deviant peer group affiliation (Murray, Loeber, & Pardini, 2012). However, it remains unclear the extent to which the familial transmission of criminal behavior is mediated by factors such as behavioral modeling, the reinforcement of deviant beliefs, stigma and labeling, dysfunctional parenting, or an inherited genetic predisposition for crime.

Maternal Depression and Stress

Children raised by mothers with elevated levels of depression and stress also tend to exhibit increased levels of conduct problems and delinquent behavior over time (Davies, Dumenci, & Windle, 1999; Hay, Pawlby, Angold, Harold, & Sharp, 2003; Loeber et al., 2005; Owens & Shaw, 2003). However, some evidence suggests that maternal depression tends to be more strongly associated with the development of conduct problems in childhood versus adolescence, potentially because it is a period of more intense parent-child contact (Marchand, Hock, & Widaman, 2002; Shaw et al., 1998). During adolescence, maternal depression may be more strongly related

to the development of delinquent behavior in girls as opposed to boys (Davies & Windle, 1997). Although the mechanisms underlying the association between maternal depression and youth problem behavior remain poorly understood, some evidence suggests that it may be accounted for by increased levels of parent-child conflict, hostile parenting, and marital conflict in the home (Conger, Patterson, & Ge, 1995; Cummings, Keller, & Davies, 2005; Davies et al., 1999; Lovejoy, Graczyk, O'Hare, & Neuman, 2000).

Parental Substance Abuse/Dependence

A family history of substance use disorders has been associated with the development of early-onset and persistent delinquent behavior (Blackson, Tarter, Martin, & Moss, 1994; Odgers et al., 2007) and substance use problems (Masten, Faden, Zucker, & Spear, 2008). For this reason, the presence of severe conduct problems among children who come from families with a high density of substance use disorders has been conceptualized as an intermediate phenotypic manifestation of a genetic risk for developing substance use disorders (Hill, Shen, Lowers, & Locke, 2000). In particular, children of an alcoholic parent may be particularly prone to follow an antisocial pathway to alcoholism (Hussong et al., 2007). Children raised by substance abusing parents also tend to be exposed to a host of different factors related to the development of delinquent behaviors, such as physical abuse and neglect, family conflict/violence, and dysfunctional parenting (Park & Schepp, 2014). However, some evidence suggests that high levels of parental monitoring and consistent discipline may help to protect children within alcoholic families from developing severe conduct problems over time (Molina, Donovan, & Belendiuk, 2010).

Parental Conflict and Family Cohesion

Families characterized by high levels of interparental conflict, particularly the tendency to

engage in arguments that involve verbal and physical aggression, tend to have children who engage in early conduct problems and chronic forms of delinquency (Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998; West & Farrington, 1973). Parental conflict may influence the development of antisocial behavior because it causes increased levels of family instability, parenting difficulties, and disrupted parent-child attachment (Almeida, Wethington, & Chandler, 1999; Davies, Harold, Goeke-Morey, & Cummings, 2002). In addition to parental conflict, a lack of family cohesion has been associated with the development of childhood conduct problems and aggression (Lindahl, 1998; Sturge-Apple, Davies, & Cummings, 2010). According to developmental models, increased family cohesion inhibits the development of delinquent behaviors by strengthening the child's commitment to engage in behaviors consistent with the prosocial norms and values of the family (Catalano & Hawkins, 1996).

Parenting Practices

One of the most extensively researched areas in developmental criminology involves the potential influence that parenting practices have on the emergence of child conduct problems and adolescent delinquency (Hoeve et al., 2009; Hoeve et al., 2012). The role of parenting practices in the development of delinquent behavior is of particular importance for "theory-driven" prevention and intervention efforts involving parent-training programs (Kazdin, 2001; Patterson, 2002). We will begin this section by reviewing some key theoretical models that have outlined how maladaptive parenting practices may lead to the early initiation and persistence of delinquent behavior over time.

Parenting and Developmental Models of Antisocial Behavior

One of the earliest and most influential models emphasizing the importance of parenting in the

development of serious conduct problems and delinquency is Patterson's coercion theory (Patterson, 1982; Patterson, Reid, & Dishion, 1992). A unique aspect of this framework is its focus on understanding the escalation and maintenance of antisocial behavior within the context of coercive parent-child interchanges in which both the parent and child are active participants. According to the model, children with an irritable and defiant temperament tend to cause unskilled parents to use increasingly harsh discipline techniques as a means of asserting behavioral control. These harsh parenting practices further escalate the child's aversive behaviors (e.g., hitting, physical attacks) rather than eliminate them, fostering an increasingly negative pattern of parent-child interactions. Over time, parents begin to withdraw from these aversive exchanges and children subsequently learn that requests can be avoided if they increase the intensity and/or duration of their negative behaviors. Once children who have developed these early negative behavior patterns enter elementary school, they typically begin to adopt the same hostile and coercive social interactions with teachers and peers. Further expansions and elaborations of this model have been developed over the years, but the core emphasis on an initial circular pattern of bidirectional negative interchanges between parents and children has remained (Eddy, Leve, & Fagot, 2001; Patterson, 2002; Snyder & Stoolmiller, 2002).

Moffitt's developmental taxonomy model is another influential framework that outlines a causal role of maladaptive parenting in the emergence of serious conduct problems. In contrast to coercion theory, this model proposes that divergent causal mechanisms (including parenting) influence the development childhood- versus adolescent-onset delinquency (Moffitt, 2006). Childhood-onset delinquency is believed to be driven in part by subtle neurological deficits in children (e.g., deficit inhibitory control, poor verbal abilities) that lead to difficulties managing peer conflicts, regulating emotions, and controlling impulses (Moffitt, 2006). These problems are further exacerbated by an increased exposure to parents who use harsh and

inconsistent discipline practices (Odgers et al., 2008). This parenting style is posited to further impede the acquisition of appropriate social skills and the internalization of rules for appropriate conduct. Over time, children with early-onset conduct problems are posited to accumulate a cascading array of additional risk factors (e.g., academic disengagement), which prevents them from making important life transitions (e.g., graduating) and entrenches them into a criminal lifestyle (Moffitt, 2006; Odgers et al., 2008).

The developmental taxonomy model asserts that a divergent set of etiological factors underlies the antisocial behavior of a larger group of youth who first begin exhibiting conduct problems and delinquency during adolescence. Specifically, adolescent-onset delinquency is believed to arise when rebellious teenagers are poorly monitored by their parents, leading them to begin affiliating with delinquent peers who model and reinforce deviant behaviors (Moffitt, 2006). While it was originally thought that most adolescent-onset delinquents would desist from their antisocial behavior during the transition into adulthood, a large body of evidence now suggests that a substantial proportion of these youth continue to exhibit delinquent behavior well into early adulthood (Odgers et al., 2008).

The importance of parenting and family factors is also emphasized within social control (Laub & Sampson, 2003) and social development (Catalano & Hawkins, 1996) models of delinquent behaviors. Both models suggest that patterns of prosocial and antisocial behavior in youth are primarily learned through interactions with socializing agents within the family, school, and community. The social development model in particular emphasizes the importance of family factors, such as perceived opportunities for involvement and engagement in prosocial family activities, parental reinforcement of prosocial behaviors and family involvement, and the establishment of clear and consistent rules for appropriate conduct both inside and outside the home. These factors are believed to facilitate a social bond between the child and family, which inhibits the development of deviant behaviors because children are invested in conforming to

the prosocial norms and values of the family. In contrast, children who fail to develop close bonds with prosocial family members or who become bonded to socializing agents within the family who model and reinforce antisocial behaviors are posited to be at increased risk for engaging in delinquency.

Research Linking Specific Parenting Practices to Later Delinquency

Successful parenting combines an array of specific skills and qualities that vary across age, social context, and cultural settings. However, models of parenting have consistently highlighted two broad dimensions: (1) aspects of parental support such as warmth and involvement and (2) aspects of parental control that involve monitoring and discipline (Baumrind, 1968). Within each of these dimensions, there are important variations in the implementation of specific parenting practices that are linked to the development of youth delinquency. Although a diverse and nuanced array of parenting factors have been associated with delinquent behavior in youth (Hoeve et al., 2009), below we overview a targeted set of parenting characteristics that have been consistently associated with the development of delinquent behavior.

Parental Attachment and Bonding

A strong and secure attachment between parent and infant is believed to serve as the foundation for successful socialization strategies that occur in later childhood (Kochanska et al., 2010). Although early attachment is typically indexed by an infant's level of distress and clinging behaviors upon separation and reunification with their caretaker, these behaviors are believed to be predominately influenced by the provision of comfort, responsiveness, and support by the child's primary caregiver (Bowlby, 1982). A lack of secure attachment is postulated to arise when a caregiver fails to consistently respond to an infant's needs in a nurturing manner. Prospective

longitudinal studies have found that insecure attachment during infancy is associated with the development of early-onset conduct problems in children (Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Hovee et al., 2012). Further, although the association between attachment insecurity and adolescent delinquency tends to be less robust (Hovee et al., 2012), high rates of insecure and disorganized attachment are often found among detained adolescents (Van IJzendoorn, 1997; Zegers, Schuengel, Van IJzendoorn, & Janssens, 2008).

There is also emerging evidence that parent-child attachment may moderate the association between specific parenting practices and the development of problem behavior in children. Specifically, children who are securely attached to their caregiver may be buffered from experiencing increases in conduct problems if exposed to low-quality or maladaptive parenting practices (Cyr, Pasalich, McMahon, & Spieker, 2013; Kochanska, Barry, Stellern, & O'Bleness, 2009; NICHD Early Care Research Network, 2006). In addition, parent-child emotional attachment seems to be particularly important for fostering the development of the affective features of conscience, including feelings of guilt and remorse and empathetic concern for others (Aksan & Kochanska, 2005). For this reason, it has been postulated that disrupted parent-child attachment may be particularly important for understanding the development of persistent delinquent behavior among youth exhibiting callous-unemotional (CU) traits (Dadds et al., 2013; Hyde, Waller, & Burt, 2014; Pasalich, Dadds, Hawes, & Brennan, 2012).

Parental Warmth and Positive Reinforcement

Beyond attachment, other aspects of positive parenting in later childhood have been linked to the development of antisocial behavior in youth, including displays of affection and positive reinforcement of prosocial behaviors (Hovee et al., 2009). One of the earliest longitudinal studies in this area found that children raised by nurturing

mothers were less likely to be convicted of a crime in adulthood compared to youth raised by cold and dismissive mothers (McCord, 1979). More recent studies have found that high levels of parental warmth and shared parent-child activities are associated with fewer conduct problems in early childhood (Gardner, Burton, & Klimes, 2006; Gardner, Ward, Burton, & Wilson, 2003) and adolescence (Steinberg & Silk, 2002). Parental affection and praise in response to positive child behaviors have also been associated with reductions in conduct problems among boys during childhood and adolescence (Pardini, Fite, & Burke, 2008). Together, these findings are consistent with a recent meta-analysis of parenting studies indicating that there is a modest, yet statistically significant association between low positive parenting practices and delinquent behavior in youth (Hovee et al., 2009).

Similar to studies on parent-child attachment, evidence suggests that the lack of an affectionate and warm parent-child relationship may be particularly important for understanding the development of delinquent behavior among youth exhibiting CU traits (Kochanska, Kim, Boldt, & Yoon, 2013; Pasalich, Dadds, Hawes, & Brennan, 2011). For example, children exposed to low levels of parent warmth and involvement tend to exhibit increases in CU traits over time (Hawes, Dadds, Frost, & Hasking, 2011; Waller et al., *in press*). In contrast, high levels of parental warmth were found to protect young girls with CU traits from exhibiting persistent conduct problems (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011). As a result of these findings, researchers have begun adapting parent-training interventions for children exhibiting conduct problems and CU traits so they focus more intensely on increasing parental displays of affection and the use of positive reinforcement in response to prosocial behaviors (Dadds et al., 2014; Kimonis, Pardini, Pasalich, & McMahon, 2014).

Harsh and Rejecting Parenting

Harsh and rejecting parenting comprises hostile, negative, and punitive responses to child

noncompliance, as well as high levels of parental criticism. A recent meta-analysis of longitudinal studies found that harsh, hostile, and rejecting parenting practices were one of the most robust predictors of youth delinquent behavior (Tanner-Smith et al., 2013). Developmentally, harsh parenting practices may have more adverse effects on behavioral adjustment when experienced in middle childhood versus adolescence (Pardini et al., 2008; Tanner-Smith et al., 2013). Although there has also been some suggestion that harsh physical punishment may not be as strongly associated with the development of conduct problems and delinquent behavior in African-American versus Caucasian youth (Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004), other studies have reported the opposite finding (Fite, Wynn, & Pardini, 2009; Pardini et al., 2008). These inconsistencies are likely due in part to difficulties delineating whether physical punishment is being used in a punitive, uncontrolled, or abusive manner. Moreover, there is increasing evidence that genetic factors may serve to moderate the impact that harsh parenting has on delinquent behavior, particularly among males (Byrd & Manuck, 2014).

Inconsistent, Lax, and Timid Discipline

Evidence suggests that the inconsistent enforcement of rules tends to lead to an escalation in conduct problems both inside and outside of the home during childhood and adolescence (Hoeve et al., 2009; Pardini et al., 2008). Inconsistent discipline is theorized to have a relatively direct influence on delinquent behavior, as youth who do not experience consistent negative consequences for rule-breaking have little motivation to refrain from engaging in such behavior. In some cases, parents may be reluctant to discipline their child for misbehavior because of concerns that it will result in a hostile response, which serves to further reinforce and escalate their child's conduct problems (Pardini et al., 2008). There is some longitudinal evidence to suggest that the youth exposed to inconsistent discipline are more likely to develop attitudes

favoring delinquency, which increases their risk for exhibiting antisocial behavior during adolescence (Halgunseth, Perkins, Lippold, & Nix, 2013).

Parental Control, Supervision, and Monitoring

Parental control and supervision refer to behaviors that allow parents to monitor and structure their child's environment, including vigilance and awareness of the child's needs or behavior and the strategies a parent employs to manage their child's behavior. In early childhood, parental control is confined to the home environment and incorporates parental scaffolding, structuring of the child's activities, engagement with the child, and contingent responding to positive and negative behavior (Dishion et al., 2008; Forgatch, Bullock, Patterson, & Steiner, 2004). A large body of literature supports the notion that effective control strategies by parents early in a child's life are related to the development of fewer behavior problems later in childhood (Gardner, Sonuga-Barke, & Sayal, 1999; Mize & Pettit, 1997). High levels of involvement in structuring and monitoring children's activities at home and school have also been associated with lower rates of later delinquency (Parker & Benson, 2004; Wright & Cullen, 2001).

In adolescence, the job of control and supervision by parents becomes more challenging as youth gain increasing freedom and begin spending more time with peers outside of home and school. Meta-analytic evidence suggests that during this developmental period, poor parental monitoring of youths' activities and whereabouts is one of strongest predictors of delinquent behavior (Hoeve et al., 2009; Stouthamer-Loeber, 1986). In particular, it has been proposed that high levels of parental monitoring reduce the likelihood of delinquency by preventing youth from affiliating with deviant peers who may model and reinforce antisocial behavior (Dishion & McMahon, 1998). In recent years there has been an increased focus on examining

more nuanced facets of parental monitoring, including (1) the extent to which parents actively solicit information about their child's activities, peers, and whereabouts, (2) the amount of information the child spontaneously discloses about these issues, and (3) the extent to which parents have accurate knowledge about their child's activities and associates outside the home (Kerr & Stattin, 2000; Laird, Marrero, Melching, & Kuhn, 2013). Although parental solicitation has been associated with lower levels of delinquency in adolescence (Hoeve et al., 2009), this effect seems to be mediated through parental knowledge (Fletcher, Steinberg, & Williams-Wheeler, 2004). Moreover, parental knowledge appears to be more strongly influenced by the level of adolescent disclosure than by parents' active attempts to solicit information (Kerr & Stattin, 2000). For this reason, it has been suggested that aspects of parental control may be more important than solicitation in reducing delinquent behavior, including requiring youth to obtain permission before going out with specific peers, ensuring that activities outside of the home are sufficiently monitored by other adults, and regulating attendance at events that involve risky environments (Fletcher, Steinberg, & Williams-Wheeler, 2004; Kerr & Stattin, 2000).

Family Factors and Delinquency Prevention/Intervention Programs

Over the past several decades, the aforementioned research on family factors has had a significant impact on the design of interventions aimed at preventing the emergence and persistence of antisocial behavior in youth. For example, several early prevention programs have been explicitly designed to target families exhibiting risk factors for child delinquency, including first-time mothers, low-income families, and children living with a substance abusing parents (Dishion et al., 2008; Webster-Stratton & Taylor, 2001). Additionally, nearly all programs designed to prevent or reduce delinquent behavior in youth include a parent management training component. These programs typically focus on

increasing parents' use of positive reinforcement, warmth/involvement, effective discipline, and proactive monitoring, while reducing their use of harsh and inconsistent discipline (Dishion et al., 2008; Forgatch et al., 2004). Because parenting programs target a wide variety of parenting behaviors, it remains unclear what parenting factors are most important for facilitating positive behavioral changes in youth, including whether intervention targets should change based on the age and level of problem behavior in the child (Forehand, Jones, & Parent, 2013). Similarly, the effectiveness of parent-training programs may be improved through more individualized treatment planning. For example, treatments focused primarily on enhancing parental warmth, affection, and the use of positive reinforcement may be particularly important for changing the behavior of conduct problem children exhibiting CU traits (Hyde et al., 2014; Kimonis et al., 2014).

Lingering Questions and Controversies

Over the past several decades, considerable advances have been made in understanding the relative influence that various aspects of family structure and functioning have on the development of delinquent behavior. However, a series of key issues remain to be addressed in order to resolve lingering questions and controversies within the field. Below we briefly outline a few of these challenges and provide some suggestions for fruitful areas in need of further study.

Genetic versus Environmental Influences

Perhaps one of the greatest challenges is determining to what extent associations between family factors and delinquency are due to environmental influences versus gene-environment correlations (Belsky, 1984). Gene-environment correlations occur when a child's

genetically influenced behavioral characteristics (e.g., conduct problems, delinquency) are associated with aspects of the environment (e.g., parental antisocial behavior, harsh parenting) either through passive or evocative genetic mechanisms (see Beaver, Schwartz, & Gajos, 2015). Passive gene-environment correlations arise because biological parents pass on genotypes to their children and provide environments that are correlated with their genotypes. For example, parental use of harsh discipline may be a marker for a genetic susceptibility for antisocial behavior that is passed on to children, rather than a direct causal mechanism associated with youth problem behavior. In contrast, active gene-environment correlations occur when a child's heritable behavior evokes a certain environmental response. For example, children with a genetic propensity to engage in delinquent behavior may be particularly difficult to manage and thus be more likely to elicit harsh discipline practices from their caretakers over time. In both cases, what appears to be an environmental influence on the child's behavior may actually be the result of an inherited genetic predisposition in the child (D'Onofrio, Rathouz & Lahey, 2011).

Biometric analysis using twins and adoption studies have provided important insights into the potential confounding effect of genetic heritability when examining putative causal associations between familial factors and delinquency. It is well established that antisocial behavior in children and adolescents is influenced by genetic factors, with a recent meta-analysis of 51 studies indicating that approximately 41 % of the variability in antisocial behavior can be accounted for by genetic factors, with nonshared and shared environmental influences accounting for 43 % and 16 % of the variance, respectively (Rhee & Waldman, 2002). Although twin studies suggest that at least a portion of the association between various family factors (e.g., negative parental discipline, parental separation, parent-child conflict) and youth antisocial behavior is attributable to environmental factors, the overall magnitude of this environmental effect is typically small (Burt, 2009; Burt, McGue, Krueger,

& Iacono, 2005; Viding, Fontaine, Oliver, & Plomin, 2009). More complex twin analyses have begun to indicate that the parenting environment may moderate the influence that genetic factors have on youth antisocial behavior. For example, one recent study found that shared environmental influences on childhood conduct problems were stronger when in families where mothers were cold and disengaged, whereas genetic factors became more influential when children were from a warm and involved child rearing environment (Burt, Ashlea, Michael, & Kelly, 2013). This suggests that genetic influences on conduct problems may be more pronounced in low-risk family environments, whereas environmental influences become more influential for children raised in negative family environments. However, it is important to note that evidence of high heritability in twin studies does not mean the targeted behavior is unaffected by environmental factors or cannot be modified by changing the environment, and some have cautioned that methodological factors can lead to overestimates of heritability in twin studies (Maccoby, 2000).

Reciprocal Parent-Child Influences

Consistent with the notion of child-driven evocative effects, future studies on family factors need to be more sensitive to the bidirectional nature of the parent-child relationship (Pardini, 2008). In a now classic review paper, Bell (1968) challenged the common interpretation that cross-sectional correlations between parenting and child behavior are indicative of parents affecting the development of children over time. Instead, he presented a series of empirically supported arguments indicating that these findings could be reinterpreted as indicating that congenital factors in children influenced parenting behaviors over time, consistent with a transactional model of understanding development (Sameroff, 2009). Unfortunately, many studies continue to conceptualize the parent-child relationship as primarily unidirectional, focusing solely on parenting as a predictor of later conduct

problems and antisocial behavior. Those longitudinal studies that have focused on the bidirectional nature of the parent-child relationship generally find that the association between youth antisocial behavior and changes in parenting is as strong as (if not stronger than) the influence that parenting has on changes in antisocial behavior (Pardini, 2008). Specifically, youth who exhibit antisocial behavior tend to have parents who show subsequent increases in harsh punishment, negativity, and timid discipline, as well as decreasing levels of involvement, monitoring, and positive reinforcement (Avinun & Knafo, 2014; Pardini, 2008; Verhoeven, Junger, van Aken, Deković, & van Aken, 2010). These studies highlight the importance of examining how children may shape their environments in ways that promote the development of delinquency.

Differential Responses to Parenting Practices

Relatively little research has examined what factors may mitigate the extent to which various aspects of the family environment influence the development of conduct problems and delinquency. For example, it is unclear whether certain parenting factors exert a greater influence on youth behavior at certain points in development. Longitudinal studies that have repeatedly assessed youth from childhood through adolescence are ideal for this purpose. One such investigation found that harsh physical discipline was more robustly associated with the development of conduct problems in childhood versus adolescence, whereas parental knowledge of youth activities outside the home was most important during early adolescence (Pardini et al., 2008). In addition, it will be important for future studies to examine whether certain children are more sensitive to the socializing influence of various parenting practices than others. For example, children with CU traits appear to be relatively unaffected by punishment (Haas et al., 2011; Pardini & Byrd, 2012; Pardini, Lochman, & Frick, 2003), but they may be protected from

exhibiting chronic conduct problems if exposed to warm and affectionate parenting (Kroneman et al., 2011; Pasalich et al., 2011). Another particularly understudied area is the potential moderating impact the gender may have on linkages between family factors and delinquent behavior (Zahn et al., 2010). In sum, future studies examining the association between family factors and delinquent behavior should further examine issues associated with susceptibility and resilience across different periods of development.

Examining Putative Mediating Mechanisms

Several of the familial factors outlined in this chapter are unlikely to have a direct causal effect on children's antisocial behavior, making it important for longitudinal studies to further examine potential mediating processes. For example, it remains unclear why young maternal age at first birth is associated with the development of delinquent behavior for all subsequent offspring. Similar issues regarding the influence that various parenting practices have on children's antisocial behavior remain to be examined. Along these lines, it is unclear whether parental regulation and monitoring of children's behavior leads to lower levels of delinquent behavior due to a reduction in the likelihood that children will affiliate with deviant peers. It will be important for future studies to examine these issues within the context of longitudinal designs to convincingly demonstrate the temporal ordering of these processes.

Severity, Type, and Pattern of Delinquent Behavior

The antisocial outcomes examined across studies focused on family influences are quite variable. Many combine disparate types of delinquent behaviors (as well as illegal and non-illegal behaviors) into a single construct, which may obscure unique associations between familial factors and different aspects of antisocial

behavior. Relatedly, the development of antisocial behavior tends to follow a fairly systematic progression, starting with less serious forms of conduct problems (e.g., threatening, hitting) in childhood that escalate into more serious delinquency (e.g., robbery, shootings) during adolescence (Le Blanc & Loeber, 1998). However, it remains unclear whether certain family factors are more important in determining who begins engaging in early conduct problems, whereas others are more strongly associated with the progression to more serious crime. It will also be important for future studies to examine the extent to which family factors play a significant role in the process of desistance from delinquent behavior over time (Kazemian, 2015). Although randomized clinical control trials evaluating the effectiveness of programs such as Multidimensional Treatment Foster Care and Multisystemic Therapy suggest that bolstering parental monitoring and effective family management practices can reduce ongoing delinquent behavior (Henggeler & Sheidow, 2011), longitudinal studies suggest that family factors may not substantively influence desistance from crime (Loeber, Farrington, Stouthamer-Loeber, & White, 2008). In sum, the field must follow recommendations outlined by Le Blanc and colleagues and adopt a developmental criminology approach that seeks to better understand familial factors that influence the initiation, escalation, and eventual desistance from specific types of offending, with a particular focus on understanding within-individual change across specific developmental periods (Le Blanc & Loeber, 1993, 1998).

Measurement of Parenting Practices

A number of measurement issues remain to be addressed in order to advance our understanding of how parenting practices may influence delinquent behavior. For example, many studies continue to aggregate multiple related, yet distinct aspects of parenting into a single construct, and operational definitions of specific parenting practices (e.g., harsh punishment) vary substantially across studies (Hoeve et al., 2009). This

aggregation makes it difficult to determine which facets of parenting are most robustly associated with the development of delinquent behavior in youth. It also remains unclear what the best method is for assessing parenting practices in childhood and adolescence. A recent meta-analysis examining the association between parenting and delinquency found that 69 % of studies in the area used child-report measures to assess parenting, 16 % used parent-report measures, and only 3 % used observational methods (Hoeve, Blaauw, van Marle, & Sheridan, 2002). Overall, those studies that used child-report measures to assess harsh and controlling discipline practices tended to find stronger associations with delinquency than studies that used parent-report measures (Hoeve et al., 2002). A review of twin studies focusing on parenting also found significant informant effects, with environmental contributions tending to be stronger in studies that assessed parenting using behavioral observations rather than parent-report measures (Avinun & Knafo, 2014). Taken together, these findings are important because it is yet to be established what constitutes the most reliable and valid method of assessing parenting, and how discrepancies between methods are related to behavioral outcomes (Laird & De Los Reyes, 2013).

Another limitation in the literature is that the assessment of parenting is typically confined to the primary caretaker in the home, which is most often the biological mother. As a result, we know very little about the influence that fathers' parenting has on children's delinquency. Studies that have explicitly examined the influence of father's parenting on children's behavior have produced inconsistent results. For example, some studies suggest that poor paternal support is more strongly linked to delinquent behavior in boys than maternal support (Hoeve et al., 2009). However, others have found that effective maternal parenting is more robustly associated with the development of serious conduct problems in adolescent boys than paternal parenting, with the opposite effect being observed for adolescent girls (Trudeau, Mason, Randall, Spoth, & Ralston, 2012). In general, it will be important

for future studies to routinely collect information on parenting practices exhibited by both male and female caretakers in the home using multiple informants and methods (Harvey, Fischer, Weieneth, Hurwitz, & Sayer, 2013).

Conclusion

Over the past several decades, considerable advances have been made in delineating the influence that various aspects of the family environment may have on the development of antisocial behavior from childhood into young adulthood. This burgeoning area of research has been supported by the maturation of several large and comprehensive longitudinal studies conducted within the United States and elsewhere that have followed families from childhood well into adulthood, including those using genetically informed twin designs. These studies represent invaluable resources to further advance the field of developmental criminology, particularly as it relates to familial influences on the early initiation, escalation, and desistance from criminal behavior across time. Further exploitation of these rich datasets should provide exciting and novel insights into the dynamic interplay between aspects of the family environment and youth antisocial behavior. As recently noted by Le Blanc (Le Blanc, 2012), there remains “a large gap between the perception of the complexities of these interactions, their discursive statements, the operational models describing them, and the results of the empirical test of these models” (pp. 130). The challenge for the next generation of developmental criminologists will be to leverage existing longitudinal data to facilitate the formulation of new developmental models and longitudinal studies that are better suited to elucidate these complex and dynamic processes in greater detail than ever before.

Summary

- Family factors linked to the development of delinquency among youth include young

maternal age at first childbirth, overcrowding, single-parent households, and low family socioeconomic status (e.g., low income, living in subsidized housing, and low parental education).

- Evidence has also linked parental characteristics to antisocial youth outcomes, including parental criminality, antisocial behavior, depression, substance use/dependence, and high level of inter-parental conflict involving both verbal and physical aggression.
- Theoretical models and empirical evidence have consistently linked parenting practices to the development of youth antisocial behavior including harsh and rejecting parenting, inconsistent discipline, poor monitoring and control, low levels of warmth and positive reinforcement, and a lack of parental bonding or insecure attachment.
- Longitudinal studies on family factors have helped to foster the development of effective universal prevention and indicated intervention programs designed to reduce delinquent behavior in youth by modifying aspects of the family environment and parenting practices.
- It is important for longitudinal studies to consider the influence that genetics, reciprocal parent-child influences, and developmental timing have on linkages between family factors and delinquency initiation, escalation, and persistence.

Future Research Needs

- Longitudinal twin studies are needed to examine whether linkages between parenting and delinquent behavior are attributable to passive or evocative genetic effects across different developmental periods, and determine whether aspects of the family environment moderate the association between genetic factors and youth antisocial behavior.
- There is a need to develop and evaluate individualized interventions designed to modify specific parenting behaviors believed to underlie the development of antisocial

behavior in specific subgroups of antisocial youth (i.e., those with high callous-unemotional traits).

- Studies that use techniques such as ecological momentary assessment are needed to better understand the micro-level temporal dynamics of reciprocal parent-child interaction patterns that may influence the early emergence and persistence of conduct problems.
- Longitudinal studies should examine the mediating mechanisms through which family/parental factors influence youth antisocial behavior, as well as the factors that may protect youth from high-risk family environments from developing delinquent behavior.
- Future prospective longitudinal studies should collect information on parenting practices exhibited by both male and female caretakers in the home using multiple informants (e.g., self-report, child-report) and methods (e.g., rating scales, behavioral observations).

Recommended Readings

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Peers and Delinquency: A Genetically Informed, Developmentally Sensitive Perspective

14

Frank Vitaro, Mara Brendgen, and Eric Lacourse

In addition to the family, peers play a major role in youngsters' development. They provide a crucial context for the acquisition of new social skills, the validation of the self-concept, and the learning of social roles and norms (Vitaro, Boivin, & Bukowski, 2009). Not all peer relationships are positive, however, and they can sometimes be a significant source of concern for caregivers such as parents and educators. This is notably the case when youngsters affiliate with deviant peers. Deviant peer affiliation (DPA) has sometimes been referred to as the proportion of friends or peers involved in disruptive or delinquent activities such as aggression and violence, theft, or substance use. Most often, however, DPA refers to friends' or close peers' involvement in disruptive or delinquent activities, as assessed by the participants themselves, the friends/close peers, or a third source (e.g.,

parents). Apart from youngsters' own early disruptive behaviors such as aggressiveness and rule breaking, DPA has been shown to be one of the strongest predictors of delinquent behavior in children and adolescents (Boivin, Vitaro, & Poulin, 2005; Dishion & Patterson, 2006; Lacourse, Nagin, Tremblay, Vitaro, & Claes, 2003).

Three explanations for the association between DPA and children's or adolescents' delinquent behavior have been debated for the past three decades (see Vitaro, Tremblay, & Bukowski, 2001 for a detailed overview). According to one perspective, the (predictive) association between DPA and delinquent behavior does not necessarily indicate a causal influence of one on the other, but is instead explained by one or more other underlying factors. That is, the same (genetic or environmental) factors that lead to a child's or an adolescent's delinquent behavior also contribute to DPA (Gottfredson & Hirschi, 1990). This viewpoint is compatible with a *Selection model* whereby disruptive children or delinquent adolescents affiliate with each other by virtue of the similarities in their behavioral dispositions (Beaver, Ratchford, & Ferguson, 2009; Kendler, Schmitt, Aggen, & Prescott, 2008; Lacourse et al., 2006). An alternative perspective proposes that DPA truly contributes to the development of delinquent behavior in youth even when possible selection processes and other risk factors are controlled. This explanation is compatible with a *Social influence* (i.e., socialization) model (Elliott,

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Huizinga, & Ageton, 1985; Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993). Finally, the *Social interactional* perspective (also referred to as the Social enhancement model) views DPA not so much as an independent contributor to delinquent behavior, but rather as influencing delinquent behavior in interaction with personal characteristics (Lacourse et al., 2003; Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997). According to this perspective, deviant friends are not necessary for disruptive children to become delinquent, but early disruptiveness is even more likely to develop into delinquency later on for those who do affiliate with delinquent peers.

The goal of this chapter is to contribute to the ongoing debate between the three models from a perspective that is both genetically informed and developmentally sensitive (for a general discussion about the benefits of a genetically sensitive design, see Bates & Lewis, 2012; as for the benefits of a developmental perspective, see Le Blanc & Loeber, 1998). Whenever possible, a distinction is made between *overt* (i.e., personal violence, aggression) and *covert* (i.e., vandalism or destruction of property, theft, lying, cheating, rule-breaking behavior) delinquent behavior. The two types of delinquent behavior are partly independent from each other and they are associated with partly different risk factors (Barker et al., 2011; Burt, 2009; Lacourse et al., 2010). The relative role of genetic and environmental influences is also different for the two types of delinquent behavior. Overt delinquent behavior is highly heritable and the genetic factors contributing to its development are first expressed during early-to-middle childhood (Lacourse et al., 2014; Niv, Tuvblad, Raine, & Baker, 2013; van Beijsterveldt, Bartels, Hudziak, & Boomsma, 2003). In contrast, environmental influences are more salient on covert delinquent behavior, despite a steady increase of genetic influences from childhood to adolescence (Burt & Klump, 2009). In consequence, some of the processes that underlie the role of DPA and its interplay with genetic or environmental influences on delinquent behavior may vary depending on

the type of delinquent behavior considered (i.e., overt vs. covert) or the developmental period under investigation (i.e., childhood vs. adolescence).

The Usefulness of a Genetically Informed Perspective

The vast majority of empirical evidence for genetic effects on delinquent behavior comes from *quantitative genetic studies* (which are also often termed behavioral genetic studies) (see Beaver, Schwartz, & Gajos, 2015). In contrast to *molecular genetic studies*, which attempt to identify specific genes related to a phenotype such as delinquent behavior, quantitative genetic studies do not explicitly measure specific genes and many do not even include any specific measures of environmental influence. Instead, quantitative genetic studies statistically infer the relative strength of genetic and environmental influences on a phenotype by examining the similarity of family members with varying degrees of genetic relatedness in regard to that behavior in a specific population. This can be accomplished using a variety of research designs, such as through the comparison of adopted and biological siblings or the comparison of identical (i.e., monozygotic, MZ) and fraternal (i.e., dizygotic, DZ) twin pairs. In the case of the classical twin design, the genetic and environmental variance associated with a given phenotype (i.e., overt or covert delinquency; DPA) is decomposed by comparing the within-pair similarity of MZ twins, who share 100 % of their genes and who are raised together, to the within-pair similarity of same-sex DZ twins, who are also raised together but only share on average 50 % of their genes. The underlying assumption of all quantitative genetic designs is that interindividual differences in a phenotype can be decomposed into three different sources of variance: *additive (or nonadditive) genetic factors*, *shared environmental factors*, and *nonshared environmental factors*. In the classical twin design, *genetic* influences are indicated when the phenotypic similarity (i.e., correlation)

of MZ twin pairs is greater than the phenotypic similarity of DZ twin pairs. Shared environment refers to environmental factors—both inside and outside of the family—that siblings are jointly exposed to and that make them similar to each other (e.g., neighborhood crime level, family SES, parental mental health problems). *Shared environmental* influences are indicated when MZ pairs as well as DZ twin pairs are similar to each other and, in addition, the degree of similarity among DZ twins is comparable to that of MZ twins. Nonshared environmental factors refer to experiences within the family or outside the family that make siblings different from each other. *Nonshared environmental* influences are indicated by the extent to which MZ twins, who are genetically identical and are raised in the same family, are different from each other (i.e., the degree to which the MZ correlation is less than 1). Nonshared environmental experiences can come from within the family, such as differential treatment by parents (Conger & Conger, 1994; Dunn, Stocker, & Plomin, 1990; McHale, Crouter, McGuire, & Updegraff, 1995). However, the most important nonshared environmental influences are likely those experienced outside the family (Dunn & Plomin, 1990). Such outside-of-the-family experiences, of course, refer to peers and friends as many children, including MZ twins, do not affiliate with the same friends as their sibling (Pike & Atzabaporia, 2003; Rose, 2002; Thorpe & Gardner, 2006). Hence, depending on whether DPA is shared or not shared by the twins of the same pair, it could be part of the shared or nonshared environmental factors affecting delinquent behavior, in line with the Social Influence Model.

Findings from quantitative genetic studies suggest that between 40 and 60 % of the variance of overt or covert delinquent behavior is influenced by genetic factors; the remaining variation is influenced by nonshared and, to a much lesser degree, by shared environmental factors (Harris, 1995; Moffitt, 2005; Rhee & Waldman, 2002; Tuvblad & Baker, 2011; Viding, Larsson, & Jones, 2008). Although quantitative genetic designs are typically used to estimate heritable

and environmental influences on traits or behaviors, such as delinquent behavior, this type of analysis can be extended to any measured variable, including aspects of the environment such as DPA. It thus becomes possible to test whether, in line with the Social Selection Model, the same underlying genetic disposition that leads to delinquent behavior also leads to DPA. Such a phenomenon, where environmental experiences are influenced by individuals' genetic disposition for certain traits or behaviors, is called *gene–environment correlation*, or *rGE*.

Testing the Social Influence and the Selection Models Through Gene–Environment Correlation: Evidence from Quantitative Genetic Studies

Several quantitative genetic studies have found significant genetic influences on youngsters' propensity to affiliate with delinquent or aggressive peers (Baker & Daniels, 1990; Beaver et al., 2009; Beaver, DeLisi, Wright, & Vaughn, 2009; Button et al., 2007; Cleveland, Wiebe, & Rowe, 2005; Kendler, Jacobson, Myers, & Eaves, 2008; Manke, McGuire, Reiss, Hetherington, & Plomin, 1995; Rose, 2002; Rowe & Osgood, 1984; Tarantino et al., 2014). In these studies, between 20 and 40 % of the variance in DPA is explained by genetic factors. Interestingly, all of the previously mentioned studies that found genetic effects on DPA used adolescent samples. In contrast, studies using samples of children or preadolescents often found no or very weak genetic effects and instead a moderate contribution of shared environmental factors and a large contribution of nonshared environmental factors. For example, a study of 12-year-old Finnish male twins (Rose, 2002) showed that participants' genetic makeup was not related to their friends' externalizing—or, for that matter, internalizing—problems, and only weak and inconsistent genetic effects were found for girls. An even clearer lack of genetic effects on DPA for both boys and girls was found in a study of

even younger identical and fraternal twins (mean age = 10 years) based on teacher ratings and direct observational assessments of children's and their close friends' antisocial behaviors (Bullock, Deater-Deckard, & Leve, 2006). And, finally, the same picture emerged in data drawn from the Quebec Newborn Twin Study (QNST), a longitudinal sample of identical and fraternal twins for whom friendship nominations were obtained over multiple time points. In kindergarten, teacher and peer ratings of physical aggression were obtained for each twin child and his or her nominated best friends in the classroom (van Lier et al., 2007). As in other studies (DiLalla, 2002), children's own physical aggression was highly heritable. In contrast, their friends' physical aggression was unrelated to children's genetic makeup. A lack of genetic effect was also found in a follow-up study in grade 1, not only with respect to children's affiliation with physically aggressive friends, but also with respect to their affiliation with socially aggressive friends (Brendgen et al., 2008). Overall, existing empirical evidence from different studies thus suggests that, whereas friends' characteristics are unrelated to individuals' genetic disposition in younger children and preadolescents, rGE seems to emerge in early-to-mid adolescence and increase thereafter.

Some evidence for such an emerging rGE with respect to DPA comes from a retrospective study with a sample of 373 adult male twins. Specifically, Kendler and his colleagues (2007) found that genetic effects on DPA (measured as the proportion of respondents' friends who engaged in specific delinquent behaviors) increased substantially and steadily across five age periods: 8–11, 12–14, 15–17, 18–21, and 22–25. In contrast, the effects of shared environmental influences on DPA while substantial at age 8–11 decreased over the first 3 age periods before increasing again moderately at ages 18–21 and 22–25. Using a prospective longitudinal design, Tarantino et al. (2014) also found that genetic influences steadily increase from age 15 to age 21.

Overlap Between the Genetic Factors Influencing DPA and Delinquent Behavior

The finding of genetic influences on DPA suggests that youngsters' deviant friendship choices are at least in part influenced by heritable characteristics, which, in turn, is consistent with the Selection Model. Even clearer support for the Selection Model comes from findings that a significant portion of these genetic influences on DPA comes from genetic factors related to delinquent behavior or similar behaviors such as substance use (Boisvert, Boutwell, Vaske, & Newsome, 2014; Button et al., 2007; Harden, Hill, Turkheimer, & Emery, 2008; Rowe & Osgood, 1984). To illustrate, Boisvert et al. (2014) used the twin and full-sibling subsample from the National Longitudinal Study of Adolescent Health (Add Health) to show that common genes explain more than 70 % of the moderately high covariation between DPA and delinquency in adolescence, with the remaining covariation explained by common nonshared environmental factors operating on both variables. These results are similar to those reported by Button et al. (2007) showing that 86 % of the correlation between DPA and antisocial behavior was due to common genetic factors, with common nonshared environmental factors explaining the rest. Again, however, these findings are typically based on adolescent samples. There is one study, however, that examined this issue over the course of three developmental periods (i.e., late childhood: ages 8–11; early adolescence: ages 12–14 years; middle-to-late adolescence: ages 15–18 years) (Kendler, Schmitt et al., 2008). This study used a retrospective design and is based on the same sample of 373 participants described earlier in reference to the Kendler et al. (2007) study. The results showed that the same genetic factors that influenced delinquent behavior at each developmental period also influenced concurrent DPA as well as increases in DPA from one period to the next. The overall strength of

these gene–environment correlations was considerably greater in mid-to-late adolescence than in late childhood. In addition to common underlying genetic factors explaining both delinquent behavior and DPA, Kendler and his colleagues also found evidence of shared environmental factors that influenced both delinquent behavior and DPA. Since shared environmental experiences could include exposure to similar friends or the same friends at school or in the neighborhood, this result could reflect a direct effect of DPA. It could also reflect the impact of family processes such as a lack of monitoring or joint family activities, which in turn may lead to exposure to deviant friends. It is noteworthy that these shared environmental influences common to both delinquent behavior and DPA were observed only during late childhood and early adolescence, but not during middle-to-late adolescence.

Together, these findings support the notion that rGE involving DPA is less likely (or at least less strong) during childhood than during adolescence. This developmental perspective is, in turn, concordant with the notion proposed by Dishion, Patterson, and Griesler (1994) that, over the course of childhood and into adolescence, youngsters progressively select—and are selected by—friends who share and positively reinforce their own values to the exclusion of others. If indeed DPA in adolescence results from rGE, then the association between DPA and delinquent behavior in adolescence may not reflect an environmental influence of DPA on delinquent behavior during that developmental period (see also Jaffee & Price, 2007 for a similar suggestion). In contrast, the association between DPA and delinquent behavior in childhood may reflect a true environmental influence because the association between DPA and delinquent behavior is only partly, if at all, explained by common underlying genetic factors. In other words, the Socialization model may apply mostly to childhood whereas the Selection model may apply more strongly to adolescence.

It is important to note that these tentative conclusions rest on few studies, most of which may have significant methodological limitations.

For example, Kendler, Schmitt et al. (2008) used a retrospective life calendar method to collect their data. Such data are not entirely free from retrospective recall bias, particularly given the long time interval between the earliest recall period (age 8) and the actual time of data collection (age 40). In addition, in all studies both friends' delinquent behavior and participants' own delinquent behavior were rated by the same source, thus creating an additional bias towards inflated similarity (Berndt & Keefe, 1995; Kandel, 1978). Not distinguishing between overt and covert delinquent behavior might also have affected the results since genetic influences on overt delinquent behavior are stronger and more developmentally constant than genetic influences on covert delinquent behavior. Notwithstanding these limitations, the previously mentioned studies cast some doubt on the notion that the association between DPA and delinquent behavior simply reflects an environmental influence of the former on the latter, at least not in adolescence when antisocial youth increasingly express their genetic dispositions and shape their own social world. A similar conclusion in favor of the Selection Model was made more than 30 years ago by Scarr and McCartney (1983).

This conclusion is also supported by two prospective studies that explored the role of DPA in samples of adolescent twins while controlling for possible rGEs through the use of the MZ-difference method. Since MZ twins share 100 % of their genes (and the same family environment when raised together), the MZ-difference method affords a unique opportunity to examine the role of nonshared environmental experiences that make the two twins of a pair different from each other, while controlling for genetic and shared environmental influence. This is achieved by correlating differences in the measured environment (e.g., DPA) with later differences in the measured behavior (e.g., delinquent behavior), while controlling for baseline differences in delinquent behavior and differences in other types of relevant environmental experiences (see Vitaro, Brendgen, & Arseneault, 2009, for a full description of the method). As a consequence, the MZ-difference method allows testing

the premise of the Social Influence Model that DPA predicts delinquent behavior even when possible selection processes and other familial influences are controlled. The two studies that used the MZ-difference method with adolescent samples found that within-pair differences in DPA (a general score of peers' delinquent behavior) were unrelated to increased within-pair differences in (combined overt and covert) delinquent behavior, which stands in contrast to what would be expected according to the Socialization model (Beaver, 2008; Burt, McGue, & Iacono, 2009). On the other hand, Vitaro et al. (2011) found that within-pair differences in friends' overt externalized problems (i.e., physical aggression towards others) at age 6 years predicted an increase in within-pair differences in twins' overt externalized problems from age 6 to age 7 years, while controlling for possible confounders such as within-pair differences in peer rejection by normative peers and coercive parenting. Overall, the findings from studies that controlled possible rGE through the use of the MZ-difference method are thus similar to those from classical quantitative genetic studies that directly tested for rGE: In line with the Social Influence Model, DPA significantly contributes to the development of delinquent behavior in childhood, even when controlling for potential selection processes. This does not seem to be the case in adolescence, however, as DPA was unrelated to delinquent behavior once controlling for selection processes through rGE. It is important to note, however, that the three studies using the MZ-difference method may not be directly comparable because of their methodological differences, which may be confounded with developmental issues.

Testing the Social Influence and Selection Models Through Gene–Environment Correlation: Evidence from Molecular Genetic Studies

Only a handful of molecular genetic studies have been published that examined potential rGE linking DPA with specific genes. These studies

cover different age groups, different genes, and different deviant behaviors, which makes it difficult to draw definite conclusions. Nevertheless, these studies help shed additional light on a possible rGE involving DPA and delinquent behavior. One of the first studies to examine a potential rGE between measured genes and DPA was published by Beaver, Wright, and DeLisi (2008). Using genotypic data ($N = 1,816$) from the Add Health Study, these authors examined whether a specific variant of the Dopamine transporter gene DAT1—the 10-repeat allele (10R)—is associated with adolescents' affiliation with substance-using peers. The dopamine transporter DAT1 is the primary mechanism for reuptake of released dopamine in the brain and individuals who carry the 10R allele of DAT1 have been found to show a lack of inhibitory control and to be more susceptible to dopamine-related disorders, notably disruptive behaviors (Cornish et al., 2005). Adolescents were asked how many of their three closest friends smoke at least one cigarette per day, drink alcohol once a month, and smoke pot at least once a month. The results revealed that—for male adolescents from problematic family backgrounds—those with a greater number of the risk allele reported more affiliation with substance-using friends ($rGE = 0.13$), despite controlling for own delinquent behavior, lack of self-control, and drug and alcohol use. No correlation was found for female adolescents or those from less problematic family backgrounds. Although these findings may indicate presence of selective rGE, the interpretation is somewhat hampered by the fact that friends' behavior was based on adolescents' perceptions instead of friends' own reports, and that the measure of friends' "deviancy" actually constitutes rather normative behavior compared to, for example, interpersonal violence or serious delinquency (i.e., using a weapon or arson).

Perhaps clearer evidence for selective rGE in regard to friendship affiliation comes from a study by Fowler, Settle, and Christakis (2011). In this study, adult participants (mean age = 38 years, range = 21–70) were asked to nominate up to two close friends during seven repeated assessment waves over a 32-year period. They

were also genotyped for six genetic markers. After Bonferroni correction and control for population stratification, the results did not show similarity between friends with regard to DAT1, but friends were significantly similar ($r = 0.11$) with respect to the DRD2 genotype. Frequency of the minor (A1) allele of DRD2 has been associated with antisocial behavior and with alcoholism (Hill, Zezza, Wipprecht, Locke, & Neiswanger, 1999; Le Foll, Gallo, Le Strat, Lu, & Gorwood, 2009). By showing that friends resemble each other (albeit weakly) on a genotypic level, these results suggest that individuals (i.e., adults in this case) with a genetic predisposition for deviant behavior may actively seek out friends with similar traits.

The weak and inconsistent evidence regarding possible rGE involving specific genes and DPA is further challenged by three studies that found no association between DPA and genotypic variants on MAOA (implicated in the breakdown of synaptic neurotransmitters such as dopamine, norepinephrine, and serotonin and associated with antisocial behavior), CHRM2 (implicated in neurocognitive processes related to sensation seeking and disinhibition), and BDNF (implicated in the regulation of responses to stress) (Kretschmer, Vitaro, & Barker, 2014; Latendresse et al., 2011; Lee, 2011). Since an interaction was found between DPA and genotype in all three studies, a more complete description of each study is presented later.

The inconsistency of the results from molecular genetic studies may cast doubt on the validity of the gene–environment correlations found in quantitative genetic studies. It is important to keep in mind, however, that the likelihood of finding significant associations between measured genes and another variable such as delinquent behavior or DPA depends on the selection of appropriate candidate genes. In contrast to the few single-gene disorders such as cystic fibrosis or sickle cell anemia, a vast number of candidate genes are functionally relevant for complex social behaviors or traits—let alone for the environmental experiences that may be influenced by such traits. Any individual gene is thus likely to only have a very small effect and

many samples may be underpowered to detect such small effect sizes. The effect of genes may also operate indirectly rather than directly on the environment, mediated by the outwardly expressed behavior or trait associated with a constellation of genes. Findings of rGE in support of the Social Selection Model—or lack thereof—derived from the findings from the few existing molecular studies are thus necessarily very preliminary and thus need to be interpreted with utmost caution.

Testing the Social Interaction Model Through Gene–Environment Interaction: Findings from Quantitative Genetic Studies

According to the Social interactional model, DPA during adolescence may exert its influence on delinquent behavior not so much directly, but rather in an interactive fashion by facilitating the expression of a preexisting personal disposition for delinquent behavior. Findings from nongenetically informed studies indeed show that DPA moderates (i.e., exacerbates) the effect of personal characteristics such as disruptiveness (Lacourse et al., 2003; Vitaro, Brendgen, & Tremblay, 2000) or low self-regulation (Gardner, Dishion, & Connell, 2008) on delinquent behavior. Because these behaviors are partly heritable (Bornovalova, Hicks, Iacono, & McGue, 2010), such an interaction effect would be in line with a mechanism known as a gene–environment interaction (GxE). While GxE may arise through different processes (Brendgen, 2012), the Social Interactional model specifically suggests a Trigger or Enhancement process of GxE, which occurs when the presence of an environmental risk factor such as DPA triggers or exacerbates the expression of a genetic disposition for delinquent behavior. It is important to note that GxE and rGE processes can co-occur, such that the same environmental factor may simultaneously be involved in both GxE and rGE. Thus, failure to account for possible rGE may lead to biased estimates of GxE (Purcell, 2002).

So far, all evidence from genetically informed studies uniformly suggests that genetic influences on delinquent behavior (or on related behaviors such as substance use) are indeed amplified in adolescents who affiliate with deviant peers compared to those who do not. These findings are observed even when controlling for rGE (Button et al., 2009; Dick et al., 2011). Importantly, this pattern is also confirmed when rigorous measures of peers' deviancy are employed. A case in point is the aforementioned study by Harden et al. (2008) with the Add Health data where peers' tobacco and alcohol use was assessed through the peers' self-reports (instead of through participants' reports). These authors found that adolescents with a stronger genetic propensity for substance use (i.e., drinking and smoking) were more likely than others to have substance-using friends (reflecting rGE). Moreover, adolescents with a higher genetic liability drank and smoked even more if their friends did as well (reflecting GxE). Using data from the same sample, Guo, Elder, Cai, and Hamilton (2009) reported a similar GxE specifically with respect to friends' and adolescents' own alcohol use. Finally, findings by Boardman, Saint Onge, Haberstick, Timberlake, and Hewitt (2008) with the Add Health data suggest that genetically vulnerable youth may not only be influenced by their close friends' behavior. They are also more likely to smoke when they attend schools where the most popular students are also smokers.

All the above studies used samples of adolescents. The few studies with children have so far produced equivocal findings. Thus, in one study that used mother and father ratings to assess both the target children's and their peers' delinquent behavior, the results showed that DPA indeed played an enhancement role even when controlling for rGE. However, it was the shared environmental influences rather than the genetic influences on delinquent behavior that were exacerbated by DPA (Burt & Klump, 2013). In contrast, evidence of true GxE was found in a study using the QNTS sample, for whom teacher- and peer-rated generalized aggression was available both with respect to the twins themselves

and with respect to each twin child's three reciprocal classroom friends in kindergarten (van Lier et al., 2007). In line with an enhancement process of GxE, children were most likely to display high levels of aggression if they were at high genetic risk for such behavior and, at the same time, were exposed to highly aggressive friends. A follow-up study conducted with data collected in grade one (Brendgen et al., 2008) revealed that this GxE may only hold for the link between friends' and children's physical aggression but not relational aggression, a more insidious type of aggression that includes social exclusion or malicious gossiping. Instead, affiliation with relationally aggressive friends seemed to foster relational aggression independently of genetic effects on this behavior.

To summarize, quantitative genetic studies that examined GxE unanimously found that a genetic disposition for delinquent behavior is more likely to be expressed when adolescents affiliate with deviant peers, thus supporting the Social Interaction model. It is still unclear, however, whether the same also holds true for children prior to adolescence or for all forms of delinquent behavior. Prospective longitudinal quantitative genetic studies using a variety of sources to measure DPA throughout childhood and adolescence and distinguishing between subtypes of delinquent behavior are needed to clarify a possible developmental change of GxE linking DPA and delinquent behavior.

Testing the Social Interaction Model Through Gene–Environment Interaction: Findings from Molecular Genetic Studies

The findings from quantitative genetic studies showed that DPA may influence delinquent behavior either directly or by fostering the expression of youngsters' genetic risk for delinquency. However, these studies cannot determine which specific genes are involved. To this end, molecular genetic studies are needed. Of note, although statistically it is irrelevant which of the two variables involved in an interaction is

considered the moderator, GxE in molecular genetic studies are often interpreted using the genotype as the moderator of the effect of DPA on delinquent behavior. Again, only very few studies to date have investigated the interactive effect of DPA and specific genes on delinquent behavior. Thus, using a subsample of male Caucasian adolescents and young adults from the Add Health study, Lee (2011) examined a potential interaction between the monoamine oxidase-A (MAOA) gene and DPA in predicting delinquent behavior. The MAOA gene is implicated in the breakdown of synaptic neurotransmitters such as dopamine, norepinephrine, and serotonin and has been associated with antisocial behavior in some studies (e.g., Buckholtz & Meyer-Lindenberg, 2008; Caspi et al., 2002; Kim-Cohen et al., 2006). Deviant peer affiliation was assessed based on participants' reports of their three best friends' smoking, drinking, and marijuana use, and of how often they fought together with their peers against others. The results showed a significant GxE in line with a trigger/enhancement process. Specifically, perceived peer deviancy was more strongly associated with participants' overt antisocial and criminal behavior for carriers of the high-risk (i.e., high-activity) MAOA genotype than for carriers of the low-risk (low-activity) genotype. Similar results were reported in a study with Caucasian male and female adolescents (Latendresse et al., 2011) with respect to the muscarinic acetylcholine receptor M2 gene (CHRM2), which is implicated in neurocognitive processes related to sensation-seeking and disinhibition (Dick et al., 2011). Specifically, the likelihood of showing moderate to high levels of self-reported externalizing behavior from ages 12 through 22 years increased with each additional copy of the minor allelic ("G") variant of the CHRM2 gene, compared to individuals who only carried the "A" allele. Moreover, this association was exacerbated in individuals who reported affiliating with highly antisocial peers at age 12. Finally, Kretschmer et al. (2014) found that exposure to deviant peers during childhood (i.e., at age 10) was related to a greater risk of

aggression in adolescence (i.e., at age 15) for carriers of the met/met variant than for carriers of the val/val variant of the BDNF polymorphism, which is implicated in the regulation of responses to stress (Colzato, van der Does, Kouwenhoven, Elzinga, & Hommel, 2011).

To our knowledge, only one study has tested a possible interaction between DPA and specific measured genes in young children. The study focused on the DRD4 polymorphism, which had been associated with ADHD in children in previous research (Gornick et al., 2007; Li, Sham, Owen, & He, 2006). The authors observed preschoolers while interacting with an unfamiliar same-age, same-sex peer during a free play paradigm in a laboratory setting (DiLalla, Elam, & Smolen, 2009). The results showed that, when the peer was not aggressive, children with at least one long allele of DRD4 (i.e., the risk allele) were significantly more aggressive than children without the risk allele. In contrast, when the peer behaved aggressively, children with and children without the risk allele were equally highly aggressive. Interestingly, this pattern indicates a suppression process—rather than an enhancement process—of GxE: In a benign peer environment, interindividual differences in aggressive behavior could be explained by children's genetic vulnerability, whereas exposure to an aggressive peer environment was sufficient to elicit high aggression even in children without genetic risk. These results are more in line with the predictions made by the Social Influence Model than those made by the Social Interaction Model.

Overall, the few existing molecular genetic studies thus support the findings from the quantitative genetic studies that delinquent behavior is influenced by an interactive effect of DPA and genetic factors. At least in adolescence, this interactive effect seems to correspond to an enhancement process, thus supporting the Social Interaction Model. Whether the same holds true for young children is still unclear, however, as the few existing studies have produced equivocal results that are more in line with the Social Influence Model than with the Social Interaction Model.

Mechanisms that Could Account for a Main or Moderating Effect of DPA

The results from the molecular and quantitative genetic studies thus give credence to the findings from nongenetically informed studies showing that DPA may foster delinquent behavior, either directly (most likely in younger children) or by facilitating the expression of preexisting personal disposition for delinquent behavior (most likely in older children or adolescents). What mechanisms can account for the main or moderating effect of DPA? One mechanism that may explain how exposure to DPA predicts an increase in delinquent behavior is observational learning through modeling of rule-breaking or aggressive behaviors (Berndt, 1999). Clear modeling effects have been shown by Cohen and Prinstein (2006) in an experiment in which adolescents were randomly exposed to virtual peers in a laboratory setting. Adolescents conformed to the virtual peers' aggressive/risky behaviors, particularly if the peers had a high (versus a low) social status. Similar experiments as well as observational studies showed that exposure to peers committing aggressive or deviant acts resulted in an increase in children's similar behaviors already during the preschool years (see Boivin et al., 2005).

A second process that can explain how DPA can impact children's or adolescents' delinquent behavior is differential reinforcement by deviant peers. This process, labeled "deviancy training," has received substantial empirical support (Dishion, Spracklen, Andrews, & Patterson, 1996). Specifically, deviant peers tend to reinforce, through laughter or positive verbal or nonverbal support, rule-breaking talk, and deviant acts. They also tend to ignore or punish normative behaviors (Buehler, Patterson, & Furniss, 1966). This differential reinforcement of deviant behaviors has been found to result in an increase in youngsters' subsequent delinquent behavior and substance use (Dishion, Poulin, & Burraston, 2001). Deviancy training may already occur among kindergarten children. Engaging in deviant talk and positive reinforcement of

deviant behaviors with same-gender peers predicted an increase in both overt and covert delinquent behavior over a 1-year interval (Snyder et al., 2005) and covert delinquent behavior over a 3-year interval (Snyder et al., 2008).

Finally, antisocial children and adolescents have been found to be bossier with their peers, including their friends, and are more frequently involved in coercive exchanges than non-antisocial children (Deptula & Cohen, 2004; Dishion, Andrews, & Crosby, 1995). These conflict-ridden interactions could set in motion a "coercive interactional process" (Boivin & Vitaro, 1995; Patterson, Reid, & Dishion, 1992) whereby coercing or threatening one's friends can increase the likelihood of similar coercive behaviors from the friends. Consistent with this notion, conflict with a best friend predicted delinquency beyond peer rejection and best friend's aggressiveness (Kupersmidt, Burchinal, & Patterson, 1995). In another study, coercion by the best friend partially explained the predictive association between the best friend's aggressiveness and an increase in children's aggressiveness, controlling for other negative experiences such as parent coercion and peer rejection (Vitaro et al., 2011). Coercion by the best friend, however, is not associated with increased aggression when the friendship bond and friends' conflict resolution skills are high (Salvas et al., 2014). Interestingly, different processes may be related to different outcomes. As shown by Snyder, Schrepferman, Stoolmiller, and Brooker (2007), deviancy training and modeling may foster covert delinquent behavior, whereas coercion may help explain overt delinquent behavior. Similar processes may explain how DPA moderates the expression of youngsters' genetic disposition for overt or covert aggression and delinquency.

Summary

- Genetic influences on DPA have been found in several studies. These genetic influences, and consequently the likelihood for rGE, seem to increase with age, but no study yet

examined this issue using a prospectively longitudinal design.

- In light of the current genetically informed literature, the Socialization model could be in effect during childhood whereas the Selection model would (increasingly) apply during adolescence.
- In accordance with the Interaction model, DPA seems to amplify the expression of genetic dispositions towards delinquent behavior in adolescents. This appears to be the case in children also, but it is family and neighborhood effects that are enhanced by DPA.
- In turn, the role of DPA is modified by individual characteristics, including genetic polymorphisms. The exact nature of these moderating effects, i.e., enhancement or suppression, is still unsettled and may involve a developmental dimension.
- A number of mechanisms can account for the main or the moderating effect of DPA. These mechanisms can differ whether covert or overt delinquency is concerned.

Future Research Needs

- Longitudinal quantitative genetic studies using the same definition and the same sources to measure DPA throughout childhood and adolescence are needed to resolve the issues raised in this review chapter in reference to rGE or GxE.
- These studies should distinguish between overt and covert delinquency for both the peers and the participants and the severity of these behaviors (e.g., use of weapons) (Lacourse et al., 2010; Lacourse, Dupéré, & Loeber, 2008). Further refinements between physical vs. social, proactive vs. reactive aggression are possible (see Vitaro & Brendgen, 2012).
- Future studies also need to use a multisource, multimethod approach with respect to both DPA and delinquency. Most studies reported in the chapter used one source only to report on both DPA and delinquent behavior. They

may also need to distinguish and compare what DPA refers to and how it is measured. Potential halo effects or assumed similarity might be increased if the characteristics of the friendship group are evaluated as a whole instead of judging the behavior of specific, nominated friends and if the measures reflect the participants' perceptions of their friends' behavior instead of friends' self-reported behavior (Kandel, 1978).

- Future studies need to adopt a developmental perspective and distinguish between childhood/onset (overt and covert) delinquency and adolescence/onset (overt and covert) delinquency. Childhood/onset and adolescence/onset delinquent behaviors may have different gene–environment architectures as suggested by several authors (Moffitt, 1993; Patterson, DeBaryshe, & Ramsey, 1989). A growth curve or a latent class trajectory approach would help empirically define the different developmental patterns of delinquent behavior and relate them to different patterns of DPA (Lacourse et al., 2003, 2006, 2008). Furthermore, they should address stability and intraindividual change and also how DPA evolves into more organized deviant clique (i.e., gang membership) or organized crime.
- Future studies need to verify whether the pattern of results is similar for males and females. Other variables such as ethnicity or macro socio-demographics could also be tested as moderators.

Recommended Readings

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How School and Education Impact the Development of Criminal and Antisocial Behavior

15

Allison Ann Payne and Kelly Welch

Analyses of criminal and antisocial behavior indicate that individual development in various stages throughout the life course has substantial influence. Much of this prior examination, however, does not comprehensively assess the important influence of schools and education on this behavior. Although many of the established developmental theories of offending acknowledge educational institutions with varying degrees of emphasis, schools and education are not a primary focus in the large majority of the research using this theoretical perspective. There is, however, a large body of work investigating school-related risk factors for antisocial behavior, an area of research that aligns well with the developmental perspective.

This chapter begins with a brief overview of the developmental perspective on human behavior, followed by a review of the research that links school-related factors with antisocial behavior and offending. The final two sections discuss how established developmental theories of deviance address the role of schools and education and present the small body of research that uses a general developmental perspective to examine the relationship between education and deviance.

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Developmental Perspective of Human Behavior

The developmental framework of understanding human behavior examines development within the context of age-related life stages and the overall life span (Elder, 1985). Theories within this perspective focus on continuity and change (Le Blanc & Loeber, 1998) by examining trajectories, or long-term patterns of behavior, and transitions, or short-term changes, which may or may not be turning points that alter an individual's trajectory (Elder, 1985; Hagan & Parker, 1999). A developmental perspective on human development also proposes an interaction between the genetic and biological characteristics and the environmental and social experiences of an individual. For example, as children grow, their biological systems mature at the same time that they develop behavioral skills, thus creating an interactive process. Children's biological characteristics influence how they react to certain environments or events. In turn, these environments and events shape children's reactions and influence the maturation of their biological makeup, thereby creating repertoires of certain behavioral skills (Biglan, Brennan, Foster, & Holder, 2004).

Importantly, an individual's development is embedded within social institutions that also influence the interactive process (Elder, 1985). One influential domain is the school, which is particularly important during the younger phases

of development, from early childhood through adolescence (Biglan et al., 2004), as children react to and interact with teachers, peers, and other members of the school community. Focusing specifically on antisocial behavior, the developmental perspective suggests that certain school practices interact with an individual child's predisposition to increase the likelihood of deviance. For example, children with high impulsivity and low self-control will experience difficulty keeping quiet in their seats and listening to teachers; this may, in turn, lead these children to learn at a pace that is slower than their peers, thus increasing the likelihood that they will dislike school and act out behaviorally (Biglan et al., 2004). By contrast, school environments may cultivate social and academic skills through certain practices, thereby increasing children's ability to learn and their enjoyment of school, ultimately leading to a greater likelihood of prosocial behavior.

School-Related Risk Factors for Antisocial Behavior

One area of research on offending that aligns well with the developmental perspective is the sizeable body of work examining school-related risk factors of criminal and antisocial behavior (Farrington 1996a, 1996b; Welsh & Farrington, 2007). Risk factors are characteristics of an individual or environment that increase the likelihood of antisocial behavior. These factors can influence any aspect of behavior, including onset, frequency, persistence, or duration of deviance (Farrington 1996a, 1996b). It is important to note that these factors do not operate in a vacuum; new risk factors are added to those already there, leading them to act in a cumulative and interactive manner (Howell, 2003). These factors often occur together, or "travel in packs" (Biglan et al., 2004); thus, it is often difficult to disentangle individual effects. In addition, school-related risk factors for deviance can operate at either the individual student level or the school level.

Student-Level Risk Factors

As described by Patterson and his colleagues (Patterson, DeBaryshe, & Ramsey, 1989; Patterson, Reid, & Dishion, 1992), children who are already displaying antisocial behavior at home enter schools with a limited behavioral repertoire for interacting with teachers and other students. These students are then more difficult to handle in the classroom, which increases the likelihood of poor academic performance, poor attachment to teachers, lower school commitment, and rejection by conventional peers. This process continues to cycle and, due to a process of cumulative continuity, poor academic performance, and poor school bonding, "the child who receives antisocial training from the family during the preschool and elementary years is likely to be denied access to positive socialization forces in the peer groups and schools" (Patterson & Yoeger, 1993, p. 331). Ultimately, this entire process greatly increases the likelihood of persistent antisocial behavior.

Academic performance, or school success/failure, is one student-level risk factor strongly supported by research (Biglan et al., 2004): "Consistent evidence supports an association between poor school performance and drug use and other adolescent problem behaviors" (Gottfredson, 2001, p. 32). Students with poor academic skills are more difficult to teach, which enhances the deficits in skills needed for future education. This may lead to student frustration as well as remedial placement, in which deviant students tend to be clustered (Biglan et al., 2004). Much longitudinal research supports the relationship between poor academic performance and problem behavior at many stages of the life course, including truancy (Farrington, 1986), delinquency (Ayers et al., 1999; Farrington & West, 1993; Nagin, Farrington, & Moffitt, 1995; Williams & Van Dorn, 1999), drug use (Krohn, Thornberry, Collins-Hall, & Lizotte, 1995; Smith & Thornberry, 1995; Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003; Thornberry, Lizotte, Krohn, Farnsworth, & Jang, 1991), gang

membership (Hill, Howell, Hawkins, & Battin-Pearson, 1999), violence (Farrington, 1989; Hawkins et al., 1998; Herrenkohl, Maguin, Hill, Hawkins, & Abbott, 2000; Maguin et al., 1995), convictions (Farrington, 2003), and incarceration (Arum & Beattie, 1999). Meta-analyses of longitudinal studies also support the relationship between poor academic performance and later delinquency (Lipsey & Derzon, 1998; Maguin & Loeber, 1996).

Another risk factor for delinquency and crime is school bonding, as one of the main domains for prosocial bonding during childhood and adolescence is the school (Hawkins et al., 2003; Hirschi, 1969). School bonding is often conceptualized as two separate components of attachment and commitment to school. School attachment is indicated by the extent to which students care about their school and their teachers and the extent to which they care about the teachers' opinions; students who feel as though they belong in their school are less likely to engage in delinquent behavior. School commitment is generally defined as time and energy invested by students in the pursuit of educational goals, also often presented in terms of educational aspirations. Students who invest considerable effort in school are more likely to be concerned about losing their investments if they are deviant. Conversely, students who invest little in a school will have less to lose and are, therefore, more likely to be delinquent.

The effect of school bonding on adolescent delinquency and later criminal behavior is well documented by much longitudinal research (Ayers et al., 1999; Chung, Hills, Hawkins, Gilchrist, & Nagin, 2002; Hawkins et al., 1998; Loeber & Farrington, 2001; O'Donnell, Hawkins, & Abbott, 1995; Williams, 1994). Essentially, "students who are... weakly attached to their schools... [and] have little commitment to achieving educational goals... are more likely to engage in crime than those who do not possess these characteristics" (Gottfredson, Wilson, & Najaka, 2002, p. 149). Drawing from Patterson et al.'s (1989, 1992) description of the relationship between school bonding and antisocial behavior, it is easy to see how students'

antisocial behavior increases the likelihood of poor attachment to conventional members of the school community and leads to lower school commitment due to poor academic performance.

Separate examinations of school attachment and commitment also show support for both. Sampson and Laub (1993) found that attachment to school is a strong predictor of subsequent delinquency and continues to predict delinquency even when controlling for earlier antisocial behavior. Even more longitudinal research specifically supports the causal path from low commitment to school to later delinquency and criminal behavior. This includes problem behavior and persistent serious delinquency (Maguin et al., 1995; Smith & Thornberry, 1995; Stouthamer-Loeber, Wei, Farrington, & Wikstrom, 2002; Thornberry et al., 1991), teen pregnancy and substance abuse (Maguin et al., 1995), violence (Herrenkohl et al., 2000; Maguin et al., 1995; Stouthamer-Loeber et al., 2002), and joining and remaining in a gang for several years (Battin-Pearson et al., 1997), even when taking childhood antisocial behavior into account (Simons, Johnson, Conger, & Elder, 1998).

Research on the influence of another risk factor, truancy and dropping out of school, is mixed. Some studies show clear relationships: Early truancy tends to be linked to later truancy, antisocial behavior, youth violence, and adult offending; dropping out of school shows the same relationships (Arum & Beattie, 1999; Drapela, 2006; Farrington 1980, 1989, 1996a, 1996b; Farrington & West, 1993; Janosz, Le Blanc, Boulerice, & Tremblay, 1997; Robins & Ratcliff, 1980; Thornberry, Moore, & Christenson, 1985). However, studies that examine the issue in more detail have found that the impact of dropping out on delinquency differs depending on *why* the individual left school; youth who drop out because they do not like school or for unspecified reasons are more likely to engage in delinquency than high school graduates, while those who drop out because of problems at home do not have higher levels of future delinquency (Jarjoura, 1993, 1996).

Rejection by conventional peers is another risk factor for delinquency and later criminal

behavior. Antisocial children tend to have limited social skills, which may cause them to interact with their peers in a negative, often hostile manner (Patterson et al., 1989, 1992), leading to these children being rejected by prosocial youth and greatly reducing antisocial children's opportunities to learn and practice positive prosocial skills (Patterson & Yoeger, 1993). In addition, peer rejection makes it more likely that these youth will befriend other rejected children and form deviant peer groups, thereby increasing their problematic behavior. Conversely, youth who are effectively socialized with no early history of antisocial behavior are successful in the school environment when forming conventional peer relationships, thus decreasing their deviance (Moffitt, 1993; Smith & Thornberry, 1995).

A final student-level risk factor for antisocial behavior suggested by the developmental perspective is school transitions, or changing schools either because of graduating to the next level or moving residences. Although little research has examined this factor, what has been conducted is supportive of this influence: school changes at ages 14 and 16 predict later violence (Hawkins et al., 1998; Maguin et al., 1995). In addition, another research indicates a relationship between school transitions and previously discussed risk factors, such as academic achievement and dropping out (Alspaugh, 1998), attachment to school (Eccles & Midgley, 1989; Simmons & Blyth, 1987), participation in extracurricular activities, and perceptions of support from school personnel (Seidman, Allen, Aber, Mitchell, & Feinman, 1994). Thus, school transitions may be a remote influence on deviance and later offending.

School-Level Risk Factors

There are also characteristics of the school itself that are related to student antisocial behavior, which can be grouped into two categories. Contextual or structural factors are predetermined characteristics of a school, such as grade level, student enrollment, student-teacher ratio, racial and ethnic composition, and location. School

climate refers to the "inner workings of the school" (Ma, Stewin, & Mah, 2001, p. 256), such as school social organization, social relations between and among teachers and students, the cultural system of norms and values in the school, and the management of school discipline, such as the clarity of rules and fairness of rule enforcement.

Studies have established that the structural characteristics influence the amount of disorder a school experiences. Higher levels of delinquency and victimization tend to occur at schools with greater student-teacher ratios and fewer resources (Gottfredson & Gottfredson, 1985), greater percentages of male students (Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Payne, Gottfredson, & Gottfredson, 2003), a more racially diverse student body (Felson, Liska, South, & McNulty, 1994; Gottfredson et al., 2005; Payne, 2011; Payne et al., 2003), and greater percentages of students who receive free or reduced-price lunches (Wilcox & Clayton, 2001). In addition, studies using hierarchical linear modeling techniques have illustrated that individual-level problem behavior is more prevalent in larger and racially diverse schools (Bryk & Driscoll, 1989; Payne, 2008).

Research also demonstrates a definite relationship between school climate and general school disorder. Teachers in communally organized schools that have a system of shared values and expectations and that experience meaningful social interactions demonstrate higher levels of morale and satisfaction as well as fewer absences and less victimization (Battistich & Solomon, 1997; Bird & Little, 1986; Bryk & Driscoll, 1989; Little, 1985; Newman, Rutter, & Smith, 1989; Payne, 2008, 2009; Payne et al., 2003). In addition, students in communally organized schools demonstrate less delinquency, misbehavior, fear, victimization, and dropping out, and have greater empathy, school bonding, academic interest, motivation, and achievement (Battistich & Hom, 1997; Battistich, Solomon, Kim, Watson, & Schaps, 1995; Bryk & Driscoll, 1989; Payne, 2008; Payne et al., 2003; Phaneuf, 2006; Solomon,

Watson, Battistich, Schaps, & Delucchi, 1992; Stewart, 2003), regardless of their race or ethnicity (Payne, Gottfredson, & Kruttschnitt, 2009).

The discipline management of a school also influences school disorder. Schools that establish and maintain rules, effectively communicate clear expectations for behavior, consistently enforce rules, and provide rewards for rule compliance and punishments for rule infractions experience lower levels of crime and victimization (Gottfredson et al., 2005). By contrast, overly punitive responses to misbehavior appear to increase delinquency: Skiba and Knesting (2001) discusses this possibility with zero tolerance policies which requires a response to even minor infractions with immediate, certain, and severe punishments. Indeed, exclusionary discipline, such as suspensions and expulsions, has been used with increasing frequency for the past couple of decades (Cameron, 2006; Wallace, Goodkind, Wallace, & Bachman, 2008), the results of which have been particularly consequential for the students subjected to them. Research shows that these punishments are associated with various negative academic outcomes, including school failure, grade retention, negativity toward school, and a greater likelihood of dropping out (Nichols, 2004; Schiraldi & Zeidenberg, 2001; Skiba & Peterson, 1999), all of which are risk factors for offending. Further, the use of these forms of discipline seems to actually increase the probability that the students receiving these disciplinary measures will commit delinquent acts at school, such as participate in physical fights, carry weapons, smoke, and use alcohol and other drugs (Schiraldi & Zeidenberg, 2001), and engage in delinquency within the greater community (Foney & Cunningham, 2002; Nichols, 2004).

Specific Developmental Theories' Views on Schools and Education

In contrast to the robust research on school risk factors, schools and education are not a main focus of established developmental theories. However, many of these theories do

acknowledge the school domain with varying degrees of emphasis. One of the best known developmental theories provides the most in-depth discussion about the role of schools and education in offending from a developmental perspective. Focusing first on her trajectory of life-course persisters, Moffitt (1993) discusses how antisocial behavior for this small group of individuals has its origins in neuropsychological deficits from birth, which interact with the social environment, first at home and then at school. Because of these deficits, life-course persisters tend to display problems with cognitive and verbal skills, hyperactivity and impulsivity, and even aggression and hostility. These traits have been shown to lead to a stable trajectory of problem behavior due to both contemporary and cumulative continuity. First, these individuals display the same behavior in all situations, regardless of previous experiences, leading to contemporary continuity or cross-situational consistency (Moffitt, 1996). This occurs because, throughout their lives, these children carry the same “constellation of traits that got them into trouble as a child, such as high activity level, irritability, poor self-control, and low cognitive ability” (Moffitt, 1996, p. 21). Thus, in schools, these students have trouble sitting still and listening to teachers and have a greater likelihood of cheating on tests and stealing from or even attacking other students.

In addition, because of these behaviors, life-course persisters rarely develop positive relationships with their teachers or prosocial peers at school and are often rejected by these conventional members of the school community (Moffitt, 1993). This significantly reduces life-course persisters' opportunities to learn and practice prosocial skills, thus leaving them with a behavioral repertoire limited to aggression and hostility. Eventually, youth who have been consistently rejected by teachers and peers tend to be defensive and react by either withdrawing or preemptively attacking, thus continuing the cycle of lost conventional opportunities (Moffitt, 1996). This cumulative continuity also occurs through a loss of academic skills: Antisocial students are often more difficult to teach, which

may lead to a failure to obtain basic math and reading skills. This, in turn, limits future educational and even occupational opportunities, which may then ensure offending in adulthood (Moffitt, 1993). Indeed, using the Dunedin data, (Moffitt, 1996) found that childhood antisocial behavior predicted lower educational attainment in adolescence, which then predicted lower occupational status as an adult.

Ultimately, if important social and academic skills are not learned as a student, it is much harder to succeed as an adult, as these life-course persisters are “snared” by the consequences of their problem behavior, thus reducing the probability of a conventional life due to the loss of opportunities to escape from the negative cycle (Moffitt, 1996). These include experiences such as dropping out of school, substance addiction, unplanned parenthood, and poor ties to family and school. Events such as these significantly decrease the likelihood of these individuals pursuing higher education, obtaining successful jobs, or even attracting a prosocial spouse; failure in these areas greatly increases the likelihood of continual offending (Moffitt, 1996).

In contrast to life-course persisters, Moffitt’s (1993) larger group of adolescent limited offenders only engage in antisocial behavior during their teenage years. As children, these individuals do not suffer from neuropsychological problems and are thus able to learn prosocial skills. This positive behavior accompanied them throughout early schooling experiences, where they were able to practice these social skills and obtain needed academic skills as well. Thus, the cumulative continuity that may restrict life-course persisters to a life of offending does not apply to most adolescent limited youth. Instead, these students engage in deviance because of the “maturity gap” they experience as they reach puberty and are biologically ready to act as adults yet are denied access to adult status (Moffitt, 1993). At this point, adolescents become aware of the adult-like, though delinquent, behavior of the life-course persisters and mimic these actions to establish their independence from adult controls (Moffitt, 1996). In this process, schools are the prime location for such mimicry. Once

these adolescents reach adulthood and have access to adult status and roles, however, the large majority desist in their offending and rely on the social and academic skills they obtained earlier in life.

Patterson and his colleagues (Patterson, Capaldi, & Bank, 1991; Patterson & Yoeger, 1993; Patterson et al., 1989, 1992; Simons, Chyi-In, Conger, & Lorenz, 1994) describe a similar pattern comprised of two trajectories of deviants, categorized as early and late starters. Similar to Moffitt’s adolescent limited offenders, late starters experiment with delinquency during their teenage years, mainly as a result of peer encouragement; these youth eventually tend to desist after a short period of time. In contrast to Moffitt, however, the early starters engage in antisocial behavior throughout the life course primarily as a result of poor parenting. This leads early starters to experience serious deficits in social skills, which then lead to aggressive and hostile interactions with teachers and prosocial peers. This results in rejection by these conventional people and a loss of opportunities to learn and practice the social skills that they are lacking. As with life-course persisters, early starters suffer myriad consequences of their deviant behavior and poor social skills, including poor academic performance and weak bonds to teachers, peers, and the school in general (Patterson et al., 1989, 1992). Ultimately, “the child who receives antisocial training from the family during the preschool and elementary years is likely to be denied access to positive socialization forces in the peer groups and schools” (Patterson & Yoeger, 1993, p. 331), thus ensuring that antisocial behavior will continue through the life course.

Focusing specifically on the school environment, Patterson and his colleagues described the most likely narrative involving school-related risk factors and antisocial behavior (Patterson et al., 1989, 1992). Children who are already displaying antisocial behavior at home enter schools with a limited behavioral repertoire for interacting with teachers and other students; this repertoire tends to contain only aggressive and hostile behavior. These students are likely

difficult to handle in the classroom, which increases the risk of poor academic performance, poor attachment to teachers, lower school commitment, and rejection by conventional peers. This cycle continues, feedbacking on itself and spiraling downward. Thus, due to a process of cumulative continuity, poor academic performance, and poor school bonding, the likelihood of continual antisocial behavior is greatly increased.

The Social Development Model, proposed by Catalano and Hawkins (Hawkins et al., 2003), offers a different yet related developmental perspective on the role of schools and education. A product of their work on a school-based prevention program (the Seattle Social Development Project), this theoretical model details how individuals progress through institutions such as elementary and high schools across developmental stages. At each stage, the impact of various risk factors is mediated by certain social processes and the development of certain skills. Specifically, the model proposes that an “interplay of specific factors during development influences the degree to which children develop strong social bonds to school and family” (Hawkins et al., 2003). Along the prosocial path, youth who are given opportunities to be actively involved in the classroom are able to learn and practice social and academic skills. As these students improve their skills, they are recognized and rewarded for their involvement. This positive reinforcement leads to strong attachment to prosocial teachers and peers and commitment to education and other prosocial activities, resulting in normative beliefs that prevent antisocial behavior (Hawkins et al., 2003).

By contrast, the antisocial path demonstrates how these same factors may work in the opposite directions (Hawkins et al., 2003). Interactions with antisocial others lead to stronger antisocial skills, which are then rewarded and reinforced by deviant peers. This strengthens the attachment to these peers, commitment to antisocial activities, and belief in antisocial norms. Similar to the concept of cumulative continuity, an individual’s norms and behavior in one developmental stage influences future stages in the life course by

limiting that individual’s skills and opportunities (Hawkins et al., 2003). Thus, deviant youth are essentially stuck in the cycle of antisocial opportunities, peers, beliefs, and behavior.

Another well-known developmental theory, Sampson and Laub’s (1993; Laub & Sampson, 2003) age-graded theory of social control, addresses how social bonds that are formed in a variety of institutions throughout the life course influence an individual’s continuity and change in offending. One of the earliest sources of the social bonds that may intervene in a life of antisocial behavior is the school: While the family is the primary source of influence in early childhood, schools become just as or even more important in adolescence. Indeed, Sampson and Laub (1993) found that a higher grade point average and a more positive student attitude decreased delinquent behavior. Thus, school can serve as a turning point in the life course, such that weak school attachment and poor school performance may increase the probability of an offending trajectory throughout the life course, while strong school attachment and success in school may decrease it (Sampson & Laub, 1993). Similar to Moffitt (1993), Sampson and Laub (1993) also consider the idea of cumulative continuity. The consistency seen in antisocial behavior is partly a result of this behavior undermining social bonds early in life, which then reduces these youths’ opportunities to participate in conventional experiences such as those found in school. This loss can then continue the cycle of school failure and rejection by the school community, which can ultimately lead to a life of offending (Sampson & Laub, 1993).

Thornberry and his colleagues (Thornberry, 1987; Thornberry et al., 2003) also explore the role of education and schools through a developmental lens. Similar to Sampson and Laub (1993), Thornberry’s interactional theory sees a weak bond to society as the basic cause of antisocial behavior (Thornberry et al., 2003). This bond is formed by strong attachments to family, commitment to school, and belief in conventional goals. If this bond weakens, an individual is more likely to become involved in antisocial groups, thus increasing the chances of deviance

and delinquency. The causal influences on anti-social behavior vary depending on the developmental stage: Although family is an early influence on behavior, schools and peers become more influential during adolescence (Thornberry, 1987; Thornberry et al., 2003). Importantly, these developmental stages are interrelated; if an individual is able to form strong ties to the family in early childhood, he or she is more likely to succeed in forming strong ties with peers and teachers in school. Thornberry and his colleagues also discuss the feedback loop that may occur, such that weak ties to family and school lead to delinquency involvement, which then is likely to further weaken these ties to family and school (Thornberry et al., 2003). Research on interactional theory supports the importance of commitment to and success in school: Students who were committed to their education and performed well in school were less likely to engage in later delinquency and drug use (Thornberry et al., 2003). This finding held true even for those individuals who were considered high risk youth (Thornberry et al., 2003), suggesting that schools may be able to provide resiliency or protection for those most in need.

Finally, Le Blanc and his colleagues have presented an interactional developmental model of school social control (Le Blanc, Vallieres, & McDuff, 1992, 1993). This model examines six sets of concepts: structural, such as parents' educational achievement; internal, such as school stress; school bonding, built from attachment to teachers, commitment to education, and involvement in school activities; school performance, including both grades and retention; constraints, such as individual belief in school rules as well as school disciplinary responses; and student behaviors, including school misbehaviors and delinquency. The structural variables impact school performance, which is reciprocally related to a student's school bond. Students' school performance and bonds impact their misbehavior and delinquency in school, which influences the disciplinary responses enacted by school authorities. Finally, student behavior and school discipline predict student future criminal

activity. Essentially, adolescent misbehavior is amplified by a weak school bond and poor school performance; in turn, adolescent crime increases if student misbehavior is frequent and school discipline occurs often. Importantly, this model is both interactional and developmental: "a poor school performance and a weak bond to school will reinforce themselves in a sort of spiral and they will increase the probability of misbehaviors in school that will, in turn, provoke disciplinary reactions. The result of this process builds up through elementary and secondary school, leading to higher level of adolescent delinquency and, eventually, to adult offending" (Le Blanc et al., 1993, p. 472).

A General Developmental Perspective on Schools and Education

Beyond the established developmental theories' limited discussion of education as a life course event and schools as an important domain for human development, there is also little research that focuses on education through a general developmental lens. This is particularly surprising given the large body of research that has established a strong relationship between education and antisocial behavior (Ford & Schroeder, 2011). While the research that links school-related factors and problem behavior has been useful, it is likely that the influence of schools and education on antisocial behavior is far more complicated than suggested by this work (Dishion & Patterson, 2006). This complexity can be seen in the small body of research that uses the life course perspective to examine the relationship between education and deviance.

Some researchers have used a developmental perspective to examine the impact of higher education on antisocial behavior. Participation in postsecondary education decreases the risk of offending (Shover & Thompson, 1992), reduces the opportunities for offending (Stouthamer-Loeber, Wei, Loeber, & Masten, 2004), and even increases the likelihood of a positive marriage (Rutter, Quinton, & Hill, 1990). The influence of higher education can also be seen on

recidivism, such that inmates who continue their education have a reduced likelihood of returning to prison (Adams et al., 1994; Batiuk, Moke, & Rountree, 1997; Chappell, 2004; Harer, 1995; Streurer, Smith, & Tracy, 2001), mainly because postsecondary education increases their chances of becoming employed following release.

Perhaps the best use of a developmental lens on higher education is Ford and Schroeder's (2011) analysis of the longitudinal data from the National Youth Survey. Proposing that higher education helps develop and maintain strong social bonds during early adulthood, they examine how attending college and investing in postsecondary education influence adult offending. Results show that individuals who attended college were less likely to engage in future crime. Similar findings were seen with investment in higher education, such that those with higher levels of investment had lower likelihood of adult offending. Interestingly, both attendance and investment interacted with juvenile offending: the protective effect of higher education is stronger for those students who had higher levels of prior delinquency (Ford & Schroeder, 2011). Thus, college experience can be a turning point in a youth's life such that he or she desists from the trajectory of offending.

Others have examined the process by which youths' involvement in the juvenile justice system affects their education which, in turn, influences their subsequent offending. This work builds on the developmental concept of cumulative disadvantage (Sampson & Laub, 1993), which suggests that certain events or turning points may change an individual's life course by reducing conventional opportunities. Thus, a delinquent who experiences official intervention may continue to be involved in crime as an adult because of a lack of positive educational experiences due to that original intervention (Bernburg & Krohn, 2003). Earlier research supports this idea: educational attainment partly mediates the relationship between police contact in adolescence and unemployment in adulthood (Hagan, 1991), even while controlling for earlier delinquency (Tanner, Davies, & O'Grady, 1999). More recently, Bernburg and Krohn (2003)

analyzed the Rochester data to examine this process. Both police and juvenile justice intervention decreased the likelihood that a student would graduate from high school. In turn, this increased the chances of that individual being unemployed and engaging in crime at later ages. Thus, educational attainment partly mediates the influence of official intervention during adolescence on unemployment and crime in adulthood (Bernburg & Krohn, 2003).

The developmental perspective has also guided the examination of education's effect on individual trajectories of crime and delinquency and eventual incarceration. It is clear that the risk of institutionalization is "highly stratified by education" (Pettit & Western, 2004, p. 151), with all levels of schooling having a significant impact, particularly at the high school level (Arum & Beattie, 1999; Lochner & Moretti, 2003), but also among those who attended college (Pettit & Western, 2004). Arum and Beattie (1999) found that school factors such as low grade point average, low test scores, placement in lower tracks, dropping out, and being suspended significantly increased students' chances of being incarcerated later in life. They propose that this occurs as these educational factors decrease an individual's attachment to school, which then increases their likelihood of deviance and offending, and ultimately, incarceration. Various other elements of schooling and education contribute to this outcome, including school resources such as student-teacher ratios (Arum & Beattie, 1999; Arum & LaFree, 2008) and student compositional traits (Arum & Beattie, 1999). These influences are highly pronounced according to racial characteristics, and may substantially contribute to the vast disparity between the incarceration of black and white men (Lochner & Moretti, 2003; Pettit & Western, 2004). Further, analyses of FBI data indicate that diminished educational experience is especially associated with incarceration for specific types of offenses, including murder, assault, and motor vehicle theft (Lochner & Moretti, 2003).

Another use of a developmental focus on education can be seen in the concept of interdependency (Wright, Caspi, Moffitt, & Silva, 2001),

which pulls from Elder's (1985) description of interdependence as the "interlocking nature of trajectories and transitions, within and across life stages" (p. 32). This model describes both internal and external influences on antisocial behavior and proposes that external influences, such as social ties, have a greater effect on individuals who possess certain internal characteristics, such as impulsivity, that predispose them to deviance. Thus, social and environmental influences can produce turning points for certain children who are more prone to problem behavior (Wright et al., 2001). Wright et al. (2001) propose two specific effects: the social protection effect and the amplification effect. The social protection effect predicts that prosocial ties, such as those to school, will reduce antisocial behavior more strongly for those who are already predisposed to such behavior because of certain psychological characteristics, such as low self-control. Thus, individuals with a greater potential for deviance are more in need of these environmental deterrents, while those who are less prone to deviance, regardless of their environments, are less in need of this protection. Along the same lines, the social amplification effect predicts that antisocial ties, such as those to other delinquent students, will increase the likelihood of antisocial behavior most strongly for those same predisposed individuals. Those with a greater potential for deviance are more susceptible to peers who pull them into such behavior, while those who are less prone to deviance are less susceptible to such forces. Ultimately, individuals who are more able to control their own behavior due to their psychological makeup are less influenced by the social environment, whether prosocial or antisocial, while those who are more inclined to deviance due to certain psychological traits are more influenced (Wright et al., 2001). Using the Dunedin data, Wright et al. (2001) found support for these predictions by examining the interaction between education and self-control. School attachment displayed a negative relationship with offending. However, as predicted, the

influence of education on crime decreased as self-control increased. Thus, the independency of external and internal predictors of offending is clear, as high school attachment deterred offending while low school attachment increased offending most strongly among those students with low self-control (Wright et al., 2001).

Finally, Hagan and Parker (1999) focused on intergenerational causes of delinquency by examining the educational experiences of the adolescent's parents. They focus on the concept of educational disinvestment, citing Hirschi's (1969) discussion of an individual investing "time, energy...self, in a certain line of activity—say, getting an education" (p. 20). Individuals who experience positive schooling, with high educational aspirations and achievement, tend to continue on to higher education and find stable employment. They also engage in effective parenting practices and are able to provide their children with skills and experiences that ensure the children's success in school, thereby contributing to the children engaging in prosocial behavior throughout their life course (Hagan & Parker, 1999). By contrast, individuals who have negative experiences in school, in the form of low aspirations and school failure, are more likely to suffer negative life events, such as dropping out, teen pregnancy and parenthood, and unemployment. These individuals tend to engage in poor parenting practices, likely due to the deficit in prosocial skills they themselves possess, which makes it highly unlikely that their children are able to learn and practice these skills needed for school success. Thus, these children are far more likely to engage in antisocial behavior throughout their life course (Hagan & Parker, 1999). Truly utilizing a developmental perspective, this intergenerational process provides a strong case that deviance and delinquency result from parental educational disinvestment. These parents are unable to prepare their children for school experiences, which creates multiple problems for the children, and ultimately culminates in continual antisocial behavior.

Summary

- A developmental perspective indicates several ways that education may reduce antisocial behavior and involvement in later criminal offending.
 - Schools are social institutions that promote positive social bonds. They provide access to conventional role models and encourage students to form attachments to these prosocial others, who therefore, may reinforce positive behavior demonstrated by the students. This should reduce antisocial behavior because of the value young people place on these relationships.
 - Schooling establishes commitment to conventional goals, such as students' current education as well as later educational and occupational attainment; this is likely to reduce antisocial behavior because of the value youth place on these goals.
 - Schools encourage student involvement in conventional activities, which helps individuals form attachments to prosocial peers and reduces unsupervised free time that may be spent on deviant activities.
 - Ultimately, the bonds promoted by schools and education can have a strong protective impact on behavior.
 - Education may increase access to future social capital. Students who graduate high school may continue with postsecondary education, which will provide them with greater status and a more advantageous social position. These individuals have opportunities to get better-paying jobs, have successful marriages, and have larger and more supportive social networks, all of which can increase their social capital.
 - Cumulatively, these influences may increase an individual's sense of personal control and effectiveness, further improving several areas of individuals' lives.
 - As the sizeable body of research on school-related risk factors illustrates, schools and education are important influences on human development.
- Youth spend a substantial part of their childhood and adolescence in school and the skills they learn there, both academic and social, can have an enormous impact on their lives.

Future Research Needs

- A small amount of developmentally oriented research demonstrates the influence that schools and education have on an individual's behavior over the life course. More research is needed to establish how education earlier in one's life, particularly in kindergarten and elementary school years, can influence later adult behavior.
- Research is needed to demonstrate different ways school-based prevention programs can alter school-based risk factors for criminal and antisocial behavior in order to attempt reductions of such behavior. It would be good to know if it is possible that these programs are more effective for high risk students who are most in need, as predicted by the developmental concept of interdependency.
- Poor academic achievement, low attachment and commitment to school, truancy and dropping out of school, and other school factors are consistent and strong predictors of antisocial behavior. However, these relationships have generally been studied only during adolescence and these factors have not generally been considered to have an impact on other behavior over the life course, such as unemployment and later adult offending. More research is needed during different developmental phases.
- The processes among different school factors and factors from other domains of risk (such as those originating in peer groups, families, and neighborhoods) should be systematically assessed to determine the plausibility of interaction or mediating effects.
- If these theoretical and research contributions can be better linked and expanded, we are sure

to see a positive impact on antisocial behavior and offending over the life span.

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Neighborhood Context and the Development of Criminal and Antisocial Behavior

16

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The study of criminal and antisocial behavior historically has coalesced around two major traditions (Farrington, Sampson, & Wikstrom, 1993). The first approach, typically associated with fields such as psychology, focuses on the premise that criminal behavior arises from stable individual personality traits reflecting biological vulnerabilities (Gottfredson & Hirschi, 1994) and early socialization (Dishion & McMahon, 1998). The second perspective, usually associated with sociology, centers on contextual or community circumstances facilitating criminal behavior (Shaw & McKay, 1942/1969). In recent years, attempts have been made to integrate these individual and ecological approaches (Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990). Within the ecological approach, for example, is a body of research aimed at delineating the role of the neighborhood context while also taking into consideration individual and

family risk factors for antisocial behaviors (Leventhal, Dupéré, & Shuey, 2014; Sampson, Morenoff, & Gannon-Rowley, 2002).

This chapter provides a review of the literature on the associations between neighborhood characteristics and the development of criminal and antisocial behaviors. This overview is organized around three major developmental periods, broadly following Loeber and Le Blanc's (1990; Le Blanc & Loeber, 1998) notions of onset (behavior problems in early and middle childhood), activation/aggravation (antisocial behavior in adolescence), and desistance (adulthood). Before reviewing the relevant neighborhood literature pertaining to these developmental periods, we first describe broad classes of processes through which neighborhoods are thought to influence development. This chapter primarily focuses on research examining the link between neighborhood disadvantage (i.e., low socioeconomic status) and delinquent and criminal behavior because the majority of theoretical and empirical neighborhood research is on this aspect. Although there is an emerging body of research on neighborhood advantage and antisocial behavior (Ansary & Luthar, 2009), it is largely conceptual and empirical validation is limited.

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Conceptualizing Neighborhood Effects

The research tradition linking neighborhood characteristics and antisocial behaviors was

originally based on the observation that despite population turnover, urban criminality remained concentrated in the same areas of a city, that is, disadvantaged inner-city neighborhoods (Shaw & McKay, 1942/1969). Based on this observation, a relatively large body of research has examined associations between neighborhood disadvantage and individual crime-related outcomes, over and above other known individual risk factors. Comprehensive reviews of this literature conclude that neighborhood disadvantage is independently related to such outcomes but that the magnitude of the association is generally small to modest (see Sampson et al., 2002). These findings have fueled debates about the existence of “neighborhood effects” over and above selection effects and about the underlying mechanisms involved. These two issues are discussed next.

Selection Issues and Study Designs

Because selection into disadvantaged neighborhoods is not random, but rather is due to a number of individual (e.g., parental motivation) and family (e.g., income) characteristics, isolating neighborhood influences on development can be challenging. Over time, researchers sought to examine the association between neighborhood disadvantage and crime using various research designs and methodologies to account for such selection mechanisms (e.g., Leventhal et al., 2014). The “gold standard” research design to achieve this goal is the randomized experiment, exemplified by the Moving to Opportunity for Fair Housing Demonstration (MTO) funded by the Department of Housing and Urban Development (Goering & Feins, 2003). Through this program, families living in public housing units in high-poverty neighborhoods were randomly assigned to be part of an intervention group who received assistance to move to private housing in low-poverty neighborhoods or to be one of two control groups. The results of this and other similar experiments are mixed and found to depend on a number of factors, notably gender

(Sanbonmatsu et al., 2011). Nevertheless, the presence of significant results supports the general idea that neighborhoods help to shape individual outcomes.

Explanations of the mixed experimental results are the subject of whole books and of special journal issues (Goering & Feins, 2003). A full discussion of these results is beyond the scope of this chapter, both because of their complexity and because of the fact that they narrowly apply to a very limited subset of the population. The remainder of this chapter focuses on the broader neighborhood literature based on correlational designs. Studies using such designs typically rely on longitudinal city-based (e.g., the Project on Human Development in Chicago Neighborhoods; Sampson et al., 2002) or nationally representative (e.g., the Panel Study of Income Dynamics; Hill, 1992) samples and various statistical techniques to minimize selection. These approaches range from regression analyses that covary for individual and family background characteristics to more rigorous analytic strategies for addressing selection (e.g., propensity score matching, instrumental variable analysis).

Processes Linking Neighborhood Disadvantage and Behavior

A variety of theoretical processes have been proposed to explain the recurring observation that neighborhood disadvantage is associated with delinquency and crime. These explanations can be classified into three broad groups, following Leventhal and Brooks-Gunn’s (2000) integrative framework: (a) institutional resources, (b) norms and collective efficacy, and (c) relationships and ties. We discuss in broad terms the theoretical underpinnings of each of these processes in turn.

Institutional resources. The presence of high-quality neighborhood institutions—such as schools, childcare, employment, or community centers—is thought to foster positive individual outcomes. In disadvantaged neighborhoods, high-quality institutional resources are less common than in more affluent communities, with

potential consequences for the development of antisocial behaviors. Schools provide a good illustration of this point.

Because public schools in the USA are funded through local income taxes, schools in disadvantaged neighborhoods, where large proportions of residents are poor, are often underfunded (Ryan, 2010). The imbalance between such limited resources and the needs of a disadvantaged student body can create many challenges in disadvantaged schools, including difficulties in hiring and retaining high-quality teachers and in providing students with basic material resources (e.g., up-to-date texts and technology; Holme & Rangel, 2012). Moreover, students from disadvantaged backgrounds have higher rates of learning disabilities and socioemotional problems—known risk factors for antisocial behavior—than their peers from more advantaged backgrounds (Brooks-Gunn & Duncan, 1997), potentially placing additional pressure on already limited resources. Under such circumstances, disadvantaged schools may have insufficient resources to support students with special needs (Hibel, Farkas, & Morgan, 2010). For these reasons, school quality is thought to be an important vehicle through which neighborhood disadvantage relates to suboptimal developmental outcomes, including delinquent and antisocial behaviors (Gershoff & Benner, 2013).

Similar observations have been made regarding the availability and quality of other forms of services in disadvantaged neighborhoods, including childcare and recreational activities (Burchinal, Nelson, Carlson, & Brooks-Gunn, 2008). Residents in disadvantaged neighborhoods may be dissatisfied with local resources and not use them; in turn, low demand may further weaken an already limited supply (Jencks & Mayer, 1990). Although some parents in disadvantaged neighborhoods employ various strategies to obtain quality resources for their children—for instance, by using services in other communities (Jarrett, 1999)—the children of parents who do not try and succeed in connecting them to such resources may be restricted to limited poor-quality local resources. Thus, children in disadvantaged neighborhoods

may be less likely to reap the developmental benefits associated with regular exposure to high-quality institutions than children in more advantaged neighborhoods.

Norms and collective efficacy. In addition to institutions, neighborhood social processes, such as norms and collective efficacy, may be critical to understanding neighborhood effects on child and adolescent development. Collective efficacy is conceptualized as the presence of social organizational resources that support collectively shared goals such as the desire to live in a safe neighborhood (Sampson, Raudenbush, & Earls, 1997). Collective efficacy is thought to be composed of two major dimensions. The first is informal social control, defined as residents' willingness to monitor others' behavior and to intervene when witnessing disruptive behaviors in the neighborhood. The second is social cohesion, which involves the extent to which residents share values and norms and how willing they are to help one another. When collective efficacy is high, residents are better able to monitor and control undesirable behaviors in their neighborhood, especially that of unsupervised adolescents, thus reducing youths' opportunities for engaging in delinquent activities. Conversely, when collective efficacy is low, as is often the case in disadvantaged neighborhoods, the lack of social control and cohesion may allow for delinquent and criminal activities to take hold (Sampson et al., 1997).

A concept that intersects with collective efficacy is that of neighborhood disorder. Neighborhood disorder can be defined both physically (e.g., broken windows and poorly maintained roads) and socially (e.g., public drug dealing and prostitution; see Sampson & Raudenbush, 2004). The broken windows theory proposes that signs of disorder are thought to be consequential for antisocial behaviors, as they provide observable cues that delinquent behaviors are prevalent and to some degree tolerated (Wilson & Kelling, 1989). Although there is significant heterogeneity among low-income neighborhoods (Brody et al., 2001), economically disadvantaged communities may be susceptible to disorder as a result of compromised structural

and social resources (see Elo, Mykyta, Margolis, & Culhane, 2009).

Other norms, behaviors, and attitudes may spread and reproduce themselves within disadvantaged neighborhoods. For instance, the proximity of peers engaging in problematic behavior is thought to increase the chances that other children from the same neighborhood will do the same. Harding's (2011) model of cultural heterogeneity suggests that children living in high-poverty neighborhoods are exposed to a wide range of cultural scripts, mostly mainstream ones but also to many unconventional variants. Accordingly, adolescents in these neighborhoods have a wider set of models to choose from than their peers in more advantaged neighborhoods, increasing the likelihood that they will take part in deviant or antisocial behaviors (see Vitaro, Brendgen, & Lacourse, 2015).

Relationships and ties. Leventhal and Brooks-Gunn's (2000) conceptualization of the relationships and ties framework builds on the family stress model linking parental strain and child and adolescent well-being (e.g., Conger, Lorenz, & Wickrama, 2004). Parents in disadvantaged neighborhoods, where disorder, crime, and subpar institutions are part of daily life, live under more stressful conditions than parents in more advantaged neighborhoods. Stressful neighborhood conditions take a toll on parents' health and well-being and compromise effective parenting (Conger et al., 2004). Thus, poor-quality relationships with parents may contribute to links between neighborhood characteristics and child and adolescent outcomes (Kohen, Leventhal, Dahinten, & McIntosh, 2008).

Processes Linking Neighborhood Structure and Antisocial Behaviors Across Development

The three types of processes outlined have been used to theoretically ground empirical investigations linking neighborhood disadvantage and antisocial behavior at different developmental periods. However, much of the neighborhood research to date focuses on isolating direct

independent associations between neighborhoods and problem behavior, without attempting to elucidate the pathways thought to underlie the neighborhood context-behavior relationship. Nevertheless, the number of empirical studies examining potential mediating processes at different developmental periods is growing. We review these studies next, focusing on three broad developmental periods—childhood (early and middle), adolescence, and adulthood. These three periods generally match the criminological development phases in Loeber and Le Blanc's (1990; Le Blanc & Loeber, 1998) framework (onset, activation/aggravation, and desistance).

Childhood

A number of studies link neighborhood socioeconomic disadvantage with behavior problems in early and middle childhood (Leventhal & Brooks-Gunn, 2000; Leventhal et al., 2014), the developmental periods during which early-onset antisocial pathways start to diverge from more conventional ones. The mechanisms thought to underlie potential neighborhood influences on behavior in early and middle childhood overlap, but new ones come into play as children enter middle childhood, when they make the transition to school and when peer relationships take on a new significance. For this reason, early and middle childhood are described separately.

Early Childhood

During early childhood, young children's direct exposure to the neighborhood is likely to be quite limited. As such, associations between neighborhood conditions and young children's outcomes are thought to be largely indirect and to operate via family and institutional dynamics. Young children's development likely reflects the quality of contexts to which they are most immediately and extensively exposed, including the daily care they receive first from their parents and then from other caregivers.

As discussed in previous sections about institutional resources and relationships and ties, there are a number of ways through which neighborhood poverty may negatively impinge on family processes as well as the quality of local childcare services and, in turn, children's development. The few studies directly investigating these mediating pathways among young children primarily focus on achievement-related outcomes and not on behavior problems (e.g., Froiland, Powell, Diamond, & Son, 2013). Nevertheless, a handful of studies using nationally representative samples of young children find that links between neighborhood disadvantage and behavior problems are mediated through family processes (e.g., Odgers et al., 2012). Without directly examining mediation, additional research shows that among mothers of young children, neighborhood disadvantage was associated with their mental health and parenting (e.g., Barnes et al., 2005). Because these maternal characteristics are generally recognized as important determinants of young children's outcomes, these results indirectly support mediation via family processes (e.g., Goodman et al., 2011).

In terms of mediation via institutional processes, some findings indirectly support the premise that institutions may explain the connection between neighborhood structure and children's behavioral outcomes. Of note, neighborhood disadvantage is linked with lower-quality local institutional resources serving young children, most importantly childcare (Burchinal et al., 2008). In turn, other studies show that higher-quality childcare is associated with better long-term developmental outcomes, especially among disadvantaged children (Ruhm & Waldfogel, 2011). In other words, access to high-quality care appears problematic in the very places where it is needed most. The shortage of high-quality childcare options in disadvantaged communities may limit the effectiveness of childcare subsidies (Johnson, Ryan, & Brooks-Gunn, 2012). These results underscore the need for new studies directly investigating the role of local institutional resources in explaining the link between neighborhood

disadvantage and young children's behavioral outcomes.

Even though neighborhood influences on young children's problematic developmental outcomes are generally described as small and as largely operating indirectly through family- and institution-related processes, it does not mean that they are unimportant. On the contrary, recent findings suggest that the association between neighborhood disadvantage and young children's suboptimal outcomes tend to accumulate as children grow older (Odgers et al., 2012), reflecting the observation from the family poverty literature that exposure to disadvantage in early childhood is especially detrimental to long-term development (Duncan, Ziol-Guest, & Kalil, 2010). For instance, Odgers et al. (2012) found significant differences between the antisocial behaviors of 5-year-olds living in disadvantaged neighborhoods and those of peers living in more advantaged ones; this gap widened over time. Thus, neighborhood disadvantage could play a role in the development of early-onset antisocial behaviors, a proposition explicitly considered during middle childhood, as described next.

Middle Childhood

Middle childhood may be a period of critical importance when it comes to potential neighborhood influences on antisocial behaviors. Ingoldsby and Shaw (2002) described this period as a crossroads of potentially significant neighborhood influences, where children's trajectories of antisocial behavior diverge, with some embarking on a problematic course characterized by persistent escalating antisocial behaviors, whereas others stop exhibiting these behaviors and evolve away from that path. Because middle childhood is also a time when children become more sensitive to peer influences and when parental supervision tends to decrease, they proposed that neighborhood circumstances may be especially meaningful for antisocial behaviors at this juncture. In their review, Ingoldsby and Shaw (2002) find evidence that neighborhood disadvantage is associated with the onset of

antisocial behaviors during middle childhood, as well as with progression towards more serious forms of these behaviors.

Other studies provide evidence that family processes continue to mediate the link between neighborhood characteristics and behavior in middle childhood but that new processes related to peer dynamics also come to play an increasingly important role during the course of this developmental period (Criss, Shaw, Moilanen, Hitchings, & Ingoldsby, 2009). In addition, in middle childhood, schools replace childcare as the most salient neighborhood institution shaping children's outcomes. So far, the mediating role of schools has been investigated mostly in neighborhood studies looking at achievement-related outcomes, with a few exceptions considering delinquency (see Dupéré, Leventhal, Crosnoe, & Dion, 2010). New studies simultaneously considering neighborhood and school processes in relation to the development of antisocial behaviors are clearly needed (Gershoff & Benner, 2013), especially in middle childhood, as the limited research base on this topic focuses on adolescents, as described next.

Adolescence

The majority of research linking neighborhood contexts and criminal and antisocial behavior has been conducted among adolescents (Le Blanc & Loeber, 1998). This research trend is due in large part to the fact that the neighborhood context is thought to be especially relevant for adolescents' development, given young people's tendency to spend increasing amounts of time with peers and outside the home (Steinberg & Morris, 2001). Studies aimed at uncovering the mechanisms underlying the association between neighborhood disadvantage and adolescent delinquent and antisocial behaviors are reviewed next, starting with those considering institutional resources, followed by studies looking at norms and collective efficacy and, finally, relationships and ties as potential mediators.

Institutional Resources

In adolescence, two local institutions are thought to be especially salient with regard to antisocial behaviors and criminality: schools and after-school activities. These institutional resources play an important role in structuring adolescents' daily activities and in modulating exposure to prosocial adults and peers, as opposed to deviant peers (Gottfredson, Gerstenblith, Soulé, Womer, & Lu, 2004). When these institutions are not engaging or stimulating, adolescents may spend more time in unstructured settings and activities with deviant peers, that is, in the kinds of situations that facilitate delinquent behaviors. Neighborhood studies that have examined the mediating role of these two institutions are reviewed next.

Because adolescents spend a large portion of their days in and around school, school characteristics such as quality/climate and norms may be especially potent mediators linking neighborhood disadvantage and adolescent behavior (Leventhal et al., 2009). For example, in their examination of public middle and high schools in Florida, Eitle and McNulty Eitle (2004) found that schools with students who were not strongly attached to the academic mission, with fewer resources to dedicate per student, and with inexperienced faculty had higher levels of tobacco, alcohol, and illicit drug offenses. Moreover, neighborhood norms about the importance of attending school and obtaining a diploma may be related to truancy and school disengagement, which are in turn linked to adolescents' antisocial behavior (e.g., Hemphill et al., 2012).

The availability and quality of after-school programs and other recreational activities may be related to adolescents' antisocial behavior (Snyder & Sickmund, 2006). Delinquency rates tend to be highest during after-school hours, from 2 pm to 6 pm, when parents are not home. Adolescents living in disadvantaged neighborhoods may not take advantage of after-school programs, either because they do not exist in their communities or because they are of low quality (Leventhal et al., 2009). Adolescents

who are unsupervised, do not have structured activities to keep them occupied during the afternoon, and are not exposed to prosocial peers and adults through organized programming are more likely than their program-involved counterparts to engage in risky behaviors (Gottfredson et al., 2004). Adolescents in low-income neighborhoods may face barriers to participating in after-school programming beyond issues of access and quality, such as lack of safety and parental involvement: Coulton and Irwin (2009), for example, found that in disadvantaged unsafe neighborhoods, adolescents whose parents were uninvolved in their communities were significantly less likely to participate in out-of-school activities as compared with their peers in safer neighborhoods.

Other institutional resources are potential mediators of the link between neighborhoods and adolescent development, including the availability of employment opportunities or health services (Leventhal, Graber, & Brooks-Gunn, 2001), but a full discussion of these resources is beyond the scope of this chapter. The link between low-quality or inaccessible institutional resources and adolescent behavior problems may be further mediated by neighborhood norms and climate, as described next.

Norms and Collective Efficacy

Because adolescents tend to spend increasing amounts of time in their neighborhoods, neighborhood norms are thought to exert a stronger influence on adolescents than they do on younger children (Leventhal et al., 2009). Various studies point to a link between low collective efficacy (low social control and low social cohesion) and adolescents' delinquent behavior (e.g., Elliott et al., 1996). In neighborhoods with lower collective efficacy, adolescents may feel unconnected to conventional society (Kingston, Huizinga, & Elliott, 2009); the adoption of unconventional norms is, in turn, associated with greater delinquency (Anderson, 1999).

Correlates of low collective efficacy, such as neighborhood disorder and violence, also may

mediate the relationship between neighborhood disadvantage and adolescent delinquency (Sampson et al., 2002). Studies have found that neighborhood disorder is associated with adolescents' exposure to criminal and antisocial individuals in their neighborhoods (e.g., Haynie, Silver, & Teasdale, 2006). In turn, adolescents exposed to neighborhood violence are more likely to commit violent acts themselves (Chauhan & Reppucci, 2009). Although neighborhood norms and collective efficacy may be linked to adolescents' behaviors, more proximal factors, such as relationships with parents and peers, may mediate neighborhood influences on adolescents' antisocial behavior.

Relationships and Ties

Children spend less time under the direct supervision of their parents as they move into adolescence, although parents are still active in guiding their children through this transition (see Pardini, Waller, & Hawes, 2015). Parents who monitor and track their adolescents' whereabouts and structure their activities and ecologies when outside of the home help their children avoid engagement in antisocial activities, and these practices appear especially important in disadvantaged communities where occasions for such activities are numerous (Dishion & McMahon, 1998). Low parental monitoring has been found to mediate the relationship between neighborhood disadvantage and adolescent delinquency (Chung & Steinberg, 2006), but the relationship may be further mediated by adolescents' exposure to deviant peers and antisocial role models (Brody et al., 2001). Another way that living in a disadvantaged neighborhood may be related to adolescents' antisocial behavior is through parental stress (e.g., Brody et al., 2001).

Other studies find that peer influences may mediate the link between neighborhood characteristics (including both structural disadvantage and social disorganization) and risky behaviors. For instance, neighborhood structural disadvantage is associated with affiliation with deviant peers, which in turn is related to

adolescent violence (e.g., Haynie et al., 2006). Some scholars suggest that weakened social controls contribute to the development and dominance of deviant peer networks over prosocial networks in disadvantaged neighborhoods (e.g., Anderson, 1999). These studies highlight the complexity of the relationship between neighborhood disadvantage and adolescent antisocial behavior.

Moderators

As stated earlier, the body of work linking neighborhood contexts and antisocial behavior is more developed in adolescence as compared with other developmental periods. In addition to looking at mediation via institutions, norms, or relationships, a growing body of research considers how the significance of the neighborhood context for antisocial behaviors may depend on other individual characteristics.

Biological or psychological characteristics may interact with neighborhood characteristics and moderate associations with adolescent development such that an individual's propensity for antisocial behavior is more likely to translate into actual criminal behavior for those exposed to crime-prone contexts (Agnew, Brezina, Wright, & Cullen, 2002). In most studies, neighborhood disadvantage interacts with individual risk factors in a manner amplifying problematic outcomes. For example, the link between impulsivity or self-control and delinquency-related outcomes was strongest in disadvantaged neighborhoods in both city-based and national samples (Gibson, 2012). This conclusion should be considered tentative, however, because it is based on a small number of studies and discrepant findings exist (Zimmerman, 2010). In addition to impulsivity, sociodemographic characteristics such as gender (e.g., Dupéré et al., 2010) and race/ethnicity (e.g., Chauhan & Reppucci, 2009) have emerged as moderators of the relationship between neighborhood characteristics and antisocial behavior, with mixed findings (for a full discussion of these findings, see Leventhal et al., 2014).

Adulthood

The neighborhood processes operating in adolescence are likely to continue to influence adult antisocial and criminal behaviors. For instance, low collective efficacy is linked not only with antisocial behavior in adolescence but also with general levels of violent offending (Sampson et al., 1997). In addition to this continuity between adolescence and adulthood, the neighborhood context may become relevant in new ways during adulthood, notably in relation to desistance. This section focuses on the central issue of desistance, in order to illustrate how neighborhood circumstances may continue to shape antisocial behaviors in adulthood. It does not attempt to provide an extensive review of the literature about neighborhoods and adult criminal behaviors.

Desistance is a process through which long-term offenders decrease or stop their involvement in criminal activities at some point during adulthood (Le Blanc & Loeber, 1998). A number of factors are thought to explain whether, how, and when desistance occurs (see Kazemian, 2015). Social bonds constitute one important class of such factors, including, for instance, the creation or reinforcement of social bonds via marriage or employment, as well as the severance or weakening of existing bonds via residential mobility or incarceration. Some researchers have proposed that neighborhood circumstances could play a role in modulating such social bonds in adulthood and thus potentially influence desistance.

Residential mobility offers one way to assess potential neighborhood influences on desistance. For individuals with a long history of offending, moving out of highly disadvantaged neighborhoods may precipitate the process of desistance (Kirk, 2009; Laub & Sampson, 2003). Mobility may weaken bonds with antisocial peers, for example, when one leaves behind a disadvantaged neighborhood where the proportion of residents engaging in criminal activities is high and where local social networks are likely to include at least some criminally active members

(Pattillo, 1998). When looking at desistance in Gluecks' longitudinal sample of Boston juvenile offenders, Laub and Sampson (2003) observed that for some of them, mobility represented an opportunity to leave behind their former deviant lifestyle and to embark on a more prosocial pathway.

A recent study by Kirk (2009) took advantage of a rare opportunity to assess the impact of residential mobility on recidivism via a natural experimental design. This opportunity emerged in the aftermath of Hurricane Katrina. Before the hurricane, inmates from New Orleans usually resettled, upon release, in their neighborhoods of origin, typically located in the city's most disadvantaged areas. After the Hurricane, many of these neighborhoods were decimated, such that inmates often could return and instead relocated elsewhere. The study found that the inmates' rates of recidivism and re-incarceration after release were reduced after the hurricane as compared with rates before the hurricane. This result is thought to reflect the disruption of social bonds with deviant peers for those relocating to new neighborhoods. By contrast, inmates returning to disadvantaged neighborhoods with few or overtaxed institutional resources have been found to be at an increased risk of recidivism (Hipp, Petersilia, & Turner, 2010). However, such associations between residential mobility and criminal behaviors are unlikely to emerge when the distance between the new community and the community of origin is short, as short-distance moves within the same city do not necessarily imply noteworthy changes in bonds with antisocial peers (Clampet-Lundquist, Edin, Kling, & Duncan, 2011).

Neighborhoods are also thought to be relevant for the nature, quality, and duration of romantic and marital relationships, which are implicated as contributing to desistance (e.g., Laub & Sampson, 2003), resulting in heightened levels of family instability and of female-headed households in these communities. Other researchers have uncovered associations between neighborhood economic or social disadvantage and outcomes such as delayed marriages or short-lived romantic relationships (Browning &

Olinger-Wilbon, 2003). Neighborhood circumstances thus potentially shape the process of entering strong and stable marital relationships. This observation is relevant to the desistance process, as marriage has been identified as a major turning point that can create strong prosocial bonds and reshape routine activities in a manner that contributes to desistance (Laub & Sampson, 2003). Further research simultaneously considering the role of neighborhoods and family formation in the desistance process is needed to delineate these processes.

The decline of stable, relatively high-paying industrial jobs in disadvantaged inner-city neighborhoods as first highlighted by W. J. Wilson (1987) is relevant for another aspect related to desistance: employment. Like marriage, full-time legal employment provides structure to daily routines and reduces opportunities for offending (Laub & Sampson, 2003). If adults, especially males, in disadvantaged neighborhoods have little access to satisfying and stable jobs, one important pathway to desistance may be blocked. A vast literature linking neighborhood characteristics and employment outcomes supports the idea that place matters for employment (for a review, see Fernandez & Su, 2004). With diminished opportunities for stable, well-paying, and legal employment, alternative pursuits in illegal markets may continue during longer periods in the adult life course. Indirectly supporting this view are findings from the ecological analysis of Cleveland and Chicago neighborhoods indicating that when access to employment is reduced in a neighborhood, the crime rates also tend to be higher (Wang, 2005).

Finally, disadvantaged communities overwhelmingly bear the burden of the mass incarceration phenomenon that has emerged in recent decades (Clear, 2007), with potential implications for desistance. Some evidence suggests that incarceration is disproportionately high in disadvantaged communities. Notably, concentrated neighborhood disadvantage is associated with high rates of incarceration, even after controlling for local crime rates (Sampson

& Loeffler, 2010). Because imprisonment is thought to weaken social bonds and to alienate inmates from society, imprisonment could delay desistance (Maruna & Toch, 2005). However, recent findings, including some from randomized experiments, suggest that the impact of incarceration on reoffending is minimal (e.g., Nagin & Snodgrass, 2013). Still, other findings suggest that incarceration may have negative consequences for other residents by increasing the problem behaviors and criminal activities among children of incarcerated parents (Wakefield & Wildeman, 2013). Studies conducted during different developmental periods and considering family dynamics are needed to identify potential links between neighborhood characteristics, incarceration, and trajectories of antisocial behaviors.

There are a number of ways in which the neighborhood context might be relevant to the desistance process, but there is little empirical investigation of this link. Additional research in this area is warranted. The next section summarizes the state of research linking neighborhood processes and antisocial behaviors across the three developmental periods reviewed.

Summary

- Children, adolescents, and adults in disadvantaged neighborhoods are more likely to exhibit antisocial behaviors than their peers in more affluent communities, but the causal nature of these associations remains debated.
- Potential neighborhood effects on criminal and antisocial behavior may operate via three main processes: institutional resources (e.g., childcare, schools, and employment opportunities), norms and collective efficacy (e.g., social control, social cohesion, and social disorganization), or relationships and ties (e.g., with parents, peers, or romantic/marital partners).
- Although children's direct exposure to neighborhood norms and values is limited, a relatively small corpus of studies finds that neighborhood disadvantage is associated

with early-onset antisocial behaviors, through institutions, particularly childcare settings (early childhood) and schools (middle childhood), family processes, and peer relationships (middle childhood).

- The bulk of neighborhood studies looking at antisocial behaviors focuses on adolescence as a period during which the neighborhood context is particularly salient. The link between neighborhood characteristics and adolescents' antisocial behavior may be mediated through institutional resources such as schools and after-school programming (which may be unavailable or of poor quality in disadvantaged neighborhoods), neighborhood norms (low collective efficacy and high disorder), and relationships with parents (low monitoring and family conflict) and peers (affiliation with deviant peers).
- Desistance from criminal and antisocial behavior in adulthood may be influenced by neighborhood characteristics through "turning points," including moving out of high-crime neighborhoods, developing significant relationships, and securing stable, legal, and well-paying employment.

Future Research Needs

- Much of the work conducted on neighborhood effects in childhood focuses on achievement outcomes; additional research is needed to further elucidate the links between neighborhood context and behavioral problems in early and middle childhood.
- Additional life span research on associations between the neighborhood context and trajectories of antisocial behavior is warranted. Although more longitudinal work in this tradition has been conducted in recent years, it is typically constrained to a single developmental period (e.g., adolescence).
- Research designs that attempt to reduce selection bias are needed. These designs should include advanced analytical techniques (such as propensity score matching, instrumental

variable analysis, and fixed effects) as well as experiments and quasi-experiments.

- Further research that continues to elucidate the processes (such as parental or peer influences) underlying associations between neighborhood characteristics and antisocial behavior should be conducted to provide a deeper understanding of potential causal pathways. Mixed methods approaches may be useful in this endeavor.

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Media Exposure and Consumption as Risk Factors in the Development of Antisocial Behavior

17

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Media exposure and consumption have become unprecedentedly intense, ubiquitous, diversified, simultaneous, and interactive in the everyday lives of young people (Brown & Bobkowski, 2011; Rideout, Foehr, & Roberts, 2010; Roberts, Henriksen, & Foehr, 2009). In the last decade, the daily amount of time that 8- to 18-year-olds dedicate to media has risen to a point where it easily rivals with their school activities, community events, and family matters—4:29 h of television, 2:31 h of music, 1:29 h of computer, 1:13 h of video games, 0:38 h of print, 0:25 h of movies, 7:38 h of total use, and 10:45 h of total exposure via 29 % of multitasking (Rideout et al., 2010). In the coming years, students in grade 7 are thereby likely to be exposed to at least 23,000 h of media by the time they complete high school. This estimate is actually modest inasmuch as the recent outburst of portable multitasking devices (e.g., smartphones, tablets) will considerably increase young people's use and exposure to media.

Media—by design and mass—should plausibly have multiple psychological, social, cultural,

and even biological influences on people (Dill, 2013). The multifaceted question is not only to better understand the nature and magnitude of these media-related influences but also if we deem those to be adaptive or maladaptive in a given society and at a given time in history. Media comprising prosocial information and stimuli have been credited for promoting many developmental benefits, such as education, health promotion, identity exploration, socialization, and civic engagement (Brown & Bobkowski, 2011; Mares & Pan, 2013; Roberts et al., 2009). Conversely, media involving violent or antisocial information and stimuli have been suspected of being deleterious to development (Anderson & Bushman, 2002a; Bushman & Anderson, 2001; Huesmann, Dubow, & Yang, 2013). In particular, media conveying antisocial contents have been alleged to impact a myriad of serious issues in youth, notably aggressive behaviors but also gender role stereotyping, risky sexual relationships, disturbed body image, obesity, and substance use (Brown & Bobkowski, 2011).

In this chapter, we address the controversial question as to whether media exposure and consumption can represent risk factors in the development of criminal and antisocial behavior (CAB). Many literature reviews have already tackled this complex question (e.g., Anderson & Bushman, 2002a; Anderson et al., 2003; Browne & Hamilton-Giachritsis, 2005; Bushman & Anderson, 2001; Ferguson & Savage, 2012; Gentile, Saleem, & Anderson, 2007; Groves, Prot, & Anderson, *in press*; Huesmann et al., 2013).

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Indeed, this is a crucial question as media is a fundamental tool in the information age, while CAB remains extremely burdensome to individuals and disproportionately costly for their larger societies. From a scientific standpoint, the evidence about the deleterious effects of antisocial media is increasingly robust, even though the news media and folk wisdom often minimize or even deny its validity (Bushman & Anderson, 2001; Huesmann et al., 2013).

Nonetheless, there are heated debates opposing scholars who assert that media can be serious risk factors (e.g., Anderson et al., 2010) to those who disagree with these claims (e.g., Ferguson, 2010). From an applied/clinical standpoint, however, professional organizations have already endorsed findings indicating that antisocial media can increase risks of antisocial behavior (e.g., *American Psychological Association*, the *American Academy of Pediatrics*, the *American Medical Association*; Brown & Bobkowski, 2011). From a societal viewpoint, there is still a divide between parents, practitioners, policy makers, media producers, and young people. Some of them express concern over and criticism against antisocial media, whereas others opine skepticism about and even sense “moral panic” in current research findings (Ferguson, 2010). That said, from a judicial standpoint, the courts of law have often remained unconvinced by the extant scientific evidence warning against antisocial media (Ferguson, 2013; Gentile et al., 2007). This is in spite of longitudinal research indicating that antisocial media in childhood can represent risk factors of antisocial behavior in adulthood (e.g., Huesmann, Moise-Titus, Podolski, & Eron, 2003). In other words, the game is far from over, especially given the many players, and this is likely to be mediatized by the crowd.

In this chapter, more specifically, we draw on recent empirical findings from meta-analyses and longitudinal studies to evaluate the extent to which television/movies, video games, Internet, music, and media in general may influence aggressive behaviors in children and adolescents. We adopt a pragmatic definition of *media* by considering those that are not only the most popular but also the most controversial in terms of

putative deleterious effects: Television, movies, video games, Internet, and music (Brown & Bobkowski, 2011; Rideout et al., 2010). Unfortunately, reviewing the conceptual models underlying the short- and long-term effects of media violence is beyond the scope of this review (for a recent review of conceptual models, see Groves et al., *in press*). Rather, we selectively review the most robust empirical findings from meta-analyses and longitudinal studies that tested the impact of media violence on aggressive behaviors. These studies consist of the lion’s share of compelling empirical findings in the research arena on media as putative risk factors of CAB. As a definition for aggressive behaviors, we consider that “human aggression is any behavior directed toward another individual that is carried out with the proximate (immediate) intent to cause harm” (Anderson & Bushman, 2002b, p. 28). Herein, from a developmental perspective, we also make considerations vis-à-vis differential impact and generalized impact of media-related risk factors, certain developmental parameters, and putative developmental processes (e.g., moderation, mediation). We end this chapter by offering specific concluding remarks and by suggesting future research needs that might foster scientific progress at the intersection of media studies, developmental psychology, and developmental criminology.

Television and Movies

For several decades, screen media (television and movies) have become prime societal and cultural products to inform, educate, and entertain large audiences. Screen media that convey antisocial and aggressive stimuli have at least four characteristics that make them theoretically important to understand the risks associated to the development of CAB. First, television, in particular, is still very popular among children and adolescents, including those who are more at risk. Second, screen media can elegantly (aesthetically and artistically), convincingly, rapidly, and massively convey vivid antisocial and aggressive scenes, scripts, and dialogues that

describe real or imagined social settings, interpersonal relationships, and life events. Third, until recently, screen media viewing had often been considered to involve passive viewers who interacted minimally with the media content or with other viewers. Fourth, screen media have become so traditional in and familiar to many households that it may lead younger and older viewers to lack awareness as to their potential influences. The classic hypothesis is that children and adolescents can observe, emulate, and learn behaviors depicted on screen media (television and movies) and that when these mediated behaviors are antisocial, they become risk factors of aggressive behaviors. Therefore, screen media seem to have the mechanisms to convey compelling antisocial information—but also prosocial information—to an audience. Consequently, meta-analyses have shown that watching television with antisocial material is related to more antisocial behavior ($r = .31$; Paik & Comstock, 1994) but also that viewing television with prosocial material is also associated with more prosocial behavior ($r = .28$; Mares & Woodard, 2005).

In terms of developmental parameters, can violence on television spur violence in people (i.e., socialization effect) or is it those who are already violent that tune in violence on television (i.e., selection effect)? The long-term impact of violent television viewing seems to have an early onset in childhood. Huesmann et al. (2003) conducted a long-term longitudinal study that followed American children (ages 6–10) during 15 years and thus onto young adulthood. After controlling for baseline aggressive behavior, longitudinal findings revealed that exposure to violence on television (but also identification to TV characters and perceived realism of TV violence) in childhood predicted more aggressive behaviors in men and women during young adulthood. Cross-lagged structural equation modeling (also controlling for IQ and SES) further indicated that childhood exposure to violence on television predicted more aggressive behaviors in young adulthood but that, conversely, childhood aggressive behavior did not predict TV-violence viewing in adulthood. In

fact, violent television viewing as early as in preschool (from ages 41 to 53 months) could also predict antisocial symptoms in Canadian (Québécois) second graders (age 97 months), even after controlling for baseline aggressive behavior (Fitzpatrick, Barnett, & Pagani, 2012). Longitudinal media studies in the preschool years, however, are difficult to conduct and thus are particularly rare. Nevertheless, Christakis and Zimmerman (2008) reported evidence from a 5-year longitudinal study indicating that violent television viewing in American male (but not female) preschoolers (ages 24–60 months) predicted subsequent antisocial behavior in elementary school (ages 7–9), despite controlling for baseline problem behavior, age, parental education, maternal depression, as well as cognitive and emotional support. Differential impacts were also observed inasmuch as nonviolent television and educational television viewing were not predictive of antisocial behavior.

The long-term impact of television viewing on aggressive behavior is not necessarily confined to childhood and may also persist throughout adolescence. Johnson, Cohen, Smailes, Kasen, and Brook (2002) reported longitudinal findings among American adolescents who were assessed from early (mean age 14) until middle (mean age 16) and late adolescence (mean age 22). Television viewing in early adolescence predicted aggressive behavior (but not criminal acts against property) later in adolescence, even after controlling for confounders (baseline aggressive behavior, parental neglect, SES/education, neighborhood violence, and psychopathologies). Aggressive behaviors in middle adolescence (but not in early adolescence) predicted more television viewing in late adolescence. These longitudinal findings may tentatively suggest that if television violence and aggressive behaviors share some reciprocal influences, then it might be over shorter periods of time and perhaps later in adolescent development. In a recently published longitudinal study conducted in New Zealand, Robertson, McAnally, and Hancox (2013) also reported that—over and above several confounders (gender, IQ, SES, temperament,

baseline antisocial behavior, and parenting)—excessive television viewing from childhood to adolescence (ages 5 through 15) predicted criminal acts, antisocial personality disorder, and aggressive personality traits by young adulthood (by age 26). Lastly, a 2-year longitudinal study conducted among German early adolescents also found that viewing horror and violence in movies at age 12 was predictive of violence at age 14 (Hopf, Huber, & Weiß, 2008).

Should everyone be careful while approaching a television set? In terms of moderators, identification (identifying with violent TV characters) and perceived realism (perceiving TV violence as realistic) seem to exacerbate the longitudinal effect of childhood exposure to TV violence on aggressive behaviors in young adulthood, but only among males (Huesmann et al., 2003). In general, however, gender does not seem to moderate the long-term predictive relationships between TV violence and aggressive behaviors (Fitzpatrick et al., 2012; Johnson et al., 2002; Robertson et al., 2013). Ferguson and Savage (2012) have recently offered a series of pertinent criticisms that call for more nuance in interpreting this body of research, notably vis-à-vis demand characteristics, operationalization of TV violence, operationalization of aggressive behaviors, choice and computing of confounders, and suboptimal statistical modeling. In terms of differential impact, Ferguson and Savage also underscore the broad range of generally modest meta-analytic effect sizes ($r = .04$ to $.31$), which seem particularly small for the link between TV violence and violent crime ($r = .02$ to $.10$). That said, it should be mentioned that even if the direct and additive effect size of TV violence on aggressive behavior could be null ($r = .00$), it would not rule out the possibility that TV violence is a moderator (aggravating factor) in multiplicative effects (risk factors \times TV violence) that would increase the likelihood of aggressive behavior. Moreover, what should be added is that three-wave longitudinal models that conceptualize mediators are much needed to better evidence *how* and not only *when* TV violence may impact aggressive behavior in the long term.

Video Games

There are at least five reasons for which video games as risk factors are theoretically important to understand the development of CAB. First, there is a growing and lucrative market for video games, which have become an extremely popular leisure activity in youth. Second, video games involve a virtual world that renders realistic or imaginary social environments. These social environments can replicate existing violent milieus or create new violent worlds. Third, children and adolescents can easily be immersed in and be absorbed by these virtual environments. They may spend several consecutive hours engaging in violent virtual worlds. Fourth, children and adolescents actively learn to interact with these virtual environments. They need to learn and master simulated aggressive behaviors in order to continue exploring, competing, and ultimately winning the game. Fifth and last, whether in person or over the Internet, young people can compete against each other in such a way that their behavior in the multiplayer game setting might be as important as their virtual behavior inside the game. This may create recurrent dynamics of social dominance, competition, and rivalry that may foster aggressive behavior among young multiplayer gamers. The basic postulation is that since violent video games simulate aggressive behavior and require young people to engage in simulated aggressive behavior, young gamers might be at increased risk of developing aggressive behaviors. Indeed, a meta-analysis by Anderson et al. (2010) has found exposure to violent video games to be associated with more aggressive behavior ($r = .24$), aggressive cognition ($r = .18$), and aggressive affect ($r = .12$), but less empathy ($r = -.19$) and even less prosocial behavior ($r = -.11$). These trends remained similar across gender, age, as well as cultures (Eastern and Western). In longitudinal studies, they found that the overall effect size between violent video games and aggressive behavior was significant ($r = .20$), but smaller

when confounders (e.g., gender, baseline aggressive behavior) had been controlled ($r = .08$). Conversely, prosocial video games can also predict more prosocial behavior (Gentile et al., 2009; Greitemeyer, Osswald, & Brauer, 2010). Accordingly, in a recent meta-analysis, Greitemeyer and Mügge (2014) observed that prosocial video gaming was not only associated with less aggressive behavior ($r = -.16$), aggressive cognition ($r = -.30$), and aggressive affect ($r = -.35$) but also with more prosocial behavior ($r = .20$), prosocial cognition ($r = .42$), and prosocial affect ($r = .25$). Nonetheless, they found that violent video gaming was still linked to more aggressive behavior ($r = .19$), aggressive cognition ($r = .25$), and aggressive affect ($r = .17$) as well as less prosocial behavior ($r = -.11$) and prosocial affect ($r = -.16$). Overall, Greitemeyer and Mügge evidenced that the small to medium effect sizes were consistent across research designs and were similar across violent video gaming ($r = .18$) and prosocial video gaming ($r = .22$). Surprisingly, there is also some evidence that violent video games could have an unsuspected positive effect on visuospatial cognition, peer socialization, and learning educational material (Ferguson, 2010).

In terms of differential impact and developmental parameters, is it only the game or also the way one plays it? On the one hand, Willoughby, Adachi, and Good (2012) conducted a 4-wave longitudinal study among Canadian adolescents (from grade 9 through 12), which indicated (through latent growth curve modeling) that sustained violent video gaming predicted greater increase in aggressive behavior during high school over and above numerous confounders (gender, parents' education, computers at home, at-risk background, school marks, depression, delay of gratification, sports activities, peer deviance, friendship quality, parenting, and school culture). Aggressive behavior did not predict more violent video gaming. Findings remained equivalent in adolescent boys and girls. On the other hand, Adachi and Willoughby (2013) reported additional findings from cross-lagged path analyses, which indicated that competitive/

nonviolent video gaming predicted more aggressive behavior, while aggressive behavior also predicted competitive/nonviolent video gaming. These results were significant over and above baseline levels of competitive/nonviolent video gaming and baseline aggressive behavior.

Anderson et al. (2008) conducted a longitudinal/cross-cultural study with three samples that consisted of Japanese early adolescents (aged 12 to 15 years; 4-month follow-up), Japanese adolescents (aged 13 to 18; 3–4-month follow-up), and American children (aged 9 to 12 years; 5–6-month follow-up), respectively. Findings from multigroup structural equation modeling indicated that violent video gaming predicted physical aggression, despite controlling for gender and baseline physical aggression. In Germany, Möller and Krahe (2009) found further evidence of differential impacts for violent video gaming. Their data were collected through a 30-month longitudinal design among early adolescents of about 13 years of age. Their cross-lagged path analyses revealed that violent video gaming predicted more physical aggression, but not relational aggression. Moreover, aggressive behaviors did not predict violent video gaming. That said, not all studies find significant prospective links between violent video gaming and aggressive behavior. Ferguson, Garza, Jerabeck, Ramos, and Galindo (2013) conducted a 1-year longitudinal study among American early adolescents. Prospective results first accounted for several confounders (baseline aggressive behavior/or civic behavior, age, gender, depression, antisocial personality, family attachment, peer delinquency, physical abuse, parenting, parental depression) and then indicated that violent video gaming did not predict aggressive behavior nor civic behavior. Ferguson, San Miguel, Garza, and Jerabeck (2012) further collected 3-year longitudinal data among pre- and early American adolescents (aged 10–14). The research design controlled for baseline aggressive behavior, gender, depression, antisocial personality, family attachment, peer delinquency, and family violence (psychological aggression and physical abuse).

Prospective findings indicated that violent video gaming did not predict serious aggressive behavior or dating violence.

In terms of moderation, Wallenius and Punamäki (2008) conducted an intriguing 2-year longitudinal study among Finnish adolescents of 12 and 15 years of age. Some of their prospective findings revealed that parent–child communication, gender, and age moderated the predictive relationship between violent video gaming and aggressive behavior. More specifically, in older girls, violent video gaming predicted more aggressive behavior when parent–child communication was poor. In boys, surprisingly, violent video gaming predicted more aggressive behavior when parent–child communication was good. In terms of mediation, Möller and Krahe (2009) provided evidence that the predictive relationship between violent video gaming and aggressive behavior might be mediated by normative acceptance of aggression. However, this study did not include 3 waves of data and thereby the mediator and outcome were both assessed at time 2, which warrants more prospective research to confirm the temporal sequence of this mediation model.

Internet

Internet-related information and activities as risk factors are theoretically important to understand the development of CAB, notably because of four of Internet's integrated features. First, it is a multitasking platform that supports the production and diffusion of all forms of media (e.g. television, movies, videos, video games, music). Second, it creates interlocking ecological niches (global and local) for interpersonal relationships to evolve within and across social networks. Third, it is currently connecting (acquainting, bonding, and confronting) most young people living in industrialized societies. Last, Internet users are unprecedentedly free and active in creating, using, and diffusing media but also in choosing when and how to interact with other users. The main assumption is that the Internet is about sharing information with people, and thus,

Internet-based antisocial contents might be risk factors of antisocial behavior.

Is it only about the things or also the people on the Internet? Conceptually, antisocial media contents may hypothetically have additive (massive accessibility), epidemic (social contagion via social networks), multiplicative (multitasking), or distinctive (extreme content) influences over the Internet. That said, it is more what people do to one another on the Internet—sometimes anonymously, at times very publicly, and at any given time around the clock—that has been of particular concern lately. Cyberbullying has become a serious instance of antisocial and aggressive behavior on the Internet. In a meta-analysis, Tokunaga (2010) found some potential developmental parameters in that the incidence of cyberbullying victimization (i.e., repeatedly receiving hostile or aggressive messages through digital media) ranged from 20 % to 40 % during childhood and adolescence and peaked in early adolescence.

Unfortunately, longitudinal data on cyberbullying is rather sparse, especially in early adolescence. Recently, however, at least two longitudinal studies have identified differential impacts that antisocial behaviors can have on cyberbullying. Werner, Bumpus, and Rock (2010) conducted a 1-year longitudinal study during early adolescence (grades 6 through 8 in the United States), which indicated that being older, being a victim of online aggression, and endorsing relational aggression predicted future aggressive behavior on the Internet. In their sample, 18 % of adolescents were perpetrators, 17 % were victims, and 9.5 % were both. In a 6-month longitudinal study among Swiss early adolescents in 7th grade, Sticca, Ruggieri, Alsaker, and Perren (2013) found that traditional bullying (but not being victimized), antisocial behavior (but not moral disengagement, empathic concern, nor global self-esteem), and frequent online communication (but not gender) predicted subsequent cyberbullying (over and above baseline cyberbullying and concurrent traditional bullying). These authors interpreted their findings as evidence that the Internet represents another tool or territory for those who would already commit aggressions in traditional

settings. In sum, these longitudinal studies inform about the differential impact of antisocial behavior on cyberbullying. Nonetheless, it remains unclear whether cyberbullying could also represent a risk (or aggravating) factor of further antisocial or aggressive behaviors.

In terms of processes, gender does not seem to be a moderator in longitudinal studies on cyberbullying. However, a recent longitudinal/cross-cultural study found that both gender and culture could generate moderation effects in the short-term growth rate of cyberbullying. In a 2-month prospective study among late adolescents and emerging adults, Barlett et al. (2014) observed a greater increase in cyberbullying among American males than among Japanese males, whereas this trend was not significant among both American and Japanese females. Future longitudinal research on cyberbullying should also examine putative mediators as it has yet to test explicative processes. Recently, Runions (2013) developed a conceptual framework of cyber-aggression in adolescence, which one might deem fruitful for theorizing different motivational processes (e.g., aversive/reactive or appetitive aggression) as mediators of different kinds of cyberbullying. Moreover, this framework may also allow considering self-control (or the lack thereof) as a moderator (protective/vulnerability factor) of cyberbullying.

Music

Music behaviors as risk factors are theoretically important to understand the development of CAB for at least three reasons. First, music is a universal, ubiquitous, and versatile (multitasking) cultural product that serves as a recurring soundtrack (people listen to songs repetitively) across most media (e.g., Internet, television, movies, video games). Second, music preferences are relatively stable over time and contribute to identity exploration (e.g., musical subcultures) and peer socialization (e.g., high school peer crowds) during adolescence. Third, songs are complex and multifaceted stimuli that combine both linguistic (e.g., explicit/antisocial

lyrics) and musical (e.g., pounding/exciting beats) characteristics pertinent for conceptual models of media and CAB. The general hypothesis is that those music genres exploring more antisocial themes (e.g., violence, hostility, deviance) may represent risk factors of CAB. Hence, the issue primarily concerns the influence of the lyrics rather than that of the music itself. Accordingly, experimental studies show that violent song lyrics can increase hostile feelings and aggressive thoughts (Anderson, Carnagey, & Eubanks, 2003), whereas prosocial song lyrics can increase prosocial thoughts, interpersonal empathy, and helping behavior (Greitemeyer, 2009).

Are antisocial songs precursors of antisocial behavior (i.e., socialization effect), or rather, is it antisocial behavior that begets a taste for antisocial songs (i.e., selection effect)? Selfhout, Delsing, terBogt, and Meeus (2008) conducted a 2-year longitudinal study, in which a robust two-wave/cross-lagged design disentangled this reciprocal relationship. Their findings among Dutch adolescents indicated that two general factors of music preferences (heavy metal and hip-hop) were predictive of more antisocial behaviors (e.g., aggression, theft, vandalism), but that antisocial behaviors were not predictive of music preferences. Multigroup structural equation modeling confirmed that this model fitted among both younger (11- to 14-year-old) and older (15- to 18-year-old) adolescents of different ethnocultural backgrounds and educational levels. However, such longitudinal findings can remain equivocal inasmuch as each general factor of music preference encompasses many distinct music subgenres that can have differential impacts on different antisocial behaviors. For instance, Miranda and Claes (2004) have shown that specific subgenres of hip-hop music (American rap, French rap, hip hop/soul, and gangsta/hardcore rap) may have a differential impact on different kinds of antisocial behaviors (e.g., violence, theft, street gang involvement) among French Canadian adolescents. Among other findings, they found that French rap was associated with more violence and street gang involvement, that gangsta/hardcore rap was linked to more thefts, but that

hip-hop/soul and American rap were both related to less thefts.

Are stable music preferences better at reflecting or predicting antisocial behaviors? In terms of developmental parameters, terBogt, Keijsers, and Meeus (2013) recently proposed a *Music Marker Theory* (MMT), according to which early and strong personal tastes for music that explore antisocial themes may not only directly influence antisocial behaviors through deviant media exposure but also gradually facilitate (through selection and socialization) the social contagion of antisocial behaviors among peers that share a similar taste for such music. In their 4-year longitudinal study conducted in the Netherlands, findings from latent growth curve modeling revealed that early adolescent music preferences (hip-hop, metal, gothic, trance, R&B, rock, punk, techno) at the age of 12 were more predictive of minor delinquency (e.g., shoplifting, theft, vandalism) at the age of 16 than of minor delinquency at the age of 12 (terBogt et al., 2013). The growth rates in most music preferences from ages 12 to 16 were not predictive of minor delinquency at age 16. These results are interesting as they suggest that relatively stable music preferences may play a role (e.g., deviant peer affiliation) not only at the onset but also over the course of minor delinquency in early adolescence. Nevertheless, it should be mentioned that music genres are subject to stereotyping (Rentfrow, McDonald, & Oldmeadow, 2009). Therefore, research that focuses on music preferences as early markers of antisocial behavior needs to be careful not to adopt, maintain, or produce stereotypes vis-à-vis music genres (e.g., hip-hop, metal, techno) that are appreciated by and important to millions of young music fans.

Should youth take violent lyrics with a grain of salt? The extant developmental literature has yet to specify longitudinal processes (moderation and mediation) that may condition or explain how music can predict antisocial behaviors. In one experimental study, humorous lyrics mitigated the effects of violent lyrics on hostility, but this moderation effect does not seem robust (Anderson, Berkowitz et al., 2003; Anderson,

Carnagey & Eubanks, 2003). However, gender differences can moderate longitudinal findings, for instance, heavy metal preferences can predict antisocial behaviors in adolescent boys but not in adolescent girls (Selfhout et al., 2008). Unfortunately, mediation models are lacking, and thus, explicative mechanisms linking music and antisocial behaviors have not been tested longitudinally. That said, adolescent studies linking music and antisocial behaviors have nonetheless ruled out a number of confounding mechanisms, including music-induced arousal, importance given to lyrics, violence in other media, baseline levels of antisocial behaviors, antisocial behaviors in peers, personality, age in adolescence, level of education, and school commitment (Anderson, Carnagey & Eubanks, 2003; Miranda & Claes, 2004; Selfhout et al., 2008; terBogt et al., 2013). In sum, the impact that music with antisocial themes has on antisocial behaviors is not necessarily large, but it seems quite robust for many adolescents.

Media in General

Some researchers tackle media as a whole by using a more general assessment of media and by aggregating (or comparing) many forms of media. There are three main reasons for which this generic approach can contribute to theorizing about the development of CAB. First, this approach may increase breadth and reliability but also better account for cumulative effects in media consumption. Second, this approach may partially account for multitasking across different media. Third, when specific usage measures are available, the relative impact of each form of media can be compared. The overarching proviso is that media in general is supposed to influence people to various extents, in different ways, and over short or long periods of time. Overall, the effect size for the link between media violence and aggressive behavior is usually modest (e.g., $r = .19$; Bushman & Huesmann, 2006). Moreover, Ferguson and Kilburn (2009) report an even smaller effect size ($r = .08$) for the positive relationship

between exposure to media violence in general and aggression. Unfortunately, far less is known about the effect size for the few studies that have examined the interface between prosocial media and prosocial behavior in general (Greitemeyer, 2011). That said, meta-analytical estimates specific to television programs support the beneficial impact of educational media on children's social reasoning/attitudes ($d = .19$; Mares & Pan, 2013).

Is it the violence in the media or the media at large? Krahé and Möller (2010) followed a sample of German early adolescents (grades 7 and 8) twice over the course of 12 months. Results from cross-lagged path analyses (controlling for baseline aggression, academic achievement, and nonviolent media usage) revealed that—similarly across boys and girls—media violence usage (movies, TV, and interactive video games) predicted higher levels of physical (but not relational) aggression and lower levels of empathy, but that neither types of aggression (nor empathy) predicted media violence usage. Conversely, similar analyses also indicated that nonviolent media usage did not predict aggression or empathy. In a follow-up to this study, Krahé, Busching, and Möller (2012) tried to disentangle developmental parameters of violent media usage through latent growth mixture modeling based on a 3-wave design over the course of 24 months. Three trajectories were identified: 64.9 % were “Stable Low Users” (37.8 % of boys and 90.6 % of girls); 30.9 % were “Stable High Users” (55.4 % of boys and 7.7 % of girls); and 4.2 % were “Desisters” that decreased in use (6.8 % of boys and 1.7 % of girls). Interestingly, different from Stable High Users but similar to Stable Low Users, Desisters showed a decrease in aggressive behavior over 24 months. That said, across the three waves, Stable High Users remained the most physically aggressive adolescents in the sample. Of particular interest, compared to Desisters, Stable High Users were younger and reported less use of nonviolent media. Overall, it was also found that violent media use predicted more physical aggression over and above several confounders, such as

baseline aggression, sociodemographics, academic contexts, nonviolent media use, parenting, aggression norms, and empathy. Moreover, nonviolent media did not predict physical aggression. Lastly, physical aggression did not predict later violent media usage. Krahé and collaborators conclude along the lines that those younger aficionados of violent media who display less interest in nonviolent media are not only more likely to maintain a taste for violent media but also to display more physical aggression in early adolescence. In the United States, Graber, Nichols, Lynne, Brooks-Gunn, and Botvin (2006) followed a sample of early adolescents and performed a set of 1 year of longitudinal analyses. After controlling for gender, ethnocultural background, and outcomes' baseline levels, they found that violent media consumption (television, movies, music, and video games) predicted more delinquency (violence, vandalism, and theft) not only from 6th to 7th grade but also from 7th to 8th grade. Gentile and Bushman (2012) found that American children (grades 3 and 4) who were exposed to more media violence (TV, movies, video games) were more physically aggressive over the course of 6 months in elementary school. This predictive effect remained significant even though gender, physical victimization, hostile attribution bias, parenting, and baseline physical aggression were considered as concurrent predictors.

Can a good thing be bad? There is recent evidence for differential impact of media in terms of educational media predicting more relational aggression but not physical aggression. Ostrov, Gentile, and Mullins (2013) followed a sample of American preschool children (aged 30–58 months) during the course of 4 months. After controlling for confounders (gender, age, SES, and baseline levels of physical and relational aggression), educational media exposure (television/movies and video/computer games) did not predict physical aggression, but instead predicted more relational aggression. The authors posit that preschool children might focus more on the portrayed relational aggression than on the conveyed conflict resolution skills.

Can we compare the differential effect of each media, respectively? In a 1-year longitudinal study conducted in Canada, Janssen, Boyce, and Pickett (2012) examined the respective effect of different media (television, video games, and computer) on physical aggression among adolescents in grades 9 and 10. Video gaming predicted physical aggression over and above the respective effects of television and computer. That said, in the United States, Ferguson (2011) examined data from a 1-year longitudinal study among pre- and early adolescents (aged 10–14). The research design controlled for several pertinent confounders, including baseline aggressive/criminal behavior, gender, depression, neighborhood problems, negative relationship with adults, antisocial personality, family attachment, peer delinquency, family conflict, and family violence (psychological aggression and physical abuse). Violent television viewing and violent video gaming did not predict serious aggressive behavior, nonviolent criminal behavior, or violent criminal behavior. Moreover, consistent with most longitudinal research, prior serious aggressive behavior did not predict later violent video gaming.

Baseline levels of aggression might not only act as a confounder but also as a moderator that may suggest differential impacts across different developmental trajectories. For instance, media violence usage was found not to predict physical aggression among early adolescents who were more physically aggressive at baseline, but it predicted more physical aggression among those who were less physically aggressive at the outset (Krahé & Möller, 2010). Hence, these results may hint developmentalists that media violence is not a significant (or potent) risk factor among those adolescents who are already in a high and persistent trajectory of aggressive behavior. Recent meta-analytic estimates for the link between media violence and criminal aggression can only find a small but significant effect size ($r = .07$) among boys (Savage & Yancey, 2008). Twenty years ago, Paik and Comstock (1994) had also found a small effect size ($r = .10$) for the link between violent television viewing and criminal violence. Perhaps violent media has a small effect

size in the case of criminal aggression because the latter can be part of a much more serious antisocial trajectory. However, Ferguson (2011) recently reported that in youth who had a less antisocial personality, violent media predicted less criminal behavior (attenuating effect), whereas violent media predicted more criminal behavior among those who had a more antisocial personality (aggravating effect). In all cases, it should be considered that individuals who are in a high and persistent trajectory of antisocial behavior are also known to have multiple genetic and environmental risk factors starting in early infancy (Moffitt, 1993; Tremblay, 2010). Thus far, it is unclear to which extent violent media consumption is associated to more severe trajectories of CAB.

Summary

In this chapter, we addressed the complex question as to whether media exposure and consumption can represent risk factors in the development of CAB. More specifically, we selectively reviewed the most recent and sound empirical findings from meta-analyses and longitudinal studies to evaluate the extent to which television/movies, video games, Internet, music, and media in general may influence aggressive behaviors in children and adolescents. In light of this review of the extant literature, we can offer nine concluding remarks:

- Longitudinal/correlational findings reveal that antisocial, violent and aggressive contents across various forms of media (television, video games, Internet, music, or in general) can predict an increase in aggressive behavior among children and adolescents. Therefore, violent media consumption is a *correlational* risk factor of aggressive behavior in youth. Interestingly, these prospective *socialization effects* have usually been established on short-term follow-ups of a couple of years, though some have actually spanned over many years from childhood to young adulthood.
- Longitudinal/correlational findings clearly indicate that, in turn, aggressive behavior

does not predict an increase in consumption of media with antisocial content during childhood and adolescence. Hence, contrary to a widely held belief among social scientists and laypeople that a *selection effect* would be the main explanation for the link between media violence and violent behavior, it seems that aggressive behavior is not a predictor of violent media consumption in youth.

- Meta-analyses suggest that the significant effect of media violence on aggressive behavior is generally consistent across research designs (experimental, cross-sectional, longitudinal), but usually small to medium in size.
- Meta-analyses suggest, however, that the effect of media violence on severe or criminal aggressive behavior is hitherto small, although it is also understudied.
- In terms of gender differences, longitudinal and meta-analytic findings are usually equivalent among male and female participants throughout childhood and adolescence.
- Many confounders or so-called third variables (e.g., gender, SES, baseline aggressive behavior, known risk factors) do not account for the predictive relationship between media violence and aggressive behavior in childhood and adolescence. Thus, the predictive relationship between media violence and aggressive behavior does not seem to be spurious. Rather, media violence might have a moderate but distinctive impact on youth development.
- Longitudinal and meta-analytic findings also indicate that media with prosocial content can also predict more prosocial behavior in childhood and adolescence. In sum, media is not good or bad in and of itself. The nature of the content (antisocial or prosocial) has a differential impact on youth development.
- Longitudinal data evidence that violent media consumption is relatively stable across a period of a few years among children and adolescents, but this developmental continuity is generally moderate in magnitude. Hence, if violent media are risk factors of CAB, then they may be malleable enough to be susceptible to preventive initiatives in youth.
- Media can probably feed thoughts, emotions, and behaviors in young people. In turn, they choose, feed off, and digest their media regimen in different ways, for better and for worse but also while maintaining homeostasis. On the one hand, scholars are being scientifically curious and conscientious in their scrutiny of the impacts (positive and negative) of media on youth development (e.g., Anderson et al., 2010). One can qualify this as a “toxic diet” approach to media consumption in youth, which might be more compatible with the biomedical model. On the other hand, scholars are also being scientifically sound and reasonable to warn against possible “moral panics” and miscalculation of risks related to media consumption (e.g., Ferguson, 2010). One can qualify that as an “omnivorous diet” approach to media consumption in youth, which may be more compatible with a psychosocial model. In sum, it is perhaps better to balance both scientific approaches toward a better understanding of what is a “sensible diet” approach to different media consumptions for different young persons. This more balanced approach, which would consider both positive and negative aspects of media, might be more in keeping with a biopsychosocial model.

Future Research Needs

In our review of the literature on media violence and aggressive behaviors, we were able to identify some caveats that need to be addressed by future research. Some researchers have already started to address these caveats. However, these research issues represent future research needs that most researchers should tackle at some point in their programmatic line of research. Hence, we suggest six of those research needs:

- *Longitudinal Designs.* Unfortunately, most studies only use two waves of data to examine the longitudinal relationships between media violence and aggressive behaviors. Researchers should thus strive to increase the

number of time points in their longitudinal designs. For instance, prospective mediation models necessitate at least three waves of data collection in order to test the developmental sequence among mediating variables. Moreover, adding more waves of longitudinal data through a multilevel design can enable to test within-person processes along with between-person structures over time. It would be particularly interesting to better describe how different trajectories of media consumption are intertwined with different trajectories of antisocial behaviors from childhood to adulthood.

- *Multitasking and Cost/Benefit Ratio.* The vast majority of studies do not consider for the presence of multitasking and do not consider that a given media product can include both antisocial and prosocial contents. First, it would be a great improvement if researchers could operationalize the successive and simultaneous uses of different forms of media during the unfolding of everyday life, perhaps through experience sampling methods. The former may reveal a sequential timing effect of media violence, while the latter a synergistic effect. Second, researchers should disentangle the additive or multiplicative effects of antisocial contents and prosocial contents in the daily media diet of children and adolescents. It could be that there is a cost/benefit ratio or trade-off for each form of media and also for each given media product within each form of media.
- *Testing Theories with Longitudinal Data.* There are many elegant theoretical models that can explain the short-term effects (e.g., priming effects, excitation transfer) and long-term effects (e.g., social cognition, scripts, desensitization, social information processing, general aggression model, model of reinforcing spirals) of media violence on aggressive behaviors (for a review, see Brown & Bobkowski, 2011; Groves et al., *in press*). That said, correlational longitudinal studies rarely provide a direct test for all these causal models but rather assume that the broad significant longitudinal relationships are interpretable from such fine grained conceptual models. Researchers should therefore strive to better test these causal models through their longitudinal findings, perhaps by resorting to prevention program evaluation with randomized control trials (experimental designs).
- *Research on Media in Early Infancy.* Research advances in developmental psychopathology inform that different children will have different antisocial behavior trajectories across their life span and that many critical risk factors coalesce during early infancy. Researchers should thus conduct more research on the influence of media violence on infants and also on their parents and caregivers.
- *Developmental, Cultural, and Generational Trends.* Developmental research should try to provide more nuances as to how an increase in media violence (e.g., Bushman, Jamieson, Weitz, & Romer, 2013) could still be situated concurrently within a decrease in violent behavior and violent crime in the larger society (e.g., Finkelhor, Shattuck, Turner, & Hamby, 2014). In addition, given that media represents a social and cultural product, there is a need for more research examining media violence across different cultures.
- *Bridging Research and Practice.* Much better bridges should be built between research and practice. Future research should support scientifically based public policies that do not underestimate (or overestimate) the risks of violent media in youth. However, relatively few public policies have been successfully developed, perhaps because some of these policies are judged as infringing on constitutional rights (e.g., First Amendment in the United States; Gentile et al., 2007). For many years, communities have turned to media-rating systems (content- or age-based) as a societal resource to guide parents in the monitoring of their children's media consumption. However, Bushman and Cantor (2003) conclude that many parents use but do not necessarily understand media-rating systems, that they would prefer these media-rating systems

to be based on content rather than age and that such ratings for restricted/controversial content may deter younger children and yet possibly entice older ones. Initiatives that promote autonomy and competence can also strive to better educate youth in their use of mass media. Media literacy interventions can help children and adolescents to develop more knowledge and critical thinking toward mass media and thereby gain more resilience from media with negative influences (Potter, 2010). Recent meta-analytic estimates suggest that media literacy interventions might be beneficial to mitigate the deleterious effects of media ($d = .37$; Jeong, Cho, & Hwang, 2012). Early adolescents who learn principles of media literacy through an intervention might better understand the potentially deleterious effects of media violence (Webb & Martin, 2012). That said, in childhood, media literacy interventions that present salient examples of violent media also bear the risk of producing an iatrogenic effect (“boomerang effect”) that increases aggressive behavior intentions as a result of media priming (Byrne, Linz, & Potter, 2009). Hence, media literacy may need to be complemented by other components (e.g., cognitive reasoning activity) so that it does not backfire (Byrne, 2009).

Recommended Readings

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Fabienne Glowacz and Michel Born

What makes individuals evolve differently when confronted with unfavorable situations and/or traumas? Why do some individuals engage in delinquency and substance use as a result of these at-risk situations and others abstain? In this chapter, we wish to draw attention to the concepts of resilience and protective factors. These areas of research were developed on the premise that some youths manage to “survive” and adapt when exposed to adversity, whereas others develop adjustment problems or psychopathologies.

Several studies have demonstrated that a significant proportion of individuals identified as “high risk” (between 25 % and 50 %) are resilient to the difficulties produced by high-risk environments and do not engage in delinquent and criminal behaviors (Laub & Sampson, 2001; Turner, Hartman, Exum, & Cullen, 2007; Werner, 1989). As stated by Hartman, Turner, Daigle, Exum, and Cullen (2009), resilience does not merely refer to the act of abstaining from crime. Resilience is more accurately conceptualized as the ability of individuals with high-risk profiles to resist the criminogenic conditions that are often associated with criminal and antisocial behaviors. What differentiates resilient from non-resilient youths? To answer this question, we shift the focus from risk to protective factors, since the latter promote the

process of resilience. In this chapter, drawing on the relevant research, we define the constructs of resilience and protective factors. We also discuss the relevance of these constructs in the development of criminal and antisocial behavior.

Defining Resilience

Resilience has been defined as the maintenance of a healthy and successful functioning despite exposure to significant adversity or risk (Garmezy, 1993; Luthar, Cicchetti, & Becker, 2000, Masten & Obradovic, 2006). Although there is substantial variability in the definition of resilience, two central constructs are included in most definitions: adversity (or risk) and positive adaptation (or competence). These two constructs were introduced by Luthar and colleagues (2000, 2006). *Adversity* includes risk factors, traumas, negative life events that are harmful to healthy adaptation, or any other form of hardship or suffering. It is essential for researchers to clearly define the concept of adversity (Fletcher & Sarkar, 2013), as there are many variations in the definitions employed by researchers.

It is equally important to define the concept of successful or *positive adaptation* to the environment. Luthar and Cicchetti (2000, p. 858) defined positive adaptation as “behaviorally manifested social competence, or success at meeting stage-salient developmental tasks.” Subsequently, adaptations will vary across fields,

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developmental stages, and populations. Masten and Obradovic (2006) emphasized the importance of both external adaptation to the environment and internal sense of well-being in the assessment of resilience. An appropriate behavior in one environment may be regarded as inappropriate in a different environment. For example, a young person can develop antisocial behaviors that are appropriate in a context where delinquent acts confer a higher social status. It is thus important to consider the sociocultural context in which these constructs are established and defined. Delinquent behaviors and other forms of antisocial behaviors (e.g., drug use) can be regarded as survival strategies or adaptive behaviors in particular contexts, but are not indicators of resilience at the behavioral level. However, these behaviors may occur in conjunction with individual values, such as autonomy and perseverance, which may promote the development of resilience among individuals. It has been suggested that a very small proportion of children show evidence of resilience in all areas of adaptation; resilience is usually observed in specific domains (Luthar, 2003).

Resilience as a Multidimensional Concept

As stated above, resilience is not a single-dimensional or a global construct, which means that individuals may be resilient in one domain of adaptation or several, but rarely in all domains. A topic of debate in the literature relates to whether resilience is best regarded as a feature or a process (e.g., see Windle, 2011). As a feature, resilience represents a constellation of characteristics that lead the individual to adapt positively in unfavorable circumstances. Following Rutter (1987), resilience factors are influences that modify, ameliorate, or alter a person's response to some environmental hazard that predisposes to a maladaptive outcome. Psychological resilience conceptualized as a personality trait is considered by Rutter (1987, p. 316) as the "positive pole of individual differences in people's response to stress and

adversity." However, resilience has also been conceptualized as a process subject to change over time. Luthar et al. (2000, p. 543) make reference to a "dynamic process encompassing positive adaptation within the context of significant adversity." Instead of defining resilience as a single personality trait, this perspective considers resilience as a process or phenomenon that may be influenced not only by individual characteristics but also by the various social systems and environments they are exposed to (Luthar, 2003).

The impact of protective factors also varies across contexts and time. Even though an individual may adapt positively to adversity at a particular time of his/her life, he/she will not necessarily adapt positively to other stressful situations occurring at different periods of his/her life. Resilience is more accurately defined as a dynamic process because individuals can be resilient to specific environmental hazards or at one particular period in time (Rutter, 2006). Resilience is thus not a static state, but rather a dynamic process.

We therefore propose to define resilience to delinquent behavior as a dynamic process that involves an individual's positive adaptation despite at-risk conditions or life events and interactions between the individual's protective personal characteristics and his environmental support. Thus, the concept of resilience is regarded as multidimensional and dependent on the intrinsic and extrinsic characteristics of the individual.

Protective Factors and the Resilience Process

Protective factors refer to influences altering or improving the response of an individual to various at-risk situations preceding maladaptation (Rutter, 1985). Protective factors prevent an individual exposed to risk from developing deviant or antisocial behaviors. These factors enhance adaptation and reduce the likelihood of problem behavior either directly or by mediating or moderating the effect of exposure to risk factors

(Luthar, 2006; Masten & Obradovic, 2006; Rutter, 1987; Werner & Smith, 2001). Recent research, particularly longitudinal studies, has better defined the protective factors against adolescent drug use, delinquency, violence, and school dropout (Hawkins, Catalano, & Miller, 1992; Lipsey & Derzon, 1998; Loeber & Stouthamer-Loeber, 2008). Although a single protective factor may exert a modest impact on given behaviors, the accumulation of protective factors promotes resilience among high-risk youths. It is thus the cumulative effect in addition to the interactions and combinations of multiple protective factors that enable young people to resist taking the path to delinquency. In addition, different protective factors may be related to a lower probability of onset of delinquency but also to desistance from these behaviors. The latter, however, should arguably be referred to as desistance factors (Kazemian, 2015).

Different terms have been used more or less interchangeably to refer to protective factors. Lösel and Farrington (2012) make the distinction between direct and buffering protective factors in the development of youth violence. According to these authors, *direct protective factors* [also referred to as *promotive* (e.g., Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikström, 2002) or *compensatory factors* (e.g., Fergusson, Vitaro, Wanner, & Brendgen, 2007)] predict a lower probability of future problem behavior and violence through a main effect, thus not taking other factors into account. In contrast, *buffering protective factors* predict a lower probability of violence in the presence of risk factors by attenuating the impact of a risk factor through a moderating effect (see also Rutter, 1985).

It has been argued that resilience emerges within an interactive model in which the relationship between a risk factor and an outcome is weakened by the presence of one or more protective factor(s) (Noltemeyer & Bush, 2013; Rutter, 1985). The effects of protective factors may vary in nature: they may buffer the risk factor, interrupt the risk chain, or prevent the occurrence of the risk factor altogether (Lösel & Farrington, 2012). Protective factors can be *extrinsic* or situational (e.g., family, peers, school, community,

etc.) or *intrinsic* (e.g., personality characteristics, empowerment, self-control, cultural sensitivity, self-concept, social sensitivity, etc.) (Garmezy, 1993; Masten, Best, & Garmezy, 1990; Noltemeyer & Bush, 2013).

In a recent review of the literature, Lösel and Farrington (2012) grouped variables that have protective or promotive effects against antisocial behavior into five categories: (1) individual traits, (2) family, (3) school, (4) peers, and (5) neighborhood characteristics. First, individual traits include cognitive functions, psychological characteristics, and temperamental characteristics (e.g., above-average intelligence, positive attitudes toward family and school, nonaggressive social cognitions and beliefs, low impulsivity, absence of attention deficit or hyperactivity, enhanced anxiety and shyness, etc.). Portnoy et al. (2013) also highlighted recent studies suggesting that biological factors such as high heart rate or high monoamine oxidase A (MAO-A) may have protective effects (see Beaver, Schwartz, & Gajos, 2015). Adolescent religiosity is also related to a higher age of onset for drug use, a more limited number of different drugs used, and reduced involvement in other types of delinquent behaviors (McKnight & Loper, 2002). Hartman et al. (2009) found that girls reporting frequent religious service attendance and high importance of religion tend to avoid getting involved in delinquent behavior. More broadly, participating in a range of prosocial activities promotes reduced illegal activity among high-risk youth (Mahoney & Stattin, 2000). At the individual level, a sense of purpose, a sense of control, and hope for the future characterize youth who avoid delinquency (Taylor, Karcher, Kelly, & Valescu, 2003). Protective factors that lead to hopefulness buffer and reduce the effects of risk factors (Garmezy & Rutter, 1983; Masten, 2001).

Second, research has consistently demonstrated the protective effects (direct or buffering) of several family factors, such as strong bonds with at least one parent, parental acceptance, intensive supervision, high persistence of discipline, parental disapproval of antisocial behavior, low physical punishment, strong involvement in family activities, above-average

socioeconomic status (SES), low parental stress, family models of constructive coping, and positive parental attitudes toward the child's education (Vanderbilt-Adriance & Shaw, 2008).

Third, school performance, bonding to school, motivation to study, educational aspirations, support and supervision from teachers, clear classroom rules, and a positive school climate have been found to exert protective effects in the context of delinquency (Lösel & Farrington, 2012).

Fourth, prosocial friends, membership to a peer group that condemns antisocial behavior, involvement in religious groups, and social isolation may have direct or buffering protective effects against youth violence and delinquency (Lösel & Farrington, 2012; Herrenkohl, Tajima, Whitney, & Huang, 2005). Close relationships with nondeviant peers and involvement in religious groups have been shown as having a buffering protective effect against violence in the presence of risk factors (Cattellino, 2000; Herrenkohl et al., 2005; Werner, 1993).

Finally, living in a nondeprived, nonviolent, and cohesive neighborhood, where informal social control is eminent, constitutes an important protective factor (Loeber, Farrington, Stouthamer-Loeber, & White, 2008). Lynam et al. (2000) found that living in a nondeprived neighborhood buffered to some degree the undesirable impact of impulsivity on juvenile offending.

Each of the factors listed above can have a protective effect, either on their own or in association with others, but we reiterate that the cumulative effect or the configuration of different factors will prove to have the most salient effects. Four models of resilience have been proposed to conceptualize these configurations of protective and promotive factors in childhood and adolescence aggression (Fergus & Zimmerman, 2005; Hollister-Wagner, Foshee, & Jackson, 2001): (1) compensatory, (2) risk-protective, (3) protective-protective, and (4) challenge models. Each model proposes a different relationship between risk and protective factors. The *compensatory model* states that each risk and protective factor act independently and directly on predicted outcomes but combine

cumulatively to compensate for each other. The *risk-protective model* postulates the presence or the absence of protective factors as moderating factors in the associations between risk factors and development. The *protective-protective model* is based on the interactive risk-protective model by positing that the risk and outcome relationship decreases with each protective factor present. Finally, the *challenge model* proposes a curvilinear relationship between risk factors and predicted outcome. In other words, the low levels of risk engagement provide an experiential context for learning new coping strategies. Donnon (2010) empirically tested these models in a study on bullying and victimization, conceptualizing exposure to violence as a risk factor, and closeness to an adult, importance of religion, self-esteem, relationship competence, constructive communication, and constructive anger as protective factors. Findings suggested that the most appropriate model of resilience varies by gender. The protective-protective and challenge models were more influential for females, but none of the models were supported for males, highlighting an important gap in the state of knowledge on resilience and protective factors.

Primary Versus Secondary Resilience

Primary resilience refers to the absence of disorder despite the occurrence of various risk factors (Luthar et al., 2000; Masten & Obradovic, 2006). *Secondary resilience* refers to the process of starting a new life and a new development (Born, 2011; Cyrulnik, 2008). Primary delinquency resilience applies to individuals who do not commit an offense, or commit only minor or sporadic offenses, after being exposed to various risk factors. Minimal involvement in offending is included in the definition of primary resilience, namely, because several studies have shown that over 50 % of youths commit at least one offense during adolescence (Klein, 1989). These periods of temporary offending during adolescence have been labeled as exploratory or sporadic delinquency (Fréchette & Le Blanc, 1987) or

adolescence-limited delinquency (Moffitt, 1993). Because adolescence is a period of questioning, some involvement in delinquency is considered to be the norm and a manner in which to test rules, laws, boundaries, and social tolerance. Adolescents involved in delinquency can be regarded as resilient only if they have been exposed to social, familial, or personal risk factors.

Secondary resilience adds to the concept of primary resilience by integrating the concept of “reconstructing/rebuilding oneself,” i.e., find a positive social life after having committed several offenses (see Maruna, 2001). This type of resilience may occur among individuals who have been subject to formal punishment for their behaviors (e.g., residential placement or imprisonment). The absence of reoffending is referred to as desistance (see Kazemian, 2007, 2015), and it is an essential component of secondary resilience. Lösel and Bliesener (1994) discuss resilience by isolating the factors of success and of desistance after a period of incarceration for young people. The authors showed that resilient youth from an institutionalized population have a larger social network and are more satisfied with their social support system. There is evidence that resilient adolescents live in a more positive emotional climate, i.e., in a nonconflictual, cohesive environment in which autonomy and open-mindedness are encouraged and the values of success and religion are endorsed. Lösel and Bliesener (1994) found that resilient youths tend to have a meaningful relationship with a person outside of the nuclear family; a third have a meaningful relationship with a member of the extended family and half with a teacher.

Drapeau, Saint-Jacques, Lépine, Bégin, and Bernard’s (2004) study on adolescents in substitute or foster families highlights the importance of several factors for resilience (i.e., the establishment of emotional ties with adults, and the presence of positive experiences in the sporting, artistic or professional fields, which can be encouraged in the institutions). On an individual level, the perception of being able to control one’s life, the confidence of these young people

in their own ability to become better, and high self-esteem may reinforce resilience. These resilience factors interact with the environment (in this case, interventions provided in the institution that support secondary resilience).

In a study of the delinquent trajectories of 363 institutionalized youths in Public Institutions for the Protection of Youth network of a French-speaking community in Belgium, Born, Chevalier, and Humblet (1997) identified only 7 % of the youths as primary resilient youths, i.e., having very minor delinquency despite exposure to several risky factors. These authors also observed that 30 % of the youths desist from delinquency after their stay in a residential setting; these individuals may be regarded as secondary resilient desisters, depending on whether they displayed many or few risk factors. Delinquent trajectories varied with levels of self-control and maturity. Born, Chevalier, and Humblet (1997) and Born, Jackson, and Jacob (1997) also reported that youths who were perceived by the residential treatment center staff as being less aggressive and more capable of showing attachment and interest in others were better adjusted to institutional life and had a more favorable prognosis at the end of their placement. These individual characteristics suggest the absence of a delinquent personality, as described by Le Blanc and Morizot (2001). In other words, personality traits can play a protective role for youths in residential treatment. For these delinquent youths with protective personality traits, secondary resilience will be dependent on their capacity to make new socially acceptable choices, which are expressed at the end of their institutional placement through the formulation of an adequate personal project. In a study of 100 teenagers from the same Belgian institutions, Hélin et al. (2004) noted that it is the adhesion to a realistic project that supports secondary resilience (e.g., the transition from being a resident of the institution to an educational instructor).

Resilience appears to be a result of within-individual factors that help to withstand environmental risk factors. For example, the capacity for an individual to exercise self-control and to resist

the temptations of the environment is a protective factor, which finds its origin in individual aptitudes and early training. This capacity of inhibition, which develops early during childhood, proves to be a safeguard against externalizing problems and antisocial behavior (Boët & Born, 2001). These inhibitive effects are also likely to result from parenting practices as well as temperamental and personality characteristics that facilitate adaptability and social conformity (Glowacz, Veronneau, Boët, & Born, 2013). These claims are consistent with social and cognitive learning theories, which are the most relevant paradigms to explain socialization toward social conformity.

Sexual Abuse and Resilience

Research on delinquency has always primarily relied on male samples, namely, because researchers have taken for granted the scarcity of female delinquency as well as women's specific biological and social protective factors (see Lanctôt, 2015). Moreover, few studies have investigated the protective factors that may predict positive outcomes among girls (Rasseneur & Born, 2004; Stevens et al. 2011). Using a sample of 2,247 Belgian adolescents, Vettenburg, Brondeel, and Gavray (2013) found that unsurprisingly, boys committed significantly more delinquent acts when compared to girls (see Lanctôt & Le Blanc, 2002). They also found a strong correlation between the attitudes promoting violence and the production of violent behaviors. With regard to protective factors, the authors also noted that 63 % of boys and 37 % of girls reported that violent and delinquent behavior was acceptable or promoted in their peer group.

The link between sexual abuse and criminal trajectories is another important topic in the study of female delinquency. Among girls, sexual assault is significantly associated with a higher risk of having a deviant and delinquent trajectory, particularly for violent crimes (Kerig & Becker, 2015). Sexual victimization during childhood increases the risk of being arrested

during adolescence; over half of criminal justice-involved women (56 %) in Goodkind, Ng, and Sarri's (2006) study had been victims of sexual abuse. Incarcerated women also present a much higher prevalence of childhood sexual victimization when compared to nonincarcerated women. In addition, many empirical studies have highlighted the significant prevalence of sexual abuse histories among adolescents and adults with alcohol and drug use problems.

While not all sexually abused teenagers will engage in delinquency, and not all delinquents have histories of victimization, there is a significant association between sexual victimization and offending. The nature of the abuse, the extent of violence involved, its duration, and chronic character are important factors in the explanation of the abuse-offending link. Five factors have been identified as predictors of resilience following an experience of trauma (e.g., sexual abuse): (1) attachment, (2) personal characteristics, (3) support at the moment of disclosure, and the (4) family and (5) environmental resources. Some personal characteristics of children and youths promote resilience, including intelligence, self-esteem, recognition of one's own successes, and adaptive coping strategies, such as the search for social support and re-evaluation. Many authors have stressed the importance of support when reporting the abusive situation; victims who received adequate parental support presented less behavioral problems (Spaccarelli & Kim 1994; Dumont, Spatz Widom, & Czaja, 2007). In our own study (Glowacz & Buzitu, 2014), paternal support differentiated our two groups of victims; nondelinquent female teenagers benefited from higher levels of paternal support. Other studies have found similar results. Parent-Boursier and Hébert (2010) found that the perception of high paternal support at the time of reporting the sexual abuse incidents predicted a better psychosocial adaptation. Harris, Furstenberg, and Marmer (1998) reported that the paternal figure acts as a protective factor against delinquent behaviors, particularly when the mother shows low levels of commitment. Finally, our research also showed that nondelinquent female teenagers benefited more from

resources that come from outside the family, which is consistent with studies showing that a significant relationship with an adult external to the nuclear family acts as a protective factor against delinquency and can be considered as an important factor of resilience after an abusive situation (Glowacz & Buzitu, 2014).

Evaluating the Strength of Protective Factors

We approached protective and resilience from the angle of developmental criminology. However, the concept of protective factors is also used in forensic sciences for the evaluation of minor and adult offenders who are subject to psycho-legal interventions:

- In forensic psychiatry, the *Structured Assessment of Protective Factors for Violence Risk* (SAPROF) was developed to extend violence risk assessment with an assessment of protective factors (DevriesRobbé, de Vogel, & Stam 2012). The SAPROF consists of 2 static and 15 dynamic protective factors organized within 3 scales: internal factors (e.g., coping, self-control), motivational factors (e.g., work, attitudes toward authority), and external factors (e.g., social network, professional care). The scores indicate the extent to which the factors are present for a given person in a specific situation. These factors can be important for the individual in two ways: The factors that provide protection at the time of assessment are *key factors*, while the factors that are potential targets for treatment are *goal factors*. The identification of key factors and goal factors is very important in clinical practice because they can be useful for the development of risk management plans and treatment intervention strategies. The assessment with SAPROF also provides an overall protection score, which is counterbalanced against that of violence risk, i.e., low, moderate, or high (De Vogel, devriesRobbé, de Ruiter, & Bouman, 2011).

- When dealing delinquent youths, professionals should strive to look for their strengths and resources, which will enable them to resume a satisfactory social development and allow them to rechannel these strengths to more prosocial outcomes.
- The assessment of resilience can be done using psychological interviews, qualitative evaluations, and psychometric instruments. While the psychometric instruments that have been developed often draw on self-reports, they make it possible to have a standardized measurement and are easy to use (e.g., Connor-Davidson Resilience Scale (CD-RISC), Connor & Davidson, 2003; Adolescent Resilient Scale (ARS), Oshio et al., 2003); Resilience Scale for Adolescents (RSA), Hjemdal, Friborg, Stiles, Rosenvinge, & Martinussen, 2006; Resilience Factors Inventory (IFR-40), Bekaert, Masclet, & Caron, 2012).

Using the resiliency scales for children and adolescents, identified 4 profiles of resilience in a population of 215 delinquents (51 males and 164 females, average age 16 years and 1 month). The first profile shows low levels of resilience and very high vulnerability and includes the highest percentage of females, who were significantly younger, incarcerated at a younger age during the current incarceration. They rated themselves higher on the adaptability and comfort subscales. Their adaptability can be used in interventions to improve their sense of mastery over the environment, improve their trust in others, and learn strategies for emotional regulation.

In the second profile, there are mainly males who are labeled *high vulnerability* by Prince-Embury and Steer's (2010). These individuals have to learn ways to control their emotional reactivity and impulsivity.

The third profile includes a large number of juveniles from non-Caucasian ethnic origin that committed major delinquent offenses. Their dangerousness forbids them from attending school or taking advantage of instructional time. They do not have protective factors associated with

attending school and obtaining educational advancement and have a lower level of resilience. They are labeled as *low resource vulnerability*. Interventions should focus on teaching skills relevant to the juvenile's future goals. Self-monitoring, anger management, and problem-solving may help them attain desirable outcomes without aggression.

Finally, the fourth profile includes older youths and those incarcerated at an older age, usually for a shorter period of time. They have the fewest major offenses and they demonstrate average resilience and vulnerability according to Prince-Embury and Steer (2010).

In conclusion, we stress the importance to continue our efforts to identify protective factors and resilience processes of delinquency in different contexts and for different types of individuals. The necessity to improve our tools for assessment and to generalize their use also has to be encouraged. Recognition of protective factors should be an essential part of the risk management process and of interventions with high-risk adolescents to reduce reoffending (Rutter, 2010). We argue that theory and research on resilience and the related assessments or typologies are useful tools to differentiate the best and most promising effective interventions adapted to specific persons, which is the only way to successfully help criminals on the way to resilience "pour qu'ils s'en sortent" ("for them to make it"; Born, 2011).

Summary

- Resilience can be defined as a personal characteristic of an individual who has succeeded in overcoming stressful and potentially damaging circumstances but can also be considered as the process through which a person adjusts and succeeds in overcoming adversity.
- It is important to distinguish between primary and secondary resilience, which can be paralleled to the processes of onset and desistance.
- Protective factors can be drawn from various dimensions: the community, family, school,

peers, and individual. However, the cumulative effect and particularly the configuration of multiple protective factors are more important than any single factor associated with resilience.

- The impact of these protective factors varies with the situations in which the children and youth are living and are not universal. Risk factors can be different according to distinct developmental periods (i.e., children, adolescents, and adults) or genders (males or females). This specificity is also true for protective and resilience processes.

Future Research Needs

- The challenge for future research is to better identify the internal and external factors supporting resilience.
- Forensic psychiatry assessments mainly focus on risk factors, although they have acknowledged the value in taking into account protective factors. Further research investigating protective factors and strengths exhibited by juvenile offenders will aid in identifying developmental pathways for delinquency and resilience processes as well as more effective tools for prevention and intervention.
- Research is needed to identify not only the protective factors acting individually or in combination with others but also the configurations of these factors that are most effective in different periods of the life course.

Marc Le Blanc's Contribution

Marc Le Blanc's work is impossible to bypass in any discussion of risk and protective factors. Le Blanc was among the first researchers, with David Farrington and Rolf Loeber, to carry out broad-scale longitudinal research on the predictors of delinquent behaviors among adolescents, which resulted in the development of explanatory theoretical models. Le Blanc largely contributed to the identification of the

developmental paths that lead to and protect from the onset and persistence in delinquent trajectories. His self-reported assessment instruments have been highly influential in organizations working with juvenile offenders and are employed in various French-speaking countries.

He developed and validated a comprehensive instrument (Measures of Quebec Adolescents' Social and Personal Adjustment; MASPAQ, Le Blanc, 1996) for the assessment of individuals in juvenile facilities. This instrument measures delinquent and deviant behaviors but also factors from diverse domains of risk. This enables practitioners to employ scientifically validated tools in psychosocial and psychoeducational intervention organizations, which are not usually inclined to use such assessment approaches. The MASPAQ remains a useful instrument to assess protective factors and resilience among adolescents in need of care.

Through his research, Marc Le Blanc revisited Pinatel's concept of criminal personality and conceptualized it as an identifiable syndrome of delinquent personality that exhibits some degree of stability across different periods of the life course (Le Blanc & Morizot, 2001). This approach provides a theoretically relevant framework for the evaluation of personality characteristics often used in psychocriminological research. Le Blanc's work generally, and his work with Rolf Loeber more specifically, largely contributed to the birth and the notoriety of the field of developmental criminology (Loeber & Le Blanc, 1990; Le Blanc & Loeber, 1998).

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Lila Kazemian

The Relevance of Desistance Research

While most adult offenders were at one time juvenile delinquents, most individuals who engage in delinquency in adolescence do not grow up to be adult offenders (Gove, 1985; Robins, 1978; Sampson & Laub, 1993). This criminological fact has led to a large body of research investigating the process by which individuals cease offending, otherwise known as desistance from crime. Desistance from crime and antisocial behavior is an important area of study in developmental and life-course research, and the growing literature on this topic has generated a large body of knowledge on this dimension of the criminal career. While it was once true that developmental researchers invested more efforts in understanding sequences of onset, acceleration, or escalation rather than those of desistance, deceleration, and de-escalation (Le Blanc, 2002), this trend seems to have changed with the rapid growth of desistance research.

The association between age and crime is one of the most established facts in the field of criminology. It is generally agreed that aggregate crime rates peak in late adolescence/early adulthood and gradually drop thereafter, but there is remains some debate about the cause of this

decline. Gottfredson and Hirschi (1990) believed that the predictors of the onset of delinquency are similar to those of persistence and desistance from crime and that these parameters are all behavioral manifestations of one underlying construct (e.g., criminal propensity). Conversely, Farrington et al. (1990) argued that the causes and correlates of onset are likely to be different from those of desistance and persistence in crime, a concept that Uggen and Piliavin (1998) have referred to as asymmetrical causation. It has also been suggested that the predictors of early desistance may be different from those of late desistance (Weitekamp & Kerner, 1994).

From a theoretical viewpoint, the implications associated with the question of asymmetrical causation are of substantial importance. If the predictors of onset are indeed different from those of desistance, then this would defy some of the basic principles of a general theory of crime and antisocial behavior. Information about protective factors that foster or accelerate desistance also informs interventions after the onset of criminal careers. Once onset has occurred, efforts should be invested in limiting the length, intensity, and seriousness of criminal careers. Identifying life-course transitions and cognitive factors that contribute to desistance from crime can provide useful information for postonset interventions. This chapter aims to highlight some unresolved issues in desistance research, provide an overview of the most important studies in this area, and underline future research needs.

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Methodological Issues in Desistance Research¹

Defining and Measuring Desistance

In an extensive review of the desistance literature, Laub and Sampson (2001) argued that few studies have offered an operational definition of desistance and that there is currently no consensus in the literature on this issue (see also Maruna, 2001; Piquero, Farrington, & Blumstein, 2003). “Can desistance occur after one act of crime?” (Laub & Sampson, 2001, p. 6). Is the desistance process characterized by a reduction in offending frequency or seriousness of crime (Bushway, Piquero, Broidy, Cauffman, & Mazerolle, 2001)? How many years of nonoffending are required in order to determine with certainty that desistance has occurred (Bushway et al., 2001; Laub & Sampson, 2001, 2003; Maruna, 2001; Piquero et al., 2003)? Uggen and Massoglia (2003, pp. 316–317) argued that “Because conceptual and operational definitions of desistance vary across existing studies, it is difficult to draw empirical generalizations from the growing literature on desistance from crime.”

False Desistance

Desistance is often defined at the last officially recorded or self-reported offense. Since most longitudinal studies have followed up individuals over a relatively limited period of the life course, the issue of false desistance is an important limitation of desistance studies (Blumstein, Farrington, & Moitra, 1985; Brame, Bushway, & Paternoster, 2003; Bushway, Brame, & Paternoster, 2004, 2001, 2003, Bushway et al., 2001; Laub & Sampson, 2001). Patterns of intermittency may be misinterpreted as “desistance.” This issue of “temporary” versus “permanent” desistance from crime (or “zigzag,” see Laub & Sampson, 2003; Piquero, 2004) has been

highlighted by criminal career researchers (Bushway et al., 2004, 2001; Laub & Sampson, 2001; Piquero et al., 2003), although very few studies have explored this question in depth (Piquero, 2004; Piquero et al., 2003). In addition, Carlsson (2012) argued that intermittent patterns of offending come in different forms. The author identified two different patterns of intermittency in the discourse of his sample of Swedish males. The first type refers to a temporary lull in offending without any commitment to long-term change, whereas the second type involves the “will to desist” (p. 924). This qualitative study highlights the ambiguity in regarding all periods of intermittency as similar and underlines the need to better understand the dynamics underlying periods of temporary desistance.

Desistance as a Process

Most studies on desistance have adopted a dichotomous measure of desistance (static definition) rather than a process view of the phenomenon (dynamic definition). As a result, these studies do not account for *changes* in rates of offending. Although different individuals may cease offending at the same age, their criminal careers may be distinguished by very different pathways (in terms of variety, frequency, seriousness, and length). Several researchers have acknowledged the relevance of perceiving desistance as a gradual process rather than an event that occurs abruptly (Bottoms et al., 2004; Bushway et al., 2001, 2003; Laub et al., 1998; Laub & Sampson, 2001, 2003; Le Blanc, 1993; Loeber & Le Blanc, 1990; Maruna, 2001; Shover, 1983), but the dichotomous definition remains frequently employed in desistance analyses. The process view of desistance has been more prevalent in recent research. Adopting this approach in their analysis of desistance among parolees, Bahr et al. (2010, p. 674) did not focus solely on specific events (i.e., recidivism) but rather “. . . on how well parolees were able to perform across a period of 3 years.” In cases where prospective longitudinal data are not available, where observation periods are short

¹ This section draws heavily from Kazemian (2007).

and where dichotomous measures of desistance are used, “desistance” is more likely to refer to a state of “temporary nonoffending” (Bushway et al., 2001).

Over 25 years ago, Le Blanc and Fréchette (1989, followed by Loeber and Le Blanc, 1990 and Le Blanc & Loeber 1998) developed a definition of desistance that extended beyond the dichotomous measure. This definition integrated four dimensions. The authors argued that before criminal activity ceases completely, frequency (λ) declines, offenders become increasingly specialized and engage in more minor offenses, and a culmination point is reached. This was, to my knowledge, the first attempt in developmental criminology to define desistance as a process.

Within- Versus Between-Individual Predictors of Desistance

Gottfredson and Hirschi (1990) claimed that since criminal potential remains stable across time, it is not useful to follow up individuals over long periods. Sampson and Laub (1993, p. 16) responded to this comment by arguing that “the continuity to which they (Gottfredson and Hirschi, 1990) refer is relative stability, which does not mean that individuals remain constant in their behavior over time.” An increasing number of researchers seem to agree that there is both stability and change in offending patterns across the life course (Farrington & West, 1995; Horney, Osgood, & Marshall, 1995; Moffitt, 1993; Sampson & Laub, 1993, 2003). The fact that offending trajectories in adulthood are not fully explained by childhood experiences highlights the importance of change in developmental and life-course patterns.

Farrington (2007) argued that it is more relevant to demonstrate that offending decreases after getting married, getting a job, or moving house than to demonstrate lower offending rates of married compared with unmarried people, employed versus unemployed people, and so on. Unsurprisingly, between-individual analyses

tend to show that individuals with higher self- and social control are more likely to desist from crime when compared to those with lower self- and social control, and this finding has been demonstrated abundantly in the literature. There is a need for more within-individual designs in desistance research, and fortunately, these studies have become increasingly prevalent in recent years (e.g., see Lyngstad & Skardhamar, 2013).

Long-Term Predictions

In order to make the argument that it is possible to prospectively identify “desisters” and “persisters,” the two groups need to be easily distinguishable. Maruna (2001) argued that desisting and persisting offenders are similar individuals at different stages of the process of change, and not inherently distinct individuals. Laub and Sampson (2003, p. 240) also noted that “at times the intermittent offenders look like desisters, and at other times they resemble persistent offenders.” In addition, some prior research has underlined the difficulties in making accurate long-term predictions about desistance based on early risk factors (Kazemian, Farrington, & Le Blanc 2009; Laub & Sampson, 2003). Kazemian et al. (2009) found that long-term predictions were more accurate when focusing on between-individual differences in offending gravity scores at age 32 than on within-individual change in offending gravity over a 15-year period, suggesting that within-individual variations in patterns of offending may be more dependent on changing life circumstances. These findings suggest that individuals are capable of change and that life events and cognitive shifts may attenuate the impact of factors traditionally associated with delayed desistance. Morizot and Le Blanc’s (2007) results suggested that self-control and social bonding measures did not generally predict trajectories of desistance over a 25-year period. The authors found that some of these indicators did impact the desistance process, but that these effects were limited to specific

developmental periods. Sampson and Laub (2003, p. 584) concluded that "... life-course-persistent offenders are difficult, if not impossible, to identify prospectively using a wide variety of childhood and adolescent risk factors" and that "... adult trajectories of offending among former delinquents cannot be reduced to the past" (p. 588).

Self-Selection and Sequencing

The issue of self-selection has been addressed abundantly in the literature (Farrington & West, 1995; Gottfredson & Hirschi, 1990; Horney et al., 1995; Laub & Sampson, 2001, 2003; Moffitt, 1993; Sampson & Laub 1993, 1997; Uggen, 2000; Uggen & Massoglia, 2003; Warr, 1998). Since turning points and life events are not randomly assigned across individuals, it is difficult to assess whether these events are *causes* or *correlates* of desistance. Just as children with neuropsychological and other maladaptive temperamental characteristics are not randomly assigned to supportive or non-supportive environments (Moffitt, 1993), life-course events may occur as the result of a process of self-selection and reflect underlying criminal propensities. Laub and Sampson (2001, p. 23) concluded that "selection is thus a threat to the interpretation of any desistance study."

Many authors have discussed the complexity of establishing temporal or causal order between cognitive processes, situational circumstances, and desistance from crime (Bottoms et al., 2004; Laub & Sampson, 2001; Lebel et al., 2008; Maruna, 2001; Walters, 2002). It is difficult to determine the order of these sequences, mainly because external and internal changes are often interdependent and occur simultaneously (Maruna, 2001; Shover, 1983). Le Blanc (1993, p. 56) summarized this idea:

Some potential variables may occur in such close proximity to desistance that, for all practical purposes, it is impossible to measure which comes first; moreover, they may have reciprocal influences ... For example, delinquency can be caused by a weak parental attachment and it may also weaken that bond.

Le Blanc (2004) discussed the interactions between self-control, social control, and offending and argued that these two "general mechanisms of control" interact through various dynamic processes. These cyclical interactions generate criminal behavior. Le Blanc further argued that "chaos" may occur when an individual offends regularly and displays weak social bonds and self-control. The key postulate in this theory is that dimensions of self- and social control are interdependent and interact in complex ways to produce offending behavior. In short, cognitive and situational processes often occur simultaneously, which makes it difficult to unravel causal sequences.

Explanations of Desistance

This section aims to provide a brief summary of some of the key findings derived from influential studies on desistance from crime and antisocial behavior. Major findings on the social, cognitive, and genetic predictors of desistance are presented. While the focus is on desistance from crime, findings are likely to be generalizable to other forms of problem behaviors. Laub and Sampson's (2001, p. 38) extensive review suggested that "... the processes of desistance from problem behaviors such as alcohol dependency are quite similar to the processes of desistance from predatory crime."

Social Predictors of Desistance

A large body of research on desistance has drawn attention to the importance of social bonds in the process of desistance. Desistance from crime is said to be gradual, resulting from an accumulation of social bonds (see Horney et al. 1995). Irwin (1970) identified three key factors in the explanation of desistance from crime: a good job, a good relationship with a woman, and involvement in extracurricular activities. Giordano et al. (2002) made reference to the "respectability package" and argued that marriage and job stability exert a more substantial impact on

desistance if they occur jointly. In this respect, turning points (marriage, employment, etc.) are likely to be interdependent. Life events can either be positive or negative, depending on the “quality, strength, and interdependence of social ties” (Sampson & Laub, 1993, p. 21). In this respect, adult crime would largely result from weak bonds to social institutions, and desistance from crime would entail some social investment in conventional institutions.

Employment

The general consensus in the literature is that job stability promotes desistance from crime (Giordano et al., 2002). Using data from the National Supported Work Demonstration Project, Uggen (2000) explored the effect of employment on recidivism. This project recruited participants from underprivileged neighborhoods and randomly assigned them to control or experimental groups. Offenders, drug users, and dropouts were targeted. Individuals in the treatment group were given minimum-wage employment opportunities. Results showed that the program had a more substantial impact on older individuals (over 26 years of age). This finding is consistent with Morizot and Le Blanc’s (2007) analyses of a sample of adjudicated French-Canadian males, which showed that employment exerted a positive effect on desistance only at specific developmental periods. Furthermore, “offenders who are provided even marginal employment opportunities are less likely to reoffend than those not provided such opportunities” (Uggen, 2000, p. 542). Although the general consensus in the literature is that employment (and employment stability) exerts an impact on desistance, some studies have found that employment did not have an impact on the likelihood of desistance from crime (Giordano et al. 2002).

The life narratives explored in Laub and Sampson’s (2003, p. 129) study suggested that “. . . stable work may not trigger a change in an antisocial trajectory in the way that marriage or serving in the military does, even though

employment may play an important role in sustaining the process of desistance.” Analyzing data from a random sample of Texas male parolees, Tripodi et al. (2010) found somewhat similar results. Their findings showed that employment was not significantly associated with a reduced likelihood of reincarceration, but was linked to longer time lags to reincarceration (i.e., more time “crime-free in the community”). As highlighted by the authors, this interesting finding underlines the importance of studying desistance as a process:

The explanation for this insignificant finding, however, requires a shift in perspective from a “black and white” view of ex-prisoners as either recidivists or nonrecidivists. This traditional view of parolees leaves little middle ground for ex-prisoners who are in the process of changing. Instead, a more complex view of offenders is needed to recognize that they may fall on a spectrum of behavior change that consists of various stages. (p. 714)

Interestingly, a study drawing on a sample of recidivist Norwegian males found that employment is a consequence, and not a cause, of desistance (Skardhamar & Savolainen, 2014). Modeling changes in offending behavior before and after exposure to employment, the authors found that most individuals had desisted from crime prior to obtaining employment and that being employed did not result in additional decreases in criminal behavior. Skardhamar and Savolainen (2014) did detect a small group of individuals who exhibited reductions in offending behavior after obtaining employment, but they were a very small minority of the sample. This study is important because demonstrates the crucial influence of selection effects in explaining the association between turning points and desistance.

Laub and Sampson (2003) argued that the processes underlying the relationship between work and desistance are similar to those underlying the relationship between marriage and desistance. Employment promotes desistance through four main processes: (1) a reciprocal exchange of social capital between employer and employee; (2) more limited exposure to criminal opportunities and a reduced “. . . probability that

criminal propensities will be translated into action”; (3) direct informal social control; and (4) the development of a ‘... sense of identity and meaning’ to one’s life” (Laub & Sampson 2003, p. 47). Finally, the impact of employment as a turning point appears to also act conjointly with other social transitions. Sampson and Laub’s (1993) results reveal interaction effects between various social institutions and desistance from crime. For example, they find that the impact of job stability on desistance is not as significant among married men.

Marriage

The strong link between marriage and desistance has been highlighted in various studies for the past few decades and continues to hold in contemporary research (Bersani et al. 2009; Craig & Foster, 2013; Doherty & Ensminger, 2013; Farrington & West, 1995; Horney et al., 1995; McGloin et al., 2011; Sampson & Laub, 1993, 2003). The most influential findings have emerged from the Glueck data, the Cambridge Study in Delinquent Development, and Horney et al. (1995) classic analysis of criminal careers in the short term.

Drawing on a sample of Nebraska inmates, Horney et al. (1995, p. 658) explored the association between crime and local life circumstances, which they defined as “... conditions in an individual’s life that can fluctuate relatively frequently.” According to the authors, variables explaining short-term variations in criminal behavior are similar to variables explaining long-term variations (i.e., strength of bonds to conventional social institutions). Horney et al. (1995, p. 669) found that individuals were “... less likely to commit crimes when living with a wife” (see also Farrington & West, 1995; Laub & Sampson, 2003; Sampson & Laub, 1993). The authors argued that time invested in conventional social institutions was time away from sources of temptation (bars, delinquent peers, etc.). Horney et al. (1995, p. 670) added that these events may not have been randomly distributed and that “... local life circumstances can change criminal

careers by modifying the likelihood of offending *at particular times*.” Since their analyses were limited to a short period of the life course, it is difficult to assess whether these changes were permanent and whether they reflected stable changes in life-course trajectories.

Farrington and West (1995, p. 265) found that “... individuals who had married and never separated were the least antisocial at age 32 while those who had married and separated and were now living alone were the most antisocial.” They studied rates of offending before and after marriage and concluded that getting married led to a decrease in offending compared with staying single. However, their results did not allow to determine “... how far marriage and separation may be causes, consequences, or symptoms” (p. 265). The effect of marriage on desistance may have been dependent on “... the reasons for getting married (e.g., pregnancy), on the happiness of the marriage, and on the extent to which the wife is conventional and prosocial” (Farrington & West, 1995, p. 278). In a follow-up of the Cambridge Study in Delinquent Development males up to age 48, Theobald and Farrington (2009) found significant declines in the number of convictions after marriage, though this effect was less pronounced for late marriages as opposed to early or midrange marriages. The authors argued that “... there may be an interaction effect between marriage and some variable that is correlated with age such as malleability—a willingness to change or be more flexible in behaviour” (p. 512).

Laub et al. (1998) also found that high-rate offenders had weaker marital bonds when compared to other offenders. In agreement with Farrington and West’s results, Laub et al. (1998) argued that the timing and quality of marriage were important (see also Rutter, 1996), with stable marriages exerting a greater preventive effect (see also Sampson & Laub, 1993). In agreement with Farrington and West’s study, Laub et al. (1998) argued that the inhibiting effect of marriage on crime is gradual rather than abrupt. Laub and Sampson (2003) defined the effect of marriage on crime as an “investment process”; the more that individuals

invest in social bonds (e.g., marriage), the less likely they are to engage in criminal activities because they have more to lose. Laub and Sampson (2003, p. 33) rejected the idea that the effect of marriage on crime is merely a result of self-selection (i.e., the idea that people who decide to reform are more likely to get married) and claimed that marital effects remained strong despite selection effects. In contrast to these claims, many studies have suggested strong assortative mating effects (i.e., the idea that the selection of a partner is a nonrandom process that involves various similarities between the mates; see Boutwell, Beaver, & Barnes 2012; Krueger et al., 1998). Boutwell et al.'s (2012, p. 1250) findings suggested that "... the similarity in mates existed prior to the commencement of their relationship. . .," providing support for "... the role of assortative mating, not behavioral contagion, in structuring mate similarity for antisocial behaviors." The contrasting results between Laub and Sampson's work and the assortative mating literature show that there is still much to learn about the link between marriage/romantic partnerships and desistance.

Laub and Sampson (2003) summarized the key processes involved in the effect of marriage on desistance from crime, many of which revolve around shifts in routine activities. Marriage leads to reduced deviant peer associations, new friends and extended family, as well as overall changes in activities. Spouses also constitute an additional source of social control and an effective means of monitoring routine activities. Marriage often involves residential changes and children, which may promote changes in routine activities. Laub and Sampson (2003, p. 43) also argued that "... marriage can change one's sense of self."

Findings from recent research provide support for Laub and Sampson's (2003) hypotheses and further specify the marriage-desistance link. In addition to the quality of relationship, the characteristics of the partner also appear to be important. van Schellen et al. (2012) argued that the crime-reduction benefits of marriage may be diminished among convicted individuals, because they "have a tendency to marry criminal partners" (p. 567). Bersani and Doherty (2013)

found that the dissolution of the marriage is associated with increased offending, which prompted the authors to hypothesize that marriage is likely to exert temporary or situational effects on desistance.

Not all studies found a significant effect of marriage on desistance (e.g., Kruttschnitt et al., 2000). Recent European studies found divergent results. Lyngstad and Skardhamar (2013) investigated the marriage-desistance link among a sample of Norwegian males. The study used a within-individual design and followed up individuals for a period of 5 years before and after marriage and investigated the likelihood of engaging in crime during these periods. A reduction in crime is observed before marriage, and a slight increase in offending occurs after marriage. These findings suggest that the drop in offending among married individuals is initiated in the years preceding marriage and is not a result of marriage (a similar drop was observed in an analysis of the effect of parenthood on offending, using the same data; see Monsbakken, Lyngstad & Skardhamar, 2013). Lyngstad and Skardhamar (2013) hypothesized that the reduced involvement in crime prior to marriage may be due to the social control influences of the courtship period as well as the potential selection effect of individuals who show disinterest in offending (and who select partners who share the sentiment). Using a Dutch sample, van Schellen, Poortman, and Nieuwbeerta (2012) found that although individuals who were highly active in offending were less likely to marry, they were more likely to marry a deviant partner (potentially reflecting assortative mating effects; see discussion above). These results prompted the authors to recommend that we revisit the marriage-desistance link, arguing that "...offenders are less likely to experience the protective effects of marriage, because of their lower marital chances" and that the crime-reducing effects of marriage are lost on individuals who marry a deviant spouse (p. 567). These interesting findings highlight the need to better document changes before and after marriage, as well as information about partner selection.

While marriage is regarded as a major turning point in desistance research, much less attention is granted to the effects of cohabitation (for one of the first analyses of cohabitation with longitudinal data, see Farrington & West, 1995). In an analysis based on a sample of Finnish recidivists, Savolainen (2009, p. 300) found that the "... transition to cohabitation is associated with greater reductions in criminal activity than getting married," highlighting once again the relevance of taking into account the stability of the relationship as opposed to uniquely focusing on marital status. Savolainen (2009, p. 301) also noted a cumulative effect of parenthood and union formation on desistance from crime, concluding that "offenders who formed a union and became fathers enjoyed the greatest reductions in criminal activity." Drawing on a sample of 500 women living in underprivileged communities in Denver, Kreager et al. (2010) found that the transition to motherhood was significantly associated with reduced delinquency and substance use and that this effect was more pronounced than that of marriage. Conjugal relationships often coincide with having children, and further research is needed to better understand the impact of parenthood on desistance, as well as its differential impact across gender groups (see Laub & Sampson, 2001, for a discussion on the more pronounced impact of parenthood on women when compared to men; see also Lancôt, 2015).

Peers

The social learning perspective suggests that the effect of marriage on crime is mediated through peer associations. This perspective attributes desistance to associations with conventional peers, increased noncriminal routine activities, and reduced exposure to definitions favorable to crime (e.g., Cromwell et al., 1991; Farrington et al. 2002; Warr, 1998; Wright & Cullen, 2004). Using a sample from the National Youth Survey (NYS), Warr (1993) found that changes in offending behavior that occurred with age were related to changes in peer associations.

The author concluded that when controlling for peer affiliations, "...the association between age and crime is substantially weakened and, for some offences, disappears entirely" (1993, p. 35). In a later study, Warr (1998) found that married people tend to spend less time with their friends than unmarried individuals and that married individuals tend to have fewer delinquent friends than their unmarried counterparts.

Wright and Cullen (2004) replicated Warr's (1998) study and also used data from the National Youth Survey (NYS), but focused on work rather than marriage. The authors found that employment increased the interactions with prosocial coworkers, which "...restructure friendship networks by diminishing contact with delinquent peers" (2004, p. 185). Work was said to promote desistance not through the development of increased social capital, but rather through increased associations with prosocial coworkers. Wright and Cullen (2004, p. 200) argued that the effects of unemployment on desistance were not dependent on the quality of the job (as argued by Sampson and Laub), but rather on the "*quality of peer associations* that occur within the context of work." In the Pittsburgh Youth Study, Farrington et al. (2002) found that while affiliations with delinquent peers were strongly correlated with delinquency in between-individual analyses, this was not the case for within-individual analyses, suggesting that peer delinquency may not have had a causal effect on offending.

Peer networks may be associated with the environment or the neighborhood. Kirk's (2012) research suggests that residential change may be an important turning point in criminal careers, a question that has been largely ignored in life-course research.

Military

Sampson and Laub's (1993; see also 2003) analysis of the Glueck men sample suggested that the military was an important turning point in the life course. In contrast, Bouffard (2005) found that military service was not associated with offending outcomes (see also Craig & Foster,

2013, for similar results). Craig and Foster (2013, p. 219) explained that the divergence in results with Sampson and Laub "... may indicate a change in the military." However, the authors did find that involvement in the military was predictive of desistance among women. There is a need for research with contemporary samples of individuals having completed military service in order to assess the impact of the military on desistance from crime, as well as the differential gender effects.

Incarceration

Most empirical studies and meta-analyses that have investigated the impact of incarceration on recidivism have found that imprisonment has either no impact or undesirable effects on subsequent offending (Bales & Piquero, 2012; Gendreau, Goggin, & Cullen 1999; Nagin, Cullen, & Jonson 2009; Villettaz, Killias, & Zoder 2006; Weatherburn, 2010). Gendreau et al. (1999) conducted a meta-analysis of studies that have examined the link between prison and recidivism. Controlling for relevant risk factors, the authors found that both incarceration (in comparison to community sanctions) and length of time in prison led to increases in recidivism. Gendreau et al. (1999, p. 7) concluded that prison may promote offending behavior by damaging the "... psychological and emotional well-being of inmates" (see also Maruna & Toch, 2005). Clemmer (1958) discussed the concept of *prisonization*, which refers to the process by which inmates adopt the customs, values, and norms of prison, some of which may be inappropriate for life on the outside and impede desistance efforts. In addition, the significant prevalence of traumatic experiences and mental health disorders among the prison population (e.g., Fazel & Danesh, 2002; Wolff, Shi & Siegel, 2009) highlights yet another impediment to desistance. In its current form, the prison environment may not be conducive to the development of a reformed, prosocial identity. Very little is known about the identity shifts that occur

among inmates during periods of incarceration and how these shifts impact their attitudes, behaviors, and relationships.

Cognitive Predictors of Desistance

The study of subjective changes that promote desistance from crime has generally been addressed in ethnographic studies and qualitative analyses of crime. Maruna (2001, p. 8) argued that "subjective aspects of human life (emotions, thoughts, motivations, and goals) have largely been neglected in the study of crime, because the data are presumed to be either unscientific or too unwieldy for empirical analysis."

The concept of *human agency* (i.e., the idea that offenders have free will and remain active participants in their life journey) is extremely important to our understanding of desistance from crime. Sampson and Laub (2003) argued that human agency is not a stable trait, but rather an emergent property within *situations*; offenders are not mindless participants pushed or pulled to break the law. This argument is consistent with analyses that have investigated changes in personality traits over time (Morizot, 2015).

According to Gove (1985), desistance from crime is a result of five key internal changes: a shift from self-centeredness to consideration for others, the development of prosocial values and behavior, increasing ease in social interactions, greater consideration for other members of the community, and a growing concern for the "meaning of life." Through life history narratives, Giordano et al. (2002) developed the theory of cognitive transformation and discussed the *cognitive shifts* that promote the process of desistance. The authors described four processes of cognitive transformations. First, the offender must be open to change (see also Abrams, 2012). Second, through a process of self-selection, Giordano et al. (2002) argued that the individual exposes himself/herself to prosocial experiences that will further promote desistance (e.g., employment). Third, the individual adheres to a

new prosocial and noncriminal identity. Finally, there is a shift in the perception of the criminal lifestyle, that is the negative consequences of offending become obvious. As such, desistance is regarded as a gradual process.

Shover and Thompson (1992) found that the relationship between age and desistance was mediated by *optimism for achieving success via legitimate pursuits and expectations of criminal success*. Burnett (2004) also found that prerelease self-assessments of optimism about desistance were positively associated with desistance outcomes after release (see Farrall, 2002, for similar results). Maruna (2001, p. 9) concluded that desisting ex-offenders "...displayed an exaggerated sense of control over the future and an inflated, almost missionary, sense of purpose in life." The individuals' motivation and determination to cease offending is also a key component in the desistance process (Burnett, 2004; Pezzin, 1995; Shover, 1983; Shover & Thompson, 1992; Sommers et al., 1994).

Through interviews with a sample of incarcerated burglars, Shover (1996) highlighted the importance of *resolve and determination*, which were found to be essential to the desistance process. He argued that "...men who are most determined to avoid crime are more successful in doing so than their equivocating peers, even allowing for the possible influences of other factors" (1996, p. 130). Some of the interviewees expressed increasing concern with getting caught as they got older, fearing that they might spend the rest of their lives in prison and therefore miss out on the opportunity to make something of their lives (see also Cromwell et al., 1991). Furthermore, with age, some offenders gave less importance to material gain, which reduced the appeal of crime. Overall, crime (and all the caveats associated with it) has a cumulative effect on offenders and sooner or later, they get "worn down" by a life in crime.

These findings suggest that it may not be age in itself that causes a decline in offending, as argued by Gottfredson and Hirschi (1990), but rather the accumulation, overtime of failures, contacts with the criminal justice system, betrayals, and other problems associated with

crime. Shover (1996, p. 138) suggested that "...aging makes offenders more interested in the rewards of conventional life styles and also more rational in decision making." Individuals will be more willing to cease offending if the perceived benefits of abstinence from crime are greater than those of crime. These findings suggest that desistance requires both internal and external changes.

The Role of Identity Change in the Desistance Process

The importance of identity transformation in the process of desistance has been highlighted by many researchers (Bottoms et al., 2004; Burnett, 2004; Gartner & Piliavin, 1988; Giordano et al., 2002; King, 2013; Laub & Sampson, 2003; Maruna, 2001; Meisenhelder, 1977; Shover, 1983). Maruna (2001, p. 7) argued that "...to desist from crime, ex-offenders need to develop a coherent, prosocial identity for themselves" (see also Shover, 1983). In his sample, Maruna identified a need for desisting offenders to separate their past self from their current self (see also Mischkowitz, 1994). *Making good* refers to a process of "self-reconstruction" (Maruna, 2001). *Making good* entails an understanding of why past offenses were committed and of the reasons supporting the decision to stop. Additionally, it also involves an ability to see the link between past mistakes and current accomplishments, to make the best of past experiences, and to discover one's "true self." Maruna and Farrall (2004) offer a distinction between primary and secondary desistance, the former referring to any temporary lull in offending and the latter being characterized by the maintenance of nonoffending and changes in identity and roles.

The narrative approach to studying desistance has become increasingly popular in recent years, and several studies have provided support for the idea of the "redemption script" and its role in sustaining desisting identities (e.g., Burnett, 2004; Gadd & Farrall, 2004; Halsey, 2006; Maruna, 2001). The construction,

deconstruction, and reconstruction of self-stories is at the core of many traditional correctional interventions. Laub and Sampson (2003) have been critical of this perspective, arguing that desistance does not necessarily require cognitive transformation. The authors maintained that "...offenders can and do desist without a conscious decision to 'make good' ...and offenders can and do desist without a 'cognitive transformation'" (p. 279). Although desistance does eventually occur for all offenders, it occurs earlier for some individuals than others. Evidence from the studies presented in this chapter seems to suggest that, rather than being a process that occurs "naturally," desistance tends to be prompted and supported by strong social networks and an individual resolve to change. What remains less understood, however, is how the cognitive and social processes interact to cause a shift toward desistance.

It is interesting to note that many of the cognitive factors investigated in criminological studies of desistance bear many similarities to personality traits identified by psychologists, and yet this literature has been largely overlooked in criminological research. Following the publication of Gottfredson and Hirschi's (1990) of *A General Theory of Crime*, criminologists have fixated on the concept of self-control as an individual-level predictor of offending behavior. Longitudinal studies have shown that there is a "normative maturation" in personality traits, and a growing number of studies have confirmed that these changes in personality traits are correlated with decreases in offending and substance use (Morizot, 2015).

The Interaction Between Social and Cognitive Factors

One of the most interesting dimensions of the desistance process refers to the way in which individual predispositions and life events converge to promote this process. Giordano et al. (2002, p.1026) argued that "given a relatively 'advantaged' set of circumstances, the cognitive transformations and a genetic moves we describe

are hardly necessary; under conditions of sufficiently extreme disadvantage, they are unlikely to be nearly enough." Both individual and environmental dimensions should be taken into account in order to better understand the processes underlying desistance.

Giordano et al. (2002) supported the idea that permanent desistance from crime may be a result of both cognitive changes and turning points (or "hooks for change"). Through a process of self-selection, life events promote shifts in identity and act as *catalysts* for permanent changes in offending. Some of the main hooks for change that were identified in the narratives of Giordano et al.'s (2002) study included the links to formal institutions (prison and religion) and intimate or informal networks (spouse and/or children), which is consistent with Sampson and Laub's (1993) theory of formal and informal social control. Various other studies have emphasized the important roles of internal and external factors in the explanation of desistance (Farrall & Bowling, 1999; Laub & Sampson, 2003; Sommers et al., 1994; Stall & Biernacki 1986).

LeBel et al. (2008) made the distinction between *social* (i.e., life events, situational factors, "objective" changes) and *subjective* (cognitive factors, internal changes) components in the explanation of desistance. The authors explained that these two categories of factors are not necessarily independent of each other. They discussed three models explaining the interaction between social and subjective factors. First, the *strong subjective model* stipulates that it is the individual's motivation and desire to change that increases the likelihood that bonds will be strengthened by conventional social sources (marriage, legitimate employment, etc.). In this respect, turning points that promote desistance would be the result of a process of self-selection and would not cause a change in behavior. Second, the *strong social model* asserts that life events occur randomly among individuals and that these turning points are directly responsible for desistance from crime. From this viewpoint, subjective characteristics are not essential to desistance from crime. Finally, the

third model, the *subjective-social model*, supports the idea that life events may contribute to the desistance process but that the impact of these events will be dependent on the *mindset* of the individuals. As argued above, although motivation is a crucial component of change, it nonetheless requires support from conventional social networks to maintain desistance efforts. This last model thus integrates both objective and subjective factors (external and internal changes) in its explanation of desistance.

LeBel et al.'s (2008) findings suggested that the desistance process is a system in which various internal and external factors interact in different ways. On one hand, the authors suggested that some social problems occur independently of the optimistic views of the offender. On the other, they also concluded that individuals displaying the greatest motivation to change were also the least likely to recidivate. Individuals who had the right mindset and social networks to support them were better equipped to face problems, resist temptations, and avoid setbacks, provided that the problems were not tremendous. However, the authors also concluded that the desire to change may be insufficient when social problems are overwhelming and excessive (see also Bottoms et al., 2004; Farrall & Bowling, 1999; Maruna, 2001). Maruna (2001) explained that the decision and desire to desist from crime is often put to the test by situational factors, such as temptations and frustrations and in such scenarios, the desire to desist from crime may not always be sufficient.

Genetic/Biological Factors and Desistance

The maturation framework, discussed by Glueck and Glueck (1940), stipulates that physical, intellectual, emotional, and psychological development (i.e., maturation) is the main cause for decline or cessation of offending behavior. Gottfredson and Hirschi (1990) argued that aging is a major reason for the decline in crime observed over time and that offending declines for all offenders with age. Few studies have explored

the role of genetic and biological factors in the desistance process (for extensive research on biosocial explanations of offending behavior, see Beaver, Schwartz, & Gajos, 2014; Loeber, Byrd, & Farrington, 2014). In a recent study, Barnes and Beaver (2012) investigated the influence of genetic factors in the association between marriage and desistance. The authors drew on prior research having examined the genetic foundations of adult social bonds and focused on active gene–environment correlations (rGEs), which “...occur when a person selects into an environment on the basis of his or her genetic propensities” (p. 22). They found significant genetic influences on both marriage and desistance from crime. Marriage remained a significant predictor of desistance even after controlling for genetic influences, but its effect was greatly attenuated. Similarly, Beaver et al. (2008) also found a significant interaction between marital status and genetic polymorphisms in the prediction of desistance. This is a relatively new area of inquiry in desistance research, and more studies are needed to better understand the complex interplay between genes and the environment. Loeber, Pardini, Stouthamer-Loeber, and Raine's (2007) study suggested that the evidence base for physiological and biological factors linked to desistance is highly underdeveloped.

Summary

- There is an increasing consensus regarding the relevance of perceiving desistance as a process rather than an event. The decision to abandon antisocial behaviors and criminal activities is unlikely to occur abruptly, particularly for those individuals who display longer and more intense criminal careers.
- Intermittency in criminal careers is the norm. Decisions to desist from crime may involve several relapses and reversals of decisions before reaching the final point of termination from crime, which renders the prediction of desistance challenging.

- Efforts to make long-term predictions about desistance from crime and antisocial behavior have not yielded impressive results. Desistance is likely to occur as a result of various turning points and cognitive shifts that occur throughout the life course, rather than being determined by early risk factors.
 - Social bonds, particularly marriage and employment, are generally found to be significant predictors of desistance. However, the quality of the bond, the nature of the relationships with the spouse or the fellow employees/employer, and the timing of the life event are also important considerations. In addition, some research has suggested that these turning points are consequences, rather than causes, of desistance, suggesting strong selection effects.
 - Various cognitive factors (or personality traits), such as the decision to change or the development of a prosocial identity, have been found to be predictive of successful desistance efforts. These measures are typically excluded from quantitative analyses.
 - The process of desistance is likely to occur as a result of the combined influence of life events, cognitive/personality changes, and potentially genetic/biological factors.
- several decades ago, but remains underutilized in desistance research.
 - The assessment of desistance should extend beyond traditional measures of offending. Additional outcome measures for successful desistance may include improvements in mental and physical health outcomes, social bonds and integration, personality traits, and behavioral variables other than offending (e.g., substance use, routine activities, etc.).
 - We need to better understand the interplay between individual traits and turning points in the explanation of desistance. For instance, while we generally regard life events as objective turning points, they may in fact be subjective due to the fact that personality traits influence how these events are perceived.
 - Efforts should be undertaken to better integrate knowledge generated in areas of desistance and prisoner reentry research. While desistance research has primarily emphasized theoretical advancements, research on prisoner reentry has focused on the practical implications of the desistance process of formerly incarcerated individuals as they return to the community. Findings drawn from desistance research have obvious implications for reentry practices, but these two areas of study often appear to be disjointed. Recent studies have successfully bridged this gap by examining the predictive value of criminal history records on termination from crime (e.g., Blumstein & Nakamura, 2009; Bushway, Nieuwbeerta, & Blokland 2011). The obstacles faced by formerly incarcerated individuals upon release from prison are similar to the impediments to desistance identified in the literature, namely, strains on family relationships, physical and mental health issues, substance abuse, housing issues, lack of marketable skills, restrictive laws and policies, and unemployment (Burnett, 2004; Laub & Sampson, 2001; Maruna, 2001; Petersilia, 2003; Travis, 2005). There is also

Future Research Needs

Despite the substantial progress in desistance research, some important issues warrant more attention:

- There is a need to operationalize desistance beyond a single-parameter outcome and to integrate several criminal career parameters in the measure of desistance (i.e., frequency, seriousness, and versatility) in order to better capture the changes occurring in the dynamics of offending. Such a conceptualization was suggested by Le Blanc and Fréchette (1989)

a need to study the desistance process during periods of incarceration.

- Desistance research has, for the most part, failed to integrate the concept of resilience (for exceptions, see Born, Chevalier, & Humblet 1997; Lösel & Bender, 2003; Glowacz & Born, 2015). In the psychological literature, resilient individuals refer to those who are exposed to life stresses but who “defy expectation by developing into well-adapted individuals” (Luthar, 1991, p. 600). In the context of desistance research, better knowledge about resilience would shed some light on the factors that contribute to the success of individuals who, theoretically and statistically, may be less likely to desist given their exposure to influential risk factors.
- Research on subjective accounts of desistance (e.g., emotions, motivations, self-enforced goals, etc.) is relatively underdeveloped, possibly because there is a tendency to regard subjective dimensions of human experiences as “unscientific” (Maruna, 2001). With the exception of qualitative studies, the input of desisting offenders has seldom been documented. When investigating the reasons why offenders desist from crime, quantitative researchers tend to overlook the viewpoints of the concerned actors. While the “objective” approach has generated a wealth of knowledge on desistance, self-assessments of conditions needed to successfully desist and reintegrate into the community are also important. These subjective dimensions are generally overlooked in appraisals carried out by external observers (e.g., researchers, criminal justice professionals, etc.).
- Given the relatively limited participation rates of women in crime, studies investigating the desistance process of female offenders have been more limited in number and scope when compared to studies using male samples. Specifically, longitudinal studies of female offending have been particularly scarce (for exception, see Giordano, 2010). A better understanding of the desistance process of

female offenders would also offer insight about the relevance of gender-specific intervention programs.

Marc Le Blanc’s Contributions to Desistance Research

Marc Le Blanc’s work with the Montreal Two-Sample Longitudinal Study over the course of the last 40 years has made invaluable contributions to developmental, life-course, and criminal career research. His follow-up of various cohorts of French-Canadian boys and girls has led to many publications that have advanced knowledge in developmental criminology in important ways. It is quite rare to encounter a body of work that is simultaneously strong on empirical, methodological, and theoretical fronts. Long before desistance became a popular topic of research, Marc Le Blanc developed the idea of measuring desistance as a process. Drawing on several criminal career parameters, Le Blanc and Fréchette (1989) argued that desistance involved declines in offending frequency, versatility, and seriousness. This was a pivotal point in desistance research. The idea that desistance is best regarded as a process would only emerge over a decade later among American scholars (i.e., Bushway et al., 2001).

In addition to his contributions to the academic field, Marc Le Blanc has had an important presence in the practical field. His involvement in youth detention centers in Quebec has led to the implementation of various intervention programs with at-risk youths (Le Blanc & Trudeau Le Blanc, 2014). He is a unique scholar in that his dedication to developmental prevention and to interventions promoting desistance has not only been evident in his writing but also in his continuous involvement with criminal justice populations and institutions. Both scholarly and practical fields are extremely indebted to him for his significant contributions to theory, research, policy, and practice.

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Part III

Special Themes in Developmental Criminology

An Evolutionary Perspective on Antisocial Behavior: Evolution as a Foundation for Criminological Theories

Daniel Paquette

Even though criminology has traditionally been dominated by sociological and social theories of crime, criminologists are now increasingly drawing on a broad range of other academic disciplines such as biology, psychology, and political science to understand crime, its causes, and its consequences (Durrant & Ward, 2012). Criminology's interdisciplinarity would have much to gain from the integration offered by an evolutionary perspective. The objective of this chapter is to introduce the reader to the key evolutionary theories that have been put forward to help us understand not only criminal behavior but analogous antisocial behaviors as well from a developmental perspective.

The Evolutionary Perspective

From an evolutionary perspective, humans, like other animals, are the result of natural selection that has taken place over millions of years to enable us to adapt to our environment. Thus, every human physical or behavioral trait is a phenotype, the expression of an interaction between biological predispositions (genetic potential) and the environment (Walsh, 2009),

although learning is generally considered to play a more determinant role in our species. It is not possible to conclude based on the considerable data collected to date that socialization alone plays a significant role in determining certain traits or behaviors. On the contrary, studies on twins and adoption show that all traits are partly inherited (Bouchard & Loehlin, 2001).

Contrary to the developmental psychopathology model (Ellis et al., 2012; Frankenhuis & Del Giudice, 2012) which considers any socially undesirable trait to be maladaptive (e.g., aggression, precocious sexual behaviors, risk-taking), the evolutionary perspective seeks to determine the potential function of the behavior in terms of the individual's adaptation to the physical or social environment, distinguishing between proximal and ultimate causes. Proximal causes involve physiological (nervous, hormonal) and psychological (concerning emotions and cognition) mechanisms as well as developmental processes (including types of learning) beginning at conception (ontogenesis). Ultimate causes concern the behavior's biological function on the one hand, i.e., its adaptive or survival value in terms of enabling individuals to increase their reproductive success, and the evolutionary history of the behavior in species over generations (phylogeny), on the other. Ultimate causes are attempts to explain why and how the proximal causes known to us came to be.

Thus, the evolutionary perspective offers theoretical frameworks allowing for the generation of new hypotheses that may prove helpful in

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explaining human behavior. The problem lies in the fact that the vast majority of researchers in this field content themselves with proposing biological functions for contemporary behavior without attempting to reconstruct its phylogeny. To avoid going down the wrong path, it is essential that we use the comparative method with primates, which are sharing a lot of genes with humans. This involves comparing human behavior to that of other primates while taking into consideration the degrees of relatedness between species and the environment in which each of them has evolved. When similar patterns of behavior exist in different species, it may be deduced that the pattern also existed in their common ancestor. The more similar the pattern of behavior, the more distant the common ancestor would be in the past.

The following example illustrates the importance of completing a functional analysis of behaviors by establishing their phylogeny. The predominant evolutionary model for explaining the existence of the family in the human species is the parental cooperation hypothesis. This point of view holds that human pair-bonding originated in selective pressures for paternal investment in the form of male provisioning generated by the costs of raising children linked to a longer period of child dependence (see Chapais, 2011). Given the high costs of maternity, it became progressively more advantageous for a female to be the single beneficiary of a male's provisioning effort, thus resulting in the emergence of monogamy. Using the comparative method with primates, and taking into account the fact that humans lived in hunter-gatherer societies for over 99 % of the evolutionary history of the genus *Homo*, Chapais (2011) developed the leveling hypothesis, i.e., that with the evolution of weaponry, it became progressively more costly for males to try to monopolize more than one female in their competition for access to females. Thus, monogamy originated as a male strategy of mate guarding fostering paternity confidence. The leveling hypothesis sees monogamy and male provisioning as evolving sequentially, whereas the cooperation hypothesis sees them as evolving concomitantly.

It is unfortunate that evolutionary psychology (Tooby & Cosmides, 1990) has limited itself to the period of hunter-gatherer life that began 1.8 million years ago, ignoring the fact that we shared a common ancestor with chimpanzees approximately 5.4 million years ago. Evolutionary psychology has chosen to focus on that which distinguishes us the more from other animals, giving more importance to cognition than emotions, but without providing itself with the means to understand these differences fully.

Developmental Perspective of Criminal Behavior

It is important first to stress that the terms *antisociality*, *delinquency*, and *crime* are all three value judgments of observable behaviors. Antisociality takes the form of physical aggression in young children, adopting different manifestations based on age. In adolescence, the term *delinquency* is used to refer to an ensemble of behavioral disturbances (vandalism, theft, physical aggression, psychotropic drug use, high risk sexual behaviors, etc.) that go against social norms or standards. In adulthood, the term *crime* is used to describe behaviors considered illegal.

In developmental psychopathology, aggression is seen as one of several elements in the general category of so-called externalizing problem behaviors (along with impulsivity, opposition, lying, vandalism, disobedience, etc.). The concept of aggression is frequently confused with that of violence. Paquette, Bigras, and Crepaldi (2010) define violence as a value judgment regarding aggression—an abuse of power—in which aggression is operationally defined as any oriented (physical, gestural, verbal, etc.) nonplayful behavior that has the potential to cause harm to physical or psychological integrity. Physical aggression is an adaptive behavior, a means used in competition for access to environmental resources and for dominance rank. Physical aggression appears at an early age, around 8 or 9 months, and for the vast majority of children peaks at between 15 and 24 months (Tremblay, 2015; Tremblay et al., 1999);

around the age of 3 years, boys engage in significantly more physical aggression than girls, becoming more focused on dominance (Archer & Côté, 2005). The minority of children who maintain a high level of physical aggression between the ages of 2 and 5 years are later at extremely high risk of experiencing serious social adaptation problems such as academic failure, school dropout, delinquency, drug addiction, and teenage pregnancy (Underwood, 2002).

As with physical aggression among 2- to 5-year-olds, the vast majority of youth who offend during adolescence eventually desist from such behavior, and only a small number of youth continue to offend into adulthood (Moffitt, 1993). Life-course-persistent offenders are individuals who begin offending prior to the onset of puberty and are the most frequent and serious offenders (Farrington, 1996; Moffitt, 1993). The comorbidity of attention deficit with hyperactivity disorder (ADHD) and conduct disorder (CD), both of which are more prevalent in males than in females, is one of the major predictors of whether individuals will continue to commit crimes after adolescence (Walsh, 2009). ADHD has its onset around age 3–4 years and is characterized by constant movement and restlessness, low levels of inhibitory control, impulsiveness, difficulties with peers, frequent disruptive behavior, short attention span, academic underachievement, risk-taking behavior, and proneness to extreme boredom. It has consistently been found to be associated with a wide variety of antisocial behaviors. CD has its onset around 5 years of age and consists of a persistent display of serious antisocial actions (assaulting, stealing, setting fires, cruelty to animals) that are extreme given the child's developmental level and have a significant impact on the right of others (Loeber et al., 1993).

Criminological theories have traditionally dealt solely with proximal mechanisms. There is a fundamental tension between strain and control theories, two of the most important models used to explain criminal offending (Durrant & Ward, 2012). In strain theories, it is the failure to achieve monetary success and social status that

leads to crime: individuals seek culturally valued goals through illegitimate means. Two main forms of control theories dominate the criminological literature: social control theory (Hirschi, 1969) and self-control theory (Gottfredson & Hirschi, 1990). According to social control theory, individuals commit crime and deviant acts because social bonds have been weakened (Tibbetts, 2003). The more adequately socialized individuals are due to the creation of positive attachment bonds with others, particularly parents, the more they internalize social norms and values, and the less they express their natural selfish tendencies. According to self-control theory, individuals must learn to regulate or control their selfish and impulsive behaviors through child-rearing and socialization. Low self-control is a specific label for a related class of personality traits including risk-taking, impulsiveness, self-centeredness, and orientation to the present (Morizot, 2015; Tibbetts, 2003). Control theories state that humans are naturally hedonistic and selfish and it is therefore the avoidance of crime that needs to be explained (Durrant & Ward, 2012).

The evolutionary perspective states that (a) individuals are in competition with one another for survival and reproduction and (b) that as a social species, they depend on one another, resulting in the necessity of adherence to group norms in order to foster cooperation and sharing. Thus, this perspective offers a way to bridge the gap between strain and control theories. Two proximal mechanisms must be examined concurrently over the course of development in order to understand individuals' adaptation to their social environment: status striving and attachment.

Social rank dominance is known to be positively correlated with reproductive success in most social species. According to Wrangham and Peterson (1996), wars among humans and raids among chimpanzees are rooted in competition for dominant status. The primary or immediate motivation of common chimpanzees and humans is not to mate more frequently or to obtain greater food supplies, but to dominate others (Paquette et al., 2010). The function of social dominance is to determine the priority of

access to limited resources (food, territory, sexual partners, etc.) while avoiding conflict and thus the risk of injury. The dominance hierarchy is most often decided by a series of aggressive interactions, but once established, it automatically determines priority of access to resources without the need for opponents to attack one another again as everyone knows their place in the hierarchy. Testosterone is correlated with dominance and antisocial norm breaking in men, not with aggression (Archer, 2006; Mazur, 2009). Male testosterone increases both before and after nonphysical as well as physical competition (Mazur, 2009).

Mother–child attachment is essential to the survival of young mammals in early life, especially in altricial species such as primates whose motor and perceptual abilities are not fully developed at birth and continue to develop slowly during infancy. To better understand the pathogenic effects of a lack of maternal care due to early and prolonged separation on children's mental health, Bowlby (1969) looked to the experimental work of ethologists with nonhuman primates. The emotional bond that develops between mother and child promotes physical proximity between the two, thus ensuring the care and protection of the child, and is necessary to future social development. The attachment relationship is essentially a mechanism that fosters the exploration and development of social competencies (sociability, reciprocity, popularity, positive social orientation, synchrony, communication, etc.) and of emotion regulation (Weinfield, Sroufe, Egeland, & Carlson, 2008). Infants who have a secure relationship (Type B) with their mothers tend to explore their environment more than insecure children (Types A and C). Very few studies have successfully shown a link between the ABC types of attachment and aggression in children (Berlin, Cassidy, & Appleyard, 2008; DeKlyen & Greenberg, 2008); aggression and, more generally, externalizing behaviors in preschool and school children have been linked far more explicitly to disorganized attachment (Lyons-Ruth & Jacobvitz, 2008). Disorganization is in fact a breakdown of the attachment mechanism.

Disorganization is observed in children who have been subjected to environmental conditions that are extreme (abuse, maternal depression, frightening parental behaviors, etc.) compared to the ancestral environment in which the adaptive mechanism of attachment evolved. One could say that disorganized behaviors, which most often result from children being afraid of the people who normally should comfort them in moments of distress in daily life, are outside our species' adaptive range.

Evolutionary Perspectives on Criminal Behavior

The basic behaviors humans consider antisocial are also observed in other animals. This would indicate that, in principle, evolutionary theories may also apply to our species.

The fact that homicides are most often committed by young males against other males supports the interpretation that they are fundamentally related to inter-male competition that is ultimately rooted in reproductive rivalry (Daly & Wilson, 1988). In every human society, and in both sexes, the tendency to commit crimes rapidly increases in early adolescence, peaks in late adolescence and early adulthood, rapidly decreases throughout the 20s and 30s, and levels off in middle age (Kanazawa, 2009). This decline of criminal behavior in men does resemble a testosterone output curve, as well as a curve representing mating effort and competition for mateships (Quinsey, 2002). Kanazawa (2003a) proposed a general evolutionary psychological theory of criminality to explain the universal age–crime curve in men, who are responsible for more than 90 % of all crimes. According to Kanazawa, this curve reflects the risk-taking in which men are ready to engage to achieve and maintain status, honor, and reputation. Assaults, homicides, robberies, thefts, and other forms of interpersonal violence ultimately result (mostly unconsciously) from the intrasexual competition among males for access to sexual partners (competition for mates). Men are much more highly motivated than women to accumulate resources

and achieve higher status through legitimate or illegitimate means, while women steal only to satisfy their material needs. Women prefer to mate with men of high status and good reputation and with men with more resources (Buss, 1989). Wealthier men of high status have more sex partners and copulate more frequently than poorer men of low status (Kanazawa, 2003b).

The fact that men take more risks on average than women is well documented (Baker & Maner, 2008; Byrnes, Miller, & Schaffer, 1999; Farthing, 2007) in numerous domains such as conflictual interactions, sexual relations, driving, alcohol and drug consumption, financial decision-making, and outdoor activities (Pawlowski, Atwal, & Dunbar, 2008). Such risks may be psychological or physical and extend to all spheres of daily life. Through risk-taking, men are able to show women their skill as a protector and provider of resources, as well as to demonstrate to other men that they are adversaries to be reckoned with (Wilke, Hutchison, Todd, & Kruger, 2006). Women prefer men who take risks, but not when the risk is so high as to cost the man his life—unless it is a heroic act—for the woman would then risk finding herself on her own to raise their offspring (Farthing, 2007).

Men's greater risk-taking is the result of sexual selection, which preserves the anatomical and behavioral characteristics that provide an individual with a reproductive advantage over others of the same sex (Darwin, 1871). Most primate species are promiscuous or polygynous; the males are bigger, more aggressive, and engage in more rough-and-tumble play than females (Fedigan, 1982). These differences, both behavioral and physical (sexual dimorphism), can be explained by the combination of two factors over the course of evolution: competition among males for sexual access to females and females, preference for the most dominant males.

According to Kanazawa (2009), the age-crime curve would appear to be the result of the curves of benefits and costs of competition. Beginning in puberty, risk-taking potentially increases the reproductive success of men. Because risk-taking can easily result in the

man's own death or injury, the cost of competition rises dramatically with the birth of the first and subsequent children. To ensure the survival of their offspring, it is more advantageous for men to decrease mating effort and increase parenting effort through the provision of resources and protection. The literature supports the notion that paternal provisioning allowed for the improvement in child physical health and the reduction of child mortality risks in preindustrial and industrializing Europe as well as the USA and that it plays the same role in developing nations today (Geary, 2000). Obtaining a stable job and attachment to a prosocial spouse are the main factors in desisting from risk-taking (Walsh, 2009) and desistance from criminal and antisocial behavior (Kazemian, 2015). However, this theory does not explain why the minority of individuals are life-course-persistent offenders and responsible for the majority of crimes nor does it explain crimes committed by women (Kanazawa, 2003a, 2009).

Obviously, in humans, competition for status occurs in numerous ways, not just through antisocial behaviors. In highly industrialized societies, interindividual competition is omnipresent: at work, in sports, and at school, for example (Paquette, Gagnon, Bouchard, Bigras, & Schneider, 2013). Creativity and language also enable men to attract mates (Miller, 2000). According to Barkow (1980), individuals seek prestige, which increases self-esteem, and ultimately brings power: people who have a high social rank are the object of admiration, confidence, respect, and envy by others, causing their social network, and as a result their influence, to grow. Identical curves are found for productivity in artists (musicians, painters, authors) and scientists (Kanazawa, 2003a), although they occur somewhat later than the age-crime curve. In my opinion, all these curves would seem to reflect testosterone production and the most intense period of search for mates.

In most mammals, the ideal male strategy to ensure reproductive success is the quantitative strategy, i.e., mating with as many females as possible to increase the number of descendants. Given the greater parental investment on the part

of females (large ovum, pregnancy, lactation), the latter cannot have as large a number of descendants over the course of their lifetime. Depending on the species, there are two possible qualitative strategies for females. The first is to choose a male with good genes that would promote the survival of the offspring, by choosing a dominant male, for example. In the long term, such sexual selection leads to sexual dimorphism in size, strength, and aggression that favors males, as these characteristics are important in becoming dominant. The second strategy is to choose a male with whom the female can share the immense cost of raising the offspring. Under difficult survival conditions, natural selection will foster this strategy by favoring males who demonstrate parental investment in children in a monogamous context. In most nonhuman primate species, females compete primarily for food resources (due to the fact that they carry and raise the young), while males compete for exclusive access to sexual partners. In humans, the greater vulnerability and dependency of children would seem to have led women at some point during the course of evolution to choose men who were providers of resources rather than more dominant men, which would explain the decrease in sexual size dimorphism over the course of evolution and the inter-female competition documented in several cultures for men who control subsistence products (Campbell, 2002).

Campbell's (2002) *staying alive* theory provides an explanation for the universal age-crime curve in women. It is to women's advantage to achieve high status by competing for priority of access to men of high status so as to benefit from the latter's greater resources and greater protection. If the female age-crime curve peaks a few years before the male one, it is because women reach sexual maturity earlier. Again according to Campbell, if women commit fewer crimes than men, it is because they only steal what they need for their offspring and them to survive, and due to their tendency to avoid physical risks and danger altogether. Given that offspring survival, and thus female reproductive success, relies more heavily on maternal than

paternal care, it is important for mothers to stay alive to ensure their offspring survive until sexual maturity (Kanazawa, 2003a). Women will thus primarily use low-risk competition tactics (larceny rather than robbery) and indirect tactics (spreading negative gossip and rumors about a rival behind her back rather than confronting her physically). Indeed, girls commit more relational (or indirect) assaults than boys beginning at age three, with increasing prevalence through to puberty (Vaillancourt, 2005). Research shows that women engage in more risk avoidance than men (Campbell, 2009; Shan et al., 2012). Girls express fear earlier than boys and show more hesitation and greater distress in approaching novel objects (Campbell, 2009). According to Campbell (2009), the sex difference in fear accounts for a considerable portion of differences observed in aggressive behavior. Anger and disgust have opposite effects on risk-taking: anger increases risk-taking in men (to deter transgression through aggression), while disgust decreases risk-taking in women (to ward off contamination) (Fessler, Pillsworth, & Flanson, 2004). Furthermore, girls have a higher average score for effortful control (a dimension of temperament involving sustained attention, inhibitory control, pleasure associated with stimuli of weak intensity, etc.) than boys (Else-Quest, Hyde, Goldsmith, & van Hulle, 2006); weak effortful control is associated with aggression and externalizing problems (Fox, Henderson, Marshall, Nichols, & Ghera, 2005).

Fathers as Catalysts for Risk-Taking

Boys are more aggressive, more active, more impulsive, and more adventurous than girls; they take more risks beginning in infancy and consequently have more accidents requiring medical treatment (Coie & Dodge, 1997). Boys are generally considered to be more competitive than girls. However, with regard to three types of competition, a recent study showed preschool-aged girls to be just as competitive for local resources as boys, despite their being significantly less physically aggressive (Paquette

et al., 2013). As men have a tendency to take more risks than women, fathers may be better suited than mothers to helping their children, especially boys, learn to control their risk-taking, on the condition that they themselves have learned to regulate their own risk-taking. Jaffee, Moffitt, Caspi, and Taylor (2003) have shown antisociality in fathers (but not mothers) to be a predictor of behavior problems in offspring, even after controlling for genetic factors. Many researchers have related paternal absence and poor-quality father-child relationships to the well-known higher incidence of conduct problems (including aggression) among boys (Paquette, Eugène, Dubeau, & Gagnon, 2009). Recent work suggests that fathers play a much larger role than mothers in the socialization of children's emotions, especially in anger regulation (Parke et al., 2002).

Men seem to have a tendency to excite children, to surprise them, destabilize them momentarily, and to encourage them to take risks, thereby enabling children to learn to be brave in unfamiliar situations and to stand up for themselves (Paquette, 2004). From the first to the tenth year of their children's lives, fathers engage in vigorous physical play more frequently than mothers, and more with their sons than their daughters, tending to engage in rough-and-tumble play (RTP) primarily with their sons. Herzog (1982) suggests that fathers teach children, particularly boys, to modulate and contain their aggressive behaviors through RTP between infancy and the age of six. Paquette (2004) has put forward the hypothesis that father-child RTP, which peaks around the age of 4 years, allows the father's dominance over the son to be established, ensuring the latter's subsequent obedience and fostering the development of competition skills. Here, understand competition skills to include not only physical fighting skills but also and especially those psychological attributes that permit individuals to defend themselves and to adversity and environmental threats, a level of self-esteem that enables individuals to confront others when it is necessary to fight for their rights.

In fact, it must be mentioned that father-child RTP is a fairly recent development in our individualistic and competitive Western industrialized societies. A few decades ago, when families had large numbers of children, it was older brothers who played with younger boys, preparing them to interact with their peers outside the home (and it should be noted that young monkeys and apes engage in RTP principally with peers). Women's entry into the workforce and the reduction in family size led men to become more involved with children, first by engaging in physical play with them, then progressively in caretaking. Over the past 30 years, the gap between maternal and paternal involvement has decreased, although women continue to do more than men.

In most primate species, children are raised by the mother; in such a context, the mother is at the base of both attachment and social status developments in children (Sloman & Atkinson, 2000). The human species differs from other primate species in that fathers play, at minimum, a role of provider of resources and protection for their spouses and children while also, depending on the culture, assuming various parental responsibilities generally with boys toward the end of childhood (Paquette, 2004). Fathers in rare monogamous primate species (siamangs, titis, etc.) provide intensive parental care, while in the human species, fathers may provide very little or no direct basic care for children but do on the other hand adopt parental roles that are distinct from those of the mother. With the emergence of the sexual division of labor in hunter-gatherer societies over the course of human evolution, it was logical that men would also assume responsibility for opening boys up to the world by teaching them the skills necessary for fighting, hunting, and exploring the territory for resources, skills that would be vital in adulthood to ensure the survival of their own children.

The activation relationship theory (Paquette, 2004) concerns the father-child attachment bond that develops to enable the regulation of risk-taking in children based on their temperament. It serves as a complement to Bowlby's

attachment theory, providing a better understanding of the impact of fathering on child development and focusing primarily on parental stimulation of risk-taking and control during children's exploration. It considers risk-taking to be a basic need enabling children to explore their physical and social environment, develop skills, and consequently adapt. Children's temperaments would seem to predispose them to take either fewer or more risks, but they need their parents to help them learn how to regulate their behavior. For example, parents need to encourage inhibited children to explore more, but must exercise more control over impulsive children. The sensation-seeking and risk-taking in extreme sports observed in a number of adolescents and young adults may be the result of such learning not having taken place at an early age, due to either overprotective or overly permissive parents. It is also possible that differential gender socialization, generally more pronounced in fathers, occurs through the activation relationship mechanism. Fathers would play a unique role in amplifying or reducing sex differences in children, depending on the environment.

According to the attachment theory, children's feelings of confidence result from parental sensitivity to children's comfort-seeking in times of distress (secure base), with parents protecting their children by maintaining a close distance between parent and child. According to the activation relationship theory, however, children's feelings of confidence result from parental encouragement of risk-taking during children's exploration of their environment, with parents protecting their children through discipline (limit setting, control). A standardized observational procedure, the Risky Situation (RS), has been developed to assess the quality of the father-child activation relationship in children ages 12–18 months (Paquette & Bigras, 2010) as well as in preschoolers (Gaumon & Paquette, 2013). The scoring grid used to code the RS identifies children with underactivated relationships, activated relationships, and overactivated relationships. Underactivated children engage in little exploration, are passive, and either withdraw from novelty or remain close to

their fathers. Activated children are confident and prudent in their exploration and conform when their fathers set limits. Overactivated children are reckless and do not comply when their fathers set limits. The underactivated relationship is theoretically linked to parental overprotection, while the overactivated relationship is linked to a lack of adequate discipline (insufficient in terms of protection of the child). In high-quality activation relationships, children learn to trust in their own abilities to deal with threats and strangeness in the physical and social environment, as the fathers will encourage their children to take ever greater risks while ensuring that exploration is conducted in a secure context. The theory predicts that it is the overactivated father-child relationship that will be linked to antisocial behaviors and externalizing problems in boys.

Results confirm the existence of a sex difference in the activation relationship in toddlers and in preschoolers: fathers activate their sons more than their daughters (Gaumon & Paquette, 2013; Paquette & Dumont, 2013a). Child temperament traits (shyness, impulsivity, sociability) may be linked to the activation score (Paquette & Bigras, 2010). However, in addition and most importantly, the activation relationship reflects the history of parent-child interactions: paternal stimulation of risk-taking explains activation once child sex and temperament, the attachment relationship, and emotional support are taken into account (Paquette & Dumont, 2013a). The association between the father-child activation relationship and internalizing problems in children has been confirmed in both toddlers (Dumont & Paquette, 2013) and preschoolers (Gaumon & Paquette, 2013): underactivated children have significantly more internalizing problems. Data has revealed a unique connection to anxiety: underactivated children are more anxious when they receive less encouragement to take risks and explore their environment and when they are overprotected through the use of more control than necessary based on the degree of potential danger (Gaumon & Paquette, 2013). Flanders et al. (2010) and Flanders, Vanessa, Paquette, Pihl, and Séguin (2009) have shown

that the association between the frequency of father–child rough-and-tumble play (RTP) in the preschool period and the frequency of physical aggression is moderated by the father’s dominance during RTP (evaluated through observation). When fathers are not dominant over their children, the greater the frequency of RTP, the more physically aggressive the children are, and the less they regulate their emotions 5 years later. Paquette and Dumont (2013b) have found a positive association between the activation relationship in toddlerhood and RTP frequency at the age of 3 years only in boys, even though the fathers in the sample engaged in as much RTP with girls as with boys. When fathers encourage their boys to take risks in their physical and social environments, protecting their sons through the use of a combination of supervision and discipline, the boys engage in more risky physical play such as RTP with their fathers.

Life History Theory

Life history theory examines the allocation of time and energy by individuals to diverse activities throughout their life span (Chisholm, 1999). With limited time and resources, the decisions individuals make impact their inclusive fitness, i.e., their reproductive success, including the genes of their direct progeny as well as those of the progeny of relatives (Hamilton, 1964a, 1964b). Individuals’ efforts to maximize their inclusive fitness can generally be grouped into two categories: somatic effort and reproductive effort. Somatic effort includes such things as searching for food, avoiding predators, learning, and, for the young, growth and maturation. Reproductive effort includes the production (mating effort) and raising of progeny (parenting effort). The prolonged period of sexual immaturity in mammals—what we call childhood—which is especially long in humans, allows the individual to adapt better to the environment and is ultimately a preparatory stage for reproduction. When the environment is uncertain (food is rare, the risks of predation are high, etc.) and the chances of descendants reaching maturity are

low, the best reproductive strategy is to have as many children as possible as early as possible (*current reproduction*). On the other hand, in a predictable environment where descendants have a good chance of reaching maturity, the best strategy is parental investment with a small number of children so as to prepare them well for *future reproduction*. The focus in the first case is primarily on mating effort (quantity of offspring), and in the second, primarily on parenting effort (quality of offspring).

Attachment Relationship and Reproductive Strategies

Belsky, Steinberg, and Draper (1991) were the first to apply life history theory to the attachment relationship. In stressful conditions, marital discord increases and parents become more severe and less sensitive to their children, fostering the development of insecure attachment. Insecure children thus receive the message that resources are scarce and unpredictable, people cannot be trusted, and mating relationships tend to be brief and uncommitted. Insecure attachment should therefore lead to an opportunistic interpersonal orientation, early reproduction, and low parental investment, whereas secure attachment should lead to delayed mating, high parental investment, and a reciprocally oriented attitude. Belsky (1997, 1999) later speculated as to possible adaptive differences between insecure avoidant attachment (Type A) and insecure resistant attachment (Type C). Children with avoidant attachment would become independent of their parents more rapidly, achieve sexual maturity earlier, avoid intimate friendships, have a tendency to avoid intimacy with partners, and engage more in sexual relations outside of stable conjugal relationships. Children with resistant attachment would remain dependent on their mothers and act as helpers-in-the-nest, increasing their own inclusive fitness by raising younger siblings. According to Chisholm’s (1996) model, when parents are unwilling to invest, this favors the avoidant strategy, pushing the child toward self-reliance and protecting the

child from abandonment or abuse. When parents are willing but unable to consistently invest in offspring, the resistant strategy maximizes the available investment by increasing need signaling and immature behavior. Chisholm (1999) subsequently described two sex-specific pathways for current reproduction: males exhibit increased sex drive, aggression, impulsivity, and risk-taking whereas females mature quickly, make impulsive mate choices, and engage in early and frequent childbearing in a single motherhood context. Del Giudice (2009) recently proposed that sex differences in attachment emerge in middle childhood, become stronger in young adulthood, and finally decline markedly toward middle age. According to Del Giudice, insecure males tend to adopt avoidant attachment strategies, displaying more aggressive traits in the context of same-sex competition for dominant status. On the other hand, insecure females tend to adopt resistant attachment strategies, maximizing investment from kin and mates, and later become more focused on obtaining support than providing it.

Activation Relationship and Reproductive Strategies

I suggest that two coexisting proximal mechanisms, the attachment relationship and the activation relationship, play key roles in determining which reproductive strategies will be used by girls and boys later on in life. The attachment relationship would essentially be linked to affiliation, or the development of the ability to create positive and lasting ties with others as much in relationships with sexual partners as in building social networks and, of course, eventually with children. Linked to parental care and a secure base in early childhood, the attachment relationship would subsequently influence the capacity for empathy and the level of intimacy in friendships, romantic relationships, and parent-child relationships. The activation relationship, which is linked to risk-taking stimulation and parental control in early childhood, would be linked later on to the

development of competitive skills for access to resources in the environment. According to Charlesworth's (1988) evolutionary model, resources consist of everything that is external to the organism and necessary to its survival, development (both physical and psychological), reproduction, and, in humans, the achievement of ideals: resources may be physical (e.g., food, water), emotional (warmth), social (e.g., alliances, verbal recognition, social rank, sexual partners), or informational (e.g., new stimuli, instruction). The resultant competition for limited resources that occurs in a social and intelligent species such as ours can manifest itself via five categories of behavior: aggression, intimidation, manipulation, deception, and cooperation (Charlesworth, 1988).

Activated children will have a varied behavior repertoire to cope with diverse competitive situations: they would be expected to use assertiveness and, if necessary, aggression in confrontational contexts with threatening children, but prefer to use cooperation whenever possible. Their prosocial abilities would permit them to achieve leadership. According to a review of the literature by van Vugt (2006), there is no association between dominance and leadership, which are two different forms of power, the first resulting from coercion and the second from influence. Leadership is a form of cooperation between a group and an individual that provides the group with a structured approach to accomplishing a common goal. The works of Vaughn, Vollenweider, Bost, Azria-Evans, and Snider (2003) and Paquette et al. (2013) on preschoolers and of Hawley (2003) on school children have shown that bistrategic children (who use both prosociality and coercion) control more resources. Game theory researchers have shown cooperation to be the strategy (decision rule) that obtains the most resources in the long term, whereas coercion obtains the most resources in the short term (Axelrod, 1984). Underactivated children will tend to avoid conflicts, submit to others, and leave resources to those who demand them. Overactivated children will tend to always use aggression and other antisocial behaviors regardless of the

context and to try to achieve high social dominance status to maximize immediate access to resources.

Complementarity of the Attachment and Activation Relationships in Predicting Reproductive Strategies

Thus, the diversity of reproductive strategies in adults would be the result of nine possible combinations of three types of attachment (omitting disorganized attachment) with three types of activation. Children who are secure (B) and activated should be better equipped both to maintain positive long-term relationships with their relatives, social networks, and, eventually, spouses (monogamy) and children and to compete with peers, tending primarily to favor cooperation, which provides access to more resources over the long term. Avoidant (A), overactivated children would be expected to reproduce earliest; they would tend both to be prematurely independent from their parents and to have difficulty maintaining stable social networks or conjugal relationships (resulting in frequent changes in sexual partners), and take more risks, notably by relying primarily on the use of coercion to obtain resources. Finally, children who are both resistant (C) and underactivated would increase their reproductive success indirectly by helping relatives; they would tend to remain dependent on their parents and later their spouses for resources and would, for all intents and purposes, have none of the skills required to compete directly with peers for resources. When they had children themselves, they would still depend on their own parents to raise them.

Sex Differences in Attachment and Activation Relationships

Given that the attachment relationship serves the function of ensuring children's survival through the provision of care and parental protection during the period of maximal dependence on parents, there is no reason to expect to find a

sex difference in the prevalence of attachment types in infancy and early childhood. Indeed, no such difference appears in the literature. However, it would be logical for there to be a sex difference in attachment just before girls develop greater empathy and intimacy than boys around the ages of 12–14 years in preparation for maternal functions related to care of eventual progeny. Several studies support the idea of a sex difference in attachment toward middle childhood (Del Giudice, 2009), but there is no conclusive research on this as yet (Bakermans-Kranenburg & van IJzendoorn, 2009). Linked to both prosociality and leadership, empathy and intimacy are undoubtedly central to the development of mutual trust and loyalty and thus important to reciprocal altruism. The theory of reciprocal altruism (Trivers, 1971) offers an explanation for cooperation and helping behaviors between unrelated individuals of the same species. Reciprocal altruism is the nonsimultaneous exchange of services between two unrelated individuals. It evolves in species capable of individual recognition and remembering past events. Such behavior is selected over the course of evolution where both individuals receive more than they contribute.

Given that the activation relationship is linked at all ages to risk-taking in competition for environmental resources, one might expect to find a sex difference in the prevalence of activation types early on, beginning in toddlerhood, before the appearance of sex differences in competition strategies such as aggression. This is, in fact, what has been shown by Paquette and Dumont (2013a).

Life-Course-Persistent Offending as an Evolutionary Strategy

According to the life history theory perspective, individuals following a life-course-persistent trajectory of criminal and antisocial behavior are engaged in an (unconscious) strategy of current reproduction in response to a risky and unpredictable environment (Durrant & Ward, 2012). Suggest that, through attachment and activation

relationships with their parents, they will have developed a psychopathic or antisocial personality during childhood building on a temperament characterized by risk-taking. This is in line with a recent theory proposed by DeLisi and Vaughn (2014). Of course, the risk-taking temperament of these children is subsequently maintained or amplified by environmental factors such as inadequate or ineffective parental practices (Pardini, Waller, & Hawes, 2015) or by relations with peers (Gardner & Steinberg, 2005; Vitaro, Brendgen, & Lacourse, 2015). This psychopathic and antisocial personality drives individuals to be unempathetic toward others, to prefer cheating over reciprocity, not to trust others, to avoid stable relationships, and not to respect social norms in accessing resources, with men being prompter than women to use direct violence while committing crimes. The individuals seem to remain focused on mating effort throughout their entire lives. Indeed, criminal behavior and, more generally, antisociality are related to earlier onset of sexual activity and to the number of sex partners (Walsh & Beaver, 2009). There would also appear to be a connection to lower parental investment and shorter life expectancy (Walsh, 2003). This profile type, linked to the parenting received primarily in fatherless homes, corresponds more closely to that of sociopaths than of psychopaths (Walsh & Wu, 2008).

The decrease in criminal risk-taking throughout the 20s and 30s in the majority of individuals (age-crime curve; see DeLisi, 2015) may indicate that individuals are no longer limited to using antisociality to achieve social status, and find other (less physically risky) means to compete once they become responsible for children. In other words, competition for social status is lifelong, but physical risk-taking (criminal behavior, sport, etc.) decreases for the majority of individuals. Despite its greater intensity in adolescence and early adulthood, status striving is perpetual for access to sexual partners. This may explain the phenomenon of serial monogamy in human, that is to say, the succession of

exclusive pairing of two individuals with different partners over the course of a lifetime.

Summary

- Physical aggression in young children, delinquency in adolescents, and crime in adults are all manifestations of antisociality.
- The evolutionary perspective makes it possible to bridge the gap between strain and control theories by proposing the simultaneous study of the development of two proximal mechanisms: status striving and attachment.
- The age-crime curve would appear to reflect a similar life-course curve in risk-taking by men to achieve a higher status that would ultimately give them access to sexual partners.
- The age-crime curve would reflect risk-taking by women to achieve higher status that would ultimately give them priority of access to men of high status (in order to benefit from their greater resources and greater protection), although women have a greater tendency to avoid physical risks and danger altogether.
- Fathers act as catalysts for risk-taking and competition in children.
- The father-child overactivated relationship in toddlers and preschoolers is hypothetically linked to externalizing problems and antisocial behaviors in boys.
- Life-course-persistent offending may be interpreted as an evolutionary strategy. It can be hypothesized that persistent offenders are unconsciously engaged in a reproductive strategy that involves having as many children as possible, as early as possible (current reproduction), in response to a risky and unpredictable environment.
- It is suggested that through their attachment and activation relationships with their parents, life-course-persistent offenders have developed a psychopathic and antisocial personality in childhood built on a temperament characterized by more pronounced risk-taking.

Future Research Needs

My general developmental evolutionary model offers a bridge between developmental psychology, social psychology, and personality psychology to provide a better understanding of the connection between sex differences and human relationships in prediction of offending.

- It is vital that future studies evaluate the complementary roles of the attachment and activation relationships with the mother and father within the family system in order to accurately predict the development of antisociality from infancy to adulthood. To provide adequate support for this model, future longitudinal studies must be used to demonstrate that the father–child activation relationship predicts competition and risk-taking in children, especially boys, while the father–child and mother–child attachment relationships do not.
- Future studies must verify that sex differences in attachment and activation relationships ontogenetically precede sex differences in personality traits such as empathy, aggression, and risk-taking. According to evolutionary psychology, sex differences in personality traits reflect differences in reproductive strategies. The age at which sex differences appear is indicative of adaptive pressures that have occurred over the course of evolution through the process of natural selection.
- The central role this model attributes to relationships in ensuring the survival of individuals should be tested at some point. It is very important in future to assess attachment relationships and power relationships that an individual develops with others (parents, peers, mates, children) throughout his life. The model suggests that child temperament and parental behaviors have an interactive effect on the parent–child relationship, which would permit individuals to adapt to the environment via the development of their personality. The adult personality may in fact be the product of at least three types of relationships. While the parent–child

relationship may have a major influence during infancy and early childhood (0–5 years), just as peer relationships may during childhood, and romantic relationships during adolescence, all three of these types of relationships would continue to influence the personality throughout the individual’s entire lifetime.

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Michael J. Leiber and Jennifer H. Peck

Introduction

Worldwide, 190 million persons lived outside of their country of birth in 2005 (Kubrin, Zatz, and Martinez, 2012). It has been estimated that 12 % of the US population was born outside of the USA in 2010 (Passel and D’Vera Cohn, 2011). Accordingly, the racial/ethnic compositions of neighborhoods and communities have changed raising political, economic, and social concerns (Unz, 2010). In turn, the issue of race/ethnicity and immigration has generated an enormous amount of research in sociology and criminology (e.g., Leiber, Peck, and Rodriguez, [forthcoming](#); Sampson and Lauritsen, 1997). Underlying much of this activity is the perceived and actual involvement in crime and explanations for its occurrence (Ousey and Kubrin, 2009; Rosich, 2007). Within this context, efforts have been made to apply developmental or life-course perspectives to further understand trajectories of offending patterns and risk/protective factors by race and ethnicity (Caudy, 2011; Maldonado-Molina, Reingle, Tobler, Jennings, and Komro,

2010). This chapter first provides a discussion of the definitions and presence of racial/ethnic minorities and immigrants within crime statistics and empirical research of race, ethnicity, and crime. Next, theoretical explanations of race/ethnicity involving life-course perspectives are presented followed by developmental explanations of immigration and crime. The chapter concludes with directions for future research.

Definitions and Presence of Racial/Ethnic Minorities and Immigrants within Crime Statistics

To understand the relationship between race, ethnicity, immigration, and crime through developmental and life-course perspectives, official statistics (e.g., the Uniform Crime Reports, National Crime Victimization Survey) surrounding these issues can portray a portion of the descriptive picture, along with other forms of crime measurement (i.e., self-report surveys) and empirical studies. The combination of all different types of crime measurement provides insights into the distribution of crime across racial/ethnic groups. For the purpose of the current chapter, the terms *race*, *ethnicity*, and *Hispanic* are used based on the definitions of the Bureau of Justice Statistics (BJS) and 2010 US Census. The racial groups include individuals who self-report their racial category as White, Black, Asian, Pacific Islander, American Indian, other, or two or more races. An individual’s

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ethnicity is classified based on Hispanic origin, regardless of racial category. An individual is considered Hispanic if they self-identify as Mexican American, Chicano, Mexican, Mexicano, Puerto Rican, Cuban, Central American, South American, or any other form of Spanish origin, regardless of race.

Official Statistics on Race/Ethnicity and Crime

According to the US Census, results from data collection in 2010 indicated that the Hispanic population exceeded the Black population as the largest minority group in the USA. Hispanics comprised 16 % of the US population, while those who identified as non-Hispanic but other racial categories constituted the other 84 %. In particular, Whites and Blacks represented 64 % and 12 % of the population respectively, while American Indians/Alaskan Natives (1 %), Asians/Pacific Islanders (5 %), other racial groups (1 %), and individuals who reported two or more races (1 %) were also represented (U.S. Census Bureau, 2010).

It is important to know the representation of different racial/ethnic groups in the general US population in order to compare them to the proportion of racial/ethnic groups involved in crime (e.g., arrests, victimizations, incarceration, etc.). For example, the FBI's Uniform Crime Reports (UCR) is one form of crime measurement that collects data on crimes reported to the police across the USA. Unfortunately, due to data limitations, Hispanics are often categorized as "White" within UCR statistics. At the present time, the UCR program does not collect data (specifically arrest statistics) across different ethnic groups. However, UCR data for 2013 will be the first year that ethnicity categories will be categorized as "Hispanic or Latino origin" or "not of Hispanic or Latino origin" (FBI, 2011).

Tables 21.1 and 21.2 present the UCR's count and percentage of arrests in 2012 across racial groups for various types of violent and property crime. Table 21.1 includes arrests for individuals

18 and older, while Table 21.2 reports arrests for persons 18 years and younger.

As shown in Table 21.1, across all offense types and with a few exceptions (i.e., murder, robbery, and arson), White adults are arrested similar to their representation in the general population (60–69 %). Black adults, however, are consistently overrepresented in arrests across all crime types, especially for murder (49 %), robbery (51 %), and forcible rape (33 %). In fact, the proportion of all arrests for Blacks is at least two times larger than their representation in the general population (12 %). American Indians/Alaskan Natives and Asian/Pacific Islanders are arrested at comparable proportions to the general population across both violent and property offenses.

To some degree, Table 21.2 presents similar results as Table 21.1 for individuals who are arrested under the age of 18.

Within the general juvenile population in 2012, White youth represent 76 % of all youth up to 17 years old, while Black youth comprise 16 %. American Indians and Asians represent 2 % and 6 %, respectively (Puzzanchera, Sladky, and Kang, 2013). On the one hand, data from the 2012 UCR show that White youth are underrepresented in arrests across all crime types. In particular, represent 29 % of all robbery arrests, 47 % of arrests for murder, and 55 % of arrests for aggravated assault. The only offense that is the most similar to their representation in the general population is arson (73 %). On the other hand, as with Table 21.1, Black youth are overrepresented in arrests across all offense types. The largest disparities are evident in arrests for robbery (69 %), murder (51 %), and aggravated assault (43 %). American Indian/Alaskan Native youth are arrested at a similar proportion to their representation in the general youth population, while Asian/Pacific Islander youth are underrepresented in UCR arrest statistics.

Official crime statistics are also able to examine the extent of victimizations across different racial and ethnic groups. For example, the National Crime Victimization Survey is a form of crime measurement that collects data on the race and ethnicity of crime victims across the

Table 21.1 Arrests in 2012 for part 1 index crimes by race—ages 18 and over

	White	Black	AI or AN	Asian or PI
Crime type				
Violent Crime	60 ^a	37	1	2
Murder ^b	48	49	1	2
Forcible rape	65	33	1	1
Robbery	47	51	1	1
Aggravated assault	64	33	1	2
Property crime	69	28	2	1
Burglary	69	29	1	1
Larceny–theft	69	28	2	1
Motor vehicle theft	69	29	1	1
Arson	74	23	2	1

Data source: Federal Bureau of Investigation (2012). Crime in the United States
 AI American Indian; AN Alaskan Native; PI Pacific Islander

^aNumbers are percentages

^bAlso includes nonnegligent manslaughter

Table 21.2 Arrests in 2012 for part 1 index crimes by race—ages 18 and under

	White	Black	AI or AN	Asian or PI
Crime type				
Violent crime	47 ^a	51	1	1
Murder ^b	47	51	1	1
Forcible rape	64	34	1	1
Robbery	29	69	1	1
Aggravated assault	55	43	1	1
Property crime	62	36	1	1
Burglary	59	39	1	1
Larceny–theft	62	35	1	2
Motor vehicle theft	58	40	1	1
Arson	73	25	1	1

Data source: Federal Bureau of Investigation (2012). Crime in the United States
 AI American Indian; AN Alaskan Native; PI Pacific Islander

^aNumbers are percentages

^bAlso includes nonnegligent manslaughter

USA (United States Department of Justice. Office of Justice Programs. Bureau of Justice Statistics. National Crime Victimization Survey, 2010). One of the benefits of the NCVS compared to UCR is that victims self-identify if they are Hispanic or non-Hispanic along with a racial category. To illustrate the relationship between race/ethnicity and crime in the form of victimization, Table 21.3 presents the count and proportions of violent victimizations in 2012 across various racial and ethnic groups.

NCVS figures indicate that Whites are overrepresented as victims of personal theft/

larceny (66 %) and simple assault (67 %), but underrepresented for rape/sexual assaults, robbery, and aggravated assault. Black individuals are overrepresented in victimizations for the crime types of robbery, aggravated assault, and simple assault, but are underrepresented as personal theft/larceny (10 %) and rape/sexual assault victims. Figures also indicate that Hispanics are overrepresented in victimizations involving robbery (17 %) and aggravated assault (21 %), but have comparable proportions or are underrepresented for personal theft/larceny, rape/sexual assault, and simple assault. Overall, the NCVS

Table 21.3 Victimizations in 2012 by race and ethnicity

	Hispanic	White	Black	AI or AN	Asian or PI	Other
Victimization type						
Personal theft/larceny	16 ^a	66	10	–	2	6
Rape/sexual assault	9	63	6	7	13	2
Robbery	17	55	22	–	5	1
Aggravated assault	21	54	18	1	4	2
Simple assault	13	67	15	1	2	2

Data source: Bureau of Justice Statistics (2012). NCVS Victimization Analysis Tool
 AI American Indian; AN Alaskan Native; PI Pacific Islander; Other, 2 or more races

^aNumbers are percentages

provides a complementary method of crime measurement to the UCR. The NCVS provides information about crimes that may not have been reported to the police but also includes important information about the victimization experiences of Hispanics and various racial groups.

Official data are also collected about the racial/ethnic composition of individuals who are incarcerated. For instance, data from the Federal Bureau of Prisons indicates that the 2010 federal inmate population comprised of 58 % White inmates, 39 % Black inmates, 2 % Native Americans, and 2 % Asians (Federal Bureau of Prisons, 2010). Out of each inmate who self-reported a racial category, 33 % of all inmates also categorized themselves as Hispanic. Furthermore, research has found that 0.5 % of White males in the general population, 3 % of Black males, and 1.2 % of Hispanic males were incarcerated in 2011 (Carson and Sabol, 2012; Nellis and King, 2009). As indicated earlier, one of the limitations of some forms of official crime statistics is that they do not collect data on ethnic groups (i.e., the UCR). Another limitation is that data collection efforts may categorize Hispanics as a separate group or combine ethnicity in a racial category. This makes it difficult to assess the relationship between race/ethnicity and crime. This data collection method is implemented by the Federal Bureau of Prisons and found that in 2010, 33 % of all inmates were of Hispanic origin. This proportion of inmates, however, are also represented in one of the four racial groups as well, leading to some bias in the estimates of the proportion of inmates in different racial/ethnic groups.

Moreover, relating specifically to crime statistics of different racial/ethnic groups across time, results may vary depending on the data collection method. An individual may self-report their race/ethnicity in the NCVS, but if they are arrested at any point throughout the life course, a police officer or other court actor may not necessarily identify the individual as a member of the same racial/ethnic group. Problems with coding race/ethnicity data of both victims and offenders in official crime statistics translate to potential biases in the real representation of crime across racial and ethnic groups.

Overall, the above discussion and results from Tables 21.1 through 21.3 indicate that Blacks are overrepresented as offenders based on arrest statistics, and depending on the type of offense, Blacks and Hispanics are overrepresented as victims compared to their representation in the general population. Two potential explanations in the criminological literature have attempted to account for why Blacks, and to some degree, Hispanics, are involved in crime and the justice system. The first explanation/argument is based on differential offending, in that certain racial/ethnic groups offend more often and commit more serious crimes when compared to Whites, and these reasons account for their overrepresentation. The second explanation is based on selection or system bias, where policies within the juvenile and criminal justice system work to the disadvantage of minority groups. Due to class, race, and ethnic biases, actors in the justice system (e.g., police, judges, etc.) make decisions not only on legal criteria (e.g., crime severity, prior record) but also on extralegal criteria (e.g.,

race, ethnicity, gender) that results in disadvantaged outcomes for minority groups. Later sections of the chapter will go into more empirical detail about both explanations for the overrepresentation of Blacks and Hispanics in offending behavior throughout the life course.

The Presence of Immigrants in the USA

While there is a void in official data that can capture the relationship between immigration and crime, there is a general public and media perception that an increase in immigration in the USA corresponds to increases in crime (Martinez and Lee, 2000; Simon, 1993). However, empirical research (discussed later in the chapter) tends to find that there is an inverse relationship between immigration and crime. Stated differently, communities with a greater presence of immigrants have lower crime rates (Ousey and Kubrin, 2009) and that first-generation immigrants engage in less offending behavior over the life course compared to native-born individuals (Bersani, 2012; Butcher and Piehl, 1998). In order to more thoroughly understand the relationship between immigration and crime, it is important to first define the term “immigrant” and discuss the presence of immigrants within the USA throughout the last 10 years.

According to the Department of Homeland Security and Office of Immigration Statistics, immigrants are considered foreign individuals who are granted *lawful* admittance into the USA, either permanently (became legal permanent residents, were naturalized), were granted asylum, obtained refugee status, or temporarily (e.g., workers, students, tourists), or (United States. Department of Homeland Security, 2012). For the purpose of clarity, immigrants will be categorized as foreign-born individually who relocate to the USA with the intention to permanently reside in the USA. A discussion of temporary immigrants as categorized by the Department of Homeland Security will not be included in the current chapter.

Paralleling issues with data collection of official crime statistics with race and ethnicity, one of the complications surrounding the relationship between immigration and crime is that the majority of official data (i.e., the UCR) does not collect data on immigrant status or crime committed by immigrants. In light of this limitation, Table 21.4 presents data from the Department of Homeland Security of the types of immigrants that relocated to the USA from 2003 to 2012.

The majority of immigrants who enter the USA each year obtain a legal permanent status, followed by naturalizations, refugees, and those seeking asylum. While there has been an overall increase in immigrants who entered the USA from 2003 to 2012, there have decreases across certain time frames and types of immigrants (e.g., 2006–2007; 2009–2010). However, these data do not provide information on the count and proportion of illegal immigrants, which is considered a hidden population and difficult to include in official statistics. The uncertainty of the amount of illegal immigrants entering the USA each year may fuel the negative and stereotypical perceptions of immigrants as crime-prone individuals.

It is important to note though that some forms of official data have attempted to assess the representation of immigrants as offenders. For example, the NCVS includes immigrants (both legal and nonlegal) who reside in the households that are selected to be administered the NCVS, but they cannot officially be identified since the NCVS does not ask questions pertaining to citizenship (Addington, 2008). In addition, the NCVS does not ask questions pertaining to a respondent’s own illegal behavior. If an illegal immigrant was residing in a chosen NCVS household, this is a type of illegal behavior (residing illegally in the USA) not captured by the NCVS.

Overall, the above discussion provided official statistics surrounding the relationships between race, ethnicity, immigration, and crime. While official crime statistics can provide some information on these relationships, additional types of crime measurement (i.e., self-report studies) and of data collection (i.e., longitudinal studies) can add to the breadth and depth

Table 21.4 US immigration statistics by type of immigrant (2003–2012)

Year	Legal permanent	Naturalizations	Refugee	Asylees
2003	58 ^a	28	2	2
2004	61	34	3	2
2005	62	33	3	1
2006	62	35	2	1
2007	59	37	3	1
2008	49	47	3	1
2009	57	38	4	1
2010	59	35	4	1
2011	58	38	3	1
2012	55	40	4	1

Data source: Department of Homeland Security (2012). Yearbook of Immigration Statistics

^aNumbers are percentages

of the literature. The remainder of the chapter will focus on the empirical relationship between race, ethnicity, immigration, and crime, with a specific focus on how these concepts pertain to offending behavior throughout the life course.

Studies of Race and Crime

As discussed previously, Blacks are more likely to be arrested and to be victims than Whites. The decision to stop, release, refer, and arrest youth is contingent upon a variety of factors beyond the offense and its severity, for example, patrolling patterns, the organizational style and goals of a police department, the socioeconomic makeup of a community, and racial profiling. Thus, questions emerge concerning whether arrest data reflect bias in police decision-making (Huizinga, Thornberry, Knight, and Lovegrove, 2007; Rios, 2011; Sampson, 1987). Still, some research exists that provide results confirming a differential offending argument.

Hindelang (1978), for example, compared results obtained from the UCR to those of the NCVS to assess the differential offending and selection bias hypotheses. Victimization surveys ask household residents to report personal victimizations, regardless of whether they reported these crimes to the police. Thus, if the data from the NCVS reveal race differences in crime that are in basic agreement with arrest

data, there is greater confidence that race differences in arrest reflect real differences in offending or what is referred to as the differential offending perspective. If they do not, then support is provided for the selection or system bias perspective.

Using rape, robbery, and assault data from the UCR and NCVS, Hindelang (1978) discovered that both measurements showed Blacks to be overrepresented compared to their representation in the general population for rape, robbery, and assault. Still, Hindelang (1978) found that for the crimes of rape and assault, there was some evidence of unexplained disparity. The Black arrest rate was higher than the Black NCVS rate. Overall, although he found some evidence of differential selection bias, most of the racial overrepresentation in the arrest data was shown in the victimization data. Therefore, Hindelang (1978) concluded that Blacks commit more crime, particularly violent crime.

Victims can only tell researchers about characteristics of offenders where there has been face-to-face contact. For “victimless” crimes (e.g., drug offenses), property crimes, and homicides, victim descriptions of offenders are unavailable. Furthermore, even in crimes involving face-to-face contact, victims may not always be able accurately to identify the offender’s age and race/ethnicity and a reliance on race/ethnic stereotypes may foster inaccurate recollections (McNeely and Pope, 1978). Still, victim reports,

obtained from the NCVS, indicate that minorities are overrepresented among offenders who commit serious violent crimes (e.g., Hindelang, 1978; Sampson and Lauritsen, 1997). Pope and Snyder (2003) used the FBI's 1997 and 1998 National Incident-Based Reporting System (NIBRS) involving data from 17 states and examined the most serious offense and victim accounts to study whether race bias accounts for the decision to arrest. They did not find strong support for the race bias or selection bias perspective.

Through NIBRS, the FBI asks law enforcement agencies to record a substantial amount of information on each reported crime and each arrest. For example, the agency is asked for the following information: age, sex, and race of the victim(s); offense(s) involved; date and time of the incident; type of place where the incident occurred; each victim's level of injury; weapon (s) used, if any; victim's perception of the demographics of the offender(s), including age, sex, race and ethnicity; victim-offender relationship(s), and the demographics of arrestee(s). Thus, researchers can examine NIBRS data on the types of incidents likely to involve victim-offender interaction, determine the victim's perception of the offender in each incident, study which incidents resulted in arrests, and then compare, for example, the arrest probabilities of White and non-White juvenile offenders for similar crimes. An additional advancement of NIBRS over the UCR is that it collects information on the ethnicity of both the victim and offender/arrestee. Taking these factors into account, Pope and Snyder (2003) did not find direct evidence that racial bias exists in arrest decisions. White juvenile offenders were more likely to be arrested than their non-White counterparts, especially for violent crimes. It is important to note that the study was based on data from only 17 states and that different juvenile arrest patterns may emerge if other states were included in the analysis. Furthermore, the data indicated evidence of an indirect bias effect in the arrest of non-White juveniles in that they are more likely to be arrested when the victim is White than when the victim is non-White.

The self-report survey is an alternative method of measuring the relationship between race, ethnicity, immigration, and crime independent of the police and victims (Krohn, Thornberry, Gibson, and Baldwin, 2010). Self-reports ask high school and other samples of youth anonymously to report any offenses they have committed, whether or not they were apprehended. However, self-reports may not be equally valid for all racial/ethnic groups. Some researchers have suggested that Blacks tend to underreport serious misconduct (Hindelang, Hirschi, and Weis, 1981; Huizinga and Elliott, 1986; Thornberry and Krohn, 2000), while others have found no differences in the accuracy of reporting across racial groups (Farrington, Loeber, Stouthamer-Loeber, Van Kammen, and Schmidt, 1996).

The National Youth Survey is a self-report administered to a nationally representative sample of teens. Using these data, Elliott (1994) found that Black youth admitted greater involvement in violent behavior than Hispanic youth, who in turn reported greater involvement than Whites. These findings are consistent with those from the Denver, Pittsburgh, and Rochester Youth Studies, where White youth reported involvement in violent crimes at lower rates than Hispanic youth, and Black youth reported the highest levels of involvement (Huizinga, Loeber, and Thornberry, 1994). Although the self-reported race/ethnic differences in violent offending across all these studies are substantial, they are not nearly as great as those found in police arrest data (Bishop and Leiber, 2011; Huizinga et al., 2007; Piquero, Farrington, and Blumstein, 2003).

In summary, victimization data and results from self-report surveys suggest that Black youth, and to some degree, Hispanics, are more likely to commit more crime and more violent crimes than Whites. The disparities, however, are not as great as those reported in official arrest data. Comparisons of arrest data with victimization data and self-report data provide some clarity to race being a correlate of crime. That is, Blacks, in most instances, evidence greater

frequency of offending and more serious offending lending support for the differential offending explanation of their overrepresentation in the criminal and juvenile justice systems. Minority overrepresentation, however, is also accounted for by differences in the way justice officials (i.e., police, courts) respond to Whites and minorities who engage in similar behavior. Researchers generally acknowledge that both of these explanations may account for the greater social control of minorities than Whites. The following section will first describe theories that attempt to explain why racial and ethnic minorities engage in more crime throughout the life course compared to Whites. The topic of immigration and crime that focuses on theory and empirical research concludes the discussion.

Theoretical Explanations of Race, Ethnicity, and Crime Involving Life-Course Perspective

For the most part, general or traditional criminological theories have lacked in their attention to the relationships between race/ethnicity and crime and more specifically racial and ethnic differences in offending. Some have argued that most mainstream theories are not designed to explain why minorities commit more frequent and serious crimes than Whites (Sampson and Lauritsen, 1997); therefore, race/ethnic differences in delinquency and criminal offending are indirectly related to individual differences in offenders, family processes, or structural and community explanations. Others have argued that criminological theories can universally apply to all racial and ethnic groups, regardless of any differences in individual offenders (for a critique, see Leiber, Mack, and Featherstone, 2009), while others have stated that no one theory has adequately addressed why some racial and ethnic groups have higher levels of offending than others (Hawkins, 1995). While various studies have been conducted that examine race/ethnicity and crime from a life-course perspective, these studies are limited in number compared to studies that have examined the

relationship between race/ethnicity and crime through other theoretical perspectives. For example, the highly regarded studies by Sampson and Laub (1993, 2005; see also Laub and Sampson, 2003) examined only White male subjects (see also, Moffitt and Caspi, 2001). There is also the need for studies that address both persistence and desistance in offending (Le Blanc and Loeber, 1998).

Although there are some differences between developmental or life-course theories (see Moffitt, 1993; Sampson and Laub, 2005), these perspectives embody the principle that there is continuity or persistence and possible desistance in offending. In addition, relative offending rates in one age-period link to relative offending rates in others (Farrington, 2003; Moffitt, 1993; Nagin and Farrington, 1992). Continuity in offending is also the hallmark of the most high-rate persistent offenders that are thought to begin their offending careers earlier, have longer careers, and commit more crimes over comparable periods than other types of offenders (Mazerolle, Brame, Paternoster, Piquero, and Dean, 2000; Moffitt, 1993, 1994). While some offenders persist well past the aggregate peak age in offending, most desist in a more normative manner in late adolescence/early adulthood (e.g., Moffitt, 1993; Robins, 1978; Sampson and Laub, 2005). Although distinct, persistence and desistance are related through a dynamic process involving the consequences associated with the interrelationships between choice, life circumstances, and criminality (Sampson and Laub, 2005). This limited body of study has shown that divergent offending trends, especially for serious crime, exists between Whites and non-Whites, in particular, Blacks (e.g., Elliott, 1994; Haynie, Weiss, and Piquero, 2008; Piquero, MacDonald, and Parker, 2002).

For example, Ge, Donnellan, and Wenk (2001) examined racial/ethnic differences in offending over time by using data from the California Youth Authority and discovered that up to age 21, there were no statistically significant differences in arrest frequencies between Whites and Blacks or Whites compared to Asians. After age 21, Blacks, however, were arrested more

frequently. Hispanics were also arrested more frequently than Whites but only after age 25. Chung, Hill, Hawkins, Gilchrist, and Nagin (2002) examined data from the Seattle Social Development Project and discovered differences in race/ethnicity offending patterns. About 12 % of Blacks, 7 % of European Americans, 7 % of other (mostly Native American Indians), and 2 % of Asian Americans comprised the chronic group of serious offenders. For the desister group, no significant differences existed between Euro Americans and Blacks, but differences were found compared to Asian Americans who made up a much smaller percentage of this group. Asian Americans as a group comprised a very significant percentage of the nonoffender group (Chung et al., 2002).

Central to most life-course perspectives is the element of social control, specifically the controlling effects (or lack of) that may be exerted from family, school, peers, and, in adulthood, marriage and employment (see Moffitt, 1993; Sampson and Laub, 1993; Thornberry, 1987). Other factors such as early onset of offending, drug and alcohol use, cognitive deficits, and family dysfunction are also believed and found to correlate to the development of further problems earlier in childhood and link to continued and often increasing problems throughout each developmental stage of the life course (Farrington, 1992; Gottfredson and Hirschi, 1990; Moffitt, 1993; Piquero and White, 2003). Changes in life events or circumstances, such as marriage or employment, may act as transitions or turning points that may lead to changes in offending in adulthood (Horney, Osgood, and Marshall, 1995; Laub, Nagin, and Sampson, 1998; Laub and Sampson, 2003; Piquero et al., 2002).

For example, controlling for individual differences in criminal propensity, Horney and colleagues (1995) report that offenders who were employed, did not use alcohol and drugs, and lived with a spouse decreased the likelihood of participation in crime. Similarly, studies by Sampson and Laub (1993, 1997, 2003, 2005) show a link between delinquency and crime in adulthood whereby continuity in offending is

sustained, in part, by the cumulative disadvantage associated with involvement in crime, such as incarceration and the establishment of a prior record, which in turn, further weaken bonds of social control (Sampson and Laub, 1997). Additionally, Laub and Sampson (2003) discovered that employment and marriage led to change in adult crime. The bonding effects held despite differences in early childhood experiences (low/high IQ, crime/no crime, weak parental bonds/strong parental bonds, etc.). Despite findings that suggest life circumstances may change over the life course that possibly may lead to changes in offending, research, for the most part, has neglected the role of race and ethnicity in this process (Haynie et al., 2008; Horney et al., 1995; Piquero et al., 2002).

As previously discussed, similar to most traditional theories, most life course theories are either silent on race/ethnicity or view racial/ethnic effects on crime tied to minorities' greater structural disadvantage and the associated consequences and adaptations that follow, such as having children out of wedlock, lack of education, lack of access to quality employment, alcohol and drug use, etc. which further weaken informal social controls and collective efficacy (Laub and Sampson, 1993, p. 312). Although she does not base the differences in race/ethnicity involvement in crime as much in the context of informal social control and collective efficacy, Moffitt (1993, 1994)'s developmental taxonomy perspective emphasizes a similar argument.

Moffitt (1993) argues that persons who engage in crime can be classified as falling into two distinct groups: life-course-persistent offenders (LCP) and adolescence-limited offenders (AL). The LCPs represent a small number of individuals (5–8 % of the population) who exhibit neuropsychological problems early in childhood that interact with deficient environments (i.e., poor parenting) that produce a pathological antisocial personality whereby involvement in crime occurs across the life course. For the LCPs, change in their behavior is not likely. The AL offending group, which consists of most offenders, is characterized by youthful rebellion and status discord as a result

of biological maturity and peer contexts. Individuals in this offending group are typically delinquent during their teens but, with the exception of a few, do not typically exhibit evidence of persistent antisocial behavior beyond childhood. Desistance in crime or change in offending is the result of assuming adult status and adult roles. Moffitt (1993) views race/ethnic differences in crime as the result of minorities being overrepresented within both the life-course-persistent group and in the adolescent-limited group.

According to Moffitt (1993), Blacks are much more likely than Whites to be poor and suffer prenatal problems as an outcome of exposure to environmental toxins coupled with mothers' poor nutritional habits. These risk factors place Black children more at risk for maladaptive development. Furthermore, the higher rates of poverty lead to more instances of family disruption and weaker bonds, trouble in school, unemployment or underemployment, and other outcomes of marginalization that predispose children to "aggressive interpersonal behavior." Consequently, "Black young people spend more years in the maturity gap, on average, than Whites because ascendancy to valued adult role and privileges comes later, if at all. Legitimate desirable jobs are closed to many young Black men... Indeed the biological maturity gap is perhaps seen as an instigator of adolescent-onset delinquency for Black youths, with an economic maturity gap maintaining offending into adulthood" (Moffitt, 1994, p. 39). In addition, "adolescence-limited crime is probably elevated among Black youths ... If racially-segregated communities provide greater exposure to life-course persistent role models, then circumstances are ripe of Black teens with no prior behavior problems to mimic delinquent ways in a search for status and respect" (1994, p. 39).

The implications of most life-course perspectives and, in particular, Moffitt's views on race and involvement in crime are that relative to Whites, Blacks are expected to be more involved in crime, especially serious crime. In addition, delayed entry into adulthood and conventional adult roles should reveal greater continuity rather than change in offending into

adulthood. Thus, Blacks would be more likely to continue offending as adults because they as a group experience higher levels of risk factors (unemployment, singleness, alcohol and drug use) than do Whites. As with studies of group-based offending trajectories, research on the assumed invariant effects of the relationships between race/ethnicity and life circumstances with criminal offending is lacking.

In fact, only a few studies have examined the role of race/ethnicity, life circumstances, and the impact on either the persistence and/or desistance of offending. Although evidence of conflicting results exist, most research does support the contention of more similarities than differences in the relative effects of life circumstances on offending by race/ethnicity (Caudy, 2011; Haynie et al., 2008; Piquero et al., 2002; Piquero, Moffitt, and Lawton, 2005). Furthermore and although the casual processes, for the most part, are the same across racial/ethnic groups, Blacks can be characterized as scoring higher on risk factors that account for greater involvement in crime and continued persistence in crime. Haynie and colleagues (2008), for example, analyzing the National Longitudinal Survey of Adolescent Health data (ADD Health) to test Moffitt's (1994) economic maturity gap thesis, report that the lack of economic and employment well-being explains a moderate greater persistence in violent offending in young adulthood for Blacks relative to Whites. That is, the effects of being Black and participation in violent behavior and persistent violent behavior disappeared once economic and employment factors as well as controls were considered. Blacks were found to be at greater economic risk (i.e., unemployed and, if employed, less likely to hold a skilled occupation) than did Whites (see also Higgins, Bush, Marcum, Ricketts, and Kirchner, 2010; Piquero et al., 2005). Finally, Blacks reported greater past involvement in serious crime than Whites.

Utilizing nationally representative data from the National Longitudinal Survey of Youth 1997, Caudy (2011) discovered more similarities than differences in the number and patterns of offending trajectories for Whites, Blacks, and

Hispanics. Within the 13–14-year-old cohort, for example, Blacks made up a smaller proportion of those in the high-level chronic offending trajectory than Whites or Hispanics. In addition, similar proportions for all three racial/ethnic groups were discovered in the adolescent-limited offending trajectory. Thus, contrary to expectations, Whites were found to offend in greater prevalence and at a higher average than minorities. Caudy (2011) stated that the focus on property and drug offending may have resulted in underestimating minority offending. Risk and protective factors were found to differentiate offending trajectories between offenders and nonoffenders and varied by race/ethnicity. Gender and prior delinquency were reported to be the strongest risk factors in general and in the three race/ethnic models. Maternal monitoring, maternal attachment, early arrest, and poverty were found to have race/ethnic effects.

Last, Maldonado-Molina, Jennings, and Komro (2010) used data from the Project Northland Chicago (PNC) to examine the trajectories of physical aggression among urban Hispanic youth. Five trajectories were identified of physical aggression (nonaggressive, low stable, escalators, early-rapid desisters, and high aggression/moderate desisters). Speaking Spanish at home was identified as a protective factor. Indirect exposure to alcohol, sadness/depression, fewer negative alcohol-related attitudes, and threatening to fight were reported to increase the risk for physical aggression.

Theoretical Explanations of Immigration and Crime

As introduced earlier, the public and media perception of the immigration–crime nexus has fostered the image that at the macrolevel, communities with a large concentration of immigrants have higher crime rates than communities without an immigrant concentration (Ousey and Kubrin, 2009). At the individual level, the perception is that immigrants are more likely to engage in crime and more serious antisocial behaviors compared to native-born

individuals (Martinez and Lee, 2000; Thomas and Znaniecki, 1919). Various theoretical perspectives, for example, social disorganization (Shaw and McKay, 1942), unequal opportunities (Cloward and Ohlin, 1960; Merton, 1938), acculturation theory (see Alvarez-Rivera, Nobles, and Lersch, 2013), and cultural traditions (Lewis, 1965; Padilla, 1980; Sellin, 1938), provided some justification for why society believes that immigration results in increased crime, yet empirical research on this link states otherwise (Mears, 2001). Contrary to these perceptions, empirical examinations of the immigration–crime nexus has found that immigrants are less likely to engage in offending behavior, be arrested, or incarcerated compared to similar situated native-born individuals (Bersani, 2012; Butcher and Piehl, 1998; Martinez and Lee, 2000) and that immigrant concentration is negatively related to violent crime rates and youth violence (Desmond and Kubrin, 2009; Ousey and Kubrin, 2009).

However, there is a caveat to the inverse relationship between immigration and crime that focuses on the offending behavior of different generations of immigrants throughout the life course. For the purpose of clarity, “first-generation immigrant” is used to categorize foreign-born individuals who relocate to the USA, while “second-generation immigrants” are native-born individuals of foreign-born parents. Research has found that while first-generation immigrants are less likely to engage in crime and antisocial behavior compared to native-born youth, second- and “later”-generation immigrants engage in more offending behavior than their first-generation counterparts (Bui, 2009; DiPietro and McGloin, 2012; Martinez and Lee, 2000; Ousey and Kubrin, 2009). In other words, second-generation immigrants and subsequent generations look similar to native-born individuals in terms of antisocial behavior.

Various family, school, and peer issues from acculturation have been cited in the literature as potential reasons for this finding. Acculturation refers to the process in which individuals change their attitudes, beliefs, and values based on their interactions with different groups of people

(Kaplan and Marks, 1990). With regard to acculturated second-generation immigrants compared to first-generation immigrants, this group of second-generation immigrants changes their values to mirror those held by their new county of residence, compared to first-generation immigrants whose values are consistent with their own native country.

In particular, the effect of acculturation on family, school, and peer processes is more likely to negatively affect second-generation immigrants when compared to their parents (Bui, 2009). Immigrant parents may be less likely to exert social control over their youth because children may adopt values through the acculturation process that are different than their parents' (Alvarez-Rivera et al., 2013; Sommers, Fagan, and Baskin, 1993). Differential peer processes can also account for this relationship in that acculturated youth may be spending less time with family and more time with delinquent peers (DiPietro and McGloin, 2012). For example, Bui (2009) found that first-generation immigrant adolescents were less likely than second- and third-generation adolescents to engage in substance use, violent offending, and property offending. The reasons for this finding were attributed to family conflict and less school bonding associated with the acculturation process in second- and third-generation immigrants. Stated differently, first-generation immigrants brought with them to the USA different types of protective factors as regards family, religion, and social support. These protective factors do not necessarily transfer to more acculturated second-generation immigrants (Harker, 2001).

An emerging area of research has begun to focus on the developmental parameters (e.g., onset, persistence, and desistance) of offending both within and across different generations of immigrants (Bersani, 2012; Bersani, Loughran, and Piquero, 2013; Jennings, Zgoba, Piquero, and Reingle, 2013). The empirical connection between immigrant generation and offending patterns throughout the life course is able to be examined based on longitudinal data of immigrant and native-born individuals (see Clark, Glick, and Bures, 2009). Presently, only a

handful of studies have been able to examine the link between immigration and crime through a life-course perspective with a focus on the specific developmental parameters of onset, persistence, and desistance (Bersani, 2012, 2013; Bersani et al., 2013; Jennings et al., 2013; Powell, Perreira, and Harris, 2010).

For example, Powell and colleagues (2010) used Add Health data to examine first-, second-, and third-generation immigrant youth who were between ages 11 and 19 at the first wave of data collection and between ages 18 and 28 at the third stage of data collection. Results indicated that patterns of offending behavior from adolescence into adulthood varied by race/ethnicity and immigrant generation. Offending trajectories that mirrored a life-course theoretical perspective (i.e., offending escalates from adolescence then decreases in adulthood) was only found in third-generation male immigrants. Among first- and second-generation immigrants, delinquent behavior peaked during early adolescence and started to decline during late adolescence. In other words, first- and second-generation immigrants began to desist from crime earlier than their third-generation counterparts.

Bersani (2012) investigated various developmental parameters of offending in first- and second-generation immigrants compared to native-born individuals from early adolescence (12–16 years old) into young adulthood (20–24 years old). The overarching goal was to examine the prevalence, seriousness, persistence, and desistance of delinquency and crime over time by disaggregating individuals across immigrant generation. Consistent with prior research, foreign-born individuals (i.e., first-generation immigrants) were less likely to engage in offending behavior over the life course compared to second-generation immigrants and native-born individuals. Furthermore, analyses were also disaggregated delinquency and crime into property, violent, and drug offenses and found that compared to first-generation immigrants, second-generation immigrants had a higher likelihood of engaging in all three types of offending. Bersani (2012) also found that second-generation immigrants mirrored the offending prevalence of

similarly situated native-born adolescents from adolescence into young adulthood. The rate of participation, frequency, persistence, and desistance of second-generation immigrants was not significantly different than native-born individuals (see also Bersani, 2013). It was concluded that once again, contrary to the media and public perception, immigrants (i.e., first and second generation) do not engage in more crime and/or more serious crime than native-born individuals from adolescence into young adulthood. It may be that since second-generation immigrants are born in the USA to foreign-born parents, they are socialized in a similar manner to native-born youth (Bersani, 2013).

Focusing exclusively on first-generation and native-born Hispanics, Jennings et al. (2013) examined incarcerated Hispanic males and their retrospective arrest data from ages 18 to 50. Specifically, four offending trajectories throughout the life course were identified across the entire sample: very low-rate offenders, high-rate late-onset escalators, initially high-rate desisters, and high-rate chronic offenders (Jennings et al., 2013, p. 622). First-generation immigrants, however, had a lower likelihood of being in the high-rate desisters or high-rate chronic offenders group compared to native-born Hispanic males. These results parallel prior research that first-generation immigrants engage in offending behavior throughout the life course at a lower rate compared to native-born individuals (Bersani, 2012, 2013; Bui, 2009).

The developmental trajectories of offending across immigrant groups were also examined over an 84-month period in a sample of adjudicated youth, in a study conducted by Bersani et al. (2013). Results indicated that first-generation immigrants were less likely to engage in serious offending over time (e.g., rape, damaging property, selling illegal drugs, shooting at someone, etc.) and persist in offending when compared to second-generation immigrants. Paralleling the research by Jennings et al. (2013), first-generation immigrants were not considered to be high-rate and persistent offenders, and they were also more likely to desist earlier in the

life course compared to second-generation immigrants. Second-generation immigrants, however, had similar and persistent offending patterns compared to native-born individuals, once again confirming the results of prior research (Bersani, 2012; Powell et al., 2010).

Overall, immigration studies are important with regard to the development of criminal and antisocial behavior because they entail implications for the relationship between race, ethnicity, and crime. Immigrants, like racial and ethnic minorities, are considered a disadvantaged group in American society, so research surrounding the immigration–crime nexus can advance the life-course and developmental literature. In general, the inverse relationship between immigration and crime has been empirically established. However, understanding the link between first-, second-, and third-generation immigrants and crime over the life course, especially pertaining to the onset, persistence, and desistance of crime and antisocial behavior, is an important task for future research.

Conclusion

The topic of race/ethnicity and immigration in conjunction with actual and perceived involvement in crime remains a controversial issue. In terms of race and ethnicity, different forms of crime measurement (official statistics and self-report surveys) reveal that minorities, and in particular Blacks, are overrepresented as offenders compared to their representation in the general population. This race/ethnicity relationship is more evident when taking into account greater frequency and increase in severity of offending. With regard to the relationship between immigration and crime, empirical research has yielded consistent results that first-generation immigrants are less likely to engage in crime compared to their native-born counterparts. Tests for offending patterns and risk/protective factors over the life course reveal more similarities than differences across race/ethnicity.

Summary

- Based on official statistics, Blacks are overrepresented in arrest statistics, depending on the type of offense; Blacks and Hispanics are overrepresented as victims compared to their representation in the general population.
- It can be difficult to assess the true relationship between race, ethnicity, and crime because some instruments of official crime statistics do not collect data on ethnic groups (i.e., the UCR). Data may categorize Hispanics as a separate group or include an individual's ethnicity along with a racial category.
- Prior research has found a relationship between race, ethnicity, and self-reported crime. In general, White youth report involvement in violent crimes at lower rates than Hispanic youth, and Black youth reported the highest levels of involvement.
- While various studies have been conducted to examine the link between race/ethnicity and crime from a life-course perspective, these studies are limited when compared to studies that have examined this relationship through other theoretical perspectives. There is also a need for studies that address both persistence and desistance in offending of racial and ethnic minorities.
- One developmental perspective, Moffitt's (1993) dual taxonomic theory, proposes that Blacks are much more likely than Whites to be poor and to suffer prenatal problems as a result of exposure to environmental toxins and mothers' poor nutritional habits. These risk factors place Blacks children more at risk for maladaptive development, and subsequent offending throughout the life course (LCP offenders).
- Empirical examinations of the relationship between immigration and crime has found that immigrants are less likely to engage in offending behavior and be arrested or incarcerated when compared to similarly situated native-born individuals.
- At the present time, only a handful of studies have examined the link between immigration

and crime through a life-course perspective with a focus on the specific developmental parameters of onset, persistence, and desistance.

- Prior research has found that second-generation immigrants mirrored the offending prevalence of similarly situated native-born adolescents from adolescence into young adulthood. Second-generation immigrants born in the USA to foreign-born parents may be socialized in a similar manner to native-born youth.

Future Research Needs

- Future research should inform policy initiatives that target various racial/ethnic groups and immigrant families on family, school, and community programs to decrease the occurrence of crime throughout the life course.
- Future research should revisit the view that Hispanics represent a homogenous group. There may be differences in life-course offending patterns for Mexicans, Chicanos, Puerto Ricans, or Cubans.
- Future research can benefit from large-scale longitudinal research efforts that specifically test the applicability of life-course and developmental theories across different generations of immigrants.
- Future research should attempt to disentangle the relationship between race, ethnicity, and immigration and different criminal career parameters (onset, persistence, and desistance). In contrast to other topics discussed in this book, we know very little about the link between race/ethnicity/immigration and crime from a developmental or life-course perspective.

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Chris Melde

The study of street gangs has been a staple of criminological research. In many respects, social scientists have used the gang context as a laboratory for the development and testing of theories of criminal and antisocial behavior. The pioneering work of Thrasher (1927) is often used as the starting point for serious academic exploration into the complex world of street gangs, but others around this same time (e.g., Shaw & McKay, 1931; Sutherland, 1937) and into the future (Cloward & Ohlin, 1960; Cohen, 1955) utilized gangs and their members as inspiration for more general theoretical explanations of deviance. This focus on street gangs to study deviance was often a practical choice for these early researchers. First, unlike most criminals and juvenile delinquents who prefer a more cryptic approach to criminal behavior, street gangs have a tendency to use explicit signs and signals to announce their presence to the local community and were thus easily detectable by researchers who sought access to these groups to conduct their studies. Second, members of street gangs are routinely involved in a disproportionate amount of deviant acts, ranging from underage substance use and minor property crimes to serious violence. Thornberry (1998) went as far as to describe the disproportionate

involvement in delinquency and violence by active gang members as “one of the most robust and consistent observations in criminological research” (p. 147). These groups, therefore, provided a reliable source of action for researchers interested in understanding the causes and correlates of criminal and antisocial behaviors.

Despite this long history of research on street gangs, our knowledge of this phenomenon remains limited in many ways. With respect to developmental criminology, in particular, the study of street gang members has been dominated by sociologically oriented criminologists, who have historically focused more explicitly on structural (e.g., social bonds, strain) rather than developmental theory and research. As Le Blanc (2006, p. 196) described, “criminological theories do not specify how these explanatory phenomena are built over time; they do not describe the mechanisms by which these phenomena are created, developed, maintained, and transformed along the life course.” In fact, it was not until the 1980s and the advent of a number of panel studies of youth (e.g., Esbensen, Osgood et al. 2001; Gordon et al., 2004; Hill, Howell, Hawkins, & Battin-Pearson, 1999; Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003; Tremblay, Vitaro, Nagin, Pagani, & Sequin, 2003) until an explicit focus on the causes and consequences of gang membership developed; even then this research was not routinely embedded in mainstream developmental research. It has been noted that

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even to this day, psychologists have paid scant attention to the social psychological and developmental implications of street gang membership (see Wood & Alleyne, 2010).

This review of the literature will focus on the theory and research most closely related to issues of street gang membership from a developmental perspective. As a result, much of this review will focus on more recent literature emanating from panel studies. Specifically, topics to be discussed will include the problem in defining and operationalizing gang membership in panel studies, risk factors for gang membership, theoretical explanations of gang membership in the life course, empirical research on the consequences of gang membership, as well as a discussion of areas for future research.

Defining Gang Membership

Undoubtedly, one of the primary reasons gang membership has not been studied more thoroughly across academic disciplines concerned with human development is the lack of a systematic definition of the phenomenon. We are certain that “gangs” exist and are associated with a great deal of harm to local communities through their involvement in crime, disorder, and violence, leading to public anxiety and concern in areas known to have a “gang problem.” Indeed, the hallmark of street gangs is their public pronouncement (e.g., through graffiti, symbols, shared colors) of their dangerous and deviant propensities. After all, it is their disproportionate involvement in acts of crime and delinquency that makes them interesting. There is widespread disagreement on the necessary or sufficient conditions that distinguishes a gang from other peer groups, however. While a full history of the definitional dilemma is beyond the scope of this chapter (for a review, see Klein & Maxson, 2006), a brief description of the complexity of this problem is in order.

First, studies of street gangs consistently note that the great majority of the individuals involved in these groups are adolescents, roughly between the ages of 12 and 24. This becomes problematic

given the fact that involvement in crime and delinquency peaks during this age in the life course more generally and that deviance among this age-group is often a group-based phenomenon. That is, youth regularly experiment with delinquency and criminal activity during adolescence, and they frequently engage in such behaviors with their friends and acquaintances. Most youth who engage in criminal and delinquent behaviors, however, do not consider themselves gang members, nor do they consider their peer group(s) a gang; neither do the police, educators, or other concerned parties. There is widespread agreement, therefore, that there is a difference between an “ordinary” delinquent peer group and a gang. Systematically documenting the nature of this difference for definitional purposes has been difficult, and most would agree that it has yet to be done successfully.

A common example used in the literature to exemplify the difficulty in distinguishing between deviant peer groups and street gangs is Klein’s (1971) influential definition of a gang. Klein (1971, p. 13) defined a gang as “any denotable adolescent group of youngsters who (a) are generally perceived as a distinct aggregation by others in their neighborhood, (b) recognize themselves as a denotable group (almost invariably with a group name) and (c) have been involved in a sufficient number of delinquent incidents to call forth a consistent negative response from neighborhood residents and/or enforcement agencies.” With respect to being exhaustive, this definition includes the characteristics of most if not all street gangs that are often thought of during discussions of the phenomenon by policymakers, researchers, and law enforcement. The problem is that this definition, and just about any other definition attempted before or after, is not exclusive. Gang definitions are often unable to distinguish between groups that recognize themselves as a street gang, and other denotable deviant peer groups that are not considered street gangs, either among those in the group or by outside entities. For example, many college campuses have numerous fraternities and sororities, each of which may have a notable reputation for some

feature of their social lives. As one might expect, you would not have to search far and wide to discover that certain Greek organizations have garnered a reputation for violence, loud parties with underage drinking, illegal drug use, and drug dealing, among other deviant activities. Fraternities or sororities with such a reputation fit all of Klein's (1971) criteria, but they do not likely fit our generalized conception of a street gang.

Suffice it to say, researchers, policymakers, and criminal justice practitioners have yet to identify a working definition of a street gang, or by extension a street gang member, that is not fraught with the potential for Type I or Type II errors. Making such a distinction is not merely an academic exercise, however. With the advent of sentence enhancements in criminal court for gang-related crimes (e.g., an extra 2 years added to a sentence for armed robbery if the crime is considered gang related), and the use of civil gang injunctions that allow communities to call upon justice officials to regulate even noncriminal behavior (e.g., associating in groups of more than three individuals in a public place, wearing gang colors, being outside after midnight) (Bjerregaard, 2003), the misidentification of gangs or gang members can have serious consequences.

Due to the difficulty in imposing a definition of gang membership on individuals, academic research routinely uses self-report methods to ascertain this status, and indeed such practices have received considerable support (see e.g., Esbensen, Winfree et al. 2001). The exact wording of the question(s) utilized to identify gang members differs in certain ways across studies, however. For instance, while the International Self Report Delinquency study (Junger-Tas et al., 2010; see also Melde & Esbensen, 2011) focused their question on the peer group by asking "Do you consider your group of friends to be a gang?", most self-report studies ask some form of the basic question, "Are you a member of a street gang?". Variations on this theme have a tendency to be either more restrictive by imposing added restrictions, such as that used by the Add Health longitudinal study, where

they asked respondents whether they "had been initiated into a named gang in the past 12 months" (emphasis added; DeLisi, Barnes, Beaver, & Gibson, 2009), or more inclusive in nature, like the Montreal Longitudinal and Experimental study which asked respondents "During the past 12 months, were you part of a group or gang that did reprehensible acts?" (emphasis added; Tremblay et al., 2003).

While there is certainly room for debate on the best way in which to ask respondents about their gang status, a number of researchers have examined the validity this measurement technique and have come to the conclusion that this general methodology produces a sample of adolescents that are distinct from other youth in their study population, including youth who report involvement in more delinquency and have greater exposure to known risk factors for violence (Curry, 2000; Esbensen, Winfree et al. 2001; Thornberry et al., 2003). For example, Curry (2000) compared data from both self-report surveys and police identified gang youth in Chicago, IL, and found a large degree of overlap between the self-reported gang youth and those classified as such by the local police department. In fact, the degree of concordance between the two was similar to studies that have assessed the validity of self-reported delinquency, more generally, by comparing such figures with official data (Thornberry et al., 2003).

A potential limitation of the self-report method for identifying gang members is that it lumps together members of what surely are distinct groups in both form and function. Klein and Maxson (2006) provided a thorough overview of the different types of gangs that have been documented throughout the United States, in particular, and across the world. For instance, a relatively small number of neighborhoods in some major cities (e.g., Los Angeles, Chicago) have large multigenerational gangs dating back to the early to mid-1900s. Membership in such groups, referred to as "traditional" or "neo-traditional" gangs in the Maxson-Klein typology (Maxson & Klein, 1995), is easily in the 100s, with a roster of former and inactive members in the 1000s. Such gangs serve as the stereotype for "real" gangs and would include such groups as the

original bloods and crib sets in Los Angeles and vice lords, gangster disciples, and Latin kings in Chicago and elsewhere. On the other hand, the more numerous type of gang found in cities throughout the world are “compressed” gangs (Maxson & Klein, 1995), whose membership roster ranges from roughly 10 to 50 and whose tenure as a gang is just as easily measured in months as years (i.e., 1–3 years).¹ It would be difficult to confuse these groups for one another, but the use of self-report methods would identify members of any of these groups as gang involved.

For developmental criminologists, however, drawing hard line distinctions between what is and what is not a gang may be misguided. That is, if a respondent reports that they are in a gang, but that the gang has no leader and/or no name, or is located in a city without a long history of gang problems, which is inconsistent with preconceived notions of the characteristics of “real gangs,” are we in any position to suggest the respondent is either lying or naive? There is no compelling research to suggest we have enough evidence to support such a practice, and thus self-reported gang membership should not be discounted outright based upon mere descriptors of the group (e.g., name, location, history). Rather, the form (e.g., hierarchical, multi-generational, mixed gender) and functional (e.g., drug distribution, protection of turf) properties of a gang should be used to help explain potentially heterogeneous patterns of within-individual change associated with gang joining or leaving. Idiosyncrasies related to peer group structure, dynamics, and characteristics should help inform our studies of the developmental processes associated with self-identification as a gang member. For instance, Le Blanc and Lanctot (1998) found no evidence that the structure of the group was substantively related to attitudinal or behavioral characteristics of gang members in their sample

of Montreal youth. They concluded that “participation in a group involved in illegal activities seems in itself, more of an activator than the nature of the group” (p. 24). The following review of empirical research on street gangs in developmental perspective, therefore, is based upon self-report methods of identifying gang membership.

Risk Factors for Gang Membership

Studies of street gang members have relied upon cross-sectional and retrospective data collection techniques to assess the reasons why individuals join gangs and the demographic characteristics of gang-involved youth. The use of such study designs is understandable given the difficulty in implementing prospective longitudinal studies that include individuals at high risk for gang membership. Not only are such studies labor intensive and costly, but the inclusion of enough respondents to ensure that a sufficient number will actually join a gang requires a relatively large sample size. Tracking these individuals across time is also especially challenging due to the likelihood of differential attrition (i.e., respondents dropping out of the study) of high risk youth. Less expensive and time-consuming cross-sectional studies present difficulties in determining cause from effect, however, and thus basing policy or practice on such data collection techniques is inadvisable. That is, if risk factors are “individual or environmental hazards that increase an individual’s vulnerability to negative developmental outcomes” (Small & Luster’s, 1994, p. 182), such as gang membership, it is inherently necessary to establish proper temporal ordering in order to capture this developmental process.

The danger present in using cross-sectional methods to identify risk factors for gang membership is not simply an academic exercise, but could have practical implications for those attempting to prevent gang membership by identifying those most at risk for later gang involvement. Melde and Esbensen (2011) demonstrated the threat in using cross-sectional methods in this regard, as they found that many

¹ Gangs routinely differ in other respects as well, such as hierarchy or organizational characteristics and level and type of criminal activity engaged in by their members (e.g., organized drug dealing activities, drug use, violence).

of the factors commonly believed to place youth at risk for gang membership (e.g., delinquent attitudes/beliefs, peer delinquency, low school bonding) were themselves impacted by these associations. That is, exposure to street gangs leads to changes in the very same factors we use to measure their risk for gang membership. Thus, measuring such phenomenon subsequent to youth membership in street gangs may inflate the relative difference in risk factors between gang and nongang youth, producing biased estimates and potentially Type I errors (i.e., finding statistically significant differences where none actually exist). In addition to the potential for Type I errors demonstrated by Melde and Esbensen (2011), Drake and Melde (2013) found evidence that some risk factors might actually be masked through the use of cross-sectional methods (i.e., a Type II error). Using data from the national evaluation of the Gang Resistance Education and Training (G.R.E. A.T.) program (Esbensen, 2002), they found that four cognitive or behavioral variables were associated with a greater risk of gang membership in cross-sectional models (i.e., social isolation, attitudes toward the police, belief in techniques of neutralization, street socialization). Only one such variable (“perceived limited educational opportunities”) was significantly associated with gang joining in prospective analyses (i.e., where the risk factors were measured prior to gang membership) using the same data, and this variable was not statistically significant in the cross-sectional analysis. Thus, the risk factors for gang membership identified through cross-sectional and prospective analyses of the same sample were mutually exclusive, a real problem for policymakers looking for scientific evidence from which to produce gang prevention programming. For a more complete review of such issues related to longitudinal versus cross-sectional methods for the study of gang membership, see Krohn and Thornberry (2008). The following discussion of risk factors is limited to findings that have received support in panel studies to limit the possibility of incorrectly identifying factors associated with gang membership.

Howell and Egley (2005) suggested that a useful way in which to study risk factors for antisocial outcomes (e.g., delinquency, gang membership) is to organize them into developmental domains, such as individual, family, school, peer group, and community factors. This is necessary because individual studies often fail to measure risk factors using similar research instruments, making direct comparisons of individual risk factor items difficult. Based on such a strategy, our best available evidence on what places youth at risk for gang membership suggests that youth who experience risks in any of these domains (i.e., individual, family, school, peer group, and community) leads to an increase in the odds of later gang membership. This literature also suggests that there are no unique risk factors for gang membership relative to other delinquent or violent outcomes. That is, the very same factors that predict gang membership also predict later involvement in violent offending (see, e.g., Esbensen, Peterson, Taylor, & Freng, 2009). Maxson’s (2011, p. 165) review of this literature led her to conclude that the risk factors for gang membership supported across studies were: (1) experiencing a critical life event such as an injury or disrupted social relationship (e.g., parental divorce); (2) evincing antisocial, though not necessarily delinquent, tendencies (e.g., risk taking, impulsivity); (3) having pro-delinquent attitudes; (4) low levels of supervision by parents; and (5) associating with delinquent peers. In isolation, however, any one of these factors does little to predict gang membership. This suggests that social service providers and law enforcement personnel concerned with identifying youth who are at greatest risk for gang membership should not use any single risk factor to differentiate high- from low-risk youth.

Risk factor studies using prospective data suggest that the best way to identify individuals at high risk for gang membership is to measure the total accumulation of risk factors (e.g., Hill et al., 1999) and exposure to risk across multiple domains (e.g., Thornberry et al., 2003). Both Hill et al. (1999) and Thornberry et al. (2003) found that there was a tipping point in which the

accumulation of risk factors would lead to a substantial increase in the odds of later gang membership. For example, Hill and colleagues (1999, p. 313) found that youth who experienced between four and six risk factors were 4.7 times more likely to join a gang than those who had zero or one risk factor. Even more importantly, youth who had seven or more risk factors were 13.2 times more likely to later join a gang than those with zero or one risk factor. Similarly, Thornberry et al. (2003) found that among the male youth in their sample who were exposed to risk in four to six developmental domains, about 30 % went on to become gang involved. Over half (60.6 %) of the youth who were at risk across seven domains, however, later became gang members.

Overall, the body of evidence on risk factors for gang membership suggests two important conclusions. First, there are no unique predictors of gang membership relative to other problematic behaviors (e.g., violent offending). This suggests that practitioners trying to identify characteristics that distinguish youth at high risk for gang membership should not focus their effort on youth who have a unique background characteristic they feel is associated with gang membership (e.g., growing up in a single-parent household). Such a strategy is not supported in the research literature and will likely be inefficient. Second, because adolescents appear to be resilient to a limited number of risk factors, the accumulation of risk factors, either individually or across domains (i.e., individual, family, school, peer group, and community), is the best known way to identify those most likely to become gang involved. Practitioners, therefore, should determine the critical mass of risk factors that leads to a substantial increase in the likelihood of gang membership.

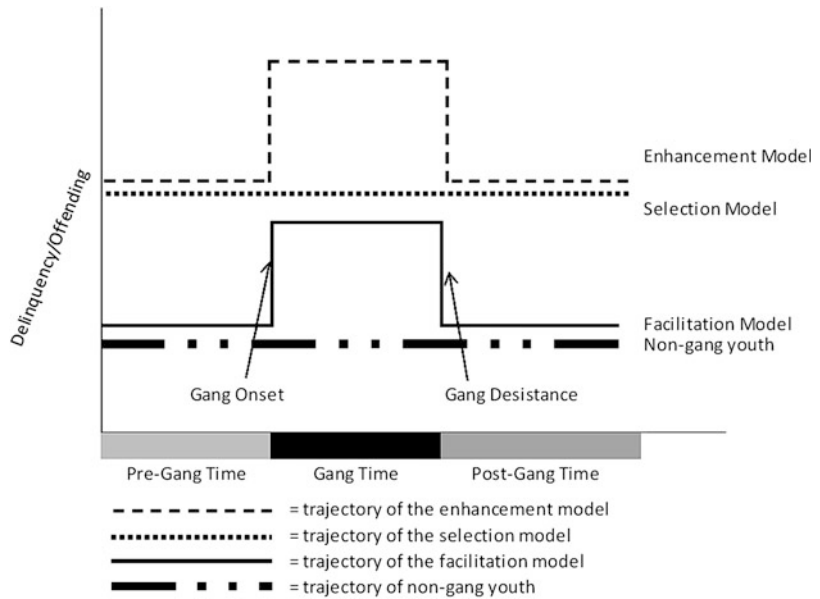
The literature is still unclear on a number of issues pertinent to the efficient identification of individuals at risk for gang membership. Decker, Melde, and Pyrooz (2013) suggested a number of areas for future research into risk factors for gang membership. For instance, they suggested that there has been little systematic attention paid to identifying the intensity at which certain factors

in an adolescent's life become risky. Future research in this regard should examine whether there are standard instruments that can identify the appropriate cut points for being considered at risk on individual risk factors and/or as a result of accumulated risk. Decker and colleagues (2013) also suggested that systematic attention to the identification of specific combinations of risk factors that may help in the identification of youth at high risk for gang membership is necessary. For instance, are some risk factors (e.g., single-parent household) only predictive of gang membership when they are experienced in combination with other such risks (e.g., low school commitment, poor parental monitoring)? From a developmental standpoint, systematic research on the potentially age-graded nature of risk factors is warranted. Perhaps some of the inconsistent findings with respect to individual risk factors have to do with when they are measured, such that exposure to certain phenomenon is only risky when experienced at a particular point in the life course. Lastly, Decker and colleagues (2013) identified that researchers have not systematically examined how the ordering of risk factors in the life course impacts their relationship with later gang membership. Exposure to delinquent peers in early adolescence may only be risky, for instance, if youth have already experienced other individual or family risk factors; without earlier experiences of family-related risk factors, simply having delinquent peers may not increase the probability of later gang joining.

Does Gang Membership Influence Life Course Development?

One limitation of street gang research from a developmental perspective is the lack of longitudinal panel data sources until the advent of a number of such studies in the 1980s and beyond. As a result, "the general literature on street gangs often fails to highlight life-course development, thereby limiting our understanding of both the antecedents and the consequences of gang membership" (Thornberry et al., 2003, p. 4). As the

Fig. 22.1 Hypothesized models of change in patterns of delinquency associated with gang membership status



previous section highlighted, however, the evidence that has been collected using prospective data suggests that even before joining a gang, these individuals appear to have a number of social deficits that place them at risk for antisocial outcomes, irrespective of their later membership in a gang. This fact is an important insight when it comes to the question of whether or not gang membership matters in the course of human development. If youth who join gangs were at risk for later involvement in a host of antisocial and violent behaviors before joining a gang, there is a real possibility that gangs have little or no causal impact on their members above and beyond what would be expected given the presence of these other risk factors; these individuals would likely be delinquent and/or violent if not gang involved. Thornberry and colleagues (1993) described this issue in great detail and provided the selection, facilitation, and enhancement frameworks as possible explanations for the observed association between gang membership and disproportionately high level of offending on the part of gang members.

The *selection model* is consistent with theories that explain criminal behavior as the product of relatively stable differences in criminal propensity between individuals (e.g.,

Gottfredson & Hirschi, 1990), what Nagin and Paternoster (1991) refer to as population heterogeneity. According to this view, the association between gang membership and delinquency is spurious, as a common set of factors explain both delinquency and gang involvement; gang membership is simply a manifestation of criminal propensity. This idea is often summarized in the research literature using the phrase “birds of a feather flock together,” which means that gangs are nothing more than the collection of a number of antisocial youth. As Gottfredson and Hirschi (1990, p. 158) explained, “adventurous and reckless children who have difficulty making and keeping friends tend to end up in the company of one another, creating groups made up of individuals who tend to lack self-control. The individuals in such groups will therefore tend to be delinquent, as will the group itself.” If the observed association between gang membership and delinquency is consistent with the selection framework, we would expect to see a consistent difference in criminal offending between gang members and their nongang peers before, during, and after their gang involvement (see Fig. 22.1).

The *facilitation model* is consistent with both social learning (e.g., Akers, 1998) and opportunity (Osgood, Wilson, Bachman, O’Malley, &

Johnston, 1996) perspectives. From a social learning perspective, it is surmised that gang membership exposes individuals to a social forum that influences attitudes and norms promoting delinquent behavior, and this in turn increases individual involvement in such activities. In this model, gang membership is afforded a causal role in shaping delinquent behavior through a learning process similar to the one described by Akers (1998). McGloin (2008; p. 144) summarized this process by stating that “as a consequence of gang involvement, individuals learn to commit crime because this primary social environment provides access to definitions favorable towards committing crime, to sources of reinforcement for delinquent/criminal behavior, and to a number of delinquent models for observational learning.” As an alternative, Osgood and colleagues’ (1996) opportunity theory suggests that simply associating with other adolescents outside the watchful eyes of adult authority figures should, in and of itself, lead to increased offending. To the extent that gang membership changes individuals’ routine activities in a way that leads to greater socializing in such contexts, then gang membership should lead to an increase in delinquency and potentially violent conduct irrespective of any changes to attitudes or beliefs in societal norms. In the end, if the facilitation model were correct, we would see no significant differences in offending relative to their same-age peers either before or after gang membership. The disproportionate involvement in crime and delinquency associated with gang membership would be limited to periods of active gang membership (see Fig. 22.1).

Finally, the *enhancement* model blends the selection and facilitation models and suggests that gang members are likely more delinquent than nongang youth even before gang involvement, but the gang context further exacerbates these differences. Thus, the enhancement model suggests that processes related to control, opportunity, and learning theories are likely at work, whereby adolescents already involved in delinquent activities due to underlying risk factors (e.g., low self-control, low social control)

become even more criminally active due to group processes related to the learning and reinforcement of pro-delinquent norms and attitudes, as well as the increased opportunity for criminal involvement offered by the gang context.² If the enhancement model is the best explanation of the influence of gang membership on delinquent and violent offending, one would expect to find that gang-involved youth were already involved in a greater number of delinquent and criminal acts than their nongang peers before they joined a gang but that this difference is further exacerbated during periods of active gang membership. Then, upon leaving the gang, their overall level of offending should decrease, but not to the level of peers who were never involved in a gang; there are enduring differences between these groups of individuals (see Fig. 22.1).

Overall, extant research supports the enhancement model concerning the influence of gang membership on delinquency (Krohn & Thornberry, 2008). Evidence suggests that there is a non-negligible self-selection of individuals with a high propensity for criminal involvement into gangs (e.g., DeLisi et al., 2009; Haviland, Nagin, & Rosenbaum, 2007; Melde & Esbensen, 2011). Gang membership does not lead to the onset of criminal and delinquent behavior, as gang members typically have already engaged in a number of deviant acts. Rather, gang membership leads to both an acceleration in offending

²It should be noted, however, that Gottfredson and Hirschi (1990) contend that the amplification of deviant activity in delinquent peer groups does not necessarily refute their theory, which is consistent with a population heterogeneity model. More specifically, Gottfredson and Hirschi (1990, p. 158) state that their general theory of crime “is compatible with the idea that some criminal acts are facilitated by group membership or a group context. Facilitation is another word for reduction of difficulty, for the ‘ease’ with which an act can be performed. Adolescents clearly use groups to facilitate acts that would be too difficult or dangerous to do alone (such as robbery), but this does not mean that they learn lack of self-control in such groups.” Thus, any increase in crime which results from gang membership may be the result of a change in opportunity provided by the gang context, not necessarily a change in delinquent attitudes and norms as purported in learning theories.

behaviors and an escalation in involvement in more serious crimes. To date, findings consistent with the enhancement model have been reported in American panel studies (Battin, Hill, Abbott, Catalano, & Hawkins, 1998; Esbensen & Huizinga, 1993; Gordon et al., 2004; Melde & Esbensen, 2011, 2014; Thornberry et al., 2003) as well as in Norwegian (Bendixen, Endresen, & Olweus, 2006), Canadian (Gatti, Tremblay, Vitaro, & McDuff, 2005; Haviland et al., 2007), and Chinese (Pyrooz & Decker, 2013) samples.

Observed enhancement effects of gang membership are also not limited to specific types of criminal or antisocial behavior; gang members are routinely involved in a wide variety of offenses. For example, Gordon and colleagues (2004) found that gang membership increased involvement in minor forms of property offending, drug dealing, substance abuse, as well as violence; Thornberry et al. (2003) provided evidence that membership in a gang was associated with risky sexual activity, teenage pregnancy, dropping out of school (see also Pyrooz, 2014), and unemployment; and Melde and Esbensen (2013) found evidence that the onset of gang membership produced a disproportionately large impact on violent offending relative to other forms of crime and delinquency. The general pattern is that gang membership is associated with an increase in a wide variety of criminal and antisocial behaviors.

After youth report leaving their respective gangs, which a large majority of all youth in panel studies suggest they do within approximately 1–2 years of gang joining (Krohn & Thornberry, 2008), there is both a deceleration in offending frequency and a de-escalation in the severity of deviant behavior, including violence (Melde & Esbensen, 2013). The influence of gang disengagement on offending, however, appears to be much smaller and more gradual than that witnessed upon gang entry. Melde and Esbensen (2014), for example, found that it took about two years after termination of self-reported gang membership before youth returned to the trajectory of offending frequency and variety they had prior to gang involvement. While gang youth, again, are more likely to be involved in

criminal and delinquent offending than their nongang peers in general, evidence suggests a distinct pattern of deceleration and de-escalation upon leaving the gang, which is a promising finding for intervention specialists seeking to rehabilitate ex-gang members.

Why Are Street Gangs Criminogenic?

While extant research suggests gang membership has a causal role in the genesis of crime, violence, and substance abuse consistent with the enhancement framework, these studies can best be described as a “black box” approach to causality. The focus of much of this research has been to isolate the degree to which gang membership matters in generating criminal behavior. Thus, until recently, studies using panel data largely ignored the processes involved in producing behavior change. After all, simply joining a gang does not in and of itself lead to engaging in more or more severe deviant behavior nor does leaving a gang similarly force one to stop engaging in crime. Engaging in antisocial behavior is a choice that individuals make, and gang membership appears to facilitate this process. A natural extension of the substantial body of work that sought to isolate the causal role of gang membership in generating crime is to determine the means through which gang membership elicits behavior change. That is, what is it about gang membership that leads to a systematic increase in deviant behavior?

A number of studies using panel data have focused on identifying the mechanisms associated with the within-individual changes in criminal and antisocial behavior attributed to gang membership. Matsuda, Melde, Taylor, Freng, and Esbensen (2013) explored how gang joining influenced the cognitive and emotional development of adolescents in seven cities across the United States and found evidence that youth develop a more aggressive persona after joining a gang, akin to the attitudes and mode of behavior described in Elijah Anderson’s (1999) code of the streets thesis. Melde and Esbensen (2011, 2014) and Sweeten, Pyrooz, and Piquero (2013)

found support for the applicability of a turning point framework (e.g., Sampson & Laub, 2005) in explaining the enhancement effect of gang membership. For instance, after controlling for sources of selection in their general school-based sample, Melde and Esbensen (2011, 2014) found the onset of gang membership was associated with significant changes in attitudes and emotions associated with the use of violence (e.g., violence neutralizations, anger identity, anticipated guilt for committing violence) as well as changes in routine activity patterns (e.g., going to parties where drugs and alcohol were present, associating where no adults were present) that helped to explain heightened levels of offending among gang-involved youth.

Sweeten et al. (2013) used a developmental framework to examine the processes associated with gang disengagement using a high-risk incarcerated sample of youth from the Pathways to Desistance study (Mulvey et al., 2004). In their analysis, Sweeten et al. (2013) explored the cognitive and behavioral trajectories of 226 youth who reported gang involvement to determine how disengagement from gang membership impacted such things as routine activities, delinquent peer associations, temperance, and offending. Results suggested that disengaging from gangs was associated with less unstructured socializing, fewer associations with delinquent peers, and an increased ability to control impulses and aggression. Together, these factors helped to explain why these individuals reduced their level of offending upon distancing themselves from gang activity.

While these efforts to identify the mechanisms behind the enhancement effect of gang membership are a step in the right direction, a particularly troubling pattern in the research literature is the long-term consequences of gang membership. There is a growing body of literature that suggests that even short-term gang membership may produce long-term negative developmental outcomes, even into early adulthood (Krohn, Ward, Thornberry, Lizotte, & Chu, 2011; Levitt & Venkatesh, 2001; Pyrooz, 2014). Adolescent gang membership appears to negatively influence educational attainment (Krohn

et al., 2011; Pyrooz, 2014) and economic well-being (Krohn et al., 2011; Levitt & Venkatesh, 2001) and increases the likelihood of arrest (Krohn et al., 2011) many years after involvement in such groups ends. A more complete understanding of the reasons for these enduring effects remains elusive, however.

From a theoretical standpoint, Caspi, Bem, and Elder's (1989) discussion of the processes associated with cumulative and interactional continuity may be relevant for street gang members' ability to garner the necessary social and human capital to successfully transition to adult roles. Cumulative continuity, according to Caspi and colleagues (1989, p. 375), "arises when an individual's interactional style channels him or her into environments that themselves reinforce that style, thereby sustaining the behavior pattern across the life course through the progressive accumulation of its own consequences." If gang membership produces a lasting impact on the worldview of adolescents and/or how they interact with others around them, they may channel themselves into situations that challenge their ability to succeed socially or economically. Lasting criminal involvement may, therefore, be the product of poor decisions made early in the life course through processes consistent with cumulative continuity.

Processes of interactional continuity may also work to promote continued antisocial behavior after the cessation of gang membership. Interactional continuity arises from the "reciprocal, dynamic transaction between the person and the environment" (Caspi et al., 1989, p. 378), which works to reinforce patterns of behavior and thought processes. Gang members whose affiliation is public knowledge may elicit particularly negative, even hostile, responses from those around them given their deviant status, even after they are no longer gang involved. As an example, if teachers and other school staff label a student a gang member, and thus a troublemaker, their behavior toward that student (e.g., ignoring them in the classroom, overreacting to minor altercations) may last well beyond the student's tenure in the gang. In general, even if

a person decides to leave the gang, and turn their life around, others may still treat them as gang involved. As a result, the potentially negative interactions such youth face may be sustained and reinforced across time, especially if others continue to treat former gang members as if they were active in the gang.

Overall, coping strategies, attitudes, and behaviors learned and reinforced in the gang context are likely to affect social interactions after adolescents no longer consider themselves gang involved, especially if their self-concept and worldview remain altered by their gang experience. Developmental criminologists should continue to develop theory and produce empirical data on the mechanisms associated with what appear to be long-term consequences of street gang membership. A better understanding of the mechanisms associated with an enduring influence of gang membership will help social service providers structure their programs in a way that can counteract the detrimental developmental processes incurred as a result of these earlier associations.

Summary

- As of yet, there is no agreed upon definition of what constitutes a gang or a gang member. Numerous attempts to define these concepts have been made by researchers, policymakers, and law enforcement personnel, and indeed state and federal statutes have been adopted with explicit, though imperfect, definitions (Klein & Maxson, 2006). Given this definitional ambiguity, developmental criminologists have relied extensively on self-report methods to ascertain street gang membership.
- There are a number of risk factors associated with street gang membership that can be identified prospectively. No single risk factor, in isolation, can efficiently predict gang membership, however, and there are no unique risk factors for gang membership relative to those that predict involvement in delinquency and violence more generally. Rather, the best way

in which to identify youth most at risk for gang membership is by the total number of risk factors they have accumulated.

- Gang members are involved in a disproportionately high number of criminal and delinquent acts, relative to their non-gang-involved peers. Programs and policies designed to reduce the overall level of crime and delinquency in a local community should focus their efforts on gang-involved youth, because this may produce the greatest returns on investment if successful.
- Individual levels of offending peak during periods of active gang membership, relative to either before or after gang involvement. The onset of gang membership is also associated with escalation in the seriousness of offenses committed, especially violent behaviors. Research suggests the influence of gang membership is stronger than simply associating with delinquent peers.
- The influence of gang membership appears to endure beyond periods of active association. These long-term effects may produce negative developmental outcomes that can lead to problematic circumstances in the life course, such as lower earning potential, limited educational attainment, and prolonged involvement with the criminal justice system (e.g., higher probability of arrest and incarceration).

Future Research Needs

- **Does the local context moderate the effect of gang membership on the developmental trajectory of members?** Extant gang research is routinely based on single site samples with little variation in terms of such things as the race and/or ethnicity of respondents, community context, local economic conditions, and gender of those studied. Larger comparative studies of gang members across communities, cities, and even nations are needed to understand whether there is systematic variation in the

short-term and long-term consequences of membership across context.

- **Do the characteristics of the gang individuals belong to differentially impact the life course trajectory of members?**

Although there is a great deal of evidence to suggest that gangs exist in a number of forms, existing research is not able to adequately answer whether the form or function of gangs differentially impacts the short-term and long-term consequences of involvement in these groups. For instance, research has not identified whether there is a differential developmental impact of being a third-generation member of a large (e.g., >100 members) well-known violent gang in a traditional gang city, relative to being a first-generation member of a small newly formed gang in a city with little history of gangs?

- **What are early childhood risk factors for gang membership?**

With few exceptions (e.g., The Montreal Longitudinal and Experimental Study, Tremblay et al., 2003), panel studies in developmental criminology that include a gang measure are limited to a focus on adolescence and the months or years immediately preceding the gang experience. Too little attention has been paid to the formative years of childhood development, even though they play a prominent role in theorizing about the causes of criminal and antisocial behavior (e.g., Gottfredson & Hirschi, 1990).

- **What are the benefits of gang membership?**

Journalistic and historical documents describing the activities of gang-involved adolescents demonstrate that gang membership is a natural outcome for many youth faced with serious personal and community disadvantages, including a high risk for violent victimization and poor income potential in the legitimate work sector (for a review of the history of gang research, see Decker & Van Winkle, 1996). In this way, gang membership can be viewed as an adaptive process, and thus research needs to focus on the potential social, psychological, and/or physical

benefits associated with gang membership. As Frankenhuis and Del Giudice (2012) have documented, adaptive developmental processes can produce problematic outcomes, but these may best be viewed as unintended consequences in the process of goal accomplishment. Because gang membership is often framed from a social problem perspective, however, researchers have a tendency to focus on the average or modal antisocial outcome, which does not necessarily reflect the variety of potential outcomes considered by the individual contemplating gang membership. Perhaps developmental criminologists should consider the relevant work of evolutionary psychologists and life history theorists (e.g., see Ellis et al., 2012; Frankenhuis & Del Giudice, 2012), whose work may shed important light on the rationality of street gang membership for youth faced with highly uncertain and variable potential life course outcomes. In this way, we might better understand the processes associated with what appears to be a risk-prone decision to join street gangs.

- **What is the scope of the long-term consequences of gang membership?**

Given the number of panel studies that began in the 1980s, long-term research on the impact of gang membership on adult outcomes is possible and thus should be at the top of the research agenda for developmental criminologists given the robust influence of these associations on shorter-term developmental processes. For instance, given the negative influence of substance abuse and violence on physical well-being in adulthood, more research on the health consequences of gang membership should be considered. The heightened levels of violence experienced by gang members, both as perpetrator and victim, could also negatively influence physical and mental health well beyond periods of active membership and is an area ripe for consideration.

- **What are the mechanisms responsible for long-term developmental consequences of adolescent street gang membership?** Better theory and research on the causal pathways that connect adolescent gang membership to adulthood are necessary. Few theoretical statements in this regard pay explicit attention to the role of gang membership in the life course. If gang membership is a unique form of deviant peer associations, then more explicit statements on these differences, and how they influence developmental processes, are necessary. There is a large body of research and theory from which to use as a foundation for such work. Le Blanc's (2006) use of the chaos–order paradigm is a step in the right direction in this respect. Le Blanc (2006) provided explicit statements on how street gangs can influence developmental outcomes, apart from more general deviant peers, including how such associations can influence self-control and available mechanisms of social control across time. More work of this nature is needed to ascertain the influence of gangs in the life course.

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The Contribution of Mental Health Disorders to Antisocial Behavior Pathways

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Raymond R. Corrado and Evan C. McCuish

The Contribution of Mental Health Disorders to Antisocial Behavior Pathways

Explaining the within-individual course of antisocial behavior is a fundamental aim of developmental criminology (e.g., Le Blanc & Loeber, 1998). This involves identifying developmental correlates that are associated with the onset, escalation, and persistence of antisocial behavior. Traditional criminogenic factors such as certain family characteristics and peer influences are examples of factors that influence the course of antisocial behavior (Gorman-Smith & Loeber, 2005). However, until recently, developmental criminologists generally have given less attention to specifying mental health disorders (MHDs) that might help to identify which individuals follow which antisocial behavior pathway. It is now recognized that several MHDs, most obviously externalizing disorders (e.g., conduct disorder, oppositional disorder, and psychopathy) are intrinsically linked to antisocial behavior, yet there has been a paucity of

research that has explored whether these disorders are associated with specific types of antisocial behavior (e.g., overt, covert, authority conflict, or reckless behavioral pathways). The high prevalence of mental disorders among the most serious and violent young offenders (e.g., Teplin, 1990) suggests that it is essential to integrate these types of risk factors into developmental criminology research and theories.

In order to contribute to this general theme, we have organized this chapter into five related subthemes. First, how developmental criminologists have conceptualized antisocial behavior and behavioral pathways is reviewed by briefly outlining several empirical models constructed to measure within-individual change in antisocial behavior and predict later criminal offending. Second, the MHD construct is defined with an emphasis on differentiating internalizing disorders from externalizing disorders and how these disorders are possibly differentially associated with specific antisocial trajectories/outcomes. Third, the relationship between mental health, antisocial behavior, and later criminal behavior is considered from a developmental criminology perspective. The focus, though, is on the relationships between MHDs and the onset and persistence of criminal offending. In addition, how MHDs intersect with antisocial behavioral pathways to increase the likelihood of certain offending trajectories and offense types are discussed. Fourth, based on this review, we consider several potentially important criminal justice policy implications that MHDs might

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have regarding serious and violent young offenders. Fifth, we make recommendations for future research.

Antisocial Behavior: A Developmental Criminology Perspective

The discussion of antisocial behavior in this chapter is limited to behavior before the age of 18 because most empirical models of antisocial behavior have focused on the adolescent period and its developmentally inappropriate behaviors (e.g., Loeber & Hay, 1994). For example, in empirical models of general deviance, alcohol use, smoking, and sexual activity have been considered antisocial behavior (e.g., Le Blanc & Bouthillier, 2003). However, these behaviors in Canada and most European countries are not necessarily antisocial if engaged in by an individual who is aged 19 years or older. Moreover, several antisocial behaviors utilized in child/adolescent empirical models obviously are not applicable to adults, such as skipping school, disrupting classrooms, and not obeying parents. More generally as well, antisocial behavior is not necessarily criminal behavior. In developmental models, antisocial behavior typically has been asserted to be antecedents to more serious criminal behavior. This relationship was explained by primarily focusing on how these adolescent antisocial behaviors exposed youth to varied and greater criminal opportunities (Loeber & Hay, 1994). For example, in the National Youth Study (NYS), a longitudinal study of antisocial behavior, substance use, and mental health problems, Elliott, Huizinga, and Menard (1989) found that antisocial behavior followed a temporal order and was almost never preceded by more serious (“index”) offenses.

Again, the focal theoretical concern in developmental criminology has been the process of behavioral development within individuals (Le Blanc & Loeber, 1998). From this perspective, individual antisocial behavior differs more than in just degree (i.e., one-dimensional). Instead developmental criminologists have argued and empirically demonstrated that antisocial

behavior is a multidimensional concept (e.g., Le Blanc & Bouthillier, 2003; Le Blanc & Girard, 1997; Loeber & Le Blanc, 1990). For example, Loeber and Hay’s (1994) empirically based behavioral pathway model includes three unique behavioral subtypes: authority conflict (i.e., being stubborn, defiant, rebellious, against authority figures at home, school, and work), covert (i.e., being deceitful and dishonest, lying frequently), and overt (i.e., physical aggression, fighting, violence). For each of the three pathways, behavioral manifestations tend to appear in an orderly and hierarchical fashion. These behavioral manifestations are considered different “stepping stones,” and at each step, the severity of the behavior engaged in increases. Le Blanc and Bouthillier (2003) expanded Loeber and Hay’s (1994) three pathway model by introducing a fourth behavioral pathway, recklessness, which was identified in their confirmatory factor analysis of 45 different types of antisocial behavior. The addition of this fourth behavioral subtype, arguably, more fully represents the underlying construct of general deviance by including behaviors such as substance use and sexual activity, which were not included in Loeber and Hay’s (1994) model.

Behavioral pathways are not mutually exclusive; Loeber and Hay (1994) suggested that an individual could simultaneously follow any combination of their three behavioral pathways. Furthermore, individuals who followed multiple behavioral pathways were identified as most at risk for involvement in persistent and escalating criminal behavior (Howell, Kriberg, & Jones, 1995; Le Blanc & Loeber, 1998; Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 2001). In addition to examining the association between behavioral pathways and general offending outcomes, other researchers have examined the relationship between behavioral pathways and specific types of offenses, sex offenses in particular.

The latter studies explored (a) whether prior antisocial behavior was a better predictor of sexual aggression than traditionally hypothesized correlates of sex offending (e.g., deviant sexual

interests sexual abuse, and exposure to pornography) and whether (b) whether early antisocial behavioral patterns of sex offenders differed from the behavioral patterns of non-sex offenders. For example, Lussier, Proulx, and Le Blanc (2005) investigated whether general deviancy or measures of deviant sexual interests better explained sexual aggression against women. Separate structural equation models indicated that general deviance (measured by overt, covert, authority conflict, and reckless behavior) best accounted for the development of sexual aggression against women (29 % of the variance). McCuish, Lussier, and Corrado (2014) used overt, covert, and authority conflict behavior from the English translation of Le Blanc's (1996) MASPAQ to examine whether antisocial behavioral patterns of incarcerated juvenile sex offenders (JSOs) differed from incarcerated juvenile non-sex offenders (JNSOs). The results of their latent class analysis indicated that once other risk factors such as externalizing disorders (e.g., ADHD) and internalizing disorders (e.g., symptoms of depression) were controlled for, no differences in behavioral patterns were observed between offender types. For both JSOs and JNSOs, offenders who engaged in earlier overt, covert, and authority conflict antisocial behavior were the most frequent offenders. In effect, for incarcerated adolescent offenders, frequent antisocial behavior in preadolescence appeared to be a strong predictor of frequent offending, and this was evident for both JSOs and JNSOs. Overall, the findings from Lussier et al. (2005) and McCuish, Lussier, and Corrado (2014) underscored the importance of antisocial behavior pathways in the development of sex offending.

Correlates of Antisocial Behavior Pathways

In addition to the above-mentioned research on behavioral pathways and later offending outcomes, several researchers have examined the specific developmental correlates associated with youth in different behavioral pathways.

Using data from the Pittsburgh Youth Study (PYS), Gorman-Smith and Loeber (2005) found, unsurprisingly, that boys were more likely than girls to follow each of the authority conflict, covert, and overt behavioral pathways. When boys alone were examined, specific correlates increased the likelihood of following certain behavioral pathways. For example, boys exposed to a greater number of delinquent peers were more likely to be involved in the covert behavioral pathway, and boys in the overt behavioral pathway were more likely than boys in other pathways to come from chaotic family backgrounds (i.e., family normlessness and poor parental monitoring). In contrast, none of the factors examined by Gorman-Smith and Loeber (2005) were able to help differentiate girls' involvement in a particular behavioral pathway. Importantly, this suggested that traditional criminogenic familial and peer factors were not related to different behavioral pathways for girls. Therefore, it appears that there is a continued need to focus on different gender-based developmental theories or the elaboration of gender neutral theories such as Moffitt's (Moffitt, Caspi, Rutter, & Silva, 2001). The latter is based on Moffitt and colleagues' research that found no differences in pathway correlates for the most violent boys and violent girls. The consensus, though, remains concerning major gender differences in prevalence.

Despite the above advances, there have been far fewer adolescent-focused studies concerning the types of neuropsychological deficits and MHDs that have been hypothesized to differentiate early/serious/chronic offending pathways (e.g., Moffitt, 1993). More recently, however, there has been more theoretical and research concerns with these correlates, partly because they increasingly have been hypothesized to be important in identifying more specified pathways based on genetic, epigenetic, and early trauma based initiated developmental pathways to serious and violent offending. An argument for the need to develop these new pathways is that they increase the options and effectiveness of treatment interventions to reduce the likelihood of

chronic offending and criminal trajectories (Corrado & Freedman, 2011; DeLisi & Vaughn, 2011).

Mental Health Disorders and Antisocial Behavior

Although no single definition of an MHD adequately and unequivocally specifies the clinical criteria for its conceptualization (Stein et al., 2010), the *Diagnostic and Statistical Manual of Mental Disorders-V* (DSM-V) defines mental disorder as “a syndrome characterized by clinically significant disturbance in an individual’s cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning” (American Psychiatric Association, 2013a). By definition, therefore, many of these disorders are linked to a variety of deficits in social functioning (Stein et al., 2010). One deficit is criminal behavior. Also, part of the controversy involving MHDs as a correlate of serious offending has involved its use in criminal justice (i.e., the key or “excuse” that makes an offender less culpable for their criminal behavior; Huizinga, Weiher, Espiritu, & Esbensen, 2003). It is beyond the scope of this chapter to review all the contentious theory, research, and legal issues involving MHDs; therefore, we will focus on the relationship between MHDs and antisocial behavior. Because of the paucity of research on the relationship between MHDs and antisocial behavior before the age of 18, it will be necessary to refer to the more general research on MHDs and criminal behavior.

Since the late 1980s and early 1990s, it has been evident that the prevalence of MHDs within offender populations is much higher compared to even the most at-risk community samples (Teplin, 1990). Despite this awareness, the reliability of studies that have assessed the prevalence of MHDs within young offender populations has been limited because of major methodological design issues (Fazel, Doll, & Långström, 2008; Teplin et al., 2006). Given

these validity issues, it has not been surprising that prevalence studies have reported widely divergent rates. In Teplin et al.’s (2006) systematic review of epidemiological studies of young offenders, the prevalence of affective disorders ranged from 5 to 88 %, substance disorders ranged from 20 to 88 %, and psychosis ranged from 12 to 45 %. In effect, although MHDs have been identified as a key correlate of criminal behavior, the extent to which MHDs are associated with this offending has, until recently, not been well defined (Teplin et al., 2006).

The Northwestern Juvenile Project (NJP) is a longitudinal study that prospectively examined a large sample ($n = 1,829$) of detained young offenders. Keeping with the tradition of developmental criminology, this project examined within-individual change in offending outcomes of incarcerated youth as well as within-individual stability of mental disorders. The main purpose of this study was to address the lack of prospective studies on MHDs and associated offending outcomes. This study revealed that over two-thirds of males and three-quarters of females presented with one or more disorders. Approximately half of males and females had more than one disorder (Teplin et al., 2013), and for most offenders, their disorder was still present in adulthood (Teplin, Welty, Abram, Dulcan, & Washburn, 2012).

Clarifying the Relationship Between Behavior and Disorder

Although the NJP has helped clarify the prevalence of various disorders among young offenders, the role of the relationship between MHDs and antisocial behavior pathways has not yet been fully examined. In order to examine the association between MHDs and antisocial behavior with greater precision, several general issues need be considered. First is the temporal ordering of MHDs and antisocial/criminal behavior; does the former always precede the latter or does antisocial behavior increase the risk for MHDs? Beyond this fundamental theoretical theme, there are important treatment policy concerns



Fig. 23.1 Typical temporal ordering of antisocial behavior and mental health disorders for multiple-problem youth

associated with this temporal order since there is the perspective that early infant and childhood interventions are needed to prevent MHDs becoming a key risk factor for subsequent serious and violent offending trajectories (Farrington & Welsh, 2007; Lussier, Corrado, Healey, Tzoumakis, & Deslauriers-Varin, 2011). This theme will be discussed later in this chapter.

Temporal Order Between Antisocial Behavior and Mental Health Disorders

First, it appears that the temporal order between antisocial behavior and MHDs has been highly dependent on the severity of the antisocial behavior. Second, within-individual change in the degree of antisocial or criminal behavior has likely been influenced by MHDs. These patterns were evident initially in Elliott et al.'s (1989) review of findings from the NYS. MHD typically followed less serious antisocial behavior but preceded more serious antisocial and/or criminal behavior, especially for "multiple-problem youth" (e.g., youth with an MHD, a substance use issue, and a history of antisocial behavior). For most multiple-problem youth, the temporal ordering of their problems began with minor antisocial behavior. Minor antisocial behavior was approximately twice as likely to have preceded alcohol use, which is next in the temporal order followed by the onset of mental health problems. For most multiple-problem youth, their index offense followed their MHD, while marijuana or polydrug use occurred after their index offense. However, for a substantial portion of these youth from the NYS, the temporal ordering of offending and drug use was reversed. Figure 23.1 illustrates this process, which is

also described in greater detail by Elliott et al. (1989).

Thus, at least for multiproblem youth, it appeared that MHDs did not influence the onset of antisocial behavior; however, the onset of MHDs might have led to the onset, persistence, and escalation of more serious antisocial or criminal behavior. An important caveat to Elliott et al.'s (1989) study was that MHDs were (a) aggregated and (b) limited mainly to internalizing disorders such as social isolation, emotional problems, and depression. The validity concern with aggregating internalizing MHDs is that any relationship between a specific disorder and a particular outcome (i.e., higher likelihood of serious offending) is not discernible. As well, by limiting MHDs to social isolation, emotional problems, and depression, although these measures represent common disorders associated with young offenders, the full range of MHDs typically associated with serious criminal offending such as externalizing disorders, were excluded. For example, using the Pittsburgh Youth Study (PYS) data, Hirschfield, Maschi, White, Traub, and Loeber (2006) reported that delinquent youth tended to exhibit attention-deficit hyperactive disorder (ADHD) problems and oppositional defiant disorder (ODD) problems prior to their first arrest. Taken together, findings from the NYS and PYS studies indicated that symptoms of both internalizing and externalizing disorders manifested prior to youth engaging in more serious antisocial and criminal behavior. Similarly, Loeber's (1990) review of the impact of risk factors on antisocial behavior indicated that certain externalizing disorders such as ADHD and CD aggravated antisociality. The perspective that antisocial behavior precedes MHDs is especially salient for their clinical diagnostic criteria, including virtually all externalizing disorders; a key

criterion *requires* some history of antisocial behavior. For example, the DSM-V diagnoses of CD, ODD, and the new Intermittent Explosive Disorder all require a history of a repetitive and persistent pattern of antisocial behavior (American Psychiatric Association, 2013b). The remainder of this chapter will focus on how MHDs contribute to the unfolding of antisocial behavior pathways, including whether specific MHDs will be more likely to aggravate overt, covert, authority conflict, or reckless behavior.

Mental Health Disorders: Direct and Indirect Relationships with Antisocial Behavior

In addition to the temporal ordering of the relationship between MHDs and antisocial behavior, there is also the concern with identifying whether MHDs are directly or indirectly associated with antisocial behavior, related to its escalation, involved in its persistence, and associated with particular types of antisocial behaviors. Certain disorders have been hypothesized and empirically demonstrated to have a direct relationship with criminal behavior. For example, Catchpole and Gretton (2003) demonstrated that scores on the Psychopathy Checklist: Youth Version (PCL: YV) had equal predictive validity (based on area under the curve values) as other multi-domain risk assessment instruments in explaining both general and violent recidivism. Although concerns have been raised that psychopathy instruments are tautological because they contain measures of prior criminal offending (Skeem & Cooke, 2010), using a criminal career perspective, McCuish, Corrado, Lussier, and Hart (2014) found that adolescents' scores on the PCL:YV's three factor model, which excludes the antisocial factor, were significantly associated with membership in offending trajectories that continued through age 28 (McCuish, Corrado et al., 2014). In contrast to the predictive power of psychopathy, several MHDs (e.g., FASD) were not directly related to antisocial behavior, but instead were related to criminal behavior through a process of cumulative disadvantage (i.e., an

individual's disorder exposes them to an assortment of life problems that accumulate and influence involvement in criminal behavior) (e.g., Laub & Sampson, 1993; Moffitt, 1997). Another study added to the perspective that the relationship between MHDs and antisocial behavior and certain measures of criminal behavior are very complicated and unclear. In the Pathways to Desistance Study (PDS), a multisite longitudinal study of serious and violent offenders ($n = 1,354$) controlling for risk factors and demographic characteristics, no relationship was found between MHDs and two offense outcomes: rearrest and frequency of general antisocial activity (Schubert, Mulvey, & Glasheen, 2011). However, although different MHDs were measured in the PDS, in the Schubert et al. (2011) study, MHDs were aggregated into one general measure, likely because of low base rates of individual disorders.

A single composite measure of MHDs assumes that that all MHDs have the same relationship with offending outcomes. This assumption is problematic given theoretical assertions, and studies that have reported otherwise. For example, a major neurodevelopmental disorder, fetal alcohol spectrum disorder (FASD), has been hypothesized to not be directly related to criminal behavior, though the nature of this disorder exposes individuals to many risk factors that have been directly linked to criminal behavior (Corrado & Freedman, 2011). Youth with FASD tended to have poor school performance, comorbid MHDs, impulsivity, substance use, placement in foster care, and exposure to antisocial peers (Ernst, Grant, Streissguth, & Sampson, 1999; Habbick, Nanson, Snyder, Casey, & Schulman, 1996; Paley & O'Connor, 2009; Streissguth et al., 2004; Thomas, Kelly, Mattson, & Riley, 1998). In contrast to MHDs such as psychopathy, the involvement of FASD youth in offending has been asserted to be explained overwhelmingly by neurocognitive deficits that influence a wide range of social inappropriateness and other negative outcomes that in turn influence antisocial behavior (Green, 2007), rather than the type of willful motivation for antisocial behavior observed in

individuals with psychopathy and psychopathy symptoms.

Despite the caveats concerning a single aggregated MHD measure, because of the low base rate of many of these disorders even in offender populations, some theory-based aggregation can facilitate statistical analyses. Dichotomizing MHDs into internalizing and externalizing disorders a prominent classification (e.g., Krueger, 1999). Symptoms of externalizing disorders are more likely to have a direct effect on perpetuating antisocial behavior, whereas internalizing disorders may have an indirect effect on antisocial behavior through symptoms that expose individuals to other factors directly related to antisocial behavior.

Externalizing Disorders and Antisocial Behavior

ADHD, CD, ODD, and antisocial personality disorder/psychopathy have been identified as common externalizing disorders associated with antisocial behavior which were disproportionately represented within incarcerated youth populations (e.g., Coid, Yang, Tyrer, Roberts, & Ullrich, 2006; Teplin et al., 2012). These disorders are intrinsically linked to antisocial behavior because the diagnosis of many of these disorders is dependent on the subject having a prior history of antisocial behavior. However, these disorders are not synonymous with antisocial behavior; instead, there are different characteristics of these disorders that influence antisocial behavior. Again, psychopathy is perhaps the best example of an MHD that has symptoms that are directly associated with a wide range of impulsive and risk-taking antisocial behaviors that are engaged in to satisfy deeply embedded egotistical and sensation-seeking drives. When the antisocial behavior factor of psychopathy is removed (e.g., Cooke & Michie, 2001), what remains is a cluster of personality characteristics associated with interpersonal, affective, and lifestyle traits such as grandiosity, manipulation, callousness, a lack of empathy, and a parasitic orientation that impacts relationships

with others (Lynam, 1996). These behavioral, affective, interpersonal, and lifestyle deficits have been directly linked to a variety of offending outcomes (e.g., Corrado, Vincent, Hart, & Cohen, 2004; Dawson, McCuish, Hart, & Corrado, 2012; Hare, 1996, 2001). Moreover, unlike other risk factors that are measured in adolescence but over time become only distally related to offending (e.g., abuse, residential instability, poor parental attachment) (Chung, Hill, Hawkins, Gilchrist, & Nagin, 2002; Losel & Bender, 2003), symptoms of psychopathy remain relatively stable (Forth, Hart, & Hare, 1990; Hare, 2001; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007) and thus have been considered to have had a more proximal effect on antisocial and criminal behavior across the life course (Lynam et al., 2007).

Internalizing Disorders and Antisocial Behavior

Although conceptual boundaries of internalizing disorder are debatable, generally, in child psychology and psychiatry, an internalizing disorder refers to different forms of morbid depression and anxiety, obsessive-compulsive disorder, post-traumatic stress disorder, and bipolar disorder (Kovacs & Devlin, 1998; Ohannessian, 2003). Prior studies have linked social isolation and emotional loneliness to a number of adolescent problems, including antisocial behavior (Elliott et al., 1989). Some internalizing disorders, such as depression, have been found to be high in offender samples compared to community samples (e.g., Fazel et al., 2008). On the other hand, prevalence of other internalizing disorders, such as anxiety disorders, was relatively similar for offending and non-offending youth in the PYS (Hirschfield et al., 2006). However, anxiety problems have been related to antisocial behavior when other risk factors were also present (e.g., Loeber, Stouthamer-Loeber, & Raskin White, 1999). For example, using data from the PYS, Loeber et al. (1999) found that preadolescent males with both persistent antisocial behavior and internalizing disorders were the most likely to be persistent substance

users. Emotional and behavioral dysregulation problems may emerge at the same age, typifying the multiproblem youth who is often characterized by both antisocial behavior and co-occurring MHDs. In effect, internalizing disorders alone may not predict antisocial behavior problems; however, externalizing disorders with comorbid internalizing disorders appeared to be a stronger predictor of persistent antisocial behavior problems compared to externalizing behavioral problems alone (Loeber et al., 1999). Importantly, externalizing disorders with comorbid internalizing disorders were common, rather than exceptional. For example, Zoccolillo (1992) found that most preadolescents who met the criteria for conduct disorder also developed depression or anxiety by early adulthood. Again, these findings suggest that internalizing and externalizing disorders need to be disaggregated because different symptoms may be associated with different behavioral outcomes.

Although disaggregation of MHDs into internalizing and externalizing subgroups is important, it is also critical that internalizing and externalizing disorders be examined simultaneously in the same study because individuals with an externalizing disorder and an internalizing disorder have been found to be associated with an aggravated course of antisocial behavior. To complicate this relationship further, Loeber et al. (1999) reported that internalizing disorders may have aggravated the relationship between externalizing disorders and antisocial behavior *only* during preadolescence. By the time males in the PYS had reached an age of approximately thirteen, the effect of internalizing disorders was negated by the inclusion of externalizing disorders. In effect, the complexity of the relationship between MHDs and antisocial/criminal behaviors observed despite the use of dichotomized measure of MHDs.

This review confirms that, while substantial theoretical progress has occurred regarding the relationship between MHDs and antisocial/criminal behavior, there is considerably more research and theorizing required. It might appear contradictory then to suggest that there is sufficient understanding to proffer implications for

criminal justice policies. Yet, in the next section, we do mention just such policy implications because we believe there is sufficient theory and research to make at least tentative suggestions based on the more conclusive findings and convincing theoretical explanations.

Mental Health Disorders and Implications for the Criminal Justice Policy

Since the senior author has been involved in youth justice systems in Canada and in other national jurisdictions for 35 years, there have been fundamental changes in how youth justice systems incorporate theory and research about MHDs into their policies. Of course, politics, not theory and research, ultimately determines the justice laws, policies, and programs. Yet, there is little doubt that MHD research has been enormously significant in policy formulations, albeit, in vastly different degrees depending on particular national and subnational jurisdictions. One of the most important policy implications has involved criminal career trajectories and early MHD interventions. For example, the reform of youth justice laws have been explained, in part by public and political concern with the sequential relationships between serious child delinquent behavior, serious and violent adolescent criminal behavior, and adult serious and violent criminal behavior.

Contemporary criminal justice policy issues, in Canada, for example, have focused on how to respond to the disproportionate number of Aboriginal youth and adults in custody. There is a growing research/theory and political consensus that horrendous historical experiences of many Aboriginal families because of government policies have influenced the development of MHDs. Most importantly, the use of residential schools to remove children from their families and Aboriginal cultures along with systematic abuse of children by authority figures are the distal cause of the high prevalence of MHDs, in particular FASD and PTSD, within this race/ethnic group and criminal justice involvement

across the life course. Similar concerns have been raised about other external/internal immigrant race/ethnic groups in Canada (e.g., Caribbean Canadian and Haitian Canadian), Europe, (e.g., the Roma), and the United States (e.g., African Americans and Hispanic Americans).

More generally, for more than a century, the policy concern has been on the relationships among extreme poverty, disrupted families, MHDs, and criminal justice involvement. Since the last quarter of the twentieth century, certain jurisdictions such as Quebec and Scandinavian countries have concentrated innovative policies focused on interventions to decrease criminogenic factors and increase protective factors based largely on developmental psychology and developmental criminology theory and research. A central theme of the developmental perspective has been that MHDs remain stable across the life course. Colman, Wadsworth, Croudace, and Jones (2007), for example, found that 70.1 % of adolescents with an internalizing disorder at both age 13 and age 15 also had one or more internalizing disorders during follow-up in adulthood. Further, subjects who had only one episode of an internalizing disorder in adolescence were not more likely than subjects who had no disorders in adolescence to experience an internalizing disorder in adulthood. Thus, persistent MHDs in adolescence are likely to affect an individual throughout the life course. However, the response to treating MHDs at any age has been highly varied. For example, from the late 1970s, Quebec developed its historical “milieu therapy” treatment perspective in response to childhood and adolescent MHDs, while in the United States, in contrast, many states have done little to address an offender’s MHD. For example, of the 303 subjects in the NJP who presented with a major MHD, only 16 % were treated for their disorder prior to being sentenced (Teplin, Abram, McClelland, Washburn, & Pikus, 2005).

Another policy theme that emerged based on the pioneering research on serious delinquency by Marc Le Blanc and his many colleagues has been on the need to provide comprehensive diagnostic information to inform case management

treatment responses. This became a particularly challenging need because of the comorbid MHD profile of many serious delinquents and young offenders as well as adult serious offenders. As discussed above, combinations of internalizing and externalizing MHDs were not uncommon; therefore, without a multitreatment case management approach, the likelihood of effectively intervening to reduce future chronic offending arguably, was reduced. Le Blanc’s (1996) MASPAQ was the first comprehensive diagnostic instrument to be implemented in any jurisdiction, and it inspired the even more comprehensive yet still experimental Cracow Instrument (Corrado, 2011). The latter incorporated the most recent research and theories based on perinatal, infancy, and early childhood stages’ risk and protective factors. It has undergone several validity assessments and has demonstrated substantial predictive validity (Corrado, 2011; Lussier et al., 2011). Yet, such comprehensive risk management instruments have been difficult to implement largely because of their complexity, extensive training of staff, the need for sensitive multi-ministry/agency confidential information, concerns with negative labeling of families/children from already vulnerable groups, the absence of the appropriate full range of developmentally based treatment programs, and the costs to implement such instruments (Corrado, 2011).

Summary

- Antisocial behavior is multidimensional (Loeber & Hay, 1994). Broad concepts of general antisociality should be avoided in favor of more specific conceptualizations of overt, covert, authority conflict, and reckless antisocial behavior.
- Membership in a particular behavioral pathway(s) is a predictor of future offending. Individuals who followed multiple behavioral pathways tended to be most at risk for future chronic offending.
- There is a high prevalence of mental health disorders (MHDs) in offending samples and

- particularly for the most serious and violent offenders.
- These offenders typically have more than one MHD.
 - Despite the higher-than-average prevalence of MHDs, there is mixed evidence that MHDs are actually important correlates of later offending.
 - Although the relationship between MHDs and antisocial behavior has been understudied, it is asserted that minor antisocial behavior *precedes* MHDs and that MHDs tended to lead to the aggravation and persistence of antisocial and criminal behavior.
 - Certain MHDs are more likely than others to lead to the aggravation and persistence of antisocial and criminal behavior, with psychopathy being the strongest predictor of future chronic and violent offending.
 - Although developmental criminologists emphasize different behavioral pathways (e.g., overt, covert, authority conflict, and reckless), studies have yet to examine whether the type of MHD has implications for the type of antisocial behavior pathway that an individual will follow.
 - Effective treatment of MHDs and prevention of antisocial behavior require a comprehensive risk management strategy with interdisciplinary communication that takes place across the life course of an offender.

Future Research Needs

- Antisocial behavior measurement should be guided by tools such as the MASPAQ, which includes measures of authority conflict, covert, overt, and reckless behavior.
- Research should investigate whether internalizing and externalizing disorders are differentially associated with the abovementioned behavioral types.
- Only prospective longitudinal research can help clarify whether certain MHDs are more likely to be antecedents to, or consequences of, antisocial behavior.

- Such prospective longitudinal research should focus on the earliest stages of development (e.g., prenatal development) in order to unravel the complex directionality of the relationship between MHDs and antisocial behavior.
- For longitudinal studies focusing on the earliest developmental stages, temperament is one of the few traits that can be reliably measured in early infancy (Lahey & Waldman, 2003) and may be a critical component of research attempting to clarify the temporal relationship between MHDs and antisocial behavior (e.g., DeLisi & Vaughn, 2014).

Marc Le Blanc's Contributions

Marc Le Blanc is in large part responsible for the origins of the developmental criminology paradigm. His pioneering works (Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990) have provided a conceptual framework for the measurement of criminal careers that has helped inspire dozens of longitudinal studies to examine continuity and change in offending over the life course (see Piquero, 2008). Specific to the context of the current chapter, his development of the MASPAQ (Le Blanc, 1996) has had a profound influence on child/adolescent treatment strategies in Quebec. Again, as briefly alluded to above, the MASPAQ was constructed over a 25-year period as part of the assessment procedure in the Montreal Two-Sample Longitudinal Study (for a more comprehensive description of this measure in French, see Le Blanc, 1996; for English, see Le Blanc, 2002). In total the MASPAQ contains 29 different measures of delinquent behavior which are meant to be assessed between the ages of 12 and 18. For each of these behaviors, lifetime prevalence is measured as well as prevalence within the last twelve months. The items combined have high reliability (Corff & Toupin, 2009; Le Blanc, 1996; Le Blanc, Vallières, & McDuff, 1993). The multiple different behavioral measures

contained within the MASPAQ have allowed researchers to more precisely define qualitatively different pathways of antisocial behavior.

Underlying virtually all serious and violent offenders is the construct of general deviance. However, pathways to this construct of general deviance are not the same. For this reason, differential treatment and prevention programs are required that are tailored to the different pathways leading to the general deviance construct (Le Blanc, 2002). In the MASPAQ, several concepts in addition to antisocial and criminal behavior are examined which are intended to help parse out the different pathways to antisocial and criminal behavior. Some of these concepts include family and school experiences, peer relations, and personality type (Le Blanc, 2002). Although these concepts do not include MHDs, Le Blanc and colleagues' recognition of multiple pathways to general deviance helped influence the development of the Cracow Instrument (CI). The CI is a risk/needs case management instrument for children and youth at risk of violence and other serious offenses that was borne from an Advanced Research Workshop funded by the Scientific Affairs Division of the North Atlantic Treaty Organization (NATO) (Corrado, 2002). Marc Le Blanc was one of the participants of this workshop, and his experience with the construction of the MASPAQ, his impetus on multiple pathways to serious and violent behavior, and his emphasis that risk/needs assessments be rooted in a developmental criminology theoretical perspective were instrumental in the development of the CI (Corrado, 2002).

The structure of the CI includes an assumption that there are multiple pathways to serious and violent behavior that are influenced by five domains of functioning: environment, individual, family, intervention response, and externalizing behavior. Part of the individual domain includes psychological characteristics such as cognitive delays/disorders, personality traits/disorders, antisocial attitudes, poor coping ability, and antisocial attitudes. With these characteristics, the CI may be a useful tool for better understanding the

relationship between mental health and antisocial behavior at various stages of the life course.

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A Developmental Approach to Understanding the Substance Use-Crime Connection

24

Helene R. White

Introduction

This chapter begins with the presumption that substance use and crime are strongly associated (Welte, Barnes, Hoffman, Wieczorek, & Zhang, 2005; White, 2014), and this association results from many factors. First, a large body of literature supports a psychopharmacological explanation for this association. That is, some crimes are more likely to be committed under the influence of substances (especially alcohol) than when an individual is sober due to the acute and chronic effects of alcohol and drugs on cognitive processes (Bushman, 1997; Chermack & Giancola, 1997; Giancola, 2002; Ito, Miller, & Pollock, 1996; Parker & Rebhun, 1995). Second, addiction to certain drugs, such as heroin and cocaine, increases the need to commit crimes to get drugs or the money to buy drugs (Anglin & Perrochet, 1998; Chaiken & Chaiken, 1990; Nurco, Hanlon, Kinlock, & Duszynski, 1988). Third, illegal drug markets increase the risk of crime because they bring buyers and sellers into situations that are not protected by legal regulations (Curtis & Windle, 2007; De Li, Priu, & MacKenzie, 2000; Goldstein, Brownstein, Ryan, & Bellucci, 1989; White & Gorman, 2000). Fourth, criminal behavior induces drug use because of having extra money, reinforcement from deviant peers

groups, and other lifestyle factors (Bennett & Holloway, 2006; Chaiken & Chaiken, 1990; Collins & Messerschmidt, 1993; Hagan & Foster, 2003; Welte et al., 2005). Fifth, some criminals use alcohol and drugs to give themselves an excuse or courage to commit a crime (Collins, 1993; Zhang, Welte, & Wieczorek, 2002). Finally, for some individuals (especially adolescents), the relationship between substance use and criminal offending may be spurious or coincidental given that the individual and contextual risk and protective factors for heavy drinking and illegal drug use are similar to those for engaging in other deviant behavior, including aggression and delinquency (Hawkins, Catalano, & Miller, 1992; Krueger, Markon, Patrick, & Iacono, 2005; Reiss & Roth, 1993; White, 2014; Zucker et al., 2006). Instead of rehashing all of the literature that supports these explanations for this strong association (for reviews, see White, 2014; White & Gorman, 2000), this chapter focuses on developmental associations between substance use and criminal offending. Substance use includes licit drugs (e.g., cigarettes and alcohol), illicit drugs (e.g., marijuana, cocaine, heroin, LSD, PCP, etc.), and nonmedical use of prescription drugs (e.g., pain killers, tranquilizers, amphetamines, and sedatives). Criminal offending includes adolescent delinquent behavior (e.g., fighting, theft, vandalism, assault, etc.) and adult criminal behavior (e.g., armed robbery, rape, assault, theft, etc.). White-collar crimes are omitted due

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to their general absence in the literature on drug use and crime.

Developmental criminology focuses primarily on temporal within-individual changes in criminal offending and other deviant behaviors throughout the life course (Le Blanc & Loeber, 1998). In this chapter, I examine within-individual changes in substance use and criminal offending and their relationship with each other. Although both substance use and criminal offending are considered forms of deviant behavior (Le Blanc, 2009; Le Blanc & Bouthillier, 2003), Le Blanc and Loeber (1998) suggested that it is possible to think of all types of deviance as part of a general deviance (or problem behavior) syndrome but at the same time to acknowledge that this general pattern can be subdivided into different types of deviance. By studying these behaviors as two distinct forms of deviance, it allows one to consider and to investigate their common and unique predictors (White, 1991; White & Labouvie, 1994; White, Pandina, & LaGrange, 1987) and how each influences the other.

Le Blanc and Loeber (1998; Loeber & Le Blanc, 1990) provided a detailed description of all the parameters of interest within developmental criminology. It is impossible to cover all these parameters in a short chapter. Therefore, I have decided to focus on two primary concepts, sequences and trajectories. Loeber and Le Blanc (1990) distinguished between sequences and trajectories with the former documenting a pattern of offenses and the latter documenting developmental changes in offending. Thus, a developmental sequence can be defined as the “*orderly behavioral development* between two problem behaviors” (Loeber, White, and Burke (2012, p. 40, emphasis theirs), whereas a developmental trajectory is the “description of systemic developmental changes in offending” (Loeber & Le Blanc, 1990, p. 382). Loeber and Le Blanc argued that there are multiple trajectories that reflect individual differences in the development of deviance. Thus, an advantage of studying trajectories is that they allow for the

study of individual differences within a developmental perspective.

An ultimate goal of studying developmental sequences and trajectories is to identify etiological factors for and precursors of various developmental stages so that they can be targeted in preventive interventions (Le Blanc & Loeber, 1998). This chapter, however, does not discuss the risk and protective predictors for different sequences and trajectories (see other chapters in this volume) but rather the link between substance use and criminal offending (for a discussion of common risk and protective factors for substance use and delinquency in adolescence, see White, Cronley, & Iyer, *in press*). Therefore, I examine how substance use and criminal offending predate and co-occur with each other, that is, how changes in substance use predict changes in criminal offending and vice versa.

Developmental Sequences

Loeber and Le Blanc (1990) argued that the first aim of developmental criminology is to document within-individual changes in offending over time and to identify sequences of behaviors, thereby improving the identification of targets for prevention. Their assumption was based on a stepping stone/gateway approach to prevention, which contends that preventing the learning of one type of deviant behavior may impede the acquisition of other deviant behaviors that occur later in a developmental sequence. For example, preventing minor delinquency from occurring would theoretically prevent later theft and violence from being initiated or preventing alcohol use onset would theoretically prevent marijuana use onset. Nevertheless, unless one can prove that a prior level is a necessary cause of the next level, this prevention approach may not be effective. In this section, I briefly summarize studies of sequencing of offending and sequencing of substance use and devote most of the section to sequences between substance use and offending.

Sequences in Offending

Numerous studies have examined sequences and pathways in delinquent behavior. Overall, the existing literature indicates that childhood conduct disorders (e.g., aggression, lying, truancy, stealing) predate and are predictive of later delinquency (Loeber & Le Blanc, 1990). Based on median ages of onset for a sample of delinquents, Le Blanc and Fréchette (1989) identified a sequence of delinquency from: (1) minor delinquency (e.g., petty larceny) to (2) shoplifting and vandalism; to (3) common theft, public mischief, burglary, and personal larceny; to (4) drug dealing, motor vehicle theft, armed robbery, and personal attack; and finally to (5) astute (e.g., fraud) and more violent offending (e.g., homicide). Using a Guttman scaling approach instead of median ages of onset, they reduced the sequence to three main stages: (1) shoplifting and vandalism; (2) common theft, burglary, personal larceny, and automobile theft; and (3) personal attack, armed robbery, drug trafficking, and sex-related crimes.

In a representative sample of youth, Le Blanc, Côté, and Loeber (1988, as cited in Loeber & Le Blanc 1990) identified several multiple-step sequences, which were summarized into four steps: (1) status offenses, (2) minor thefts, (3) aggression, and (4) major thefts. This pattern from less serious to more serious offending has been documented in studies of delinquents and general population samples when based on self-report and official records (Loeber & Le Blanc, 1990). Although research on sequences of offending has used both self-report data and official offending records, Le Blanc and Loeber (1998) argued that self-report studies are more informative for developmental criminology.

Rather than a single sequence, Loeber et al. (1993) identified three different pathways of externalizing problems and demonstrated that the development of externalizing problems within each pathway was systematic. In the first pathway, the authority conflict pathway, youths move from stubborn behavior to defiance/disobedience and finally to authority avoidance (e.g., running away from home and truancy). The

second pathway, the covert pathway, starts with minor covert activities (e.g., shoplifting) and moves through property damage (e.g., vandalism) into moderate delinquency (e.g., pick-pocketing) and finally into more serious delinquency (e.g., auto theft and burglary). The third pathway, the overt pathway, begins with minor aggression (e.g., bullying) followed by physical fighting and then serious violence (e.g., rape, strong-arming). Loeber and colleagues found that, in general, boys moved through the pathways in an orderly progression from less serious to more serious behaviors. The three pathways were not mutually exclusive, and the authority conflict pathway often preceded escalation in the other two pathways (Loeber et al., 2012, p. 43).

In studying sequences of deviant behavior, it is assumed that individuals progress from a lower stage to the next higher stage in a sequence and that an individual is unlikely to proceed to the next stage without having first initiated a behavior on a lower stage. However, it should also be highlighted that most individuals are likely to stop at an early stage without progressing through the whole sequence (Labouvie & White, 2002). In other words, while most offenders start at the same level, most do not progress through all the levels of the sequence (Loeber & Le Blanc, 1990).

Sequences in Substance Use

Whereas evidence exists for a developmental sequence among types of delinquency, the evidence is even stronger that substance use “develops along an invariant, hierarchical sequence” (Le Blanc & Loeber, 1998, p. 180). In fact, a number of studies have replicated a developmental sequence for substance use, which, for the majority of individuals, begins with alcohol or cigarettes and proceeds to marijuana and then to harder illicit drugs (e.g., cocaine) (Kandel & Yamaguchi, 1999). This sequence has been reported in general population samples of adolescents and adults in the USA and abroad (Kandel, 2002; Kandel, Yamaguchi, &

Chen, 1992). Nevertheless, there are several studies using samples of heavy and/or drug-dependent users that have not fully supported this sequence (e.g., Golub & Johnson, 1994, 2002; Mackesy-Amity, Fendrich, & Goldstein, 1997). In fact, it has been suggested that those users who do not follow the typical sequence may be at higher risk for later substance use disorders (Graham, Collins, Wugalter, Chung, & Hansen, 1991). In addition, sequences have varied depending on historical changes in norms surrounding licit and illicit drug use and across cohorts (Golub & Johnson, 1994, 2002; Hawkins, Hill, Guo, & Battin-Pearson, 2002).

Sequences Between Substance Use and Criminal Offending

Many studies have examined the sequencing between substance use and criminal offending using longitudinal data. Generally the onset of aggressive behavior and minor delinquency developmentally precedes the onset of alcohol and drug use (Farrington, 1995; Robins, 1970; White, 1990; White, Brick, & Hansell, 1993; Windle, 1990), and the onset of serious offending often precedes the onset of illicit drug use (e.g., Elliott, Huizinga, & Menard, 1989; White, Loeber, & Farrington, 2008). This pattern can be attributed in part to age-normative development; for example, aggression is highest in childhood (Côté, Vaillancourt, Le Blanc, Nagin, & Tremblay, 2006) long before youth have access to alcohol or drugs.

Most studies examine sequences by comparing mean or median ages of onset for each behavior; some examine these ages within the total sample and some only in those who engage in a pair or all of the behaviors. Obviously, the choice of measures and samples influences the findings. For example, if one were looking at the sequence between marijuana and serious violence and included the whole sample, one might get a different picture than if one were only looking at individuals who commit serious violence and use marijuana. Because marijuana use is more normative than violence, the age of onset of

marijuana would probably be higher in the representative sample than in the sample of those who commit violent crimes. In addition, the mean age of onset depends on the age range of the sample given that there is right censoring for the initiation of behaviors that have yet to begin (Le Blanc & Loeber, 1998; White et al., 2008).

After reviewing several studies, Le Blanc and Loeber (1998) described the general pattern of sequences as: status offenses, minor theft, vandalism, aggression, drug use, drug dealing, and major thefts. In an early study of delinquent boys, Fréchette and Le Blanc (1987; as reported in Loeber & Le Blanc 1990) identified six stages: (1) minor larceny; (2) shoplifting and vandalism; (3) running away, alcohol use, vagrancy, petty theft, drug use, and burglary; (4) personal larceny, motor vehicle theft, and public mischief; (5) aggravated theft, personal attack, and sexual offense; and (6) drug selling, fraud, and homicide. Thus, the onset of alcohol and drug use emerged about halfway through the sequence of other deviant behaviors.

In a US nationally representative sample, Elliott and colleagues (1989) found that, among youths who initiated delinquency and illicit drug use, minor delinquency almost always came first and no one initiated marijuana or other drugs before minor delinquency. For most youths, alcohol use came second, although a substantial percentage of youths initiated index offenses prior to alcohol use. In general, however, after alcohol use came marijuana use, then index offending (i.e., assault, robbery, rape), and finally other illicit drug use and/or nonmedical use of prescription drugs. Among youths who initiated both marijuana use and index offending, index offending was more likely to precede marijuana use than vice versa. Elliott and colleagues (1989) noted, however, that whereas delinquency is more likely to influence the onset of drug use than the reverse, serious drug use (repeated illegal drug use) is more likely to influence the maintenance of serious delinquency than the reverse. In other words, the influence of drug use on delinquency may be reducing the probability of termination rather than increasing the probability of initiation (see Chaiken & Chaiken,

1990; Shannon, 1998; also see the Desistance section below).

Using data from the Pittsburgh Youth Study (PYS), White and colleagues (2008) examined the developmental sequences among substance use, serious offending, and other problem behaviors (i.e., gang membership, gun carrying, and drug dealing) only for those who engaged in the behaviors. First, they examined these associations among boys who engaged in any pair of behaviors. More boys first used legal drugs (alcohol or tobacco) before they first engaged in serious violence (i.e., robbery, attacking to hurt or kill, and forced sex). On the other hand, boys were equally as likely to first use illegal drugs (marijuana and hard drugs) as they were to first engage in serious violence. The onset of alcohol and/or tobacco use preceded the onset of serious theft (i.e., breaking and entering and auto theft); however, the onset of serious theft preceded the onset of illegal drug use.

In addition to examining sequences for pairs of behaviors, White et al. (2008) also examined the full sequence for those who engaged in all of the behaviors being examined. In the younger cohort, only 44 young men had engaged in serious violence, legal and illegal substance use, and the other problem behaviors by age 19. The average sequence of onset was legal drugs, gang membership, violence, gun carrying, illegal drugs, and dealing. Of the 70 young men in the older cohort, who had engaged in substance use, all problem behaviors, and serious violence by age 25, the average sequence of onset was legal drugs, serious violence, illegal drugs, gang membership, dealing, and gun carrying. The sequence for serious theft was similar to that for serious violence with serious theft occurring after legal drug use but before illegal drug use. The authors concluded that the sequences of onset indicate that illegal drug use does not lead to serious offending.

Value of Studying Sequences

Le Blanc and Loeber (1998) argued that studying sequences of criminal offending can be helpful for the planning of interventions to curtail the escalation to more serious behaviors. They

highlighted the importance of first identifying developmental sequences of deviant behaviors as a precursor to understanding factors that are causal or co-occur and suggested that sequences provide a tool to identify the direction of effects among various types of deviant behavior.

In contrast, Labouvie and White (2002) claimed that differences in onset sequences of drug use may be of little usefulness if one is interested in the prediction of abuse and/or dependence in young adulthood. They argued that ages and sequences of drug use onset are parameters that cannot distinguish adolescence-limited patterns of drug use from patterns of use that persist into adulthood. Instead, they proposed that individual differences in onset and sequencing must be considered in conjunction with intraindividual changes in use intensity.

Furthermore, Labouvie and White (2002, p. 37) distinguished between onset sequences and stages of use. By onset sequence, they meant “the ordering of initiation of various drugs (e.g., alcohol first, followed by marijuana, and then hard drugs),” whereas stages of use “indicate the highest level of drug that has been initiated.” Labouvie and White defined stages of use in terms of the “most severe” substance (e.g., hard drug use vs. marijuana use) an individual had used irrespective of sequence of onset. They found that stages, compared to sequences, of use were much better predictors of later drug problems. Individuals who achieved the most severe stage (i.e., hard drug use, such as cocaine use), irrespective of sequence, compared to those who stopped at a less severe stage, were more likely to develop problems with hard drugs as well as with alcohol and marijuana. Labouvie and White concluded that ages of onset and onset sequences may be more useful within a short-term adolescence-focused time perspective but that they become less useful when one wants to categorize individual differences in use histories over the life course. Their argument should be considered in view of the fact that many studies have demonstrated that an earlier age of onset of delinquency is a strong predictor of a longer and more serious criminal career (Le Blanc & Loeber, 1998).

Developmental Trajectories

Developmental researchers are interested in the comorbidity or contemporaneous occurrence of two or more behaviors (e.g., alcohol use and violence during adolescence), as well as heterotypic continuity, which is defined as the “manifestation over time of a latent individual trait in different but analogous behaviors” (e.g., fighting in adolescence and intimate partner violence in adulthood) (Nagin & Tremblay, 2001, p. 18). The older, traditional way to examine these types of associations is through correlations or odds ratios between two behaviors. However, this approach makes inefficient use of longitudinal data because measures of association use only two assessment periods. In addition, this approach does not take into account individual differences in the magnitude of the association. Furthermore, these types of measures of association are difficult to interpret and are often sensitive to outliers (for greater detail, see Nagin, 2005; Nagin & Tremblay, 2001).

An alternative way to examine comorbidity and heterotypic continuity is to identify trajectories of each behavior over time and then to examine the associations among these trajectories. Trajectories show the “developmental course of behavior over time” and vary across individuals (Nagin & Tremblay, 2001, p. 21). Using this approach, one would first identify various trajectories of substance use and various trajectories of offending and then examine the joint probabilities of belonging to different substance use trajectories in relation to different offending trajectories and vice versa. This type of model could provide information on the probability of membership in each of the substance use trajectory groups contingent on membership in each of the offending trajectory groups, as well as the probability of membership in each of the offending trajectory groups contingent on membership in each of the substance use trajectory groups (White, Jackson, & Loeber, 2009). This joint trajectory approach has advantages over the older, traditional approach in that it examines the links between the dynamic unfolding of the two

behaviors over the entire period of observation. It also captures population differences in the strength and form of the associations (Nagin & Tremblay, 2001, p. 20). The joint trajectory approach, which has also been called dual group-based modeling and often uses the ProcTraj software (Jones, Nagin, & Roeder, 2001), provides a basis for describing average tendencies and also deviations from average tendencies over time (Nagin, 2005, p. 146). With Mplus (Muthén & Muthén, 1998–2010), an alternative software, one can model trajectories of two different behaviors concurrently rather than using the two-step joint trajectory approach and, thereby, avoid some classification errors inherent in post hoc analyses.

Rather than examining the conjoint concordance between two behaviors, an alternative approach has been to identify trajectories of two behaviors simultaneously (e.g., high marijuana use and low alcohol use), which has been done in the substance use literature (e.g., Jackson, Sher, Rose, & Kaprio, 2009; Jackson, Sher, & Schulenberg, 2005; Jackson, Sher, & Wood, 2000). Whereas the simultaneous approach explicitly models comorbidity over time, the joint approach assigns individuals to a group before comorbidity is investigated and is less parsimonious than the simultaneous approach (for greater detail comparing the two approaches, see Jackson et al., 2009). To my knowledge, no studies have applied the simultaneous approach to studying substance use and offending combined.

In this section, I briefly summarize results from studies that have used the more traditional approach to study the contemporaneous and cross-lagged associations between substance use and criminal offending. Then I briefly summarize studies examining developmental trajectories of offending and developmental trajectories of substance use. The main focus of this section is on the trajectory studies linking substance use and criminal offending. Few of these studies, however, have used the joint modeling approach. Instead they have identified trajectories of one behavior (e.g., alcohol use) and then have examined how

members of these various trajectories groups differ in terms of the other behavior (e.g., violence) at some point in time.

Contemporaneous and Cross-Lagged Associations

Contemporaneous Associations

Loeber and Le Blanc (1990, p. 432) defined sequential covariation as “when increases and decreases in the frequency of an independent variable are associated with increases and decreases in offending.” Several within-individual analyses have examined sequential covariation and found that individuals commit more offenses at the same time in their lives when they are most involved with substances (Horney, Osgood, & Marshall, 1995; Welte et al., 2005). For example, among a high-risk sample of adolescents and young adults, Mulvey et al. (2006) conducted a within-individual analysis of drug use and crime commission on a daily basis. Violent days were more likely to be substance-using days and substance-using days were more likely to be violent days (see also Chermack & Blow, 2002; Felson, Teasdale, & Burchfield, 2008). The findings for marijuana use were weaker than for alcohol and other illicit drugs. Whereas drinking predicted next-day violence, marijuana and other drug use did not. In a sample of male offenders, Horney and colleagues (1995) found that periods of illegal drug use but not alcohol use were related to increases in drug dealing, property crime, and assault.

Using a sample of high-risk adolescent boys, White, Fite, Pardini, Mun, and Loeber (2013) found that within-individual annual increases in alcohol use quantity from one’s own typical levels of drinking were concurrently associated with within-individual increases in aggressive behavior, and vice versa. This association did not differ by race; however, these increases were more strongly associated among boys with attitudes favoring violence and those who lived in high-crime neighborhoods. On the other hand, within-individual increases in marijuana use were associated with decreases in aggressive

behavior. Thus, their results indicated that individual and contextual factors affect the strength of the sequential covariation of alcohol use and aggressive behavior during adolescence.

Cross-Lagged Associations

Research indicates that there are reciprocal relationships of alcohol use with delinquency and aggression over time during adolescence (Huang, White, Kosterman, Catalano, & Hawkins, 2001; White, Loeber, Stouthamer-Loeber, & Farrington, 1999). Individuals, especially males, who were aggressive in childhood or adolescence have been found to be more likely to be heavier drinkers in adolescence and adulthood (Fergusson & Horwood, 2000; Farrington, 1995; Menard & Mihalic, 2001; Popovici, Homer, Fang, & French, 2012; White et al., 1993; White & Hansell, 1996). Conversely, heavy drinking in adolescence has been predictive of both violent and property offending in later adolescence and adulthood (Fergusson & Horwood, 2000; Menard & Mihalic, 2001; Swahn & Donovan, 2006).

Using latent growth curve models, Loeber, Stepp, Chung, Hipwell, and White (2010) examined the prospective associations between conduct problems and alcohol use for girls followed from ages 11 to 15. Their results indicated that conduct disorder prospectively predicted alcohol use, but alcohol use did not prospectively predict conduct disorder. However, the timing of the associations differed by race. Among White girls, conduct problems prospectively predicted alcohol use at ages 11–13 but not later. In contrast, among Black girls, prospective prediction was not observed until ages 13–14. Mason et al. (2010) found that late childhood delinquency predicted young adult alcohol use disorders as mediated through adolescent delinquency. These associations were significantly stronger for those youths from low- versus middle-income backgrounds. In contrast, childhood alcohol use was not predictive of adult criminality. Thus, in general, the literature has demonstrated that early delinquency is a stronger predictor of later alcohol use than early alcohol use is of later delinquency and criminal offending.

Research on drug use is less consistent, although several studies have also found reciprocal relationships between drug use and delinquency during adolescence (e.g., D'Amico, Edelen, Miles, & Morral, 2008; Estévez & Emler, 2011; Mason & Windle, 2002). White and Hansell (1998) found that the long-term (from adolescence to young adulthood) relationships between aggression and drug use varied by drug type and stage of the life cycle. Early aggression did not predict later substance use, and adolescent alcohol use was not significantly related to later aggressive behavior at any age. In contrast, marijuana and cocaine use in middle to late adolescence were significantly related to increased aggression in young adulthood. However, their measure of aggression was hitting someone rather than a more serious form of aggressive behavior, which could have accounted for their weak associations. Kaplan and Damphousse (1995) also found that drug use in adolescence predicted increased aggression in adulthood, although the predictive utility was relatively weak (see also Kandel, Simcha-Fagan, & Davies, 1986; Menard, Mihalic, & Huizinga, 2001). In a latent growth model analysis, Dembo and Sullivan (2009) reported significant positive correlations in growth curves of cocaine use and delinquent behavior among justice-involved youths between the ages of 11 and 18. A longitudinal study of Black youth followed from childhood to age 42 found that serious adolescent delinquency had a positive impact on drug use initiation that extended into middle adulthood (Doherty, Green, & Ensminger, 2008). Whereas studies of community samples generally indicate that delinquency is a better predictor of substance use than substance use is of delinquency, in a sample of serious adolescent offenders, the opposite was true (Mulvey, Schubert, & Chassin, 2010). In contrast, Kuhns (2005) found that over time drug use was not a consistent positive predictor of serious violent offending among adolescents.

White and colleagues (1999) examined cross-lagged associations of marijuana use with violent offending in a high-risk sample of young men from ages 13 to 18. The relationship

between marijuana and violence was reciprocal. When the researchers controlled for common risk factors (temperament, family, and neighborhood variables) and violence at age 13, marijuana use at age 13 remained a strong predictor of violent offending in later adolescence. Wei, Loeber, and White (2004) replicated these analyses with another cohort studied from ages 11 to 20 and found similar reciprocal relationships between marijuana and violence and alcohol and violence. Frequent marijuana use, compared to frequent alcohol use, was more strongly related to later violence. When common risk factors, specifically race/ethnicity and hard drug use, were controlled, the relationship between frequent marijuana use and violence (and vice versa) was no longer significant, suggesting a spurious relationship. Therefore, the researchers argued that the developmental associations between drug use and delinquency may simply reflect a common cause model, in which both behaviors are predicted by the same underlying risk factors.

Le Blanc (2009) presented results from a path analysis examining cross-sectional and longitudinal associations between the variety of criminal offenses committed and variety of drugs used at ages 15, 17, 30, and 40 in the sample of adjudicated men from the Montreal Two-Sample Longitudinal Study. Previous drug use significantly predicted subsequent drug use and previous offending predicted subsequent offending, although the predictive effect of previous behavior on subsequent behavior was much stronger for drug use than crime. Cross-sectionally, drug use was less influenced by crime than crime was influenced by drug use. He attributed this difference to the greater stability of drug use. Le Blanc showed no crossover longitudinal effects of drugs on crime or crime on drugs over time after controlling for stability and cross-sectional associations. He concluded that drug use sustains criminal activity and vice versa at each age during the life course.

Lipsey and Derzon (1998) conducted a meta-analysis of studies that examined childhood (ages 6–11) and early adolescent (ages 12–14) predictors of offending (ages 15–25). They found that substance use during childhood,

compared to during adolescence, was a better predictor of later offending. Explaining this finding, Le Blanc (2009) suggested that alcohol and drug use in adolescence (compared to in childhood) are less influenced by other deviant behaviors because they are age-normative behaviors (see White et al., 2009; White, Lee, Mun, & Loeber, 2012).

Empirical Trajectory Analyses

Trajectories of Offending

Trajectory analyses have been based on both the prevalence and frequency of offending and the measure chosen has important implications for the results. In addition, the number of trajectories identified depends on the age range and type of sample studied. Furthermore, some of the studies have used self-report data, whereas others have been based on official convictions, which also affect the number and type of trajectories identified (see Piquero, Reingle, & Jennings, 2015).

Several studies have examined developmental trajectories of delinquency during adolescence or from adolescence into adulthood (e.g., Bushway, Thornberry, & Krohn, 2003; D'Unger, Land, McCall, & Nagin, 1998; Laub, Nagin, & Sampson, 1998; Laub & Sampson, 2003; Nagin, Farrington, & Moffitt, 1995; Wiesner, Kim, & Capaldi, 2005; White, Bates, & Buyske, 2001). In general, studies examining general offending have identified three to five delinquency trajectory groups, in addition to nondelinquents (or low or rare): chronic high, chronic low, high adolescence limited, low adolescence limited, and/or late onsets (D'Unger et al., 1998). With extended follow-ups, even the chronic groups show declines in adulthood (Farrington, Piquero, & Jennings, 2013; Laub & Sampson, 2003). (For greater detail, see Nagin, 2005.)

Le Blanc and Fréchette (1989, as reported in Le Blanc, 2009) identified six trajectories of offending in a representative sample of young men: abstinent, occasional, intermittent, minor continuous, major continuous, and serious persistent. They identified five trajectories in an

adjudicated sample: minor persistent, major persistent, persistent with limited seriousness, late serious persistent, and early serious persistent. After reviewing this and other trajectory studies, Le Blanc (2009) suggested that trajectories can be combined into three meta-trajectories for all types of deviant behaviors: persistent, transitory (adolescence-limited), and common offending (i.e., only minor offenses, such as vandalism, shoplifting, minor theft, or public mischief, during middle adolescence) (see also Moffitt, 1993).

Some studies have focused on trajectories of aggression or violence rather than general delinquency. For the most part, these trajectories are similar to those described above for general delinquency (e.g., Brame, Nagin, & Tremblay, 2001; Broidy et al., 2003; Chung, Hawkins, Gilchrist, Hill, & Nagin, 2002; Hirachi et al., 2006; Nagin, Pagani, Tremblay, & Vitaro, 2003; Tremblay et al., 2004). In a high-risk sample of young men, Lacourse, Dupéré, and Loeber (2008) found that a three-group model fit best for serious violence in one cohort (ages 10–19): a no/low violence, a minor stable violence, and a high-declining violence group. In a second cohort (ages 13–25), a four-group model fit best: a no/low group, a late-onset group, a moderate-declining group, and a high-declining group. In contrast, in a community sample, Barker et al. (2007) identified only two trajectories of physical violence from ages 12 to 24 (high and low), although they did not focus on serious violent behavior.

Trajectories of Substance Use

Many studies have examined trajectories of alcohol use during adolescence or from adolescence to young adulthood (e.g., Casswell, Pledger, & Pratap, 2002; Chassin, Pitts, & Prost, 2002; Colder, Campbell, Ruel, Richardson, & Flay, 2002; Finlay, White, Mun, Cronley, & Lee, 2012; Hill, White, Chung, Hawkins, & Catalano, 2000; Li, Duncan, & Hops, 2001; Oesterle et al., 2004; Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996; Toumbourou, Williams, Snow, & White, 2003; Tucker, Orlando, & Ellickson, 2003; Warner, White, & Johnson, 2007; White, Johnson, & Buyske, 2000;

Windle, Mun, & Windle, 2005). Generally, four groups are identified, although it depends on the age range studied: a stable low group, an early onset chronic high group, an increasing group, and a decreasing group. As with delinquency, the shapes of the trajectories and group prevalence rates vary depending on the measure of alcohol involvement, the time frame studied, and the nature of the sample (Jackson & Sher, 2005). When studies are limited to adolescence, then there are often two groups of increasers: an early-onset and a later-onset group (Chassin et al., 2002; Colder et al., 2002; Hill, White, et al., 2000; Oesterle et al., 2004). Studies that span from adolescence into young adulthood often identify a decreasing trajectory, especially if a measure of heavy drinking is used (Finlay et al., 2012; Jackson & Sher, 2005; Schulenberg et al., 1996; Tucker et al., 2003; White et al., 2000; Windle et al., 2005).

Marijuana trajectories have also been examined in many studies (e.g., Brook, Lee, Brown, Finch, & Brook, 2011; Brook, Zhang, & Brook, 2011; Brown, Flory, Lynam, Leukefeld, & Clayton, 2004; Chassin et al., 2010; Ellickson, Martino, & Collins, 2004; Finlay et al., 2012; Guo et al., 2002; Kandel & Chen, 2000; Lynne-Landsman, Bradshaw, & Jalongo, 2010; Schulenberg et al., 2005; Tucker, Ellickson, Orlando, Martino, & Klein, 2005; Windle & Wiesner, 2004). Besides a relatively large nonuser (or nonuser/light user) group, most studies have identified an early-onset chronic high group, a relatively early-onset group that stabilizes or decreases in adulthood, and a late-onset increasing group. Finlay et al. (2012) identified four trajectories of regular (approximately monthly) marijuana use separately for Black and White young men from early adolescence through emerging adulthood: nonusers/nonregular users, adolescence-limited regular users, early-onset regular users, and late-onset regular users (see also Brown et al., 2004). Using data from a community sample followed from early adolescence into adulthood (age 32), Brook, Zhang, and Brook (2011) identified five trajectories: never users, quitters/decreasers, occasional users, chronic users, and increasers.

Trajectories of other illicit drug use have been studied less often, probably due to relatively low prevalence rates for other drugs.

Associations Between Substance Use and Offending Using Trajectory Analysis

In general, trajectories of substance use characterized by high use and early onset or increasing use over time are associated with young adult and adult antisocial and criminal behavior (Brook, Lee et al., 2011; Brook, Zhang & Brook, 2011; Flory, Lynam, Milich, Leukefeld, & Clayton, 2004; Hill, White et al., 2000; Tucker et al., 2005). For example, Brook, Zhang, and Brook (2011) found that early-onset chronic marijuana users and increasers reported significantly more symptoms of antisocial personality disorder at age 37 than never and occasional users even with controls for early personality and behavioral factors associated with antisocial behavior. There were no differences between the quitters/decreases and the never and occasional users. Tucker et al. (2005) found that early high binge drinkers were significantly more likely to sell drugs and commit violent crimes at age 23 than nonbinge drinkers. In addition, individuals in all marijuana-using trajectories, compared to abstainers, were more likely to sell drugs in emerging adulthood. Steady marijuana increasers, compared to abstainers, were also more likely to sell drugs and steal in emerging adulthood.

Studies have also found that trajectories of offending predict later alcohol and drug use and abuse. For example, with controls for earlier substance use, Wiesner and colleagues (2005) found that high-level chronic offenders (from ages 12 to 24), compared to nonoffenders, rare offenders, and low-level decreasers, reported more alcohol and drug use at ages 23–26. Although chronic low-level offenders reported less alcohol and drug use than nonoffenders, the former did not differ from the decreasers in terms of alcohol and drug use in emerging adulthood. After controlling for adolescent substance

use, Hill, Chung, Herrenkohl, and Hawkins (2000, as reported in Wiesner et al., 2005) found that chronic theft offending during adolescence predicted drug but not alcohol dependence at age 21, whereas chronic violent offending predicted alcohol dependence.

Only a few studies have examined joint associations between trajectories of offending and trajectories of substance use. Lynne-Landsman, Graber, Nichols, and Botvin (2011) looked at trajectories of substance use (a summary score including frequency of alcohol, cigarettes, marijuana, inhalants, being drunk, and being stoned), aggression, and delinquency from the sixth to the eighth grade. They found that substance use was conditional on aggression and delinquency but for the most part that aggression and delinquency were not conditional on substance use. Therefore, they concluded that information about externalizing behaviors in early adolescence is useful for predicting future substance use but the reverse is not true, which is consistent with Le Blanc's (2009) conclusion (see also Mason et al., 2010).

In a joint trajectory analysis, White and colleagues (2009) found moderate associations between trajectories of drinking and violence during adolescence (ages 13–18), but no significant associations during emerging adulthood (ages 18–25). In addition, adolescent trajectories of violence did not predict emerging adult drinking, and adolescent trajectories of drinking did not predict emerging adult violent offending. Thus, the strength of the developmental associations between substance use and offending depends on the age period studied, with the strongest associations occurring during adolescence (Derzon & Lipsey, 1999). Age difference in prediction may have to do with age-normative changes in substance use (see White et al., 2012).

Desistance

Le Blanc and Loeber (1998; Loeber & Le Blanc 1990) highlighted the importance of studying

desistance as part of an offending trajectory. Desistance has been defined in many ways (see Kazemian, 2007). Loeber and Le Blanc (1990, p. 407) defined it as the processes that lead to cessation, either in part or entirely (see also Kazemian, 2015). Before I conclude this chapter, I will briefly discuss research on the role of alcohol and drugs in desistance from offending.

Due to age-normative changes in substance use and offending, these two types of deviance peak at different stages in the life cycle, and desistance for most individuals occurs earlier for offending than for substance use. Desistance from criminal offending often occurs in late adolescence (Elliott, 1994), a time when substance use is generally escalating (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg 1997). For the most part, youth do not mature out of heavy drinking and illicit drug use until they take on adult roles, such as marriage and career (Labouvie, 1996).

Nevertheless, studies have shown that reductions in substance use in young adulthood may play a key role in de-escalation of offending (Kazemian, Farrington, & Le Blanc 2009; Stoolmiller & Blechman, 2005). For example, Kazemian and colleagues (2009) found that, among young men who had offended in adolescence, heavier drinking and drug use at age 18 predicted a higher likelihood of engaging in frequent and serious offending at age 32. In addition, young men who reduced their substance use were more likely to reduce their serious offending. In another study of an offender population, periods of reductions in cocaine/heroin and alcohol use were related to reductions in income-generating crime, but not violent crime (Gottfredson, Kearley, & Bushway, 2008).

Some research has suggested that chronic use of substances impedes desistance from offending (e.g., Farrington & Hawkins, 1991; Hussong, Curran, Moffitt, Caspi, & Carrigm, 2004; Welte et al., 2005). For example, Hussong and colleagues (2004) found that substance abuse in early adulthood hindered a young man's natural desistance from offending (see also Morizot & Le Blanc, 2007). Hussong et al. (p. 1043) suggested that "substance abuse may interfere

with the normative tasks of young adult development by entrenching young adults within antisocial patterns of behavior...by increasing their likelihood of encountering other potential snares... (e.g., ... incarceration)... and by reducing their likelihood of gaining access to protective factors... (e.g., ... good marriages).” Their results indicated that both alcohol abuse and marijuana abuse had similar effects on maintaining antisocial behavior, although the researchers suggested that the mechanisms that account for these effects may differ. For example, dependence on marijuana may push youth into drug markets where antisocial behavior is expected, whereas heavy drinking may cause acute cognitive impairments, which increase impulsivity and the likelihood of antisocial behavior. In contrast, White and colleagues (2012) found that during emerging adulthood, heavy drinking for both Black and White young men was not related to persistence in serious violent offending. They attributed this finding to the fact that heavy drinking is normative during this developmental period. Le Blanc (2009) claimed that criminal offending and drug use sustain each other and a reduction in the variety of drug use occurs prior to a reduction in the variety of criminal offending.

Summary

- Substance use and criminal offending follow a hierarchical sequence that usually goes from minor delinquency to legal drug use to serious delinquency to illegal drug use.
- In general, early delinquency is a better predictor of later substance use than early substance use is of later offending.
- There is a strong association between substance use and offending, but its magnitude depends of the type of substance, type of offending, and stage in the life cycle.
- Heavy drinking and illicit drug use play a role in maintaining criminal offending.

Future Research Needs

- Research is needed to understand the individual and situational factors that increase the risk of substance use leading to offending.
- More research is needed to explain why some individuals progress further than others on offending and illegal drug use pathways and why individuals vary in the speed of their progression along developmental pathways (Loeber et al., 2012).
- As suggested by Loeber and Le Blanc (1990; Le Blanc & Loeber, 1998), we still need to learn more about de-escalation models of change in terms of pathways by which individuals discard problem behaviors as well as the mechanisms that account for this de-escalation.
- More research is needed to develop risk indices and screening tools to identify which behaviors are linked to later progression to serious outcomes and who is at risk of progressing to more serious acts.
- Overall, we need to understand more about the individual and contextual factors that influence transitions and comorbidity.

Marc Le Blanc’s Contributions

Le Blanc and his colleagues recognized that substance use was a form of deviant behavior worthy of study by developmental criminologists. Not only were they among the pioneers to include alcohol and drug use in the study of sequences of offending but they also acknowledged the role of substance use as an etiological factor in the aggravation and desistance of criminal offending. I have cited several of these papers above. In this chapter, I regarded substance use as distinct from criminal offending so that I could examine temporal sequences and sequential covariation between substance use and criminal offending. Nonetheless, I also acknowledge, as

Le Blanc has argued, that both substance use and criminal offending are two forms of deviant behavior that share many similar risk and protective factors and together may reflect an underlying propensity toward deviance. Minor delinquency and experimenting with alcohol and drugs is developmentally normative for many adolescents. Therefore, the critical task facing developmental criminologists today is to identify the risk and protective factors that contribute to escalation to more serious forms of offending and substance use disorders, as well as the factors that contribute to de-escalation. Along with Le Blanc and his colleagues, I advocate for the development of better and more effective strategies to prevent the onset of offending and substance abuse and interventions to promote desistance.

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Nadine Lanctôt

This chapter assesses the state of knowledge on adolescent girls' trajectories of antisocial behavior. It takes a gender-sensitive perspective building on evidence suggesting that studies focusing solely on illegal antisocial behaviors fail to capture the variety and special characteristics of the deviant and maladaptive behaviors in which girls may engage (Johansson & Kempf-Leonard, 2009; Lanctôt & Le Blanc, 2002). For this reason, throughout this chapter, we define antisocial behavior as including not only delinquent behaviors (violations of criminal and other laws) but also behaviors that adults perceive as disruptive, reckless, or dangerous and that violate consensual social norms to which adolescents are expected to conform. Examples of such behaviors include substance abuse, oppositional behavior, risky sexual activities, and rebelliousness in school. This definition of antisocial behavior is empirically supported by a vast literature on general deviance as a latent construct (see Le Blanc & Bouthillier, 2003; Le Blanc & Loeber, 1998).

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This chapter first reviews findings related to differences and similarities in the distribution of antisocial behavior between girls and boys. I then assess evidence from studies of specific developmental trajectories of antisocial behavior in girls and of how these trajectories compare with those in boys. Lastly, I present a gender-sensitive theoretical model of girls' pathways to antisocial behavior.

On the Gender Gap in Antisocial Behavior

Few social scientists today would question that there is a gender gap in the distribution of antisocial behavior. One of the best established findings in criminology and related disciplines is that boys are involved in antisocial behavior more often than girls. Gender differences in the prevalence and seriousness of antisocial behavior have been documented consistently (Lanctôt & Le Blanc, 2002; Rowe, Flannery, & Flannery, 1995; Steffensmeier & Allan, 2000; Tittle, Ward, & Grasmick, 2003). Overall, the prevalence of antisocial behavior among girls is only about half of the prevalence among boys (Fergusson & Horwood, 2002).

But when we consider the various forms of antisocial behavior and the settings in which they occur, a more complex picture emerges. For example, most studies show that boys engage in direct aggression (and especially the most serious forms of aggressive behavior) more often than

girls, but the gender gap narrows considerably when it comes to indirect aggression (Card, Stucky, Sawalani, & Little, 2008) and aggression against family members (Lanctôt & Le Blanc, 2002). Similarly, Moffitt, Caspi, Rutter, and Silva (2001) report that the incidence of drug use and violence against domestic partners was about the same among boys and girls. Such findings underscore the need to develop an encompassing definition of antisocial behavior so that we can advance our understanding of girls' involvement in various forms of conduct that could compromise their development.

Gender differences in the prevalence of antisocial behavior can be observed at any age (Fergusson & Horwood, 2002; Jennings et al., 2010; Odgers et al., 2008), but the magnitude of these differences varies from one developmental stage to the next (Jang & Krohn, 1995; Lahey et al., 2006; Silverthorn & Frick, 1999). For example, Lahey et al. (2006), drawing on a national sample of children followed through age 17, observed that the size of the gender gap in the prevalence of conduct problems varied across developmental stages. In early childhood, this gap widened considerably, with girls showing a larger decrease in conduct problems than boys. During the transition to adolescence (ages 10–13), the pattern reversed, and this gap narrowed. Other empirical studies have reported that the beginning of adolescence (ages 12–14) seems to be a critical period in which antisocial behavior is likely to emerge faster among girls than among boys (Fergusson & Horwood, 2002; Galambos, Barker, & Almeida, 2003; Lanctôt, Bernard, & Le Blanc, 2002).

Boys and girls generally engage in the same types of antisocial behaviors, but to varying degrees. In an extensive review and empirical test of a latent construct of “general deviance” in mixed-gender samples, Le Blanc and Bouthillier (2003) concluded that general deviance is composed of four categories of behaviors that characterize both boys' and girls' behavioral repertoires, which suggests that the structure of the deviant syndrome is gender-invariant. The first category is overt behavior, which consists of interpersonal violence. The second category is

covert behavior, which consists of property crimes. The third category of deviant behavior involves conflict with authority and consists of stubborn, defiant, and avoidant behaviors at home and at school. The fourth category consists of reckless behaviors, including substance abuse, risky sexual activity, and disorderly conduct.

This defined structure of general deviance has been confirmed in a wide variety of empirical studies, such as Le Blanc and Bouthillier (2003); for a review of this literature, see Culhane and Taussig (2009). Although a latent factor may explain a large proportion of the covariation between different antisocial behaviors among both boys and girls, the factor loadings for some specific behaviors tend to differ by gender. Studies of gender differences reported statistical fits that were slightly poorer for girls than for boys (Donovan & Jessor, 1985; Le Blanc & Bouthillier, 2003). In particular, in girls, risky sexual activity appears to be less correlated with other categories of antisocial behavior Culhane and Taussig (2009). From a feminist perspective, this finding suggests that risky sexual activity may operate more as a risk factor for antisocial behavior than as a symptom of the deviant syndrome (Belknap & Holsinger, 2006; Kerig & Schindler, 2013). However, this hypothesis has yet to be examined systematically in longitudinal studies.

To sum up, research strongly supports the existence of a gender gap in antisocial behavior, but this gender gap is neither constant across the spectrum of possible behaviors and settings nor is it stable over time. It seems to be wider when antisocial behavior takes more serious forms or occurs outside the family. This gap also widens and narrows over the life course. Despite these variations, the kinds of antisocial behaviors are similar for the two genders.

Past descriptive studies comparing the antisocial behavior of boys and girls have been informative but have provided limited knowledge. Some of these studies have relied excessively on aggregated data, so they have not adequately considered possible heterogeneity within each gender. Other studies have relied excessively on cross-sectional data, so they have not adequately

considered continuity and change over the life course. But these studies have certainly demonstrated the importance of not dismissing girls' involvement in antisocial behavior as a marginal phenomenon (Tracy, Kempf-Leonard, & Abramoske-James, 2009). The next step must be to examine the developmental patterns of antisocial behaviors among different subgroups of boys and girls.

On the Gender Gap in the Development of Antisocial Behavior

Research that seeks to explain the developmental processes that contribute to continuity and change in antisocial behavior in girls is still in its infancy. Our knowledge of the mechanisms by which antisocial behavior emerges, develops, persists, and changes along the life course of girls and women is still limited. As reviewed by Brennan, Breitenbach, Dieterich, Salisbury, and Van Voorhis (2012), the first set of studies that examined girls' developmental pathways to antisocial behavior relied mostly on qualitative data and adopted a feminist perspective (Chesney-Lind & Sheldon, 1992; Daly, 1992). Based on case studies and narratives, these studies focused on girls' specific risks and specific needs to explain their involvement in antisocial behavior. These studies regarded childhood victimization, socioeconomic marginalization, and relational problems as contextual factors that drive girls and women into crime as a survival strategy (Bloom, Owen, & Covington, 2003; Covington, 1998; Daly, 1992).

Subsequently, a second group of studies questioned the usefulness of gender-specific risk factors for antisocial behavior. These so-called "gender-neutral" studies provided empirical support for a common set of individual, familial, and environmental risk factors for both boys and girls (see Lanctôt & Le Blanc, 2002 for a review). Both the gender-specific and the gender-neutral perspectives yielded meaningful insights on the context in which girls' antisocial

behavior is activated, as well as on gender similarities in many risk factors associated with the emergence of antisocial behavior. But neither approach provided an understanding of continuity and change in antisocial behavior along the life course.

A third set of studies has now followed. Grounded in developmental criminology, they employ a group-based trajectory methodology, take continuity and change within the individual into account, and propose differing explanatory models according to the age at onset and the persistency of antisocial behavior. These studies tend to identify three to five distinct trajectories of antisocial behavior (Piquero, 2008; Piquero, Reingle, & Jennings, 2015). In particular, the two distinct typologies theorized by Moffitt (1993)—adolescence-limited offenders and life-course-persistent offenders—have been well established. So far, however, few studies in this third group have used samples composed solely of girls or even mixed-gender samples. Issues of measurement and statistical methodology have complicated comparisons between studies and led to contradictory findings (Andersson, Levander, Svensson, & Levander, 2012). Most importantly, most of the longitudinal studies that have been conducted with girls have focused mainly on childhood and early adolescence (Fontaine, Carbonneau, Vitaro, Barker, & Tremblay, 2009; Miller, Malone, & Dodge, 2010). Consequently, our understanding of antisocial trajectories and patterns of persistence and desistance among girls throughout the adolescent years and on into early adulthood remains quite limited (Miller et al., 2010). Even so, thanks to this last group of studies, we can now make a few statements, with some degree of confidence, about the development of antisocial behavior in girls and how it differs from the development of antisocial behavior in boys. To summarize these findings, we will follow the recommendations of Le Blanc and Loeber (1998) and examine both quantitative and qualitative differences in antisocial behavior over the life course.

Quantitative Gender Differences in Trajectories of Antisocial Behavior

Studies of *quantitative* gender differences in antisocial behavior over the life course look at differences in the degree, direction, and rate of change (Le Blanc & Loeber, 1998), as well as in the proportion of individuals who exhibit stability or change over time. Such analyses examine the relationships between various trajectory parameters (e.g., between age at onset and duration of antisocial behavior). It is now well documented that certain subgroups of individuals do not follow the general pattern of the aggregate age-crime curve: in most individuals, involvement in antisocial behavior remains low or declines rapidly over the life course, but a minority of individuals exhibit early, chronic antisocial behavior (Piquero, 2008).

Studies attest to a prominent gender gap in the trajectories of antisocial behavior. Girls are typically overrepresented in so-called low trajectories (Fergusson & Horwood, 2002; Lahey et al., 2006; Pepler, Jiang, Craig, & Connolly, 2010; Zheng & Cleveland, 2013). For example, Fergusson and Horwood (2002) found that in a large mixed-sex cohort, 71 % of the girls followed a low-risk trajectory, but only 41 % of the boys. In contrast, overrepresentation of boys in the early-onset/chronic trajectory is well documented (Andersson et al., 2012; Fergusson & Horwood, 2002; Miller et al., 2010; Moffitt & Caspi, 2001). For instance, in a birth-cohort study by Moffitt and Caspi (2001), the ratio of boys to girls among individuals who followed this trajectory was 10 to 1. Fergusson and Horwood (2002) reported similar findings for another birth cohort, in which 9.4 % of the boys and 2.1 % of girls followed a chronic trajectory of antisocial behavior. In clinical samples, the percentage of girls following chronic trajectories is higher than in birth cohorts (Lanctôt, 2005; Lanctôt & Le Blanc, 2000), but the gender gap is still as large as in the general population (Fontaine et al., 2009). For trajectories in which the antisocial behavior is limited to adolescence, the gender gap is smaller. In samples from

general and high-risk populations, from 2 % to 27 % of all girls follow such a trajectory (Brennan & Shaw, 2013), and the ratio of boys to girls following such a trajectory tends to be less than 2:1 (Fergusson & Horwood, 2002; Moffitt & Caspi, 2001). In clinical samples, the proportion of girls following an adolescence-limited trajectory ranges from 40 % to 75 % (Fontaine et al., 2009).

Thus, as a group, boys are more likely to engage in antisocial behavior at a younger age and to exhibit persistent, serious antisocial conduct later on. Whether there is any such early-onset, persistent trajectory of antisocial behavior among girls has been much debated over the past two decades (Silverthorn & Frick, 1999). But recent evidence suggests that a small yet significant subgroup of girls do exhibit chronic antisocial behavior, at least until the end of adolescence (Brennan & Shaw, 2013; Broidy et al., 2003; Fontaine et al., 2009; Lahey et al., 2006; Odgers et al., 2008). Indeed, in their critical review of 46 empirical studies of developmental trajectories of antisocial behavior in girls, Fontaine et al. (2009) concluded that all but three of these studies suggested that a subgroup of girls follows an early-onset, persistent trajectory of such behavior. However, many of these 46 studies covered only the period from late childhood to middle adolescence, so the true extent of the persistency is still in question.

Various authors have stated that the main conclusion to be drawn from all these studies of quantitative gender differences in antisocial behavior is that, other than the differences in the proportions of the two genders in the various trajectories, the ways that antisocial behavior evolves over the life course seem quite similar for both genders (Andersson et al., 2012; Fontaine et al., 2009; Miller et al., 2010). But this conclusion may be premature, especially because much of the work on girls' antisocial trajectories has relied on small samples of at-risk or justice-involved girls or has looked at only a limited age range. It remains unclear whether the developmental patterns of antisocial behaviors observed in such studies can be generalized to all girls and to the entire period

of adolescence. But more importantly, to achieve a fuller understanding of continuity and change in antisocial trajectories among girls, we must also consider qualitative differences in their behavior.

Qualitative Gender Differences in Trajectories of Antisocial Behavior

Studies of *qualitative* gender differences in antisocial trajectories look mainly at the shape of the trajectories (i.e., the timing and peak age of antisocial behavior), the nature of the behaviors, and the developmental sequence of these behaviors over time (Le Blanc & Loeber, 1998). A number of studies have provided general descriptions of various developmental trajectories and the gender composition of the groups that follow each of them. But very few empirical studies have provided a detailed examination of the shape of girls' trajectories and the developmental sequence of behaviors contributing to continuity and change. A study by Pepler et al. (2010) demonstrates the need to examine the shape of girls' trajectories more specifically. In this study, the girls in the sample who were at higher risk of antisocial behaviors developed into and out of these behaviors more quickly than the high-risk boys. In other words, involvement in antisocial behavior rose faster, peaked earlier, and began to decline earlier among the high-risk girls than among the high-risk boys. These gender differences raise several questions for future research and underscore the need to consider gender-responsive explanatory factors for the development of antisocial behavior. In this regard, Pepler et al. (2010) have questioned how puberty and socialization experiences might shape girls' trajectories.

Another shortcoming of past empirical studies is that they have rarely provided details on the nature and intensity of the antisocial behaviors exhibited by the girls who have followed the various trajectories identified. The trajectory labels assigned to girls may differ considerably depending on whether they are compared with boys or with one another. In this regard, Brennan

and Shaw (2013) have suggested that girls who exhibit levels of antisocial behaviors that are significant but not so high as boys' may be assigned to a lower trajectory in a mixed-gender classification model than they would be in a gender-specific model.

The types of developmental trajectories identified and the proportion of girls within each trajectory also tend to vary considerably according to how antisocial behaviors are measured. For example, in their study of developmental trajectories of nonviolent and violent delinquency from adolescence to young adulthood, Zheng and Cleveland (2013) found that the propensity to engage in moderately to seriously violent delinquency contributed significantly to differentiating the various trajectories in boys, but not in girls. In girls, nonviolent delinquency was the factor that differentiated the various trajectories (whereas violent delinquency did not). Similarly, Lanctôt (2005) observed that in a subgroup of justice-involved girls who persisted in antisocial behaviors from adolescence to early adulthood, the characteristic of persistent antisocial behavior was not violent delinquency, but rather chronic drug use. Another analysis of various types of antisocial behavior in women, by Brennan et al. (2012), has also yielded significant insights. These authors analyzed a sample of female offenders and identified four broad types of pathways to serious and habitual crime: drug-dependent, victimized, subcultural, and antisocial. These pathways differed largely according to whether the women were seriously involved in drug use, drug trafficking, or aggressive behavior.

As the studies cited above have shown, if we are to obtain a clearer picture of the various developmental pathways to antisocial behavior in girls, it will be crucial to differentiate among different subtypes of antisocial conduct. Nonviolent delinquency, violent delinquency, and drug use may all have different etiologies and may represent qualitatively different types of antisocial-behavior trajectories (Zheng & Cleveland, 2013).

Lastly, a few studies have documented developmental pathways escalating from less to more

serious behaviors in girls (Lanctôt et al., 2002; Loeber, Capaldi, & Costello, 2013). For example, Loeber et al. (2013) found some support for the role of oppositional defiant disorder (ODD) as a stepping-stone to conduct disorder (CD), but this developmental pattern was not as strong among girls as among boys. This observation led the authors to assert that developmental pathways in girls “are more complex than formerly thought” (p. 146). Such complexity might be explained by heterotypic continuity in girls’ pathways. In this regard, longitudinal studies covering the period from middle adolescence to the late 20s are particularly informative. For example, in a study focusing on previously institutionalized men and women, Lanctôt, Cernkovich, and Giordano (2007) showed that women in particular experienced difficulties in coping with adulthood. Although the women reported fewer antisocial behaviors in adulthood than the men, the women’s ability to function as adults was negatively affected by many circumstances that compromised their quality of life, including poor socioeconomic conditions, perceived lack of caring and trust on the part of their parents and their domestic partners, the use of violence against their domestic partners, depressive symptomatology, and low self-esteem. The cumulative effects of all these adverse conditions place such women at high risk for social isolation and persistent negative emotionality.

Gender Sensitivity in Developmental Criminology

In developmental criminology, the theoretical literature on girls’ involvement in antisocial behaviors has long been characterized by rigidly divided epistemological perspectives (for a review of this literature, see Lanctôt & Le Blanc, 2002). One group of authors has argued that mainstream theories of developmental criminology can explain girls’ pathways to antisocial behavior, even though these theories were initially developed with a focus on boys. But another group of authors has argued that this male-dominated

construction of knowledge needs to be challenged by the recognition that gender differences in socialization processes may affect girls’ pathways to antisocial behavior. There is still much debate about which theoretical perspective best explains continuity and change in girls’ antisocial behavior over time, but research on female delinquency increasingly is setting more and more store on integrating a variety of theoretical perspectives (Hubbard & Matthews, 2008; Kerig & Schindler, 2013).

In his paper on the generic control theory of the criminal phenomenon, Le Blanc (1997) argued for the value of integrating a variety of theories. He suggested that to provide a more comprehensive explanation of any given phenomenon, one should apply constructs from a number of disciplines and many different theories. Applying this advice to provide a broader explanation of girls’ pathways to antisocial behavior, Lanctôt and Le Blanc (2002) proposed a theoretical model that integrated distinct concepts from the mainstream and feminist criminological perspectives into a new whole. Though acknowledging that substantive integration can be extremely difficult or even impossible when differing epistemological stances are concerned, these authors asserted that some constructs from various theories can nevertheless be adopted and integrated.

Lanctôt and Le Blanc (2002) based their theoretical model of girls’ pathways to antisocial behavior primarily on Le Blanc’s integrative control theory of deviant behavior (Le Blanc, 1997, 2005, 2006), adopting concepts from Le Blanc’s theory as a frame of reference to choose constructs for their own model. They justified this approach by a review of empirical studies (Kempf, 1993; Moffitt et al., 2001) suggesting that mainstream theories, even though they have been developed mostly with reference to boys, can still be useful for explaining antisocial behavior in girls. Le Blanc’s integrative model proposes an interaction among six major constructs: social status, biological capacity, bonds, self-control, constraints, and prosocial influences. This model posits that individuals will conform and continue to conform to

conventional standards of behavior if the following four conditions are met: These individuals must have an adequate level of self-control, they must have firm bonds with social institutions, they must be subject to appropriate internal and external constraints, and they must be exposed to prosocial activities and individuals. The personal and social mechanisms thus regulating this conformity are conditioned by the individuals' biological capacities and their position in the social structure.

Lanctôt and Le Blanc (2002) made various adjustments to their theoretical model so as to take known gender differences and gender specificities into account. In particular, the authors incorporated gender-sensitive constructs so that the model would better explain how female gender roles and experiences may shape girls' pathways to antisocial behavior. Thus the model ensures that differences in the ways that girls and boys are socialized and in the ways that they learn to conform to certain social standards will not be overlooked.

The first adjustment that the authors made to their model was to add girls' exposure to adverse life events. One of the most significant weaknesses of current mainstream theories is that they take little account of the victimization and oppression that a large proportion of high-risk girls experience. For example, Van Vugt, Lanctôt, Paquette, Collin-Vézina, and Lemieux (2014) found that a substantial proportion of girls in residential care reported having experienced abuse. Moreover, within this group, the proportions who described their abuse as having been severe to extreme were quite high, ranging from 20 % among girls who reported sexual abuse to 33 % among those who reported emotional abuse. Lanctôt and Le Blanc's theoretical model states that the relationship between such adverse life events and antisocial behavior is mediated by a variety of factors, including social bonding, attitudes toward others, and exposure to delinquent peers.

The second major adjustment that Lanctôt and Le Blanc made in their theoretical model was to clearly differentiate between the internal and the

external constraints to which girls are subject, so as to better capture experiences that could affect their antisocial pathways. Internal constraints consist of the girls' own beliefs in social norms, while external constraints consist mainly of the parental supervision and discipline to which they are subject. As noted in Le Blanc's original model, internal constraints are one of the most proximal protective factors against antisocial behavior. Research also suggests that internal constraints strongly influence girls' antisocial behavior and recidivism (Heimer, 1996; Van Vugt et al., 2011). Girls' antisocial behavior is thus largely governed by the kinds of values and attitudes that they have internalized.

The gender-difference literature proposes an interesting link between internalization of social norms and adherence to so-called feminine gender roles. Heimer (1996) pointed out that gender roles are internalized in a manner similar to attitudes regarding other social rules and standards. Girls' beliefs in gender roles—in particular, that females should take care of the people around them—can act as a moral obstacle to antisocial behavior. Hence Lanctôt and Le Blanc added another construct to Le Blanc's original model: gender-role beliefs. The inclusion of this construct may help to explain the heterotypic continuity in girls' trajectories of antisocial behavior. For example, when young women become mothers, the cost of antisocial behavior may simply become too high. Research clearly shows that such women feel constrained by the demands and responsibilities of motherhood and tend to become unwilling to jeopardize their children's well-being by engaging in antisocial activities (Giordano, Cernkovich, & Rudolph, 2002; Rönkä et al. 2003; Michalsen, 2011). Nevertheless, even though very few justice-involved girls persist in antisocial behavior into adulthood, a large proportion of them still face myriad difficulties attributable to problems in personal and social control (Lanctôt et al., 2007). Thus there is an urgent need for studies in developmental criminology to venture beyond antisocial behavioral outcomes. One research priority should now be to broaden the scope of the

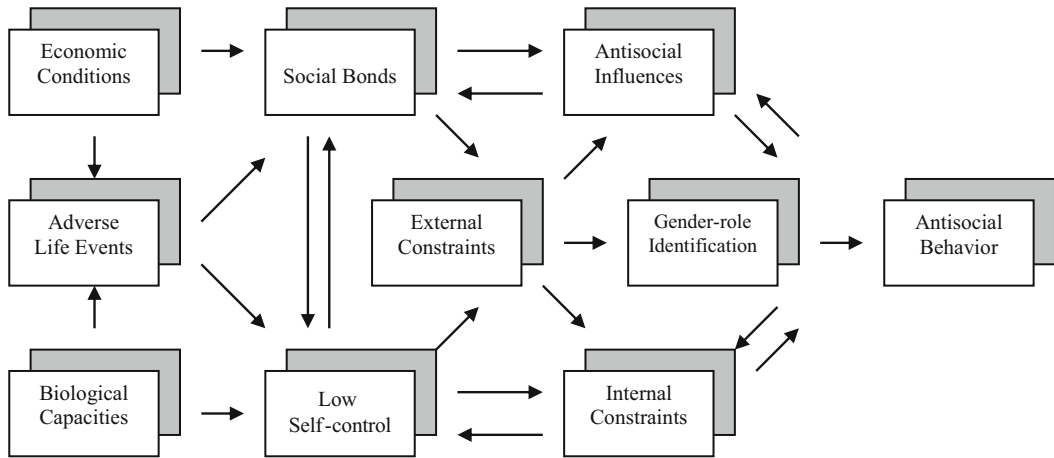


Fig. 25.1 Personal and social regulation of girls' antisocial behavior [originally published in Lanctôt and Le Blanc (2002): Fig. 3]

analysis to better understand the risks that girls' involvement in antisocial behavior during adolescence poses for negative adjustment outcomes later in life.

Figure 25.1 shows the model that Lanctôt and Le Blanc (2002) defined to explain girls' pathways into antisocial behavior. This model posits that precarious economic conditions may result in girls' experiencing more adverse life events, including various kinds of maltreatment, such as neglect and physical and sexual abuse. According to this model, girls who experience such events would subsequently have more trouble in forming bonds with social institutions and the people who belong to them. For example, maltreatment could compromise trusting relationships with parents, cause breakdowns in romantic relationships, and result in cognitive impairments that undermine commitment to school. Maltreatment could also produce trauma-related symptoms, including anger, and affect girls' ability to exercise self-control and solve problems by socially acceptable means.

The model goes on to predict that deficiency in girls' social bonds could increase their exposure to antisocial influences, especially through association with delinquent peers, and weaken their receptiveness to external constraints. At the same time, girls' low self-control not only makes it harder for them to establish strong bonds with

other people but also makes them less likely to conform to external constraints such as social rules and standards. Girls' low receptiveness to external constraints also makes them less likely to develop internal constraints on their antisocial behavior. Lastly, the rejection of traditional beliefs about female gender roles would remove an important barrier against antisocial behavior.

The shaded box behind each component of the model in Fig. 25.1 represents the various phases of the life course, suggesting the possibility of examining the behaviors of girls and women from a developmental perspective. Such an approach remains virtually unexplored in the scientific literature on antisocial behavior in girls, and the impact of girls' antisocial behavior on their long-term personal and social development has therefore rarely been evaluated. There have, however, been a few longitudinal studies demonstrating a correlation between certain traits in girls' antisocial trajectories and the severity of their difficulties in adapting personally and socially. For example, one study of 123 justice-involved girls indicated that the earlier their antisocial trajectory began and the longer it lasted, the worse their personal and social deficits grew from ages 15 to 17 (Lanctôt & Le Blanc, 2000). Adolescent girls who followed the most serious antisocial trajectories were distinguished by having weaker ties to family and

school, greater exposure to antisocial influences, and more antisocial personality traits, as well as by being less subject to internal and external constraints. Girls who gradually abandoned their delinquent activities toward the end of adolescence were on their way to a better personal and social balance (Lanctôt & Le Blanc, 2000). Similarly, Odgers et al. (2008) reported that females who followed a persistent trajectory of antisocial behavior experienced the worst economic, physical health, and mental health outcomes at age 32.

A major strength of developmental criminology is that it recognizes both change and continuity over time, thus focusing both on life transitions and on disadvantages that accumulate over the life course. In his generic control theory of the criminal phenomenon, Le Blanc (1997) adopts a comprehensive developmental perspective in which antisocial behavior is regarded as a transitional event that can play an additive, intervening role in individuals' pathways over the life course. By providing a more in-depth assessment of the mechanisms involved in within-individual changes in antisocial behavior, Le Blanc's theory provides a more meaningful understanding of why, how, and when individuals start, persist in, escalate, and desist from antisocial behavior. Furthermore, developmental theoretical models such as Le Blanc's identify not only the factors that predispose individuals to engage in antisocial behavior but also the factors that encourage desistance from such behavior (see Kazemian, 2015). For example, if individuals become less involved in maladaptive behavior as they exit adolescence and enter adulthood, the explanation might be that they are experiencing new life events that strengthen both personal and social controls. Many such new life events commonly occur in late adolescence—for example, living with someone as a couple for the first time, or becoming a parent, or getting one's first real job, or choosing a career—and their influence needs to be analyzed. The Lanctôt and Le Blanc (2002) model adopts a developmental perspective that supports such an analysis.

Summary

This chapter has highlighted, first and foremost, the many research avenues that still need to be explored in order to acquire a better understanding of gender differences in the development of antisocial behavior. As Loeber et al. (2013) have noted, much knowledge about girls' antisocial behavior has been gained from recent, major longitudinal studies with sizable samples of girls. However, current knowledge is still inadequate, and much more research needs to be done. Current knowledge is also limited by the lack of an integrated theory, as well as by ambiguities about what is regarded as antisocial behavior, the variety of measures used to capture it, and differences in the developmental stages covered by the various longitudinal studies. Hence, though few researchers would argue that there is no gender gap in antisocial behavior, the exact nature of this gap, the ways in which it is manifested, and the ways that it evolves from a developmental perspective all need to be further explored.

At present, it is therefore difficult to provide a systematic review of the evidence based on robust observations. However, the preliminary results of recent longitudinal studies all suggest that a focus on what Le Blanc and Loeber (1998) referred to as “qualitative gender differences” in trajectories of antisocial behavior might be a more promising way to compare the development of such behavior in boys and in girls.

The key conclusions of this chapter are as follows:

- There is robust evidence of a gender gap in criminal and antisocial behavior. In terms of both the prevalence and the seriousness of such behavior, boys are more antisocial than girls.
- The magnitude of this gender gap is not constant over time or across the spectrum of criminal or antisocial behavior.
- The same trajectories of antisocial behavior have been identified in both boys and girls, even including a chronic, persistent trajectory,

although the proportion of girls that follow such a trajectory is small.

- Preliminary evidence suggests gender differences in the shape of these trajectories, as well as in the nature and developmental sequence of the behaviors concerned.
- It might be more helpful to compare boys' and girls' trajectories of antisocial behavior using qualitative measures as well, rather than focusing solely on quantitative measures such as prevalence and number of trajectories.
- Theoretical models designed to explain girls' antisocial behavior could benefit from the inclusion of gender-sensitive constructs such as exposure to adverse life events and differences in the internal constraints to which girls and boys are subject.

Future Research Needs

- Longitudinal studies that apply an encompassing definition of antisocial behavior, examine sizable samples of girls, and cover adolescence and emerging adulthood as developmental stages
- A focus on both continuity and change in girls' and women's criminal and antisocial behavior over the life course and the mechanisms and developmental processes through which such behavior emerges, develops, persists, and changes
- Studies of qualitative gender differences in the shape of trajectories of antisocial behavior, the nature of the behaviors engaged in at various developmental stages, and changes in the degree of involvement in such behaviors over time
- Broader analyses of outcomes other than antisocial behavior (e.g., social adjustment and mental health outcomes) in girls who are on trajectories of antisocial behavior, particularly in late adolescence and early adulthood
- Inclusion of gender-sensitive constructs in theoretical models to better explain girls' trajectories of antisocial behavior—in particular constructs related to trauma, internalized problems, and drug use

Marc Le Blanc's Contributions

Dr. Marc Le Blanc has played a pioneering role in conceptualizing the developmental perspective in delinquent and antisocial behavior and in defining the developmental processes involved. This perspective focuses on continuity and change by analyzing within-individual variations. It has guided a number of the studies reviewed in this chapter. This developmental perspective has provided a better understanding of why, how, and when individuals begin, persist in, escalate, and desist from antisocial behavior.

In addition, the work that Dr. Le Blanc and colleagues have done on the latent deviant construct (Le Blanc & Bouthillier, 2003; Le Blanc & Loeber, 1998) has been instrumental in operationalizing this concept and demonstrating the value of a more encompassing definition of antisocial behavior for both genders. Dr. Le Blanc has also participated in a number of studies in which his ideas—originally developed for data collection involving boys only—were tested and adapted for girls (Lanctôt & Le Blanc, 2002).

This chapter has provided an integrated review of a literature that does not lend itself readily to such an effort, because of the current state of research. In this regard, the distinction that Le Blanc and Loeber (1998) make between quantitative and qualitative indicators of trajectories of antisocial behavior has proven an invaluable organizing principle. This distinction can provide a useful framework for future research aimed at exploring gender differences more exhaustively.

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Sex Offending and Developmental Criminology: A Research Agenda for the Description, Explanation, and Prediction of Juvenile Sex Offending

26

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Introduction

In the last three decades, the legal response to youth sex offending has been marked by a major shift, especially in the USA. This shift refers to the punitive approach characterized by adult-like sentences (e.g., harsher sentences, sex offender registry, community notification) as well as strict treatment programs imposed on youth convicted of a sex offense. Dubbed an *American travesty* by Franklin E. Zimring (2004), the new legal landscape for juvenile sex offenders has been heavily criticized by researchers (e.g., Letourneau & Miner, 2005; Miner, 2007) for being based on false assumptions. This shift is the result of increased concerns over certain sexual behaviors committed by youth and views (a) that these behaviors are not trivial and insignificant and grow more prevalent over time, (b) that these behaviors are not in fact exploratory but committed by youth who are involved in other consensual sexual contacts with age-appropriate partners, (c) that juvenile sex offenders are tomorrow's adult sex offenders, and (d) that these youth are likely to continue engaging in sex offending in adulthood and accumulate in the process a significant number of victims if not properly assessed and treated (e.g., Barbaree,

Hudson, & Seto, 1993; Letourneau & Miner, 2005; Zimring, 2004).

These concerns and assumptions have been accompanied by growing interests from the scientific community to provide evidence-based information to develop the most effective interventions with juvenile sex offenders (JSOs). Indeed, several empirical studies have been conducted to describe who JSOs are (e.g., Barbaree, Marshall, & Hudson, 1993), whether they are different from other juvenile offenders (e.g., Seto & Lalumière, 2010), what characteristics are more particular to youth who sexually reoffend (e.g., McCann & Lussier, 2008), and so on. Such studies have been useful in recognizing the profiles of heterogeneous JSOs with regard to their sociodemographic characteristics, their criminal history, their motivations, their psychopathology, their personality, their general functioning, as well as their upbringing. It is argued here that in the past three decades, we have accumulated a lot of knowledge about those youth involved in sex offending, but not much has been learned about sex offending. Stated differently, to date, the scientific community has focused on the "sex offender" and has somewhat neglected "sex offending".

There has been a plethora of clinical studies of individual characteristics of youth involved in sex offenses since the work of Doshay (1943), but the study of sex offending during adolescence has been limited to three core constructs: (a) the prevalence of sex offending in the general

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population, (b) the offending characteristics and associated feature describing sex offense committed by youth, and more recently (c) sexual recidivism. Prevalence refers to the portion of the general population that has committed a sex crime. This line of research has been important in determining how widespread sex offending is as well as the population-based risk factors. Type of offense refers to particular aspect of the offense such as the victim's age, the offender–victim age differential, the victim–offender relationship, the presence of contact and non-contact sexual behaviors, the level of coercion and violence, etc. Typically, researchers have used such indicators to distinguish between youth having committed a sex crime against a child (also referred to as child molesters) and those having committed a sex crime against victims of the same age or older (peer abusers) (e.g., Hendriks & Bijleveld, 2004). Others stress the importance of distinguishing solo from group offenders. These studies have helped to examine whether there are risk factors differentially associated with specific forms of sex offenses. Finally, sexual recidivism refers to the presence of a rearrest or a reconviction for a sex crime during some follow-up period following the youth's release from detention. This research has helped to raise awareness about the likelihood of sexually reoffending in JSOs. It has also helped to examine whether there are individual factors informing about the likelihood of sexual recidivism.

While a great deal has been learnt from these studies, they highlight the focus of past research on between-individual differences associated with sex offending or who within a specific group is at risk of committing a sex crime (prevalence), of committing a particular crime type (type of offense), or of doing it again (sexual recidivism). These studies have relied almost exclusively on cross-sectional measures of these youth, thus providing only a snapshot of their individual characteristics and their offending behavior at one point in time. In fact, there have been limited attempts to examine the risk and protective factors of sex offending at different developmental stages (prenatal, perinatal,

infancy, early childhood, etc.). It can be reasonably argued, therefore, that the approach pursued in the field of sexual violence and abuse has been typically a static, nondevelopmental perspective. By focusing on between-individual differences associated with sex (re)offending at one point in time, such research does not provide information about the processes involved in the development of sex offending over time, that is, how it starts and evolves over time and eventually how it terminates.

This chapter aims to provide a different, complementary framework to examine the issue of juvenile sex offending. The study of juvenile sex offending has been largely influenced by theories, concepts, and methods used to study adult sex offending (e.g., Barbaree, Marshall, & Hudson, 1993; Seto & Lalumière, 2010). The importation of such ideas has contributed to blurring the lines between JSOs and ASOs while minimizing the important developmental stages and changes between adolescence, adulthood, and the adolescence-adulthood transition (Lussier & Blokland, 2014b). The proposed framework, developmental criminology, is appropriate given the policy issues surrounding youth involved in illegal sexual behaviors but also because of the lack of empirical data regarding the sexual development from its onset (e.g., Lussier & Healey, 2010) as well as sex offending patterns of development (Lussier, van den Berg, Bijleveld, & Hendriks, 2012). The field of developmental criminology has also neglected, until recently, the study of human sexuality and sexual offending. Developmental criminologists have limited their scope of investigation mainly to reckless and risky sexual behaviors (e.g., Le Blanc & Bouthillier, 2003), such as unprotected sex, sexual promiscuity, and prostitution. As a result, the level of knowledge on the origin and development of deviant and nondeviant sexual behaviors throughout childhood and adolescence pales in comparison to that of the origin and development of aggression and violence. To date, what constitutes deviant and nondeviant sexual behaviors remains relatively unclear, and information about their development remains

even more equivocal (e.g., Friedrich, Davies, Feher, & Wright, 2003). The chapter is organized around several key questions aimed to provide baseline information about the state of knowledge regarding the development of juvenile sex offending. These questions are framed around ideas and concepts originally put forth by Dr. Marc Le Blanc's (Le Blanc, 1997; Le Blanc, 2005; Le Blanc & Fréchette, 1989; Le Blanc & Loeber, 1998) and his pioneer work on juvenile delinquency.¹

Sex Offending: A Developmental Criminology Perspective

Developmental criminologists are concerned with the description and the explanation of the development of offending over time. The development of offending is best described by a series of boundary or time-related parameters and more generic descriptors of offending. Boundary-related parameters include the age of onset of offending, the age of offset or age at which the behavior stops, and the time in between (i.e., duration of offending). The following section examines some of the core concepts used by developmental criminologists to describe the development of offending over time (e.g., Le Blanc & Fréchette, 1989; Loeber & Le Blanc, 1990; Le Blanc & Loeber, 1998). Given that the developmental criminology perspective has not really been used in the field of sexual violence and abuse until recently (e.g., Lussier et al., 2012), this area of research is underdeveloped. In the following section, existing knowledge on the core developmental descriptors (prevalence, age of onset, persistence, frequency, and specialization) is reviewed to identify emerging trends in the study of the development of sex offending among youth.

¹ For reason of clarity and space limitation, this chapter is focused on juvenile sex offending and studies conducted with JSOs. Readers interested in knowing more about the state of current knowledge on several of these issues pertaining to adult sex offending can consult Lussier and Cale (2013) as well as Lussier and Blokland (2014a).

How Common Is Juvenile Sex Offending?

Scientific research on general juvenile delinquency has flourished since the introduction of measures of self-reported delinquency. These scales, however, tend to include a limited number of items related to sex offending by youth (i.e., 1 or 2). These items generally refer to either rape or sexual assault. Juvenile sex offending encompasses a wide range of behaviors that varies along several dimensions that cannot adequately be measured with one or two items. Some of these dimensions refer to the offender's behavior during the crime phase: (a) contact and non-contact behaviors (e.g., exposing his/her genitals, fondling), (b) level of sexual intrusiveness (e.g., touching, oral-genital, anal/vaginal penetration), (c) type of coercion (e.g., pressure, position of authority, alcohol/drugs, physical violence), (d) level of violence used (e.g., push down, beat up, choke), and (e) the level of injury (e.g., minimal, serious, death). Sex offenses may also be distinguished by the characteristics of the victim, such as the victim's age and gender, the offender-victim relationship (e.g., family member, acquaintance, stranger), and the location of the offense (e.g., Deslauriers-Varin & Beauregard, 2013). Hence, composite scales of juvenile delinquency are relatively inadequate in measuring the prevalence of sexual offending. For some reason, the range of behaviors characterizing youth sex offending has not been subject to serious empirical examination. Furthermore, there is a lack of a reliable and valid measure of juvenile sex offending. This seriously impedes findings from most existing empirical studies on the prevalence of sex offending. As such, it is not unusual for researchers to refer to broad legal definitions of sex crimes. Most of the research outlined below tends to focus on legal definitions of what constitute a sex offense, which may vary from one jurisdiction to another.

Most knowledge on the prevalence of juvenile sex offending is based on official data (generally arrests). Police data show that the prevalence rate of sex offending peaks during the teenage

years, more precisely during early to mid-adolescence (Kong, Johnson, Beattie, & Cardillo, 2003). Official data on sex offending also show, that, for the most part, juvenile sex offending is mostly a male phenomenon, with over 95 % of alleged offenders being male (Kong et al., 2003; Ryan, Miyoshi, Metzner, Krugman, & Fryer, 1996). The prevalence rate varies between 200 and 225 cases per 100,000 individuals aged between 13 and 15 years old, or roughly 0.2 % of this respective age group. In a study involving three birth cohorts in Racine, Wisconsin (individuals born in 1942, 1949, and 1955), Zimring, Piquero, and Jennings (2007) estimated that 1.5 % of boys in the three cohorts had at least one police contact for a sex offense. Interestingly, the authors also noted that the earliest cohort showed a somewhat lower prevalence rate (0.7 %) when compared to older cohorts (0.9 and 1.6 %, respectively), suggesting a possible cohort/period effect. It is notable that 70 % of sex offenses were misdemeanors (e.g., prostitution, indecent exposure, parking, necking, indecent liberties). If misdemeanor offenses are excluded, the prevalence rate of felony offenses (e.g., forcible rape, assault to rape, and sexual intercourse with a child) is about 0.5 %.²

Similarly, in five birth cohort studies conducted by the Home Office in England and Wales, it was found that the overall official prevalence rate of juvenile sex offending involving a victim was of about 0.3 % for the two younger cohorts and varied between 0.4 and 0.5 % for the three older cohorts (Marshall, 1997). This prevalence of official juvenile sex offending is somewhat similar to what had been reported in the Zimring et al. (2007) study. Drawing on police data from the 1984 Dutch birth cohort study, Lussier and Blokland (2014a) estimated that the prevalence of sex offending during adolescence was of 0.4 %. In sum, despite historical,

sociocultural, and legal differences across studies, there is a surprising degree of consistency in the prevalence estimates of youth sex offending using official data on comparable behaviors. These numbers show that for every 1,000 youth of a birth cohort, between 3 and 5 are arrested for a sex offense during adolescence. These figures illustrate how seldom these acts are brought to the attention of the police and, relatedly, how difficult it becomes for researchers to isolate and identify possible patterns of explanations.

Researchers would argue that juvenile sex offending is largely underestimated in official records and other means of estimating prevalence are needed. Given that the field lacks a valid and reliable measure of juvenile sex offending, it is not surprising that there are few empirical studies that have estimated the prevalence of juvenile sex offending using self-report measures. In the field of sexual violence and abuse, the work of Mary Koss is often associated with the self-reported measure of perpetration of rape and sexual assault. Koss and her colleagues developed the Sexual Experiences Survey (Koss, Gidycz, & Wisniewski, 1987), which has been widely used to estimate the prevalence of rape and sexual assault, most specifically among young adults and college students. In their seminal paper, Koss et al. (1987) showed that up to 25 % of young adult males reported having either pressured, coerced, or used physical violence in a sexual context. Such estimates, however, are subject to much debate, given that some behaviors included in the survey might also lead to overestimation if interpreted out of context (Lussier & Cale, 2013).

More recently, Kjellgren, Priebe, Svedin, and Langstrom (2010) estimated the self-reported prevalence of sexually coercive behaviors in a Swedish sample of youth (high school students) aged between 17 and 20 years old. Sexually coercive behaviors were defined as “talked someone into, used pressure or forced somebody to masturbate them, to have sexual intercourse, oral sex or anal sex” (p. 1162). The authors found that 5 % of the sample reported at least one form of sexual coercive behavior in their lifetime. The authors also reported that several key

²Let’s keep in mind that these individuals were teenagers in the late 1950s–1960s, a period where sex offending committed by youth was mainly seen as sexual nuisance combined to the relative absence of significant empirical research on the issue (see, e.g., Barbaree, Hudson & Seto, 1993).

criminogenic risk factors of antisocial behavior were also related to sexually coercive behaviors committed by young males (e.g., aggression, risk-taking, substance use, depression, poorer perceived parental care) but also risk factors that appear more specific to sex offending such as the endorsement of rape myths, frequent use of pornography, early age of onset of sexual intercourse, and a greater number of sexual partners.

What Is the Age of Onset of Juvenile Sex Offending?

A key developmental concept to understand the behavioral development of sex offending relates to the age at first sex offense. Age of onset is particularly important because it marks the origins of the behavior, and it also contextualizes the developmental stage during which sex offending is activated. Most research findings on the age of onset of juvenile sex offending have been conducted with clinical samples of adjudicated youth. These studies tend to consistently report an average age of 14 years old, regardless of the cultural setting of the study (e.g., Lussier & Blokland, 2014a; Lussier, Blokland, Mathesius, Pardini, & Loeber, 2014; Ryan et al., 1996; Jacobs, Kennedy, & Meyer, 1997). This finding reinforces the idea that middle adolescence is a critical period for the onset of sex offending. This corresponds to a period, at least in the US school system, where students typically transition from eighth (middle school) to ninth grade (high school). It is also a transition period, puberty, during which adolescents go through several physical, neurohormonal, psychological, emotional, and behavioral changes. Interestingly, the average age of onset of juvenile sex offending is fairly similar, perhaps slightly earlier, than the average age of onset for boys' first sexual intercourse. There is clearly a need to examine the onset of sex offending in the context of normal sexual development during early-to-middle adolescence.

As suggested before, sex offending encompasses a broad range of behaviors, and empirical studies suggest that the age of onset

may vary across these behaviors. The study by Groth (1977) suggested that individuals targeting significantly younger victims initiated their offending at about 15 years of age, while those selecting peer-age or older victims started at around 16 years old. Other research has shown that youth who offend against significantly younger victims (child molesters) tend to be significantly younger than peer-age sex offenders (Hendriks & Bijleveld, 2004). These findings may speak, among other things, to the physical and psychological maturity necessary to create a context conducive to a sex offense with same-age peers as opposed to younger children. Other studies have reported much earlier-onset ages for clinical samples of juvenile offenders. For example, Zolondek, Abel, Northway, and Jordan (2001) found that the average self-reported age of onset for thirteen different sexually deviant behaviors ranged from 9.7 (masochism) to 12.4 (phone sex) years old. The self-reported onset age for child molestation was 11.9 years old and 11.7 years old for unwanted rubbing and touching. These findings suggest that in some cases, sexually deviant behaviors may precede the onset of sex offending. Unfortunately, this hypothesis has not been empirically tested.

In addition, researchers have not examined the possibility that different behavioral manifestations of sex offending may develop in a hierarchical and predictable fashion similar to what has been shown with other behavioral phenotypes, such as authority-conflict behaviors, reckless behaviors, as well as overt and covert antisocial behaviors (e.g., Le Blanc & Loeber, 1998). Existing studies have highlighted the need to combine official and self-report data that describe the onset of sex offending. Studies using both types of data with adult sex offenders have found an average of a 7-year gap between self-reported and official ages of onset among convicted adult male sex offenders (Lussier & Mathesius, 2012). It is unclear how this self-reported-official onset gap characterizes the development of sex offending in JSOs. This is important given that a youth may be active for quite some time before his engagement in sex offending is apprehended and an intervention

strategy is proposed. This is especially relevant for the identification of the early-onset juvenile sex offender group.

The Early-Onset Juvenile Sex Offender

For developmental criminologists, the identification of early-onset offenders is pivotal because this group is at risk of a long-term pattern of chronic, violent, and versatile offending (e.g., Le Blanc & Loeber, 1998; Moffitt, 1993). The scientific literature on the early-onset group of JSOs is scarce, but significant trends suggesting its importance are emerging. For example, Awad and Saunders (1991) found that 14 % of child molesters and 5 % of peer assaulters exhibited their first sexually deviant behavior prior to age 12. The Ryan et al. (1996) study of a large clinical sample of JSOs reported that 26 % of these youth had committed some sexually abusive behavior before age 12. The average age of onset for sex offending in a Canadian clinical sample of JSOs was 13 years old (Carpentier, Proulx, & Leclerc, 2011); about 20 % of the sample was categorized as early starters (or child onset, with their first sex crime occurring prior to age 12), and about 80 % were categorized as late starters (i.e., those having committed their first sex crime at a later age). The study highlighted that the correlates of an early onset of sex offending included having a parent with a history of sex offending, having a parent who had been sexually victimized, personal experiences of sexual victimization, involvement in deviant sexual behaviors, as well as early aggressive behaviors (Carpentier et al., 2011). These findings are reminiscent of the Seto and Lalumière (2010) study, which showed that a history of sexual victimization and the presence of atypical sexual behaviors strongly distinguish JSOs from juvenile nonsex offenders.

Similarly, a retrospective file review of 280 cases referred to a community assessment and treatment service compared groups of early-onset (i.e., age at first sexually abusive behavior occurring before 11 years of age) and late-onset

youth (Vizard, Hickey, & McCrory, 2007). Several developmental differences were found between the two groups. The early-onset youth were more likely to come from erratic family environments (poor supervision, inadequate sexual boundaries, parents with mental health issues, multiple home placements), to have been neglected and victimized (physically, emotionally, and sexually) to be disruptive, impulsive, and hyperactive, and to exhibit a difficult temperament. The early-onset individuals were also more likely to have abused male victims, less likely to use verbal coercion, or to penetrate their victim. Taken together, the studies on the age of onset of sex offending suggest the presence of an early-onset group (prior adolescence) and a late-onset group, who initiate offending during mid-adolescence. That said, much research is needed to clarify what constitutes an early onset (what age) and what behavior or set of behaviors should be considered as an onset (illegal behaviors, atypical sexual behaviors, etc.).

How Likely Are Juvenile Sex Offenders to Persist in Sex Offending?

Persistence implies that an adolescent repeats the behavior over time. Embedded in the concept of persistence is a behavioral (i.e., repetition of the behavior) and a temporal dimension (i.e., duration of offending). In the field of sexual violence and abuse, the concept of persistence is concerned with the proportion of youth who sexually reoffend during adolescence. Retrospective studies, typically conducted with clinical samples of JSO, tend to report a relatively high level of persistence. For example, drawing on a small sample of JSOs assessed at a forensic mental health facility, Groth (1977) found that over 60 % of the sample had a prior sex offense. Other studies based on retrospective data conducted in the 1980s also found results consistent with Groth's finding of the high recidivism rate among JSOs (e.g., Awad, Saunders, & Levene, 1984; Awad & Saunders, 1991; Becker, Kaplan, Cunningham-Rathner, & Kavoussi, 1986;

Fehrenbach, Smith, Monastersky, & Deisher, 1986). These findings have led some to conclude that “sex offenders have established a repetitive pattern of deviant behavior prior to an arrest” (Boyd, Hagan, & Cho, 2000; p. 139).

This idea of the “persistent JSO” that emerged in the 1980s appeared to be inconsistent with the predominant optimistic view of juvenile sex offending. Closer analysis of the Groth (1977) data also indicates that over 20 % of those classified as having committed a prior sex offense were either not charged or the charge was dismissed. It also indicated that another 34 % received a suspended sentence for their offense. Indeed, the Groth study highlighted that the court dealt with the initial offense through alternative means and sanctions, which may have diverted these first-time offenders from mental health facilities. In other words, the elevated level of persistence found in this sample may have been a function of the way the court dealt with recidivists (as opposed to first-time offenders), rather than a true observation that the majority of JSOs are persisters. In sum, early studies conducted in the 1980s were based on selective samples of sexual recidivists, which led researchers to conclude that juvenile offenders were prone to persist sexually offending over time.

The portrayal of JSOs as persisters does not fit the general picture provided by other empirical studies, which reported much lower level of retrospective continuity of sex offending. For example, in a study of over 1,000 JSOs, only 7.5 % were found to have previously been charged with a sex offense, and less than half had been found guilty as charged (Ryan et al., 1996). The analysis of criminal histories of a sample of youth referred to a Dutch clinic by the court showed that on average, study participants had committed less than one prior sex crime (Hendriks & Bijleveld, 2004). Similarly, in the Way and Urbaniak (2008) study of 160 consecutive closed case files of adjudicated adolescent males over an 8-year period seen at a family court, only 17 % of their sample had a prior charge for a sex offense. In a study of 56 cases referred for forensic assessment in Sweden, 29 % had any previous “documented” sex

offending behavior (Langström & Grann, 2000). These results are consistent with the view that adjudicated youth are not sexual recidivists and prospective longitudinal studies with sample of JSO tend to confirm this conclusion.

Prospective longitudinal studies also portray persistence in sex offending as an unusual phenomenon among JSOs. Indeed, empirical studies that have prospectively followed up a group of adjudicated JSOs have shown that only a small fraction of them are rearrested or charged again for a sex crime. Meta-analyses combining multiple prospective longitudinal studies show that sexual recidivism rates typically reported in longitudinal studies tend to vary between 5 and 10 % (McCann & Lussier, 2008). Longitudinal research with JSOs has shown that it is uncommon for them to sexually reoffend after 5–6 years following their release (Langström, 2002). Some studies report much higher base rates of sexual recidivism, but these findings may be attributable to divergent sample characteristics. For example, Langström and Grann (2000) reported that 20 % of their Swedish sample of adolescents/young adults referred for forensic assessment had sexually reoffended during the follow-up period; these incidents appeared to be attributable to the presence of non-contact offenders (i.e., exhibitionists). Similar figures were reported by Hagan, Gust-Brey, Cho, and Dow (2001), in a study using recidivism data for a sample of youth (age 12–19) who completed a mandatory serious sex offender treatment program in a secure juvenile correctional facility in the USA and followed for a period of about 8 years following their release. Analyses based on self-report data, as opposed to the often used official data on offending, reach the similar conclusion that persistence in sex offending is not the norm. Bremer (1992) reported a 6 % reconviction rate in a sample of serious JSOs; the recidivism rate rose to 11 % when based on self-reports. Therefore, while analyses based on official data do underestimate the true recidivism rates, the fact remains that the vast majority of JSOs are not rearrested for a sex crime. These results, therefore, suggest that the sex offending of youth may be limited to

the period of adolescence. It is difficult to draw firm conclusion from these longitudinal studies given that the follow-up period tends to be relatively short. In other words, sex offending may remerge much later in the life course. Studies on the continuity of sex offending provide some tentative answers to this hypothesis.

How Likely Are Juvenile Sex Offenders to Continue Their Sex Offending in Adulthood?

A related concept, continuity of sex offending, can be understood as the persistence of sex offending into adulthood. The concept of continuity, therefore, raises an important theoretical/policy question: What proportion of JSOs goes on to become adult sex offenders? Research has shown how important it is to separate retrospective and prospective continuity. On the one hand, retrospective continuity involves the examination of the proportion of adult sex offenders who were previously JSOs. On the other hand, prospective continuity is concerned with the proportion of JSOs who later commit another sex crime in adulthood. The importance of distinguishing between retrospective and prospective continuity was highlighted by Robins (1978) in what is now known as the Robins' paradox. Robins observed that while most antisocial children do not go on to become antisocial adults, adult antisocial behavior virtually requires early antisocial behavior. In other words, she argued that highly antisocial behavior rarely or never arose *de novo* in adulthood. It is unclear whether Robins' paradox also applies more specifically to sex offending.

In line with empirical studies examining persistence, the current state of empirical knowledge shows that most JSOs do not become adult sex offenders. To address the issue of continuity, Zimring et al. (2007) re-examined the data from the Racine (Wisconsin, USA) birth cohort studies. The findings reveal two important issues. First, Zimring et al. (2007) reported that while the official prevalence of adult sex offending in the Racine birth cohort study was about 3 %, this

figure was 8.5 % among those having committed a sex crime during adolescence. In other words, having been arrested for a sex crime in youth increased the odds of being arrested for a sex crime in adulthood. Second, the study showed that JSOs accounted for only 4 % of sex crimes committed in adulthood by members of the cohort. Relatedly, in a further examination of the Philadelphia birth cohort study data, Zimring, Jennings, Piquero, and Hays (2009) observed "the most striking feature of the Philadelphia data was the lack of overlap between juvenile sex offending and adult sex offending" (p. 65). They observed that for every ten JSOs, only one had a sex offense record in adulthood. Again, this group of JSO accounted for roughly 8 % of the total adult sex offenses committed by the entire members of the birth cohort. The lack of continuity found in the Zimring et al. studies was later confirmed in another birth cohort study. Lussier and Blokland (2014b) reported that while the prevalence of adult sex offending among non-JSOs was of 0.5 %, it rose to 3 % for one-time JSOs and 12 % for JSO recidivists. If these numbers suggest that JSOs represent a greater risk of committing a sex crime in adulthood, it is important from a policy standpoint not to lose sight of the fact that these youth are responsible for a trivial proportion of sex crimes committed by their birth cohort in adulthood. The Lussier and Blokland (2014a) study, in that regard, showed that JSOs were, as a group, responsible for less than 9 % of all arrests for a sex crime by the cohort. In other words, despite some evidence of continuity, juvenile and adult sex offending appear to be two distinct phenomena.

Chronic Offending and Adult Sex Offending

The focus of research on JSOs' sexual deviance and sex offending has distracted their attention from another continuity process characterizing the development of sex offending over life course. Developmental criminologists generally agree that a particular offense type tends to be a manifestation of more general processes or

syndromes, for example, general deviance (Le Blanc, 2005). A youth who is involved in drug dealing may have been involved in property crimes in the past and could well be involved in fraud in the future, if offending persists. This process is referred to as heterotypic continuity or the continuity of conceptually similar behaviors over time and across developmental stages. Heterotypic continuity suggests that at least for some individuals, sex offending may be another manifestation of general deviance. This hypothesis has not been the topic of research in the field of sex offending (for an exception, see Lussier, Leclerc, Cale, & Proulx, 2007). Recent research, however, suggests that this should become a priority in future investigation.

In line with the Zimring et al. (2007) study findings, Lussier and Blokland (2014a) found that the group of adjudicated youth most at risk of being arrested for a sex crime in adulthood was not the JSOs, but rather the chronic offenders (i.e., those arrested for many offenses, irrespective of the nature of the crime). Indeed, Lussier and Blokland (2014a) study demonstrated that the odds of committing a sex crime in adulthood were higher for chronic offenders (i.e., at least six arrests for any crime) (OR = 3.9) than they were for JSOs (OR = 1.8). These odds were computed by controlling for whether or not youth had been arrested for a sex crime during adolescence. In other words, chronic juvenile offenders who persist offending in adulthood are at risk of escalating to sex offending. This challenges the viewpoint that JSOs are the most at risk group of adult sex offenders and should be the only target of secondary prevention intervention (e.g., Basile, 2003).

What Is the Frequency of Sexual Offending Among Juvenile Sex Offenders?

The frequency of sex crimes can be measured in two ways (Lussier & Cale, 2013). Traditionally, the frequency of sex offending has referred to the number of different individuals that have been

sexually victimized by an offender. It can also refer, however, to the number of sex crime events, that is, the total number of different times or occasions an individual has sexually abused his or her victim(s). This approach provides a more precise picture of the extent of the sexual offending but is more difficult to estimate, especially for cases involving multiple incidents of victimization over time. Research with adults conducted by Lussier, Bouchard, and Beauregard (2011) showed that it is more useful to distinguish persistent sex offenders who pursue a victim-oriented approach (i.e., multiple victims, each victimized on a limited number of occasion) from those pursuing an event-based approach (i.e., limited number of victims, victimized multiples times). Indeed, this research suggests that offenders tend to pursue either a victim-oriented approach or an event-based approach. This choice or inclination toward one or the other approach may be explained by motivational factors (e.g., desire to develop and maintain a long-term inappropriate sexual relationship with a child, a desire for immediate sexual gratifications) and contextual and opportunity-related factors such as the presence of a vulnerable victim and the absence of capable guardians (e.g., the adolescent is repeatedly offending in the context of babysitting the same younger person). It is unclear, however, if these two offending patterns apply to juvenile sex offending.

Few clinical studies have examined the issue of the frequency of sex offending among JSOs. The frequency of sex offending appears to be low but significantly varies across samples or groups of JSOs. In a sample of over 300 adjudicated JSOs, Carpentier et al. (2011) found that study participants reported an average number of two victims, ranging from one to sixteen. These victims were primarily exclusively children (close to 60 %), followed by peers or adults exclusively (about 25 %). Similar results were found by Jacobs et al. (1997). In their sample of 78 JSOs in a residential specialized treatment programs, the average number of adjudicated sexual offenses per youth was 1.8. It is unclear, however, whether it referred to the number of

events or the number of different victims, or both. Becker et al.'s (1986) analysis of self-report data for a sample of 67 youth referred to a clinic revealed that the frequency of offending, when based on the number of victims, is relatively low, that is, about one victim per youth. This number rose to about two victims on average for adolescents having sexually abused a young boy. Those having offended against peer-age female victims had an average of 1.5 victims. Data on the average number of events were quite similar, with the exception of those having offended against peer-age male and incest, who had a much higher number of events per victim. Furthermore, the study of Miranda and Corcoran (2000) compared the frequency and duration of the abuse between a small sample of JSOs and a small sample of adult sex offenders. The findings showed that, on average, youth had been involved in about two sexual abuse incidents over a period of about 9 months. These individuals had also offended less frequently and over a shorter period over time when compared to the group of adults. In other words, for most youth, the number of victims remains relatively low unless sex offending involves male victims in an intrafamilial context.

Chronic Juvenile Sex Offenders?

These numbers contrast with those found elsewhere and suggest some heterogeneity in the frequency of sex offending among JSOs. A study of the sex offending histories of a small group of adjudicated male sex offenders revealed that they had, on average, 3.6 hands-on victims (median = 3) and were involved in 73 hands-on events (median = 12) (Wieckowski, Hartsoe, Mayer, & Shortz, 1998). The average number of hands-off victims (mean = 38, median = 14) and events (Mean = 114; median = 51) was much higher. It is more likely that hands-off offenses (e.g., exhibitionism) involved multiple simultaneous victims as opposed to hands-on offenses (e.g., rape). These findings contrast with those reported in the Zolondek et al.'s (2001) study, which found that the average self-

reported number of victims of child molestation was about four (an average of 11 events), while it was nine victims (15 events) for unwanted rubbing and touching. In the Ryan et al. (1996) study based on a large clinical sample, the average number of victims known at the time of intake assessment was close to eight.

Wieckowski et al.'s (1998) findings suggest that some forms of sex offending, such as hands-off sex offenses, may be more conducive to repetition, partly because it may involve behaviors that may be perceived as minor or not serious enough to be reported to the authorities (e.g., voyeuristic behaviors). The findings also show a significant gap between the means and medians of offending frequency, suggesting an asymmetric distribution of offending frequency. This is likely to occur when a small group of individuals present a frequency of offending that is much higher than most other offender included in the sample. In other words, Wieckowski et al.'s (1998) study findings suggest that there is a small subgroup of chronic JSOs. To date, no studies have examined the prevalence of chronic sex offending and whether chronic JSOs present a clinical profile distinct from that of other nonchronic JSOs.

Are Juvenile Sex Offenders Sex Crime Specialists or Versatile Offenders?

The specialization-versatility question addresses the issue of whether juvenile sex offenders tend to limit their offending to sex crimes (specialization) or whether their offending, if persistent, is versatile. Policy-wise, this issue is crucial in that it speaks to whether or not specialized treatment and intervention are necessary for JSOs. There have been a limited number of studies on the crime mix of JSOs, but findings emerging from these studies are revealing. In the study of a small group of JSOs by Awad et al. (1984), 50 % of JSO had a history of court appearances and/or police contacts for nonsexual offenses, with theft and breaking and entering being most prevalent. In the Ryan et al. (1996) examination of the criminal history profile of over 1,000 JSOs,

63 % had a history of nonsexual offense; close to 28 % were known to have three or more nonsexual offenses. The most prevalent offenses were shoplifting (41 %), theft (31 %), assault (26 %), runaway (26 %), and vandalism (20 %). Lussier and Blokland (2014a) found that a little more than 40 % of JSOs had a prior record for a nonsexual offense, with property offenses being the most prevalent among broad offense categories.

It is clear that among the group of adjudicated JSOs, there is a group of recidivists who have had prior contacts with the criminal justice system for nonsexual crimes. These studies are informative of the importance of nonsexual offending in the criminal histories of JSOs. These studies, however, remain silent about the possible link between past nonsexual offending and their current sex offenses. For example, is it possible that prior nonsexual offenses represent a stepping-stone toward a sex crime? Such a hypothesis was raised by Elliott (1998), who showed that nonsexual assault tends to precede sexual assault and rarely the other way around. The characteristics of these escalators were not identified. Also, it is possible that, although unlikely to characterize most JSOs, prior nonsexual offending may have had an underlying sexual motivation such as stealing underwear, but the examination of criminal records alone is unlikely to inform us about the presence of such motives.

One way of addressing the specialization-versatility debate, as suggested by clinical researchers, is to split JSOs into two groups: the sex-only and the sex-plus groups. This categorization was proposed among others by Butler and Seto (2002), who studied 114 male juvenile offenders, including 32 JSOs. The researchers distinguished JSOs ($n = 22$) who had only been charged with sex crimes (referred to as sex-only) from JSOs ($n = 10$) who had been charged with sex crimes and other crimes (referred to as sex-plus). The two groups of JSOs were then compared with another sample of youth offenders with no sex crimes in their criminal history. Looking at a series of developmental behavioral indicators, Butler and Seto (2002) found few significant differences between JSOs and

nonsexual juvenile offenders. However, they found that the nonsexual offenders were more similar to members of the sex-plus group than to the sex-only group, on the basis of many indicators. The sex-only group had fewer conduct problems, more prosocial attitudes and beliefs, and a lower expected risk of future delinquency than the sex-plus group. The study was based on retrospective data and did not provide a life-course view of their sexual offending.

The approach taken by Butler and Seto (2002) is important and relevant, but it also raises several questions about the unfolding of JSOs' behavior over time. First, is it possible that the sex-only group are late-onset nonsexual offenders? Longitudinal research suggests that it could be the case, at least for a subgroup of sex-only JSO (Lussier et al., 2012). It would be interesting to examine other patterns of deviance for this subgroup, such as the presence of a substance use and abuse issues. Second, Butler and Seto (2002) suggest that the sex-plus group is relatively homogeneous, and more recent research suggests otherwise. More specifically, different and distinct developmental pathways may lead to a sex-plus pattern. For example, McCuish, Lussier, and Corrado (2014) examined the developmental antisocial antecedents of JSOs and groups of juvenile nonsex offenders (JNSOs) and found the presence of the same two pathways across the two groups. In line with Loeber's developmental pathway model, the study showed a covert and an overt developmental trajectories among both JSOs and JNSOs. It could be hypothesized that the nature of the sex crime committed is in line with the overt (e.g., aggressive, violent) or covert (e.g., deceitful, manipulative) nature of the other antisocial behaviors manifested by the adolescent. These findings highlight that the Butler and Seto (2002) typology may be too restrictive to account for antisocial patterns among JSOs (see also Lussier et al., 2012). Although it provides an interesting framework for the study of heterogeneity among JSOs, the absence of prospective longitudinal data did not allow these researchers to capture the full developmental course of the behavior.

The specialization-versatility issue also addresses the issue of whether persistent sex offenders tend to repeat the same sex crime over time (specialization) or whether their sex offending is versatile and includes a wide array of offenses. This issue is important given that it may help to delineate the nature of treatment and intervention designed for juvenile offenders. If sex offending is repetitive and specific in nature, it may require a more circumscribed and specialized intervention aligned to the factors associated with the type of offense committed by the youth. A repetitive yet versatile sex offending may speak of the impulsive nature of the behavior and may require a much broader intervention. Measuring versatility in sex offending is challenging because sex crimes are multidimensional (Lussier & Cale, 2013). In the Fehrenbach et al. (1986) investigation of a sample of clinical referrals, 72 % of persisters had committed the same type of offense as the referral offense in the past, 23 % had committed both the same and different types of offenses, and 5 % had committed only different crimes. Awad et al. (1984) found that among recidivists, 73 % repeated the same kind of offense, 91 % reoffended against victims of the same gender, and in half of the cases the age difference between the offender and the victim was about the same (see also Awad & Saunders, 1991). Vizard et al. (2007) reported that 55 % of early onset (childhood onset) and 33 % of late onset (adolescent onset) had committed sexually abusive behaviors against both male and female victims. Furthermore, 31 % of early-onset youth had sexually abused both a child and an adult, compared with 19 % of the late-onset group. Both differences were statistically significant, which suggest that versatility in sex offending is not uncommon, especially for those who initiate their sexually abusive behaviors in childhood as opposed to adolescence.

A Developmental Taxonomy of Juvenile Sex Offenders

Prior empirical examination of JSOs has been concerned with the identification of the

“average” offender based on a series of developmental parameters (see also Seto & Lalumière, 2010). It is believed that this portrayal of JSOs as a single heterogeneous group is inconsistent with the empirical evidence about their offending patterns. Said differently, it is argued that the average JSO may not properly reflect the distinctive types of youths involved in sex offending. In fact, perhaps the field of sexual violence and abuse should move beyond the current debate regarding what the profile of the “average” JSO is (e.g., an antisocial youth committing a sex crime; an adolescent with early symptoms of sexual deviance) by exploring the presence of different types and forms of sex offending trajectories over time. Researchers have proposed pseudodevelopmental classification schemes to address the limitation of past research and to make sense of the heterogeneity characterizing JSOs (Becker, 1998; Butler & Seto, 2002). These classification schemes, however, remain relatively silent about the pattern of development of offending over time. A person-oriented approach may be a fruitful avenue to describe these youth and the development of offending (Bergman & Magnusson, 1997; Lussier & Davies, 2011). In this regard, the person-oriented approach aims to disaggregate the general information about individuals in order to identify the presence of patterns of individual development of over time.

Dual Taxonomy of Juvenile Sex Offenders

The current state of empirical knowledge suggests the presence of two distinct groups of JSOs. The proposed developmental classification model focuses on the description of a dual taxonomy describing different and distinctive pattern of development of sex offending. The classification model includes a group of (a) adolescent-limited sex offenders and a group of (b) high-rate slow desisters who can be distinguished on a series of developmental indicators (e.g., prevalence, onset age, growth, persistence, specialization, etc.) (Table 26.1). The proposed classification model is reminiscent of Moffitt’s

Table 26.1 A developmental taxonomy of juvenile sex offenders

Developmental features of sexual offending	Adolescent limited	High-rate slow desisters
Prevalence	About 90 %	About 10 %
Onset	Middle adolescence	Childhood
Growth	Limited	Gradual
Frequency	Limited	Repetitive and frequent
Persistence	If any, for nonsexual offending	Yes, and involves continuity of sex offending in adulthood
Sexual recidivism	Present, but limited to adolescence	Present in adolescence, probabilities declining in adulthood
Synchronicity	Some but limited	Very limited
Specialization	Limited	Limited in adolescence, some evidence in adulthood
Desistance in sex offending	Rapid, in adolescence	Slow and gradual, in adulthood

(1993) dual taxonomy of antisocial behavior that distinguishes a group of life-course persisters and a group of adolescent-limited youth. That said, it is not suggested here that Moffitt's adolescent-limited antisocial youth are adolescent-limited juvenile sex offenders nor it is suggested that Moffitt's life-course persisters are high-rate slow desister juvenile sex offenders. While Moffitt's taxonomy refers to the general patterns of antisocial behaviors, the proposed classification model refers strictly to patterns of sex offending. It is argued that Moffitt's taxonomy provides a limited view of specific patterns of offending *and* sex offending among youth and a more specific classification model is necessary to account for specific patterns of juvenile sex offending.

The adolescent-limited JSOs represent the vast majority of youth who are involved in sex offenses during adolescence. It is argued that this group represents about 90 % of JSOs. Their offending tends to start in middle adolescence. It is also argued that the growth of their sex offending is limited given that these young offenders may offend only once and are unlikely to be involved in more than two or three sex offenses. Persistence is possible, but limited to the period of adolescence, if the associated risk factors are present and the protective factors are limited. It is believed that risk factors are dynamic and transitory for this group and more specific to the period of adolescence

(e.g., puberty, peer influence, binge drinking). It is hypothesized that desistance from sex offending will be rapid and also immediate for most youth and will occur in late adolescence or in emerging adulthood. If there is persistence in offending beyond this period, it is expected that offending will be nonsexual in nature.

The second group is referred to as the high-rate slow desisters, and they represent a small subgroup of adolescent sex offenders (roughly 10 %). This group may be more prevalent in criminal justice settings involving more serious cases and sexual recidivists (i.e., youth detention, inpatient treatment programs). It is hypothesized that the onset of sex offending occurs early in the life course for this group, in late childhood, or early adolescence. This group is likely to show early signs of atypical sexual behaviors, which may precede and co-occur with sex offending. The growth of their offending will be gradual and constant without any treatment or intervention. This group is most likely to persist during adolescence and into adulthood, and in the process, their offending will show evidence of specialization in sex offenses. It is argued that these youth will eventually desist from sex offending but the desistance process is significantly longer compared to the adolescent-limited group. This dual taxonomy is proposed here as an initial research framework to organize and stimulate developmental research on the issue of juvenile sex offending.

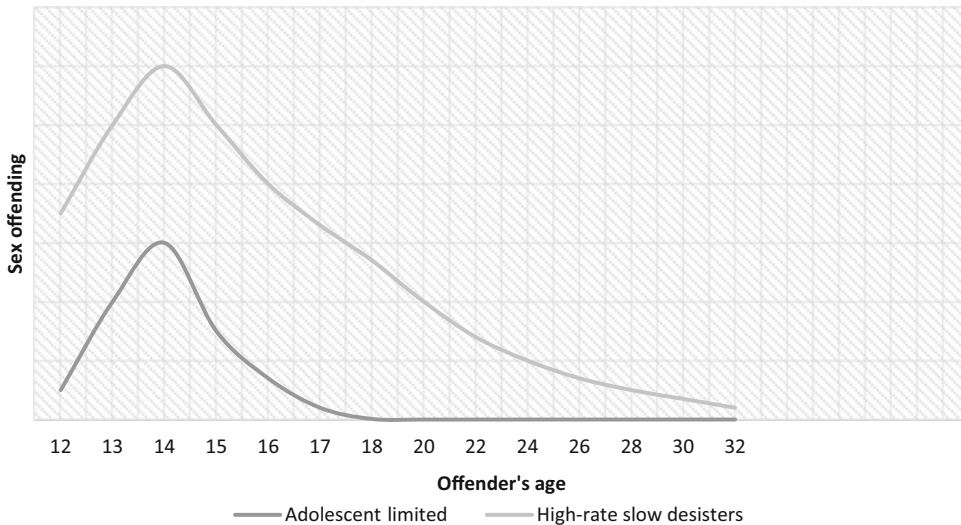


Fig. 26.1 Hypothesized sex offending trajectories of juvenile sex offenders

The dual taxonomy of JSOs has received empirical support from the field of sexual violence and abuse (van den Berg, Bijleveld, & Hendriks, 2011; Lussier et al., 2012). Using both retrospective and prospective longitudinal data of a group of close to 500 adjudicated JSOs, Lussier et al. (2012) used semiparametric group-based modeling to examine sex offending and nonsexual offending trajectories between ages 12 and 32. The authors identified that a two-sex-offending-trajectory model best fitted the data and the identified trajectories were in line with the proposed dual taxonomy of JSOs, that is, a group of adolescent-limited sex offenders (89.6 %) and a group of high-rate slow desisters (10.4 %) (Fig. 26.1).

Key observations emerged from the study. First, both groups had a similar proportion of sexual recidivists during adolescence, but with a few exceptions, only the high-rate group included sexual recidivists in adulthood. Second, the type of offender (i.e., child abusers, peer abusers, group offenders) is proportionally distributed across sex offending trajectories, suggesting that the dual taxonomy applied to different sex offender types. Third, researchers also showed little synchrony between sex offending and nonsexual offending trajectories with respect to Moffitt's (1993) dual taxonomy

of antisocial behavior (i.e., adolescent-limited and life-course persisters). In other words, adolescent-limited sex offending is not necessarily associated with adolescent-limited nonsexual offending, and a pattern of high-rate sex offending is not necessarily associated with a pattern of life-course persistence of nonsexual offending. This finding is crucial in that it shows that Moffitt's taxonomy does not account for patterns of juvenile sex offending and reiterates the need for a specific developmental model of juvenile sex offending. Clearly, this study requires replication. However, it does point out that, during adolescence, both the adolescent-limited and the high-rate slow desister groups may look similar in terms of sex offending patterns. Without additional research helping to identify developmental factors discriminating the two groups, classification errors are most likely to occur.

Summary

The field of research on juvenile sex offending is relatively recent and, over two decades, has accumulated an impressive corpus of scientific knowledge. This scientific knowledge has its share of conceptual and methodological

limitations that could benefit from a developmental criminology perspective. While many aspects related to the development of sex offending remain to be examined, the state of empirical knowledge has shown that:

- Prevalence estimates suggest that for every 1,000 adolescents, between 3 and 5 are arrested for a sex crime, but this is likely an underestimate of the true prevalence rate of sex offending during this period. These incidents predominantly involve young males.
- The peak age of onset is around age 14, which reinforces the need for more research investigating the period of early-to-mid adolescence.
- There is an early-onset group, characterized by a sex offending onset in childhood. Research has identified the individual characteristics that distinguish this group from other JSOs with a later onset.
- Frequency of sex offending is generally low and consists of one or two contact offenses but may be more frequent for a small subgroup of juvenile sex offender, especially those involved in non-contact offenses.
- Overall, persistence in sex offending is relatively uncommon, but the risk of persistence may vary across settings.
- Continuity in adulthood is limited to a small subgroup of youth (about 10 % of adjudicated JSOs), suggesting that for the most part, juvenile and adult sex offending are two distinct phenomena.
- Chronic juvenile offenders, irrespective of whether they have committed a sex crime or not during adolescence, represent a higher risk of adult sex offending when compared to JSOs.
- About half of adjudicated JSOs had histories of nonsexual offending.
- If sex offending persists, it is most likely to remain similar across offenses, suggesting some degree of specialization.
- A dual taxonomy consisting of an adolescent-limited and a high-rate slow desister group may best represent the patterns of sex offending over the life course of JSOs.

Future Research Needs

- One of the key research needs in the field of juvenile sex offending research is the implementation of prospective longitudinal studies examining the sexual development from onset (e.g., Lussier & Healey, 2009; Lussier & Blokland, 2014b). Because longitudinal studies require time and money, many authors have relied on existing data or collaborated with investigators of large-scale longitudinal studies of juvenile delinquency to examine the development of sex offending and associated risk and protective factors to provide more immediate policy recommendations (e.g., Zimring et al., 2007; Lussier & Blokland, 2014b). The downside is that existing longitudinal studies on delinquency were not developed to examine the sexual development and typically include crude measures of sexual development and sex offending.
- There is also a need to develop a scale of juvenile sexual delinquency, which measures the whole spectrum of sex offenses committed by youth. This measure would be vital to better understand the development of sex offending during adolescence and emerging adulthood, as well as the many forms that juvenile sex offending may take over time.
- Research estimating the prevalence of sex offending has focused on the 17–20 years olds, and there is little research focusing on the prevalence and associated risk factors of sex offending for the early-to-middle adolescence.
- There is little research on the childhood risk factors of juvenile sex offending, and prior research has focused on experience of child sexual abuse. There is a need to broaden the scope of risk factors to include factors such as parenting skills and values, exposure to violence and other forms of abuse, clinical symptoms of the child (hyperactivity, attention deficit, self-regulation issues, aggression), and community and school factors (living in a criminogenic neighborhood, etc.).

- Research suggests a link between atypical childhood sexual behaviors and juvenile sex offending, but there is little research on this issue, and most studies conducted have relied on retrospective data with clinical samples. It remains unclear what are atypical sexual behaviors, which atypical sexual behaviors are linked to juvenile sex offending, and whether there are pathways of atypical sexual development conducive to juvenile sex offending.
- Research suggests the presence of a small subgroup of chronic JSOs, but the prevalence and the characteristics of this group have not been systematically examined. Research needs to firmly establish a definition and criteria of what constitute chronic juvenile sex offending.
- Researchers should investigate the prevalence and characteristics of subgroups of JSOs with distinct patterns of sex offending such as the early starters and chronic, repetitive JSOs.
- Comorbidity or synchrony between juvenile sex offending and other forms of antisocial behaviors needs to be further examined, such as reckless and dangerous behaviors (e.g., sexual promiscuity, dangerous driving, substance use), authority-conflict behaviors (e.g., being defiant and deceitful toward authority figures), covert behaviors (e.g., lying frequently, false representation, fraud), as well as overt violent behaviors (e.g., assault, dating violence, gang-related violence).
- Researchers should examine the characteristics of chronic juvenile offenders who escalate to sex crimes in adulthood and explore possible policy implications for early intervention.
- Researchers should look at a broader range of parameters associated with the development of sex offending, such as escalation and desistance, both of which have received little attention in this field of research.
- More research is needed to identify and describe the sex offending trajectories and

their associated developmental risk and protective factors.

Recommended Readings

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Part IV

**Practical Applications of Research
in Developmental Criminology**

Early Prevention of Criminal and Antisocial Behavior: A Review of Interventions in Infancy and Childhood

27

Holly S. Schindler and Caroline F.D. Black

The cumulative burden of early behavior problems and subsequent criminal and antisocial activities accounts for considerable costs to affected individuals, as well as to education, child welfare, mental health, and juvenile justice systems. Indeed, it is estimated that a high-risk youth following a life-course trajectory of offending costs society approximately \$1–\$5 million (Cohen & Piquero, 2009; Munoz, Hutchings, Edwards, Hounsone, & O’Ceilleachair, 2004). These costs have catalyzed a growing public and political interest in early prevention, and a variety of approaches have now attempted to intervene early in the life course in order to address the roots of lifelong impairments. Approaches have been quite heterogeneous, varying on key factors such as participant ages, intervention setting, and documented efficacy (Losel & Bender, 2012). In this chapter, we focus on a particular subset of this diverse literature, as outlined below.

First, we focus specifically on preventive interventions during early childhood, defined as the first 5 years of life, that target children and/or their families. Early childhood is a time when rapid developmental changes make children especially receptive to the effects of intervention efforts (Shonkoff & Phillips, 2000). Furthermore, a wealth of research has pointed to the potency of risk factors as early as infancy that

predict later criminal and antisocial behavior (e.g., Caspi & Moffitt, 1995; Farrington & Welsh, 2007; West & Farrington, 1977), and the life-course persistent trajectory subtypes of antisocial and aggressive behavior can be traced back to early childhood (Campbell, Spieker, Burchinal, Poe, & The NICHD Early Child Care Research Network, 2006; Moffitt, 1993; Tremblay et al., 2004). In addition to a clear developmental rationale for intervening early, a substantial increase in early childhood programs operating throughout the world in a variety of contexts—most notably in center-based care and family homes—makes early intervention more feasible. In Organisation for Economic Co-operation and Development (OECD) countries, an unprecedented 25 % of children under age 3 and 80 % of children ages 3 to 5 attend some form of early childhood care and education program (United Nations Children’s Fund, 2008). Enrollment in low- and middle-income countries is growing as well (Engle et al., 2011). In recent decades, there has also been renewed attention on other strategies, such as home visiting, that aim to promote child development and effective parenting techniques during early childhood (American Academy of Pediatrics Council on Community Pediatrics, 2009).

Second, we focus on programs that have a strong evidence base, with an emphasis on seminal programs and programs that represent new directions in the field of early prevention. When available, we refer readers to other reviews and meta-analyses. Though the ultimate goal is to

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identify early preventive interventions that have successfully deterred criminal and antisocial behavior later in life, prevention during early childhood can also provide more immediate benefits by reducing early behavior problems. Therefore, we include studies that report on relevant short- and/or long-term program effects. This inclusion criterion also allows us to consider promising prevention programs that have not had the opportunity to follow participants into adolescence and adulthood. We prioritize evaluations of studies with randomized controlled trials (i.e., using random assignment of participants), though we also include those using high-quality quasi-experimental designs. Finally, we report on effect sizes between 0 and 0.40 as “small,” effect sizes between 0.40 and 0.70 as “moderate,” and greater than 0.70 as “large” (Hill, Bloom, Black, & Lipsey, 2008); however, we caution readers that even “small” effect sizes can be important and meaningful (Lipsey et al., 2012). For example, a “small” effect on incarceration rate translates into large monetary savings for society.

Review of Interventions

We organize this section according to three categories of intervention: (1) those that target key *child* risk and protective factors, (2) those that target key *parent* risk and protective factors, and (3) those that target key *child and parent* risk and protective factors (i.e., “two-generation” approaches). For additional information about how these factors relate to later criminal and antisocial behavior, see Part 3 of this volume, as well as reviews by Farrington and Welsh (2007) and Yoshikawa (1994). Within each section, we provide detailed descriptions of the interventions, noting important program characteristics such as setting, content, and dosage. A list of programs and accompanying references can also be found in Table 27.1. This review builds on and updates prior reviews on these intervention categories (see Schindler & Yoshikawa, 2012; Yoshikawa, Schindler, & Caronongan, 2009).

Interventions Targeting Child Factors

Prevention programs focusing on child risk and protective factors tend to target one or a combination of the following: (1) cognitive and achievement skills and/or (2) social skills and self-regulation. Programs targeting these factors for children under age 5 have predominately been implemented in early childhood care and education (ECCE) settings.

Cognitive and Achievement Skills

ECCE programs are often viewed as an opportunity to prepare children for formal schooling; therefore, many programs have been intentional about targeting skills related to cognition and achievement. In some cases, these programs have not as heavily targeted social or emotional skills. One such program is the well-known Abecedarian program, which provided full-day, year-round center-based care to children from as young as 6 weeks of age until kindergarten (Ramey & Campbell, 1984). Age-appropriate educational activities were developed to enhance skills across several developmental domains with an emphasis on language and literacy. The Abecedarian program was evaluated through a randomized controlled trial that enrolled four cohorts of high-risk children between 1972 and 1977 ($N = 111$), with risk determined primarily by low family income and low parental education. Benefits to participants in the form of higher scores on tests of cognitive, reading, and math skills through age 21 and higher educational attainment through age 30 have been well-documented (e.g., Campbell et al., 2012; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). However, no effects were found for measures of adolescent law breaking or adult criminal behavior (Campbell et al., 2012; Clarke & Campbell, 1998). Like Abecedarian, Tulsa’s pre-kindergarten program prioritized cognitive and academic skills. A quasi-experimental evaluation of Tulsa’s program found large positive impacts on pre-reading, pre-writing, and pre-math skills (Gormley, Phillips, & Gayer, 2008) but no impacts on disobedience or aggression in the kindergarten year (Gormley, Phillips,

Table 27.1 Programs and references

Target	Program name	References
Child factors	Abecedarian	Campbell et al. (2012), Campbell et al. (2002), Clarke and Campbell (1998), Ramey and Campbell (1984)
	Tulsa Pre-K	Gormley et al. (2008), Gormley et al. (2011)
	Tools of the Mind	Barnett et al. (2006), Bodrova and Leong (2007), Clements et al. (2012), Diamond et al. (2007), Lonigan and Phillips (2012), Wilson and Farran (2012)
	Head Start REDI (Research-Based, Developmentally Informed)	Bierman, Domitrovich et al., (2008), Bierman et al., (2013), Domitrovich et al. (2007)
	Chicago School Readiness Project (CRSP)	Morris et al. (2013), Raver et al. (2009), Zhai et al. (2012)
Parent factors	Nurse–Family Partnership (NFP)	Eckenrode et al. (2010), Kitzman et al. (2010), Olds et al. (1998)
	Family Check-Up (FCU)	Connell et al. (2008), Dishion et al. (2008), Shaw et al. (2006)
	Multidimensional Treatment for Foster Care for Preschoolers (MTFC-P)	Fischer et al. (2006), Fischer and Kim (2007), Jonkman et al. (2012)
	Supporting Father Involvement (SFI)	Cowan et al. (2009)
Child and parent factors	Perry Preschool	Schweinhart et al. (2005)
	Chicago Parent-Child Centers (CPC)	Reynolds et al. (2011)
	Yale Child Welfare Program	Seitz et al. (1985)
	Syracuse Family Development Program	Lally et al. (1988)
	Houston Parent-Child Center	Johnson and Walker (1987)
	Early Head Start	Administration for Children and Families (2006), Love et al. (2002), Vogel et al. (2010)
	Head Start	U.S. Department of Health and Human Services (2010)
	Incredible Years Teacher and Parent Training Program	Webster-Stratton et al. (2001)

Newmark, Welti, & Adelstein, 2011). Such findings have led some to believe that ECCE programs may need to be supplemented with distinct components focused on enhancing children’s social skills and/or self-regulation in order to achieve impacts on early behavior problems and later antisocial and criminal behavior.

Social Skills and Self-Regulation

Several teacher training programs and classroom curricula providing intensive social and emotional supports have recently been developed and evaluated. Three programs that have received a lot of attention from both research and policy audiences for their innovative approaches and positive effects include Tools of the Mind, the Head Start Research-Based, Developmentally Informed (REDI) program, and the Chicago School Readiness Project (CSRP).

The Tools of the Mind curriculum combines an emphasis on academic skills with a focus on multiple domains of self-regulation and executive function. Based on the work of psychologist Lev Vygotsky, which posits that learning and development maintain a synergistic relationship and are necessarily mediated by the learner’s cultural–historical environment, Tools of the Mind utilizes practical and imaginative play as a vehicle for teacher-supported learning. By modeling and attending to interactions that are likely to yield beneficial skill and knowledge acquisition, teachers aim to strengthen children’s deliberate memory, focused attention, and emotion regulation (Bodrova & Leong, 2007; Vygotsky, 1978). An early randomized controlled trial tested this program by comparing outcomes of children assigned to receive Tools of the Mind with outcomes of children assigned to a preschool program with similar academic

content but without an emphasis on self-regulation and executive function. Moderate end-of-treatment effects on reduced teacher-reported behavior problems were found, in addition to small to moderate effects on related executive function skills (Barnett, Hustedt, Hawkinson, & Robin, 2006; Barnett et al., 2008; Diamond, Barnett, Thomas, & Munro, 2007). While this initial randomized controlled trial produced promising results, it was relatively small in scale, with approximately 200 children assigned to Tools of the Mind or the control condition. A number of longitudinal, large-scale trials examining the effectiveness of this curriculum are currently underway. Unfortunately, initial end-of-treatment results of those trials are less promising than the earlier trial for effects on executive function skills (Clements, Sarama, Unlu, & Layzer, 2012; Lonigan & Phillips, 2012; Wilson & Farran, 2012); longitudinal effects and effects on behavior problems have not yet been reported.

The Head Start REDI program combines language and literacy activities with the preschool Promoting Alternative Thinking Strategies (PATHS) curriculum. The PATHS preschool curriculum “places primary importance on the developmental integration of affect, behavior, and cognitive understanding as they relate to social and emotional competence” (Domitrovich, Cortes, & Greenberg, 2007, p. 70). Thematic units, which are delivered through 33 weekly circle time lessons, include prosocial friendship skills, emotional understanding, emotional expression, self-control, and problem solving skills. In the REDI program, the PATHS curriculum is supplemented with an interactive reading program, sound games, and print center activities. To evaluate this program, 44 Head Start classrooms were randomly assigned to either the REDI program or Head Start “as usual.” Children in the REDI program had lower parent and teacher ratings of aggression at the end of the program (effect sizes = -0.13 , -0.29) and in kindergarten (effect sizes = -0.25 , -0.20) (Bierman et al., 2008; Bierman et al., 2013). Treatment effects were found to be partially mediated by executive function skills

(Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008).

CSRP also aims to reduce children’s behavior problems. However, it differs from Tools of the Mind and the Head Start REDI program as its primary focus is training teachers in behavior-management strategies. In addition, it includes two components that are novel in an ECCE context: (1) stress reduction workshops for teachers and (2) mental health services for high-risk children. CSRP was initially evaluated in a cluster-randomized trial in which 35 Head Start classrooms received CSRP (Raver et al., 2009). Approximately eight months into the intervention, preschoolers receiving CSRP exhibited fewer teacher-reported and observer-reported externalizing behavior problems than preschoolers receiving Head Start “as usual.” Effect sizes ranged from moderate to large. In kindergarten, treatment effects were partially maintained for children who attended high-performing elementary schools, but not for children attending low-performing elementary schools (Zhai, Raver, & Jones, 2012). More recently, the CSRP model was evaluated through a larger-scale, randomized controlled study with 91 preschool classrooms (Morris, Millenky, Raver, & Jones, 2013). Findings were less robust than in the original CSRP trial, but some positive effects on early behavior remained. No effect was found for the teacher-reported externalizing behavior problem index. On the other hand, teachers in CSRP classrooms reported less prevalent challenging behaviors overall (effect size = -0.92), and observers rated CSRP children as exhibiting less teacher and peer conflict (effect sizes = -0.40 , -0.27).

Key features of these programs include developmentally focused curriculum, intensive teacher training, and, in some cases, ongoing professional development. For example, both the Head Start REDI program and the CSRP provide weekly coaching as follow-up to the initial intensive training sessions. Though long-term impacts of these programs have not yet been explored and some findings have been mixed, programs such as these may still “offer the strongest hope for improving classroom quality as

well as child outcomes in the preschool years” (Yoshikawa et al., 2013, p. 8). Indeed, a recent meta-analysis found that, on average, developmentally focused socioemotional curricula implemented in preschool programs reduced externalizing behavior problems by 0.50 a standard deviation (Schindler et al., [under review](#)).

Notably, these programs have not been aimed at children younger than three as it is assumed that the youngest children maintain uniquely dependent relationships with their primary caregivers. For this reason, interventions targeting infants and toddlers are more likely to follow a family support model, which aims to strengthen the entire family unit in order to develop a nurturing, reliable relationship between the child and primary caregivers and to prevent family dysfunction (Dunst & Trivette, 1994). Hence, promising programs for the youngest children have instead targeted family risk and protective factors or a combination of child and family risk and protective factors, as reviewed below.

Interventions Targeting Parent Factors

In this section, we review early childhood prevention programs that have primarily targeted parent factors alone. We focus on programs in two categories: (1) those that aim to promote positive parenting practices and (2) those that aim to prevent parent-based sources of toxic stress, such as abuse and neglect, family conflict/domestic violence, and parental depression. Two-generation models, which target parent factors and provide direct services to children, will be reviewed in the subsequent section.

Parenting Practices

Parenting practices have been a primary focus of early prevention programs for decades. Some of these programs promote general positive parenting practices, such as responsiveness, warmth, and engagement, that have been shown to predict more positive social and emotional development (Brooks-Gunn, Berlin, & Fuligni, 2000). Others have been specifically designed to help parents

address children’s problem behaviors through behavior management techniques.

In the first years of life, home visiting is the most popular form of prevention targeting parenting practices. In these programs, a professional or paraprofessional visits pregnant mothers or new parents in their homes to deliver information and/or skill-building activities. Information and in-home activities are often paired with other services, such as healthcare and referrals to community resources, to improve parental welfare. Advantages of home visiting as a service delivery mode include reaching isolated families, connecting families to communities, and tailoring assistance to families’ needs (Gomby, Culross, & Behrman, 1999). For a comprehensive review of home visiting program models employed in the United States, see <http://homvee.acf.hhs.gov/>.

The most widely-known program is the Nurse–Family Partnership (NFP). NFP is currently implemented in the USA, Canada, the Netherlands, England, Scotland, Northern Ireland, and Australia (Nurse-Family Partnership International 2011). NFP provides home visits by nurses to low-income, first-time mothers from early in pregnancy until children are 2 years of age. Visits are offered weekly or every other week for most of the program. The curriculum focuses on improving the mother’s health, parenting skills, and overall well-being. NFP has been evaluated in two randomized controlled trials with long-term follow-ups and has the strongest evidence base of all home visiting programs. Though consistent effects have been found on a number of maternal and child outcomes, effects on criminal and antisocial behavior have been less consistent. The initial trial took place in Elmira, a semirural town in New York. The 15-year follow-up suggested that youth whose mothers received NFP experienced fewer behavior problems, arrests, convictions, and violations of probation than their counterparts whose mothers did not receive NFP (Olds et al., 1998). However, at the 19-year follow-up, only effects on arrest rates were sustained and only for girls; boys evidenced few lasting benefits (Eckenrode et al., 2010). The

most recent evaluation from the Memphis site, which targeted an urban population, found no effects on externalizing behavior or total behavior problems at age 12 (Kitzman et al., 2010).

In spite of the mixed results, it is possible that later follow-ups of NFP will provide a clearer picture of effects on adult criminal and antisocial behavior. Given NFP's effects on a number of early risk and protective factors, it is reasonable to hypothesize that subsequent follow-ups may show more consistent and positive results. In addition, ages 12 and 19 (the ages of the children at the most recent follow-ups) are still early to observe adult patterns of criminality (Eckenrode et al., 2010). On the other hand, it is possible that participation in NFP will continue to produce different results for different populations, such as those in different geographic areas and those of different genders. Such findings would still produce important information for future prevention programs by adding to the knowledge base concerning what works and for whom.

The Family Check-Up (FCU) program is another program targeting parenting practices, yet it differs from NFP on several key characteristics. For example, FCU focuses specifically on parent behavior management strategies and only includes three core home visits. The three home visits include (1) initial contact (the "get-to-know-you" session), (2) assessment (including observations of parent-child interactions), and (3) feedback. In the feedback session, the home visitor reviews assessment results with the parent and uses motivational interviewing techniques to explore the parent's willingness to make appropriate changes. A maximum of six additional meetings are recommended to address problematic parenting practices, other family management practices (e.g., coparenting), or contextual issues (e.g., child care, housing) (Shaw, Dishion, Supplee, Gardner, & Arnds, 2006). Though originally developed for families of adolescents, the FCU has also been adapted for use with mothers of toddlers. Randomized trials have consistently shown small reductions in children's problem behaviors, with stronger effects for children at higher risk for a persistent trajectory of conduct

problems (Connell et al., 2008; Dishion et al., 2008; Shaw et al., 2006). Effects on problem behaviors were partially mediated by improvements in positive parenting practices, which lends support to FCU's theory of change that promoting positive parenting practices can lead to decreases in problem behaviors (Dishion et al., 2008). Meta-analyses reviewing a broader set of early family and parent training programs have reported average effect sizes similar in magnitude to FCU (0.35–0.38) (Farrington & Welsh, 2003; Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009).

Sources of Toxic Stress

Another set of programs targeting adults in children's lives has focused on parent-based sources of toxic stress. Toxic stress refers to "strong, frequent, or prolonged activation of the body's stress management system" (National Scientific Council on the Developing Child, 2005/2014). Young children who are chronically exposed to stressful family contexts without support from caring adults are at an increased risk for toxic stress. These responses can disrupt the architecture of children's developing brains and leave children vulnerable to a range of undesirable outcomes, including an increased risk of behavioral disorders. This science suggests a possible mechanism through which long-established parent-based risk factors, such as abuse and neglect, family conflict/domestic violence, and maternal depression, may result in increased behavior problems and later criminal and antisocial behavior in children. Unfortunately, evaluations of interventions targeting maternal depression have rarely included measures of child well-being, and almost none have included measures specifically about children's behavior problems. Hence, it is difficult to draw conclusions about the effectiveness of this set of programs for preventing antisocial and criminal activity. However, we highlight two programs targeting other sources of toxic stress.

One example of a program focused on reducing toxic stress responses through building skills in adults is the Multidimensional Treatment for Foster Care for Preschoolers (MTFC-P).

Children residing with foster parents often have a history of abuse and neglect and are also at risk for continued exposure to toxic stress responses. MTFC-P is a 9- to 12-month program that targets 3- to 6-year-old children in foster care and their foster parents. The goal of MTFC-P is to help caregivers provide consistent and responsive care through the use of effective limit-setting and the reinforcement of positive behavior. MTFC-P starts by providing intensive training to foster parents prior to placement. After placement, foster parents work with a consultant and participate in support groups. Results from randomized trials in the USA and the Netherlands have found that children in the experimental group showed significant decreases in attachment problems and behavior problems relative to the control group children who were placed into regular foster care (Fischer, Gunnar, Dozier, Bruce, & Pears, 2006; Fischer & Kim, 2007; Jonkman et al., 2012).

Only very recently have programs targeting another source of toxic stress, family conflict/domestic violence, been evaluated as a means of prevention in early childhood. One program with positive effects on mother–father relationship quality and children’s behavior is the Supporting Father Involvement (SFI) program. This 16-week program for fathers or couples in poverty produced improvements in relationship quality, reductions in family conflict, and reductions in childhood aggression (Cowan, Cowan, Pruett, Pruett, & Wong, 2009). It was found to be most effective when groups for couples were offered versus when only father groups were offered.

Finally, it is important to point out that NFP and FCU, reviewed in the prior section, each had effects on parental sources of toxic stress in addition to reducing behavior problems and later antisocial and criminal behavior. Children randomly assigned to NFP had fewer reported injuries and incidents of child abuse than their control group counterparts (e.g., Olds et al., 1997), and mothers assigned to FCU reported lower levels of depression (Shaw, Connell, Dishion, Wilson, & Gardner, 2009).

Interventions Targeting Child and Parent Factors

Many programs have also been developed that combine a focus on child *and* parent risk and protective factors. These “two-generation” programs are built on the assumption that targeting both children (typically in an ECCE context) and parents (typically in a home context) can be more effective at promoting positive child outcomes than programs targeting either child factors or parent factors alone. Indeed, developmental theory suggests that out-of-home and in-home environments have independent influences on children’s behavior (McCall, 1981); research also suggests that a two-generation approach may have cumulative effects in preventing later behavioral problems (Gassman-Pines & Yoshikawa, 2006; Yoshikawa, 1994).

One such seminal program is the Perry Preschool program. The Perry Preschool program was evaluated through a random assignment demonstration project in the 1960s and is well-known for its long-term effects on child participants, who have been tracked by researchers since the start of the program. One hundred twelve children in poverty were randomly assigned to Perry Preschool or no services. Children assigned to Perry Preschool received high-quality half-day ECCE services that employed the High/Scope curriculum. This curriculum aims to improve children’s cognitive, socioemotional, and physical development. In addition, families received weekly home visits, a frequency that remains rare in current ECCE models. At the age 19, 27, and 40 follow-ups, Perry Preschool was found to have effects on a number of outcomes related to criminal and antisocial behavior, including fewer lifetime arrests and arrests for violent crimes, property crimes, and drug crimes (Schweinhart et al., 2005).

In addition to Perry Preschool, there were several other programs implemented between 1960 and 1990 that have had relatively long-term effects on criminal and antisocial behavior. The Chicago Parent-Child Centers (CPC)

program has evidenced long-term impacts up to age 28, including fewer felony arrests, convictions, and incarcerations. This publicly funded program provided families in inner-city Chicago neighborhoods ECCE and family support services starting at age 3. Family support services included home visits as well as referrals to a range of social services. The most robust impacts have been found for the preschool component, especially for males (Reynolds, Temple, Ou, Arteaga, & White, 2011). Though these findings reinforce the possibility that two-generation programs can have sustained impacts on criminal and antisocial behavior, it should be noted that program eligibility for CPC was not randomly assigned in this evaluation. Instead, researchers compared program participants to similar children in non-CPC schools. Other programs include the Yale Child Welfare Program (Seitz, Rosenbaum, & Apfel, 1985), the Syracuse Family Development Program (Lally, Mangione, & Honig, 1988), and the Houston Parent-Child Development Center (Johnson & Walker, 1987). These programs all served low-income or other high-risk families beginning at birth or age 1 for periods ranging from 2 to 5 years. Services included ECCE, home visits, and parenting education and resulted in reductions in antisocial behavior and juvenile arrests. Programs with long-term follow-ups including Perry Preschool and CPC have been estimated to have benefit–cost ratios ranging from four to fourteen dollars saved for every dollar spent (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004; Duncan, Ludwig, & Magnuson, 2007; Heckman, Moon, Pinto, Savelyev, & Yavitz, 2009; Temple & Reynolds, 2007).

Early Head Start and Head Start are also well-known for including a range of family and child risk and protective processes in their theories of change (Kisker, Paulsell, Love, & Raikes, 2002; Zigler & Styfco, 1993). Early Head Start serves families with children from birth to age 3, while Head Start serves families with children ages 3–5. Both programs provide parent support, social services, mental health services (for parents and children), and ECCE and/or home visiting services. Though there have not been

follow-ups into adulthood for these programs, national randomized controlled trials of both programs have been conducted. The National Early Head Start Research Evaluation found that Early Head Start children had slightly lower levels of aggressive behavior at age 3 and small reductions in behavior problems at age 5 but no impacts at age 10 (Administration for Children and Families, 2006; Love et al., 2002; Vogel, Xue, Moiduddin, Kisker, & Carlson, 2010). The National Head Start Impact Study found that the experimental group had less hyperactivity and fewer behavior problems after 1 year of the program; however, effects were not retained at the end of first grade (U.S. Department of Health and Human Services, 2010). Many hypotheses have been generated about why Early Head Start and Head Start programs have not had as robust or long-lasting effects on behavior as other two-generation programs. Notably, the parent-focused component in Head Start is less intensive than those implemented in programs such as Perry Preschool and CPC. In addition, the experiences of the control groups in these evaluations had more similar experiences to those in the experimental groups than programs evaluated in prior decades. In other words, children who weren't enrolled in Early Head Start or Head Start still had a high likelihood of receiving comparable services. For example, in the Head Start evaluation, nearly half of the control group enrolled in center-based care (National Forum on Early Childhood Policy and Programs, 2010).

While the aforementioned programs broadly targeted child and parent risk and protective factors, other two-generation models focus more explicitly on reducing problem behavior. These models aim to create alignment between the social, emotional, and behavioral skills that children learn in their ECCE classroom and the ones they learn at home. For example, the Incredible Years teacher and parent training program works with teachers to create a positive classroom climate, use positive reinforcement of social competence, and employ effective classroom management strategies. In addition, parents participate in 12-week parent groups that teach

positive discipline strategies, effective parenting skills, strategies for coping with stress, and ways to strengthen children's social skills. This program was evaluated with preschool-aged children in Head Start classrooms. Thirty-four Head Start classrooms were randomly assigned to receive the Incredible Years teacher and parent training program or to receive Head Start implemented as usual. Children in the Incredible Years program had moderately lower conduct problems at school (as reported by teachers and independent observations) than children not in the Incredible Years program. Children whose mothers attended 6 or more sessions also showed lower conduct problems at home (as reported by parents and independent observers), an effect that was maintained at the 1-year follow-up. Children who had the highest rates of noncompliant and aggressive behavior showed more clinically significant and long-lasting results than lower-risk children (Webster-Stratton, Reid, & Hammond, 2001).

Summary

- Preventive interventions during infancy and childhood have the potential to target several child and parent characteristics that are risk or protective factors related to criminal and antisocial behavior. Targeting these factors through prevention programs during the earliest years, when rapid developmental changes take place, may be more effective than trying to remediate problems later.
- Several advances have been made in the early prevention science literature in the past two decades that have provided a more comprehensive understanding of potential ways to reduce behavior problems and criminal and antisocial behavior. For example, there is an increasing number of random assignment studies, a greater attention to the key features of classroom and parenting curricula, and a more nuanced approach to targeting social and emotional development (e.g., targeting emotion regulation versus dimensions of executive functions).
- Overall, evaluation science suggests that prevention programs during infancy and childhood can be effective. Those programs that intensively target children's social skills and self-regulation and those that target adult caregivers' skills in behavior management are particularly promising. This includes programs offered in ECCE and/or in home contexts. Additionally, a number of two-generation programs offering high-quality ECCE alongside comprehensive family services have successfully reduced rates of behavior problems and later crime.
- Some programs, such as the Family Check-Up and the Incredible Years programs, have investigated differential effects on subgroups of their samples. In these cases, programs produced stronger effects for children who were at higher risk for persistent conduct problems. These findings lend an optimistic perspective to the future of the field, suggesting that even the children who are most at risk for lifelong offending can benefit from early childhood prevention programs targeting behavior.
- Despite advances in the early childhood prevention literature, many challenges remain. One pressing challenge is how to scale up effective programs while maintaining quality and fidelity. Several programs reviewed in this chapter had positive results in small, initial trials but fewer to no results in replications with larger samples. Though research is underway to better understand how to scale up and sustain evidence-based early prevention programs (e.g., Boller et al., 2014), this remains a vexing problem for the field.

Future Research Needs

- Though programs targeting sources of toxic stress were highlighted in a section of our review, few interventions have been successful in this area. Effective programs addressing particular sources of toxic stress, such as parental depression, parental substance abuse, and domestic violence, are urgently

needed. In addition, more guidance is needed on how to successfully intervene with children who have already been exposed to high levels of toxic stress. Fortunately, some innovative programs are currently testing new ways of working with children in ECCE settings who have a known background of trauma. For example, in Head Start Trauma Smart, classroom personnel and parents undergo trainings to learn about sources and symptoms of trauma, how to identify its impact on children, and specific skills for responding to children's needs. Children and families are also given access to therapeutic interventions when appropriate. This program has yet to be evaluated through a random assignment study but offers hope that the next generation of ECCE programs may become more equipped to help children and families who experience toxic stress.

- Fathers represent another overlooked population. Research on low-income fathers suggests that father engagement during early childhood has significant positive effects on children's social and emotional development (Cabrera, Shannon, & Tamis-LeMonda, 2007). Yet, parenting and two-generation programs almost universally focus on female caregivers. Indeed, only one program in this review—the Supporting Father Involvement (SFI) program—intentionally included male caregivers. More research is needed about how to promote positive parenting practices among low-income fathers and whether such interventions could help prevent children's behavior problems and later criminal and anti-social behavior.
- More systematic evaluation of intervention mediators is also needed. With few exceptions, we know very little about the pathways through which early childhood programs operate to produce long-term effects. This line of inquiry is important for increasing the generalizability of findings, improving program designs, and strengthening confidence in impacts (Heckman, Pinto, & Savelyev, 2013; Reynolds, Ou, & Topitzes, 2004).

- Finally, future research should move toward understanding relative effects of programs as well as how programs might be combined to enhance their effectiveness. Two studies underway represent exciting examples of this kind of work. The Head Start Cares project has randomly assigned classrooms to implement the Incredible Years program, the preschool PATHS curriculum, Tools of the Mind, or practice as usual. Another pilot study underway is testing the added benefit of combining the Family Check Up and Incredible Years parenting program (Shephard, Armstrong, Silver, Berger, & Seifer, 2012). These types of studies have the potential to dramatically improve our understanding of the most promising approaches for gaining and sustaining impacts on key behavioral outcomes.

Recommended Readings

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School- and Community-Based Preventive Interventions During Adolescence: Preventing Delinquency Through Science-Guided Collective Action

28

B.K. Elizabeth Kim, Amanda B. Gilman, and J. David Hawkins

Introduction

Developmental perspectives in criminology consider life transitions and context in understanding the causes and developmental processes leading to antisocial behaviors (Le Blanc & Loeber, 1998). Human development occurs through individuals' continuous interactions with social and environmental contexts, including families, schools, peers, workplaces, and communities, in contexts of societal norms and cultures (Bronfenbrenner, 1979, 1989). Within the developmental perspective, prevention scientists have adopted a public health approach, seeking to empirically identify risk and protective factors that influence the development of negative outcomes like delinquency and antisocial behavior. Prevention science seeks to prevent negative outcomes by reducing risks and increasing protection in the focal population (Coie, Watt, West, Hawkins, & Asarnow et al., 1993). Risk- and protection-focused prevention has helped guide some prevention efforts in criminology (Farrington, 2000, 2003; Welsh & Farrington, 2007). In this chapter, we review effective prevention programs in two environmental domains—school and community—and high-

light two prevention strategies that engage and empower communities to reach schools and communities as well as individuals and families for greater impact (Elliott, Dupéré, & Leventhal, 2014; Payne & Welch, 2015).

Effective Prevention Programs

Altering the developmental processes of antisocial behaviors by reducing risk and increasing protection is an effective approach to prevention (Farrington, 2003; Hawkins, Catalano, & Miller, 1992). It is important that prevention programs target both risk and protective factors, first, because both greater risk exposure and lower protection predict problem behaviors and also because youth exposed to a greater number of risks are less likely to experience high levels of protection (Pollard, Hawkins, & Arthur, 1999). Because problem behaviors tend to co-occur (e.g., violent offending, substance use, risky sexual behavior) (Hawkins et al., 1992; Jessor & Jessor, 1977), targeting shared risk factors for different behavior problems could have effects on delinquency as well as related problems like tobacco, alcohol, and other drug abuse. Thus, identifying common risk and protective factors that predict multiple problem behaviors is important for prevention (Coie et al., 1993). The growing knowledge on risk and protective factors for antisocial behaviors has resulted in the development of numerous prevention programs. Furthermore, evaluations using randomized controlled

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trials have found that, with quality implementation, some risk-focused prevention programs have been effective in decreasing the likelihood of antisocial behaviors. The following section reviews school- and community-based programs found to be effective in preventing multiple problem behaviors.

Table 28.1 identifies tested and effective community- and school-based prevention programs identified by Blueprints for Healthy Youth Development (2014, www.blueprintsprograms.com) at the University of Colorado as either promising or model programs for preventing delinquent or antisocial behavior. Blueprints promising programs all meet a set of effectiveness standards, including (1) intervention specificity (clearly articulated outcomes, targeted risk and protective factors, target population, and intervention components), (2) high-quality evaluation (either one randomized controlled trial (RCT) or two high-quality quasiexperimental evaluations), (3) demonstrated intervention impact, and (4) dissemination readiness. A program is considered a model program if it meets the standards for a promising program, has been evaluated in two RCTs or one RCT and one quasiexperimental evaluation, and positive impacts were sustained for at least 1 year beyond the preventive intervention. We include programs that have shown an impact on antisocial and aggressive behavior (including externalizing behavior, conduct problems, violence, and bullying), delinquency and criminal behavior, and substance use among children and adolescents. We include programs that Blueprints identifies as occurring within the school setting, the community setting (including social services), or both. Because we are focusing specifically on preventive programs rather than treatment, we do not include programs whose specific target population is youth who are already involved in the juvenile justice system. The programs are labeled as either universal (aimed at the entire population), selective (targets those at elevated risk), indicated (targets those who are showing early signs of the problem behavior), or some combination of the three. Finally, this table shows the cost-effectiveness

for the programs that have been evaluated by the Washington State Institute for Public Policy (2013). This total dollar amount represents the net value of the program per participant based on the total benefits to society and the participant minus the total cost of implementing the program.

Schools are a popular setting for the implementation of prevention programs. They offer access to the preponderance of children in a community (Jenson & Bender, 2014). Implementation in the school setting can also avoid problems of recruitment and retention. As shown in Table 28.1, prevention scientists have implemented a wide range of preventive interventions in school settings. These school-based interventions do not always take into consideration the influences of the family or community on the youth's development, though there are important exceptions, such as Positive Family Support-Family Check-Up (Connell, Dishion, Yasui, & Kavanagh, 2007).

The tested and effective community-based prevention programs shown in Table 28.1 are implemented in the community setting. However, several seek to change individual or family risk or protective factors. They do not focus on solving communitywide problems or seek to engage the community in solving these problems. For example, Keep Safe focuses on building confidence and developing social skills with foster children and their foster parents as they prepare for middle school (Kim & Leve, 2011). Similarly, the program Strengthening Families 10–14, which operates in community settings, targets only factors within families to reduce adolescent problem behaviors (Harrison, Boyle, & Farley, 1999; Spoth, Trudeau, Gyll, Shin, & Redmond, 2009). Big Brothers Big Sisters of America is a community-based program that matches youth to adult volunteers to encourage a positive mentoring relationship, with the ultimate goal of reducing antisocial behaviors (DuBois & Neville, 1997). This selective prevention program seeks to build protection for individual youths in the community.

An effective school program may initially reduce students' truancy or aggressive behaviors

Table 28.1 Evidence-based school and community prevention programs^a

Program	Program rating	Outcomes			Prevention type	Benefits minus cost per individual
		Antisocial and aggressive behavior	Delinquency and criminal behavior	Substance use		
<i>School setting</i>						
Athletes Training and Learning to Avoid Steroids (ATLAS)	Promising			✓	Universal	N/A
Behavioral Monitoring and Reinforcement Program	Promising		✓	✓	Selective	−\$2
Coping Power	Promising	✓	✓	✓	Universal and selective	N/A
Good Behavior Game	Promising	✓	✓	✓	Universal	\$13,050
Guiding Good Choices	Promising		✓	✓	Universal	\$1,717
Highscope Preschool	Promising		✓		Selective	\$14,934 ^b
Incredible Years—Teacher Classroom Management	Promising	✓			Universal and selective	N/A
LifeSkills Training	Model		✓	✓	Universal	\$1,704
Olweus Bullying Prevention Program	Promising	✓	✓	✓	Universal and selective	N/A
Positive Action	Model	✓	✓	✓	Universal	N/A
Positive Family Support—Family Check-Up	Promising		✓	✓	Universal, selective, and indicated	N/A
Project Northland	Promising			✓	Universal	N/A
Project Toward No Drug Abuse	Model			✓	Universal and selective	\$56
Raising Healthy Children	Promising	✓	✓	✓	Universal	N/A
Sport	Promising			✓	Universal	N/A
<i>School and community settings</i>						
EFFEKT	Promising		✓	✓	Universal	N/A
Familias Unidas Preventive Program	Promising	✓		✓	Selective	N/A
Incredible Years—Child	Promising	✓			Selective and indicated	N/A
Incredible Years—Parent	Promising	✓			Universal, selective, and indicated	−\$315
Safe Dates	Promising	✓			Universal, selective, and indicated	N/A
Strengthening Families 10–14	Promising			✓	Universal	−\$690
Strong African American Families Program	Promising		✓	✓	Universal	N/A
<i>Community/social services setting</i>						
Big Brothers Big Sisters of America	Promising	✓		✓	Selective	\$4,393 ^b

(continued)

Table 28.1 (continued)

Program	Program rating	Outcomes			Prevention type	Benefits minus cost per individual
		Antisocial and aggressive behavior	Delinquency and criminal behavior	Substance use		
Keep Safe (Middle School)	Promising	✓		✓	Selective	N/A
Parent–Child Interaction Therapy	Promising	✓			Selective and indicated	\$3,091

^aTable adapted from: Blueprints for Healthy Youth Development (<http://www.blueprintsprograms.com>)

^bFigure based on meta-analysis of several programs

N/A not available

through changes in teacher and peer behaviors, but students are influenced by factors beyond school, in family and in the community. Multi-component prevention strategies that seek to address risk and protection in multiple domains may hold promise (Arthur, Hawkins, Brown, Briney, & Oesterle et al., 2010). Federal agencies, including the Centers for Disease Control and Prevention (CDC) and the Office of Juvenile Justice and Delinquency Prevention, have emphasized the need for collaborative approaches to reduce rates of youth problem behaviors in the community (Centers for Disease Control and Prevention, 2014; Holder, Robinson, & Slowikowski, 2010).

Recent advances in the implementation of evidence-based preventive interventions for violence, delinquency, and substance use have included using locally based community partnerships or coalitions. This idea originated in the public health field, where community partnerships targeted the prevention of health problems such as cardiovascular disease and HIV infection (Spath & Greenberg, 2005). Communities have used coalitions as a vehicle to prevent youth substance use community wide (Fagan, Hawkins, & Catalano, 2011). Simply forming and funding a coalition to bring multiple sectors together does not guarantee successful prevention outcomes (Hallfors, Cho, Livert, & Kadushin, 2002; Ringwalt, Ennett, Vincus, Thorne, & Rohrbach et al., 2002). However, a communitywide coalition of diverse stakeholders may be an important element in prevention efforts seeking to achieve communitywide effects on youth problem behaviors.

Recently, Kania and Kramer (2011) proposed a collective impact approach to address social problems. Like coalition-based efforts in delinquency and substance abuse prevention, the collective impact approach calls for a strategic and well-coordinated collaboration across multiple sectors to address a common social problem. Instead of competing against each other for resources and innovations in isolated sectors, collective impact initiatives bring community leaders, nonprofit and business sectors, and government organizations together to pool ideas and resources for greater impact. Kania and Kramer (2011) suggest specific conditions that need to be met in order to achieve collective impact. As shown in Table 28.2, their five conditions for successful collective impact include a common agenda, a shared measurement system, mutually reinforcing activities, continuous communication, and backbone support (Hanleybrown, Kania, & Kramer, 2012; Kania & Kramer, 2011). Collective impact initiatives require a backbone support, a lead organization that supports and manages all collective impact activities that address a common social problem, and a shared agenda (e.g., vision, goal) for change. Then, diverse stakeholders must build trust through continued communication, facilitate mutually reinforcing activities on which to collaborate, and bring specialized knowledge. Finally, it is important to have a shared measurement system to consistently evaluate change. The collective impact initiatives are implemented in three phases: (1) initiating action, (2) organizing for impact, and (3) sustaining action and impact (Hanleybrown et al., 2012). The first phase

Table 28.2 The five conditions of collective impact

Five conditions	Communities That Care ^a	PROSPER ^{b,c}
Common agenda	Preventing problem behaviors and promoting positive behaviors to achieve healthy youth development	Strengthening families, reducing youth problem behaviors, and increasing positive behaviors to achieve positive youth development
Shared measurement	Measures risk and protective profile of communities using the Communities That Care Youth Survey	Measures that assess implementation process and youth and family outcomes
Mutually reinforcing activities	Community stakeholders collaborate to devise an action plan and task force for addressing their goals	Each group engages in specialized activities to achieve mutual goals
Continuous communication	Regular meetings to monitor implementation quality, track progress, and revise action plan	Regular meetings of teams and across stakeholders to sustain effective communication among community members
Backbone support	Community board coordinates training, workshop, and technical assistance opportunities	Prevention coordination team/ongoing technical support to assure quality implementation

^aHawkins et al. (1992)

^bSpoth and Greenberg (2011)

^cSpoth et al. (2011)

consists of identifying key players, governance structure, and baseline data to develop a case for change. The second phase engages identified stakeholders to establish an infrastructure and set common goals and measures. Finally, in the third phase, stakeholders create a sustainable process by taking steps for coordinated action in prioritized areas and tracking progress for further improvement.

As shown in Table 28.2, two communitywide strategies for preventing antisocial and delinquent behavior and drug abuse appear to have all the elements of effective collective impact initiatives. They are PROMoting School-community-university Partnership to Enhance Resilience (PROSPER) and Communities That Care (CTC). Both have, in fact, achieved reductions in drug use and antisocial behavior in community-randomized trials. Both also have included elements that likely contributed to their effectiveness beyond the five collective action elements identified by Kania and Kramer. In the next section, we review these two prevention systems, noting how they achieve and extend the elements of effective collective impact.

Both CTC and PROSPER seek to guarantee collective impact on measured outcomes by promoting the use of already tested and proven effective preventive interventions to fill service

gaps and by ensuring high-quality implementation to successfully prevent substance use, delinquency, and violence. Despite the growing list of evidence-based programs, schools and communities have not widely implemented tested and effective preventive interventions (Ennett, Ringwalt, Thorne, Rohrbach, & Vincus et al., 2003; Gottfredson & Gottfredson, 2002; Hallfors, et al., 2002). Without evidence of program effectiveness, it is not clear that the programs communities implement will have positive impact.

CTC and PROSPER also monitor implementation and progress for better outcomes. Ensuring implementation fidelity increases the likelihood of adherence to core components of the program, which in turn leads to positive participant outcomes (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Kam, Greenberg, & Walls, 2003; Spoth, Gyll, Trudeau, & Goldberg-Lillehoj, 2002). Research suggests that even communities that implement evidence-based programs often fail to implement them with high fidelity (Fagan, Hanson, Hawkins, & Arthur, 2008a).

Both CTC and PROSPER identify local needs and resources and encourage community ownership of collective action by providing opportunities for community members to choose

programs from a list of tested and effective programs. Furthermore, as described below, CTC communities also use epidemiological data to assess and select for preventive action those risk factors most widespread in the community. Since youth are exposed to risk and protection across multiple domains, CTC communities assess risk and protective factors in communities, families, schools, peer groups, and individuals, and seek to address those factors most widespread in the community in order to achieve communitywide effects (Hawkins, Catalano, & Arthur, 2002). Community-specific risk and protective factor profiles allow communities to choose appropriate programs based on community needs.

The following sections describe the PROSPER and Communities That Care prevention systems and their effectiveness based on randomized trials.

PROmoting School-Community-University Partnership to Enhance Resilience (PROSPER)

PROSPER is a partnership model and a delivery system for evidence-based preventive interventions. PROSPER was created to address the problem of evidence-based programs not being effectively implemented and sustained in communities, despite the potential they have to reduce youth problem behaviors (Spoth & Greenberg, 2011). This partnership model connects university-based prevention scientists with public schools and the Cooperative Extension System (CES) of land grant universities, which are present in nearly all communities in the USA (Spoth & Greenberg, 2011).

The PROSPER partnership model operates with a four-tiered partnership structure (three tiers composed of groups engaging in specialized tasks within each state and a fourth tier that connects state-level teams to each other across states and to the larger PROSPER Network Team (Spoth & Greenberg, 2011). The first tier is the Community Team composed of service providers and community members, including

personnel from local elementary and secondary schools, social service providers, and community representatives. It is at this level that programs are actually implemented. The second tier, the Prevention Coordinator Team, provides technical assistance to the Community Team as they implement evidence-based programs and also serves as a liaison with the third tier, the State Management Team. This team is composed of university researchers and Cooperative Extension System (CES) administrators. They provide oversight and aid in program evaluation. The final tier, the Network Team, provides technical assistance and evaluation services to the state partnerships.

According to Spoth and Greenberg (2005), PROSPER is unique from other community prevention systems strategies, including CTC, in three ways. First, PROSPER uses the already existing infrastructure established by the Land Grant University Extension System to help implement universal prevention programs in communities. Second, the PROSPER system involves an ongoing partnership between university prevention scientists and community service providers and collaborators. Finally, PROSPER uses the education system as the main setting for bringing together stakeholders to accomplish collective impact.

The development of PROSPER in a community occurs in distinct phases (Feinberg, Chilenski, Greenberg, Spoth, & Redmond, 2007). First, in the organizational phase, which lasts for approximately 6 months, communities recruit members, participate in trainings, and determine program goals. Communities implementing the PROSPER model choose one program from a list of three universal evidence-based family-focused prevention programs and one program from a list of three school-based programs (Spoth, Redmond, Clair, Shin, & Greenberg et al., 2011). In the operations phase, which takes 2–3 years, communities begin implementing their chosen programs. Finally, in the sustainability phase, communities engage other entities and focus on creating an enduring structure to keep the partnership and chosen family and school-based prevention programs going.

Spoth, Gyll, Lillehoj, Redmond, and Greenberg (2007) examined the implementation quality of both the school-based and family-focused interventions through the PROSPER partnership model. They found high levels of program adherence, student participation and engagement, and quality facilitation. They also found that this high quality of implementation was sustained across two cohorts of students.

In the trial of PROSPER, 28 community school districts in Iowa and Pennsylvania were matched and then randomly assigned to either receive the PROSPER intervention or to continue their community's usual prevention programming. Results demonstrated the effectiveness of the PROSPER partnership (Spoth et al., 2011). A total of 11,960 young people were in study schools at baseline. In both the 7th grade (1.5 years after baseline) and 10th grade (4.5 years after baseline), youth in the PROSPER communities were significantly less likely to have initiated both gateway and illicit drug use and also showed significantly lower past-year rates of marijuana and inhalant use. Additionally, at 4.5 years post-baseline, the intervention group showed significantly lower rates of past-year methamphetamine use (Spoth et al., 2011; Spoth, Redmond, Shin, Greenberg, & Clair et al., 2007).

More recently, Spoth, Redmond, Shin, Greenberg, and Feinberg et al. (2013) found that intervention effects on substance misuse were statistically significant at 12th grade, 6.5 years after baseline. Spoth, Redmond, and Shin (2000) also found significantly lower rates of aggressive and destructive behavior in the PROSPER communities compared to the control communities. In addition, researchers examining the effects of PROSPER found that the system significantly affected risk and protective factors predictive of adolescent problem behavior, including association with antisocial peers (Osgood, Feinberg, Gest, Moody, & Ragan et al., 2013), exposure to drug use (Spoth, Gyll, & Shin, 2009), and family functioning (Redmond, Spoth, Shin, Schainker, & Greenberg et al., 2009). Overall, PROSPER has been found to be an effective strategy for engaging communities to implement and sustain

evidence-based programs to reduce youth problem behaviors.

Communities That Care

The Communities That Care (CTC) prevention system is locally owned and operated. It empowers community coalitions of diverse stakeholders to reduce youth delinquency, violence, and substance use. CTC builds the capacity of the coalition to use the advances of prevention science to guide prevention efforts. CTC builds the capacity of community members to collect and use epidemiological data to identify widespread risks in the community and to choose and implement tested and effective programs to address those risks.

The CTC prevention system is guided theoretically by the social development model (SDM), a theory of human behavior that explains the development of both prosocial and antisocial behaviors by specifying predictive relationships and processes across developmental stages. Integrating elements from social control theory, social learning theory, and differential association theory (Catalano & Hawkins, 1996), the SDM specifies constructs including opportunities, skills, recognition, and attachment on parallel pathways to prosocial or antisocial behaviors.

The prosocial path hypothesizes that providing individuals with opportunities for prosocial involvement, teaching the skills to participate in prosocial activities, and recognizing individuals for skillful participation in prosocial activities will lead to the development of social bonds between the individual and the socializing unit providing the prosocial opportunities, skills, and recognition. If these social bonds are well established and the standards for behavior of the socializing unit(s) are clear, it is expected that the youth will engage in prosocial behaviors as a result. This pathway to prosocial socialization is called the social development strategy.

The SDM hypothesizes that parallel processes occur in the development of antisocial behaviors through interaction with and

recognition from antisocial others. Using these predictive relationships across developmental stages, the SDM predicts the etiology of antisocial behavior—the pathway to onset, escalation, maintenance, de-escalation, and cessation of crime. The CTC system uses the social development strategy and evidence-based programs community wide to prevent onset as well as to alter or disrupt the developmental pathways of antisocial behaviors. The CTC system also provides adults in the community with opportunities and skills to bond with each other and bring meaningful changes to the community and achieve recognition for doing so. In sum, CTC not only seeks to prevent problem behaviors and promote positive development among youth but also provides an avenue for community members to successfully take collective action to achieve collective impact.

CTC is implemented in five phases. In Phase 1, Get Started, concerned stakeholders stimulate interest among community leaders in science-based prevention and assess community readiness for collaborative prevention efforts. In Phase 2, Get Organized, key community leaders identify or form a coalition of diverse stakeholders to use CTC, and the coalition members are oriented to science-based prevention. In Phase 3, Develop a Profile, coalition members collect epidemiological data to assess community levels of risk and protection and youth antisocial, delinquent, and drug-using behaviors, as well as current prevention resources in the community. Coalitions assess community levels of risk and protective factors by using the Communities That Care Youth Survey (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002), a survey administered in middle and high schools. Through these surveys, young people themselves provide information on what risk factors are widespread and what protective factors are depressed in the community.

In Phase 4, Create a Plan, the coalition chooses evidence-based programs from a menu of tested and effective prevention programs. The coalition chooses preventive interventions that target widespread risk factors and strengthen protection in the community and creates an action

plan for implementing these interventions. CTC does not require coalitions to choose one specific program but suggests that communities select programs that best address each community's profile of risk and protection. Thus, communities trained to use CTC seek to provide youth with developmentally appropriate services specific to the needs of the community. In Phase 5, Implement and Evaluate, organizations and schools in the community implement the chosen programs with fidelity and evaluate progress and outcomes. In sum, CTC mobilizes and builds the capacity of community stakeholders to take action to prevent youth delinquency and substance abuse through a science-based approach while using local knowledge to recognize unique community characteristics.

The CTC prevention system is unique from other community prevention strategies including PROSPER in that it is data driven as well as locally owned (Fagan & Hawkins, 2013). By collecting epidemiological data, CTC communities identify communitywide levels of risk and protection. Furthermore, by providing a menu of options (the Blueprints for Healthy Youth Development) for community members to choose from, CTC facilitates the choice of science-based prevention services that are targeted to the specific needs of each community. Through this process, CTC seeks to saturate the community environment with a coordinated continuum of services that address elevated risks and low levels of protection in the community and, thereby, achieve communitywide change.

The effectiveness of the CTC system to reduce youth delinquency, violence, and substance use community wide has been evaluated in a randomized controlled trial in seven states (Hawkins, Catalano, Arthur, Egan, & Brown et al., 2008) and one quasiexperimental study conducted in Pennsylvania (Feinberg, Greenberg, Osgood, Sartorius, & Bontempo, 2007; Feinberg, Jones, Greenberg, Osgood, & Bontempo, 2010).

The Community Youth Development Study (CYDS), an evaluation of CTC using a community-randomized design, has evaluated the effects of CTC on youth outcomes in a

panel of students followed from Grade 5 through Grade 12. Twenty-four communities selected from seven states (Colorado, Illinois, Kansas, Maine, Oregon, Utah, and Washington) were matched within state on population size, racial and ethnic composition, economic indicators, and crime rates. CYDS communities are small-to moderate-sized incorporated towns with their own governmental, educational, and law enforcement structures, ranging in population from 1,500 to 41,000 residents. Communities were randomly assigned to either receive CTC (12 communities) or to continue prevention as usual without CTC capacity-building workshops or support (12 communities). In the 12 intervention communities, CTC workshops and implementation began in the summer of 2003. All intervention communities received six workshops from CTC certified trainers over 9–12 months and 4 years of funding to implement tested and effective prevention policies and programs.

In this randomized trial, communities were asked to use interventions specifically targeting Grades 5 through 9. This is consistent with life-course theory that identifies early to mid-adolescence as a developmentally influential time period (Catalano & Hawkins, 1996; Sampson & Laub, 1993) during which adolescents most likely initiate drug use and delinquency (Elliott, 1994; Farrington, 2003). Because the research trial was funded for 5 years, targeting this developmental period was considered the most appropriate to achieve greatest communitywide impact on drug use and delinquency (Hawkins, Catalano, et al., 2008).

Evaluations of the CTC process found that CTC communities successfully implemented each component of the CTC system with fidelity (Fagan, Hanson, Hawkins, & Arthur, 2009; Quinby, Fagan, Hanson, Brooke-Weiss, & Arthur et al., 2008). CTC communities formed broad-based coalitions that reported high rates of functioning and support for CTC (Shapiro, Oesterle, Abbott, Arthur, & Hawkins, 2013) and also selected and implemented tested and effective prevention programs addressing elevated risk and depressed protective factors in their communities (Fagan et al., 2008a).

Evaluations of youth outcomes were based on data from a longitudinal panel of 4,407 youth from the 24 CYDS communities surveyed annually from 5th through 12th grade, with the exception of 11th grade. Analyses of the randomized trial indicate significant effects of CTC on youth outcomes. Compared to youth in control communities, youth in CTC communities reported significantly lower levels of community-targeted risk factors and lower rates of delinquency initiation 1.5 years after CTC installation (Hawkins, Brown, Oesterle, Arthur, & Abbott et al., 2008). By 8th grade, panel youth in CTC communities were less likely to have initiated delinquency or tobacco or alcohol use (Hawkins, Oesterle, Brown, Arthur, & Abbott et al., 2009). These effects were sustained through 10th grade—1 year after the technical assistance and funding for CTC sites ended (Hawkins, Oesterle, Brown, Monahan, & Abbott et al., 2012). In 12th grade, youth in CTC communities were still significantly less likely to have initiated alcohol and tobacco use as well as delinquent behaviors compared to those in control communities (Hawkins, Oesterle, Brown, Abbott, & Catalano, 2014). A recent study, based on youth outcomes 4 years after CTC implementation began, found that CTC is a cost-beneficial preventive intervention returning \$5.30 for each \$1 invested (Kuklinski, Briney, Hawkins, & Catalano, 2012).

CTC has also been evaluated in the state of Pennsylvania with a quasiexperimental cross-sectional design where youth in Grades 6, 8, 10, and 12 in schools served by CTC coalitions were compared to students at schools not served by CTC. Feinberg and Greenberg et al. (2007) studied approximately 97,000 students in 2003 and found 6th-grade CTC youth reported lower rates of alcohol and cigarette use in the past month and less delinquency in the past year. Students also reported less past-year delinquency in 10th grade and less binge drinking and drug use in 12th grade compared to students in the comparison schools. In a separate follow-up study based on data collected in 2005 which included 59,000 students, Feinberg et al. (2010) found a significant reduction in self-reported delinquency in

youth in CTC communities compared to youth in communities not served by CTC coalitions.

CTC is an effective communitywide prevention strategy that helps coalitions identify data-driven targets of change and specific widespread risk and protective factors to achieve better outcomes in their communities. CTC advocates for the use of tested and effective preventive interventions to fill gaps in order to address prioritized risk factors. CTC monitors both implementation and outcomes to assure self-correction and measurable outcome achievement.

The process of ensuring implementation fidelity and monitoring outcomes of comprehensive strategies such as PROSPER and CTC is complex. Clearly, all components of the model need to be in place to successfully achieve communitywide impact. For detailed descriptions of implementation and possible challenges, see Fagan et al. (2008a); Fagan, Hanson, Hawkins, and Arthur (2008b); Fagan et al. (2009, 2011); and Spoth and Greenberg (2011).

Conclusion

This chapter has summarized some of the advancements in the last few decades in prevention science and the reduction of youth problem behaviors through community- and school-focused programs. Several preventive programs operating in school and community settings have been tested and shown to be effective at reducing youth antisocial behavior, including delinquency, violence, and substance use, but these are not widely used across the USA or in other countries.

Prevention scientists have recognized that local coalitions can be an effective tool for assessing risk factors prevalent in the community and achieving and sustaining communitywide effects on youth behaviors through collective action. Engaging community leaders, groups, and organizations facilitates effective coordination of resources for prevention efforts.

The collective impact movement asserts that achieving five conditions, including a common

agenda, shared measurement, mutually reinforcing activities, continuous communication, and backbone support, will contribute to coalition success. Both CTC and PROSPER achieve these collective impact conditions. However, both systems go beyond meeting these conditions by using evidence-based programs to fill gaps and address local needs in communities, as outlined above. In addition, CTC uses epidemiological data collected through surveys of the community's youth to assess needs and tailor prevention efforts to specific community needs identified through those surveys. Controlled studies of CTC and PROSPER have shown that with these added components, a collective impact approach can achieve better outcomes for young people communitywide.

Summary

- Targeting known risk and protective factors can effectively prevent youth problem behaviors such as substance use, delinquency and violence.
- Several tested and effective prevention programs work in school and community settings to reach a large segment of the youth population. The collective impact approach calls for a wider collaboration across multiple environmental domains and service sectors to coordinate prevention efforts to achieve communitywide change.
- High-quality evaluations of the collective impact approach, such as CTC and PROSPER, suggest that using tested and effective programs and, in the case of CTC, using epidemiological data to identify priority risk and protective factors for collective action can fill gaps in prevention services and achieve collective impact in preventing antisocial behaviors and drug use.
- Communities seeking to prevent youth delinquency, violence, and substance use should engage community stakeholders to target widespread risk and protective factors and implement developmentally appropriate

tested and effective prevention programs for communitywide impact.

Future Research Needs

- Identify effective strategies for implementing collective impact initiatives at scale by expanding the availability and accessibility of technical assistance and training through the web.
- Develop strategic approaches to evaluate the effectiveness of community wide prevention efforts by using existing archival data or state-wide surveys for monitoring implementation process and outcomes.
- Examine the comparative merits and costs-benefits of large-scale prevention operating systems by adopting strategies used by organizations such as the Washington State Institute for Public Policy and expand the ability to make adequate comparisons across programs and systems.

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Effective Family-Based Treatments for Adolescents with Serious Antisocial Behavior

This chapter provides clinical and research overviews of family-based treatments that have been identified by well-respected independent entities as effective in reducing serious antisocial behavior in adolescents. Separate sections are devoted to family-based interventions for adolescent criminal behavior and for substance use disorders in adolescents. For criminal behavior, identification of effective treatments was based on conclusions of The Office of Juvenile Justice and Delinquency Prevention Blueprints for Violence Prevention review (Mihalic & Irwin, 2003). Criteria for designation as a Blueprints model program include favorable reductions in rearrest in randomized trials with delinquents, replication of such outcomes across at least two research teams, and sustained treatment effects for at least a year. Only three treatments have met these criteria, and each is family based. These interventions include multisystemic therapy,

functional family therapy, and multidimensional treatment foster care. For substance use disorders, identification of effective treatments was based on reports from the National Institute on Drug Abuse (NIDA, 2012), SAMHSA's National Registry of Evidence-based Programs and Practices (www.nrepp.samhsa.gov), and recent academic reviews (Baldwin, Christian, Berkeljon, Shadish, & Bean, 2012; Spas, Ramsey, Paiva, & Stein, 2012; Tripodi & Bender, 2011). Each of the aforementioned Blueprints model programs and several additional family-based treatments were identified as likely efficacious with substance use disorders in adolescents. Indeed, family-based treatments constitute the overwhelming majority of interventions identified across reviews as effective in treating serious antisocial behavior in youths.

Several factors account for the finding that almost all of the effective interventions for serious antisocial behavior in adolescents are family based. First, as reviewed by Pardini, Waller, and Hawes (2015) and elsewhere (Lieberman, 2008), family variables play central and critical roles in the development and maintenance of antisocial behavior in children and adolescents. Variables such as parental monitoring and supervision, discipline strategies, consistency, emotional warmth, and conflict are particularly important. Second, these variables are malleable—parenting practices and emotional climate can change for the better, and certain well-specified therapeutic interventions have been shown to promote such

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change. Third, as reviewed subsequently, multiple studies have demonstrated that decreased antisocial behavior in adolescents was mediated by favorable changes in family functioning. That is, improved family relations led directly to improved youth behavior. Fourth, family-based interventions possess high ecological validity, which increases the likelihood that therapeutic changes will be sustained. In contrast with group therapy or residential treatment, for example, where youths learn to adapt to artificial contexts, family therapy aims to transform patterns of maladaptive interactions in their naturally occurring environment.

This review focuses on findings from two clinical populations that often overlap: juvenile offenders and youths with substance use disorders. The review excluded evaluations that were not peer reviewed and not published in English or that examined the effectiveness of these family-based treatments on other serious clinical problems (e.g., youths in psychiatric crisis, child maltreatment, conduct disorder).

Effective Treatments of Criminal Behavior and Substance Abuse in Adolescents

Development of the three models (i.e., multisystemic therapy, functional family therapy, multidimensional treatment foster care) identified subsequently as effective treatments of delinquency by Blueprints (Mihalic & Irwin, 2003) began in the 1970s, at a time when the general consensus in the field was that “nothing works” (Romig, 1978). These three treatment models were specified and evaluated for about 20 years before dissemination efforts began in the late 1990s. Currently, the effectiveness of the models has been supported by more than 30 published evaluations, the vast majority of which are randomized clinical trials (RCTs). Moreover, these approaches have been transported to almost 1,000 community sites worldwide, where they serve approximately 20,000 juvenile offenders and an equal number

of youths with other serious clinical problems annually (Henggeler & Schoenwald, 2011).

Multisystemic Therapy

Multisystemic therapy (MST) (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009) is based on a social ecological theoretical model that views antisocial behavior as multidetermined (i.e., by interrelated individual, family, peer, school, neighborhood factors) and is consistent with empirical literature on the determinants of juvenile crime and substance use.

Clinical Approach MST is a home-based intervention delivered by master’s level therapists who work within teams of two to four therapists and a half-time supervisor. Caseloads are low to facilitate family engagement and the delivery of intensive services, which are of 4 months duration on average. Therapists and supervisors receive intensive training and ongoing quality assurance to promote treatment fidelity and youth outcomes.

The therapist’s primary clinical task is to determine the key proximal factors (e.g., poor parental monitoring, association with deviant peers) contributing to the youth’s antisocial behavior. These factors are then prioritized based on salience and amenability to change, and specific interventions are designed to address any barriers to change. For example, perhaps parental substance abuse is a key barrier to effective monitoring of the youth’s whereabouts and implementation of productive discipline strategies. In such case, the therapist might deliver an evidence-based substance abuse treatment (e.g., contingency management) to the parent while concurrently developing more effective parenting skills. Youth and family outcomes are tracked continuously, and interventions are modified in a recursive process until the desired outcomes are achieved. Importantly, a primary aim of treatment is to empower the parents to be more effective with their children. Thus, for example, therapists might coach parents in how

to promote their child's problem-solving skills, disengage the adolescent from deviant peers, or negotiate desired support from teachers and school administrators.

Outcomes for Juvenile Offenders The first evaluation of MST (Henggeler et al., 1986) was a quasiexperimental efficacy (i.e., graduate students as therapists, conducted in a university research context) study in which MST improved the family relations and decreased the behavior problems of juvenile offenders at posttreatment. Three subsequent RCTs with chronic and violent juvenile offenders (Borduin et al., 1995; Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Henggeler, Melton, & Smith, 1992) replicated the favorable short-term effects of the initial trial (e.g., improved family relations) and included follow-ups that demonstrated favorable reductions in recidivism and incarceration. For example, in a long-term follow-up to Borduin et al. (1995), Sawyer and Borduin (2011) showed that MST decreased felony arrests, violent felony arrests, and days in adult confinement 22 years posttreatment. Together, these studies set the stage for subsequent MST research with juvenile offenders as well as MST adaptations for other complex and costly clinical problems (Henggeler, 2011).

Outcomes for Juvenile Sex Offenders With three published RCTs, no intervention has more empirical support in the treatment of juvenile sex offenders than MST. An initial randomized efficacy study (Borduin, Henggeler, Blaske, & Stein, 1990) demonstrated the capacity of MST to reduce sexual offending and other criminal offending at a 3-year follow-up in a small sample of juvenile sexual offenders. Subsequently, in a larger randomized efficacy study with juvenile sex offenders, Borduin, Schaeffer, and Heiblum (2009) demonstrated favorable effects across a variety of domains (e.g., family relations, peer relations, school performance) as well as substantive reductions in recidivism for sex offenses, rearrest for other crimes, and days incarcerated at a 9-year follow-up. These findings were generally replicated in a relatively large community-based RCT with juvenile sex offenders (Letourneau et al., 2009) at a 1-year

follow-up. At 2-year follow-up (Letourneau et al., 2013), favorable outcomes were sustained for some (e.g., youth problem sexual behavior, out-of-home placement) but not all outcomes (e.g., arrests for other crimes).

Outcomes for Youth with Substance Use Disorders Two MST RCTs were conducted with juvenile offenders with diagnosed substance use disorders. In the first (Henggeler, Pickrel, & Brondino, 1999), MST produced decreased drug use at posttreatment and decreased days in out-of-home placements. At 4-year follow-up (Henggeler, Clingempeel, Brondino, & Pickrel, 2002), young adults in the MST condition evidenced decreased violent crime and increased marijuana abstinence. The second study integrated MST into juvenile drug court (Henggeler et al., 2006) and showed that MST enhanced substance use outcomes for alcohol and marijuana. In addition, RCTs with serious juvenile offenders (Henggeler et al., 1991; Timmons-Mitchell, Bender, Kishna, & Mitchell, 2006), an unknown percentage of who were substance abusers, have shown decreased substance use, substance-related arrests, and substance related problems.

Independent Replications More than ten independent replications of MST have been published, and three of these were conducted with samples of juvenile offenders. Timmons-Mitchell et al. (2006) conducted a randomized community-based effectiveness trial with juvenile felons at imminent risk of placement. At 18 months posttreatment, youths in the MST condition evidenced improved functioning, decreased substance use problems, improved school functioning, and decreased rearrests. Similarly, in a randomized effectiveness trial with juvenile offenders conducted in England (Butler, Baruch, Hickley, & Fonagy, 2011), MST demonstrated improved parenting and decreased offending and placements at an 18-month follow-up. Finally, in a large multisite study with juvenile offenders (Glisson et al., 2010), MST reduced youth symptoms at posttreatment and out-of-home placements at 18 months follow-up.

Cost Analyses Several MST studies with juvenile offenders included cost analyses. Based on

the sample from Borduin et al. (1995), Klietz, Borduin, and Schaeffer (2010) observed cost benefits ranging up to almost \$200,000 per MST participant. More modestly, using data from Henggeler et al. (1999), Schoenwald, Ward, Henggeler, Pickrel, and Patel (1996) concluded that the incremental cost of MST was nearly offset by reduced out-of-home placements. Similarly, Cary, Butler, Baruch, Hickey, and Byford (2013) showed that MST was associated with cost savings related to crime reduction in the Butler et al. (2011) RCT. **Mediational Studies** The MST theory of change posits that reductions in adolescent antisocial behavior are mediated by improved family functioning. This perspective has been supported by mediational and qualitative studies with substance-abusing juvenile offenders and chronic and violent juvenile offenders (Huey, Henggeler, Brondino, & Pickrel, 2000), juvenile sex offenders (Henggeler et al., 2009), juvenile offenders in England (Tighe, Pistrang, Casdagli, Baruch, & Butler, 2012), and Dutch youth with severe and violent antisocial behavior (Dekovic, Asscher, Manders, Prins, & van der Laan, 2012).

Functional Family Therapy

Functional family therapy (FFT) (Alexander, Waldron, Robbins, & Neeb, 2013) views adolescent antisocial behavior as a symptom of dysfunctional family relations. Interventions, consequently, aim to replace problematic family relations with counterparts that promote healthy adolescent behavior and family interactions.

Clinical Approach FFT is delivered by clinicians who work in teams of three to eight therapists with caseloads of 12–15 families each. Treatment can be delivered in either home or office settings, and the average duration of treatment is about 3–4 months. FFT includes a relatively intensive quality assurance protocol to promote treatment fidelity and program success.

Treatment progresses through several stages. Therapy centers initially on engaging families in

the therapeutic process and motivating change. Here, the therapist engenders optimism and shifts the family's focus from the youth's problem behavior to establishing more positive family relations. Next, using a variety of behavioral, cognitive behavioral, and family systems intervention techniques, the therapist replaces the dysfunctional patterns of family behavior with interactions that promote more positive functioning among all family members. The final phase of treatment aims to sustain favorable therapeutic change and generalize such change to the social ecology. Here, linkages with school and community resources might be developed, and the therapist helps the family anticipate future problems and develop plans to address such.

Outcomes for Juvenile Offenders, Including Independent Replication FFT provided the first RCT of a family-based intervention to demonstrate favorable outcomes with youths in the juvenile justice system (Alexander & Parsons, 1973)—FFT improved family communication and decreased status offending through an 18-month follow-up. In a subsequent quasiexperimental study with serious juvenile offenders (Barton, Alexander, Waldron, Turner, & Warburton, 1985), FFT reduced criminal offending at a 15-month follow-up.

Two independent replications have been published. Using a quasiexperimental design, Gordon, Arbuthnot, Gustafson, and McGreen (1988) found that FFT decreased recidivism at a 2.5-year follow-up and subsequently at a 5-year follow-up (Gordon, Graves, & Arbuthnot, 1995). More recently in a large multisite community-based study, Sexton and Turner (2010) failed to demonstrate FFT effects on rearrest at 12 months posttreatment. Additional analyses, however, showed treatment adherence (i.e., therapist fidelity to the FFT model) was linked with recidivism outcomes. This finding is consistent with several MST studies (e.g., Henggeler et al., 1997) that showed more favorable outcomes when therapists adhered to treatment protocols. In addition to the aforementioned independent replications, two others with nondelinquent samples have been published in Swedish, and

these are noted in Henggeler and Sheidow (2012).

Outcomes for Substance Use Disorders, Including Independent Replications Three RCTs have examined the effectiveness of FFT in treating youths with substance use disorders, and two of these were conducted by independent investigators. Friedman (1989), in an independent study with substance-abusing adolescents, failed to observe treatment effects at a 15-month follow-up. Waldron, Slesnick, Turner, Brody, and Peterson (2001) found favorable FFT effects on marijuana use at posttreatment, but these dissipated by the 7-month follow-up. More favorable results were observed, however, in an independent study conducted with runaway adolescents with identified alcohol problems (Slesnick & Prestopnik, 2009)—FFT reduced alcohol and drug use at a 15-month follow-up.

Mediational Studies Although formal mediational analyses have not been conducted with FFT, results from several studies are suggestive. For example, Alexander, Barton, Schiavo, and Parsons (1976) observed that improved family communication was associated with decreased youth recidivism. More recently, Robbins, Turner, Alexander, and Perez (2003) showed that therapeutic alliances in which the therapist was not equally aligned with the youth and parents were associated with higher dropout rates.

Multidimensional Treatment Foster Care

Social learning theory provides the conceptual framework for multidimensional treatment foster care (MTFC). Though more explicitly behavioral and less systemic than most family-based approaches, MTFC attends closely to the broader social ecology in which juvenile offenders are embedded.

Clinical Approach As described by Chamberlain (2003), MTFC targets youths who have been removed from their family home due to serious antisocial behavior. The overriding purpose of MTFC interventions is to surround youth with

competent adults who are positive and encouraging, model responsible behavior, and provide a highly structured context. Youth are placed in a foster home for 6–9 months, one youth per placement, with specially trained foster parents who have continuous access to an MTFC program supervisor. The foster parents implement a highly structured behavioral plan that specifies contingencies for desired and inappropriate behaviors occurring at home, school, or elsewhere. Youth behavior is closely tracked, and rewards and sanctions are applied as specified in the plan. Concomitantly, a therapist works with the youth to address individual-level deficits (e.g., social skills, emotion management), and a skills trainer provides real-world opportunities to practice newly developed skills. Finally, a family therapist works with the youth's biological family to facilitate a smooth and effective transition back home.

Outcomes for Juvenile Offenders MTFC clinical trials have produced consistently favorable results in comparison with group care placements. In an initial quasiexperimental study, Chamberlain (1990) demonstrated decreased rates of incarceration at a 2-year follow-up. In a subsequent RTC (Chamberlain & Reid, 1998) with chronic and serious juvenile offenders, MTFC reduced rates of incarceration and criminal charges at 1-year posttreatment. These gains were largely sustained at a 2-year follow-up (Eddy, Whaley, & Chamberlain, 2004) and were especially pronounced for violent offending. In one of the few RCTs in the field targeted exclusively for female chronic offenders (Leve, Chamberlain, & Reid, 2005), MTFC was again effective at decreasing youth incarceration and criminal behavior at a 1-year follow-up, and these favorable outcomes were largely sustained at a 2-year follow-up (Chamberlain, Leve, & DeGarmo, 2007). An additional sample of female offenders was added to the sample from Leve et al. (2005), and outcomes on additional measures were assessed at a 2-year follow-up. Here, MTFC was also effective at decreasing pregnancy rates (Kerr, Leve, & Chamberlain, 2009) and depressive symptoms (Harold et al., 2013).

Independent Replications and Substance Use Outcomes Although the effectiveness of MTFC has not been replicated with samples of juvenile offenders, Westermark and colleagues (Westermark, Hansson, & Olsson, 2011; Westermark, Hansson, & Vinnerljung, 2008) conducted independent evaluations of MTFC in Sweden. Across studies, results showed MTFC was effective at reducing youth mental health symptoms and decreasing placement disruptions. Similarly, although MTFC has not been evaluated for youth with substance use disorders, its long-term effects on the substance use of women with prior juvenile justice involvement have been examined. Based on the samples noted in the aforementioned Kerr et al. (2009) follow-up study, a 7–9 year follow-up showed that MTFC reduced drug use and was associated with greater resilience to partner drug use (Rhoades, Leve, Harold, Kim, & Chamberlain, 2014).

Mediational Studies Two studies have examined mediators of MTFC effectiveness, and these support the clinical emphases of the model. Eddy and Chamberlain (2000) found that favorable MTFC outcomes were mediated by improved foster parent supervision, discipline, and relations with the youth as well as by decreased association with deviant peers. Leve and Chamberlain (2007) showed that MTFC outcomes were mediated by increased completion of schoolwork.

Conclusion

Evidence of the capacity of MST, FFT, and MTFC to reduce adolescent criminal activity and rates of incarceration is overwhelming. Moreover, results from mediational studies and from secondary outcome measures (e.g., family functioning) in RCTs support the general theory of change posited by these treatment models—improved family functioning leads to

improved adolescent behavior. Significantly, and consistent with the reviews on personality traits, peer relationships, school and education, and neighborhood factors of this volume, these treatment models are also comprehensive—attending to factors from various domains of risk that can exacerbate or attenuate antisocial behavior in adolescents. As noted by White (2015), the risk factors for adolescent criminal behavior and substance use are very similar. Hence, it is not surprising that these same family-based treatments have evidenced promising results in the treatment of adolescent substance use disorders. As discussed next, several family-based interventions have been developed specifically to address such problems.

Promising Treatments for Substance Use Disorders in Adolescents

In contrast with the generally consistent findings of effectiveness for the aforementioned evidence-based treatments of delinquency, adolescent substance abuse has proven more recalcitrant to well-conceived interventions. Findings for the most promising treatments of substance use disorders in adolescents are often ambiguous. Although RCTs typically show time effects for key outcomes (e.g., substance use is reduced over time across intervention conditions), treatment effects (i.e., the experimental intervention is more effective than the comparison intervention) are often not observed. Moreover, sustained results at more than a year follow-up have rarely been demonstrated, and only a few independent replications have been conducted. The following review examines the most promising of the family-based treatments for adolescent substance use disorders, and, as stated previously, the majority of the most promising interventions are family based. Please note that only treatment effects are presented here; time effects are not described.

Family Behavior Therapy and Contingency Management with Families (CM)

Family behavior therapy (FBT) and CM are related treatment models based on well-validated cognitive behavioral and behavioral approaches to addressing clinical problems in children and adolescents. Substance use is viewed as a behavior that is learned through positive (e.g., pleasurable feelings, peer support) and negative (removal of negative emotions) reinforcement. As such, substance use behavior can be changed by the appropriate application of contingencies (i.e., rewards and disincentives) as well as through the development of certain cognitive strategies (e.g., self-management plans to avoid high-risk situations).

Clinical Approach FBT (Donohue & Azrin, 2012) is an outpatient treatment of approximately 6 months duration and includes several key components. (a) Behavioral contracts are developed in which parents agree to provide rewards (e.g., cell phone privileges, a favorite meal) for desired youth behavior that is responsible and not conducive to substance use (e.g., school attendance, household chores). (b) Self-management training is used to help the youth identify triggers for substance use (e.g., depression, attending a friend's party) and to develop and implement strategies for addressing those triggers (e.g., going to work out, visiting friends who don't use drugs). (c) Communication training is provided to help family members interact more effectively—for example, how to manage anger in ways that increase the probability that family conflicts are resolved satisfactorily.

CM (Henggeler et al., 2012) is an outpatient treatment of approximately 4 months duration and is based on the highly effective Community Reinforcement Approach for adult drug abuse treatment specified by Budney and Higgins (1998). CM possesses many theoretical and

clinical similarities with FBT. The primary differences between FBT and CM are that CM monitors youth substance use closely through frequent drug testing, with corresponding contingencies specified in the behavioral contract, and parents are closely involved in every aspect of treatment (e.g., parents are taught to facilitate self-management training with their youth).

Outcomes FBT was initially evaluated in a small RCT with youth who had engaged in drug use during the past month (Azrin, Donohue, Besalel, Kogan, & Acierno, 1994). At posttreatment, FBT demonstrated favorable effects on drug use, alcohol use, school/work attendance, family relations, and depression. These promising results, however, were not replicated in a larger RCT that compared FBT with a cognitive behavioral approach with dually diagnosed conduct-disordered and substance-dependent youth (Azrin et al., 2001). Two RCTs have examined the effects of CM integrated into juvenile drug courts with favorable findings. In a study with juvenile offenders with substance use disorders, Henggeler et al. (2006) showed that the integration of MST into juvenile drug court improved standard drug court outcomes for substance use, and the further integration of CM accelerated the decrease in substance use achieved by MST. In a multisite juvenile drug court study (Henggeler, McCart, Cunningham, & Chapman, 2012), CM was effective in reducing marijuana use and criminal behavior at 9 months post-recruitment. Another family-based variation of CM was evaluated in an RCT with substance-abusing adolescents (Stanger, Budney, Kamon, & Thostensen, 2009). CM reduced youth marijuana use during the 14-week treatment; however, these gains were not sustained through a 9-month follow-up. In sum, although the results are promising and a vast amount of research supports the use of these types of behavioral and cognitive behavioral interventions with adult drug abusers (Higgins, Silverman, & Heil, 2008), consistent and sustained outcomes have not been observed when treating adolescents.

Brief Strategic Family Therapy

Brief strategic family therapy (BSFT) emphasizes the important role that family relationships play in the development and maintenance of youth behavior problems. Family structure, which constitutes the repetitive patterns of interactions that characterize a family, is of particular importance. BSFT targets those interactions that are maladaptive and associated with antisocial behavior in adolescents.

Clinical Approach BSFT (Szapocznik, Hervis, & Schwartz, 2003) is delivered through weekly clinic- or home-based sessions for an average duration of about 4 months. Therapists use a set of practical and problem-focused strategies to identify those family structures that are contributing to the youth's antisocial behavior and then to replace these maladaptive structures with family interactions that promote positive youth functioning. Initially, the therapist joins the family by establishing relationships with each family member and the family as a whole. During sessions, family interactions that reflect the family's typical structures are elicited, thereby allowing the therapist to identify maladaptive patterns of interaction. Family hierarchy (e.g., who leads the family), emotional connectedness, and strategies for conflict resolution are particularly important in identifying maladaptive interaction patterns. Such patterns are subsequently changed through the therapist's use of restructuring techniques. Here, for example, family therapy techniques such as reframing are employed, and the therapist works to modify family boundaries (e.g., reinforcing the primacy of the parental dyad) and alliances (e.g., disengaging an overinvolved parent-adolescent dyad and reconnecting family members who are emotionally distant). Pragmatic and strategic tasks are assigned inside the session (e.g., asking parents to determine the youth's curfew) and as homework outside the session (e.g., having parents go on a mutually agreeable date) that facilitate the desired shift in family structure. These changes in family structure are then

assumed to reduce the adolescent's behavior problems.

Outcomes The effectiveness of BSFT in treating adolescents with antisocial behavior has been evaluated in three RCTs. In a community-based effectiveness trial, Coatsworth, Santisteban, McBride, and Szapocznik (2001) failed to observe treatment effects at posttreatment for a sample of young adolescents with behavior problems. Findings in a subsequent efficacy trial with older adolescents presenting antisocial behavior (Santisteban et al., 2003), however, were considerably more favorable. At posttreatment, BSFT was effective at decreasing youth conduct problems and marijuana use, and family functioning was improved. More recently, an independent multisite effectiveness study included a follow-up and compared BSFT with community services in the treatment of adolescents, the vast majority of whom had a substance use disorder (Robbins et al., 2011). Although treatment effects based on biological measures of substance use were not observed throughout the 12-month post-recruitment follow-up, a treatment effect was found at the last assessment point for the self-report measure of substance use. BSFT effects were also observed for improved family relations. Overall, the outcomes across BSFT RCTs with antisocial adolescents show promising results but are generally modest in scope.

Mediational Research Rynes, Rohrbaugh, Lebensohn-Chialvo, and Shoham (2013) evaluated the association between therapist behavior and youth outcomes in the Robbins et al. (2011) study. As noted previously, the BSFT therapist should align with each family member and restructure maladaptive patterns of family interaction. Rynes and colleagues focused on therapist behavior that duplicated a type of maladaptive family interaction that has been linked with poor outcomes in previous research and is inconsistent with the BSFT model—demanding a family member to change, which leads that person to withdraw from the interaction (e.g., demanding that the youth stops using drugs, which leads him or her to withdraw from

the interaction). The researchers found youth substance use outcomes were worse when therapists duplicated this maladaptive interactional sequence—thereby supporting one aspect of the BSFT approach.

Multidimensional Family Therapy

Multidimensional Family Therapy (MDFT) conceptualizations of behavior are based primarily on findings from developmental psychology and developmental psychopathology regarding factors that sustain problem behavior in adolescents. Conceptualizations and interventions are also influenced by family systems theory and structural and strategic approaches to family therapy.

Clinical Approach MDFT can be delivered in a variety of settings (e.g., office based, home based, residential) over about 4–6 months with varying frequency (Liddle, 2009). Therapists address four treatment domains that are interdependent—adolescent, parent, family, and extrafamilial. In the adolescent domain, the therapist engages the adolescent and aims to develop his or her social skills and problem-solving skills across peer and school settings. Interventions in the parent domain focus on facilitating more effective parenting of the children (e.g., monitoring and supervision) as well as improving emotional bonds. Parental psychosocial challenges might be addressed as well. Interventions in the family domain emphasize the development of effective communication strategies, conjoint problem solving, and conflict resolution skills. In the extrafamilial domain, the therapist aims to build positive relations between family members and key social systems, such as the school and juvenile justice authorities. Similar to FFT, these interventions are delivered through three phases: engagement, behavior change, and generalization and maintenance.

Outcomes In contrast with the validation of most evidence-based treatments (e.g., initial studies typically use graduate students as therapists and are conducted in university settings), the vast majority of MDFT RCTs

have been conducted in community settings—a practice that facilitates transport to real-world service systems. In an initial RCT with drug using adolescents (Liddle et al., 2001), MDFT evidenced several favorable outcomes at a 12-month posttreatment follow-up, including decreased drug use, improved school functioning, and improved family functioning. These findings were replicated in a subsequent RCT (Liddle, Rowe, Dakof, Ungaro, & Henderson, 2004) that included young adolescents referred for substance abuse and behavior problems—youth with severe problems were excluded. At posttreatment, MDFT was effective at decreasing youth externalizing symptoms, marijuana use, and association with delinquent peers, and treatment improved school functioning and family relations. These favorable outcomes were generally sustained at a 12-month posttreatment follow-up (Liddle, Rowe, Dakof, Henderson, & Greenbaum, 2009), and MDFT reduced juvenile recidivism as well. On the other hand, findings were mixed at 12-month follow-up in an RCT with adolescents with substance use disorders (Liddle, Dakof, Turner, Henderson, & Greenbaum, 2008). MDFT decreased the severity of problems associated with substance use, but treatment effects were not observed for the frequency of substance use. Henderson, Dakof, Greenbaum, and Liddle (2010) conducted secondary analyses on data from Liddle et al. (2008) and also presented findings from a new RCT of MDFT delivered in juvenile detention and subsequently in the youths' homes. Interestingly, across studies, MDFT was effective for youths with more serious problems (i.e., greater substance use and more co-occurring mental health disorders) but not for counterparts with less serious problems.

Independent Replications and Cost Analysis Three independent RCTs have been conducted for MDFT, with mixed results. In the large multisite Cannabis Youth Study (Dennis et al., 2004), which included MDFT and four other treatment conditions, treatment effects were not demonstrated for any of the interventions. Likewise, an economic evaluation of this study (French et al., 2003) concluded that

MDFT failed to provide significant net benefits. An independent evaluation with adolescents meeting diagnostic criteria for substance use disorders in the Netherlands (Hendriks, van der Schee, & Blanken, 2011) also failed to support the effectiveness of MDFT. Consistent with findings from Henderson et al. (2010), however, posthoc analyses showed that youth with the most severe problems tended to respond more favorably to MDFT. Importantly, a multisite study in Western Europe has recently supported the effectiveness of MDFT in treating cannabis use disorders in adolescents (Rigter et al., 2013). MDFT was more effective at moving youth from dependence to abuse at 12-month follow-up and, again, was especially effective with higher severity youth. Overall, despite some equivocal results, evidence of MDFT effectiveness in addressing substance-related problems in challenging adolescents is promising.

Mediational Research Two studies have supported the MDFT theory of change—linking treatment processes with youth outcomes. Shelef, Diamond, Diamond, and Liddle (2005) found that a strong therapist–adolescent alliance was associated with short-term reductions in symptoms when the therapist–parent alliance was also positive. Consistent with mediation research for MST and MTFC, Henderson, Rowe, Dakof, Hawes, and Liddle (2009) observed that favorable MDFT effects on substance use were mediated by improved parental monitoring.

Conclusion

Evidence of the capacity of FBT, CM, BSFT, and MDFT to reduce adolescent substance use and abuse is convincing, though modest—with treatment effects observed in most RCTs. As noted previously, the evidence-based treatments of delinquency (i.e., MST, FFT, and MTFC) also showed promising results in the treatment of adolescent substance use disorders. Although outcomes are not overwhelming, family-based

treatment models are undoubtedly the most promising approaches in this area of research, with scant evidence supporting the relative effectiveness of individual, group, or residential approaches to the treatment of adolescent substance use disorders. Moreover, consistent with research for the evidence-based treatments of delinquency, mediation studies for adolescent substance abuse support the important role that family relations play in attenuating substance-related problems in youths.

Summary

Only three interventions have met the Blueprints criteria for effective treatments of delinquency, and each is family based. Several additional family-based approaches are the most promising treatments of adolescent substance abuse in the field. Significantly, the treatments discussed in this chapter share several commonalities that likely account for their effectiveness:

- These treatments explicitly address well-established family risk factors associated with youth antisocial behavior (e.g., monitoring, supervision, discipline, emotional bonding). Moreover, the reviewed outcome research showed that these family-based treatments improve family functioning, and mediation studies demonstrated that such improved functioning leads to decreased antisocial behavior in the adolescents.
- Interventions are also directed at known risk factors in the youth and family's broader environment, including association with problem peers, school performance, and relations with community stakeholders.
- Each of the family-based models has well-specified intervention strategies that are pragmatic, problem focused, and present oriented. Similarly, behavioral and cognitive behavioral intervention techniques are used across models, though these techniques are implemented within systemic conceptual frameworks.

- The interventions are delivered in community-based settings, often directly in the youths' homes and schools, which overcomes barriers to service access and promotes treatment generalization.
 - The programs within which these treatments are delivered include considerable quality assurance (i.e., training, clinical oversight) to promote treatment fidelity and youth outcomes. Indeed, several studies demonstrated significant links between therapist adherence to the treatment protocols and favorable youth outcomes.
 - Importantly, and in contrast with many intervention approaches in youth service systems, the family is viewed as the solution, not as the problem. Thus, each of the family-based treatments takes a strength-focused approach to problem conceptualization and intervening.
- that have contributed to inconsistent outcomes among clinical trials is needed. Clearly, poor intervention fidelity is often a major factor in treatment failure, but other treatment and service system variables are likely relevant as well.
- Additional research is needed on the mediators of intervention effectiveness. Although some family-based treatments have two or more mediation studies, others have none.
 - Finally, although demographic moderators (e.g., gender, race, age) of the effectiveness of these interventions have rarely been observed, investigators should continue to explore the generalizability of treatment effects.

Future Research Needs

Several research priorities can be identified:

- Although the effectiveness of a number of the family-based approaches has been supported in independent replications, others have not received independent validation. Treatments that require the oversight of the treatment developer for success are limited in their ultimate value. Hence, independent replications are critical for several of the approaches reviewed here.
- As detailed by Fixsen, Naoom, Blase, Friedman, and Wallace (2005), the transport of interventions proven effective in controlled settings (e.g., university clinic with graduate student therapists) to real-world community settings can be extremely challenging on many levels (e.g., training, funding, administrative demands). The transportability of family-based treatments is a ripe subject for the emerging field of implementation research.
- Similarly, and this likely also comes under the rubric of implementation research, a better understanding of the conditions and processes

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Intervening Effectively with Juvenile Offenders: Answers from Meta-Analysis **30**

Sarah M. Manchak and Francis T. Cullen

Starting in the first years of the twentieth century and continuing until the late 1960s, rehabilitation flourished as the primary goal of the juvenile justice system in the USA (Feld, 1999; Platt, 1969; Rothman, 1980). Acting as a kindly parent, the state was entrusted to take wayward youths—from those showing signs of misconduct to those deeply entrenched in serious criminality—into its bosom and, through benevolent treatment, cure them of their antisociality. Mirroring the medical model, the ideal intervention involved diagnosing troubled youths and then developing an individualized treatment plan to attain their reform.

Many delinquents could be treated in the community, but others in need of more intensive services would be sent to institutions called reformatories and located in bucolic rural areas far from the crime-ridden, impoverished neighborhoods that produced the most persistent offenders. To do their job well, juvenile court judges and correctional officials would be granted—much as do physicians—unfettered discretion to choose the appropriate treatment for each juvenile. Legal formalities would not

be allowed to interfere with their acting in the best interest of troubled youngsters.

As just described, the rehabilitative ideal is powerful because it merges benevolence with utility. It promises a justice system that both saves juveniles from a life in crime and, in so doing, enhances public safety by preventing future victimizations. But the very legitimacy of correctional rehabilitation collapses if this system proves to be an abusive rather than a kindly parent. In the 1960s, many observers came to believe that this was the case (Allen, 1981).

What inspired this switch in thinking—from advocating to opposing offender treatment? Part of the reason can be traced to the prevailing social context. In the space of a decade—roughly from the mid-1960s to the mid-1970s—Americans witnessed a series of disquieting social events: police dogs attacking civil rights marchers, a failed and deadly war in Vietnam, the assassination of the Kennedy brothers and Martin Luther King, Jr., urban riots that left neighborhoods aflame, CIA deceptions and misdeeds, the Attica prison riot, the Watergate scandal, and protesters taking to the streets and shutting down college campuses across the nation. Taken together, these events triggered a precipitous loss of trust in the state that Lipset and Schneider (1983) termed a “confidence gap.” And here was the rub for rehabilitation: Was it wise to believe any longer that *this state* would administer a juvenile justice system that, in fact, acted in the best interests of its charges? Or

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would the government, as it had done in so many other ways, abuse its powers to the detriment of those it promised to save? Skepticism about the state's capacity to be benevolent became increasingly pervasive.

Another reason for turning against the rehabilitative ideal was empirical reality. When skeptics peered into the juvenile justice system, they did not like what they saw. In Morris's (1974) words, rehabilitation was a "noble lie." Much good was promised, but much evil was delivered (Gaylin, Glasser, Marcus, & Rothman, 1978). Three problems were central to the critique of treatment—the last of which is our concern here.

First, the unfettered discretion given to judges and correction officials to individualize treatments was misused, if not abused. These actors lacked the expertise to diagnose and treat offenders. Still worse, they were accused of using their discretion not to save the wayward but to discriminate against poor and minority youths. Critics advocated the introduction of due process rights into the juvenile court so as to constrain these discretionary powers—a call that was largely heeded by the courts. Second, juvenile reformatories typically did not resemble therapeutic communities but dreary, if not dangerous, total institutions. It was particularly inexcusable that all sorts of youngsters were mixed together, from status offenders to violent predators. Victimization of the most vulnerable was held to be rampant. These youngsters were not being rescued from a life in crime but rather were "weeping in the playtime of others" (Wooden, 1976). Third, many of the treatment programs being used simply did not work. In essence, unproven correctional "medicines" were being used; quackery was often the result (see, more broadly, Latessa, Cullen, & Gendreau, 2002).

This last claim—that rehabilitation could not be justified due to its ineffectiveness—received seemingly irrefutable empirical support from a famous essay published by Robert Martinson (1974) in *The Public Interest*. Although not focusing on juveniles per se, Martinson provided a high-quality systematic review of existing

evaluations of rehabilitation programs (for a full report of his findings, see Lipton, Martinson, & Wilks, 1975). His article, which became famous soon after its publication, suggested that "nothing works" in corrections to change offenders—an assertion that Martinson repeated more directly in a *60 Minutes* interview with Mike Wallace (CBS Television Network, 1975). Four decades after its publication, this essay continues to enter into discussions on the efficacy about rehabilitation. However, commentators today do not fully understand why Martinson's work assumed importance both at the time it was published and, in a more enduring way, as the correctional context changed in the years thereafter.

Thus, when published 1974, Martinson's essay did not so much change minds as confirm what opponents of rehabilitation "already knew" (Cullen & Gilbert, 1982). They touted his study because it seemed to drive the final nail into rehabilitation's coffin. They were happy to hold up his study and ask: "How can treatment be supported if Martinson has shown that 'nothing works'?" Still, the critics' opposition to rehabilitation was already well entrenched prior to the appearance of his "nothing works" essay. As noted, people had lost faith in treatment because, like those around them, they had lost faith in the goodness of those in power. Mistrusting the state, they were persuaded that officials used their unfettered discretion unwisely and ran juvenile reformatories that were harsh and damaging. They did not need a study to convince them that, in this corrupt context, the rehabilitative ideal was a fraud. As such, those rejecting rehabilitation did not do so because they dispassionately read the empirical evidence in Martinson's essay and suddenly changed their minds. If this were the case, they would have heeded a later article by Martinson (1979) in which he reported an updated review of the evidence and recanted his "nothing works" conclusion. Other reports of positive treatment results were similarly ignored or gratuitously debunked (Gottfredson, 1979; Palmer, 1975).

Over time, however, blaming rehabilitation for the willingness of judges to discriminate and

for inhumane institutional conditions gradually dissipated. As rehabilitation declined as a governing correctional ideology, its critics watched a policy nightmare unfold. The justice system did not become, as they anticipated, more fair and humane; rather, a mean season in corrections took hold and persisted for the better part of four decades (Cullen, 2013; Cullen & Gilbert, 2013). Critics of the government's crime-control policy came to realize that the correctional system suffered not from too much social welfare ideology, which urged the state to help those under its auspices, but rather from too little. Where once they had worried that the benevolence of the rehabilitative ideal unwittingly masked coercion, now they were faced with a system in which coercion was celebrated and purposefully imposed on offenders—including, in an increasing way, on youthful offenders (Feld, 1999; Feld & Bishop, 2011; Greenwood & Turner, 2011). As the reality of "get tough" corrections set in, critics thus were no longer concerned about "noble lies" but about the "punitive imperative" and an extraordinary long-term rise in mass incarceration (Clear & Frost, 2014; see also Pratt, 2009).

But it is here where Martinson's (1974) essay became significant in a more enduring way. As just noted, the criticism of rehabilitation as a source of state injustice and coercion slipped from policy discourse as commentators stopped worrying about the welfare state and started worrying about the punitive state. So what, then, became of their critique of rehabilitation? Unable to blame rehabilitation for the central problems in corrections, they fell back on the issue of *effectiveness*, often citing Martinson's 1974 essay as showing that offender treatment was a failed enterprise. In suggesting that "nothing works" in corrections, Martinson thus played a central role in *reframing* the treatment debate from the broad issue of state power to the narrow issue of "the data" (Cullen, 2013; Cullen & Smith, 2011). Although he did not use the term, he was calling for evidence-based corrections (see Cullen & Gendreau, 2000; MacKenzie, 2000, 2006). He was arguing that, in the end, the key question was whether treatment

programs could be shown with empirical evidence to "work."

This framing of the debate was a distinct problem for rehabilitation when the existing evidence was unclear. Critics could smugly claim that "nothing works," and those advocating for treatment could not muster a compelling rebuttal. But Martinson also gave treatment advocates a target. If they could show that interventions reduced recidivism, then they could reclaim legitimacy within corrections. Notably, in recent times, this is precisely what has occurred. The evidence pendulum has swung back in the pro-treatment direction—in two ways. First, research increasingly shows that rehabilitation programs are effective. And second, conversely, research increasingly shows that punishment-oriented programs are ineffective (Cullen, 2005).

In large part, this dual appraisal—treatment programs work whereas punishment programs do not—exists because of the publication of research that uses the statistical tool of meta-analysis to quantitatively synthesize the existing studies that evaluate correctional interventions. In fact, key meta-analyses, especially by Mark Lipsey and his colleagues, have proven instrumental in deflating nothing works rhetoric and in inspiring a new era of hope in corrections.

In this essay, we begin by focusing on how the emergence of meta-analyses in the 1990s had a dramatic impact in transforming the debate over rehabilitation. We then proceed to demarcate what meta-analyses tell us about reducing recidivism. One section focuses on what does not work, whereas the following section reports on what does work. In the "what works" section, two approaches to the use of meta-analysis are reviewed—one by Mark Lipsey and one by a group of Canadian psychologists who developed the Risk–Need–Responsivity (RNR) Model. The essay concludes by summarizing our main points and by laying out key research needs in the time ahead.

Before proceeding, we must add one further comment. As scholars from the USA, our essay reflects our knowledge of the policy developments and criminological literature from our home nation. Nonetheless, although each

country has its specific history, the criticisms voiced against rehabilitation were not limited to the USA but rather were commonplace in Canada, Great Britain, and beyond (see, e.g., Andrews & Bonta, 2010; Brayford, Cowe, & Deering, 2010; Garland, 2001; Lösel, 1995; McGuire, 1995; Raynor & Robinson, 2009). Across these diverse contexts, the issue of treatment effectiveness has now emerged as a salient consideration within corrections. Especially in the face of attempts to advance punitive crime-control policies, it has become important to establish what does and does not work to reduce offender recidivism. Again, meta-analyses are playing an integral role in this conversation.

Helping to Settle the Effectiveness Debate

Critics of rehabilitation believed that purging so-called enforced treatment from juvenile and adult corrections would lead to a system in which “justice” would be the governing principle. The focus would switch from treating the criminal to punishing the crime. Such punishments, however, were to be constrained by extensive due process rights that would ensure that all offenders were treated equally before the law. Advocates of this “justice model” assumed that incarceration would be used sparingly and that the coerciveness of the correctional system would decrease. Unfortunately, the very opposite occurred (Cullen & Gilbert, 2013; Rothman, 2002; Tonry, 1996).

In the following four decades, the USA was in the grips of a “get tough” movement that embraced mass imprisonment and “no frills” institutions aimed at diminishing the quality of inmates’ lives. Intervention programs meant to “reform” offenders took on a punitive quality. In the juvenile arena (ages 12–21), these included an emphasis on deterrence-oriented interventions such as intensive supervision (close surveillance of offenders), scared straight programs, and boot camp programs (Cullen, 2013; Cullen & Jonson, 2012; Lipsey, 2009).

In the midst of this context, the “nothing works” doctrine became a sacred wisdom—a belief that seemed immune to falsification. Even though few people had ever read the full report on Martinson’s research (Lipton et al., 1975)—or even, we believe, the details of his 1974 essay—they could claim that rehabilitation programs “did not work” and be comfortable that they would not be challenged. “Nothing works” thus had become a matter of faith, not of science.

Importantly, a few scholars did produce reviews of research revealing that many correctional programs were effective. Palmer (1975), for example, showed that within Martinson’s own sample, nearly half the studies that examined recidivism (48%) showed positive (crime-reducing) effects (see also Palmer, 1978, 1992). Gendreau and Ross (1979, 1987) compiled two lengthy reviews in which they identified numerous effective programs. They called their attempt to educate the nothing works crowd “bibliotherapy for cynics.”

These works gave encouragement to those still advocating correctional treatment, but they did little to change the minds of nonbelievers. Beyond the sheer resistance to altering their correctional faith, two factors made discounting these assessments plausible. First, the scientific findings reported were doubted because the authors were known to be advocates of rehabilitation. Might they be cooking the data—just selectively picking out studies they liked? Second, the method they used to summarize the extant evaluation studies yielded findings that were, in fact, open to different interpretations.

Take Palmer’s (1975) reassessment of Martinson’s research, which used a “ballot box” approach of counting studies showing positive and nonpositive treatment effects. What did it mean if half the studies showed reductions in recidivism? For Palmer, it meant that claims of nothing works were absurd and that the next step was to see what interventions worked with specific offenders. But for opponents, his results only confirmed what Martinson (1974) had claimed: that treatment programs were as likely to fail as to be successful. Or let us consider Gendreau and Ross’s (1979, 1987) “narrative

reviews” of the literature. They were making qualitative judgments on what to include in their review and how to interpret the findings. If a more “objective” scholar did the review, might not this assessor reach a different, less glowing conclusion about treatment effectiveness?

These counterarguments are examples of what Gottfredson (1979) called “treatment destruction techniques”—that is, the use of very stringent criteria to falsify findings that are disliked. A more balanced approach would have tried to discern if the characteristics of effective and ineffective treatment programs differed (imagine a cancer researcher saying that “nothing works” if half of the interventions tried reduced mortality!). But at this time, there were few criminologists around to do such work. Criticism of rehabilitation could be made without fear of much professional opposition; questioning treatment was less a scientific enterprise and more a matter of preaching to the choir (Cullen, 2005; Cullen & Gendreau, 2001).

Here is where a methodological technique came to play a large role in the debate over rehabilitation: the use of meta-analysis to assess treatment effectiveness (Cullen, 2013). Others have explained this statistical technique far better than we can here (see, e.g., Lipsey & Wilson, 2001), but we will provide a brief introduction for those unfamiliar with this approach to summarizing evidence. Essentially, four steps are involved.

First, an attempt is made to find every evaluation study—published and unpublished—that have assessed treatment programs either for a population (e.g., juveniles) or for a specific modality (e.g., cognitive-behavioral therapy). Second, the researcher computes for each study the relationship between the treatment (e.g., counseling, boot camp) and recidivism. This effect could be positive (recidivism went down), null (no effect), or negative (recidivism went up). Some authors reverse the signs, so be aware of this when reading a meta-analysis. In any event, the researcher essentially is taking a “batting average” of how well a treatment intervention does across all the studies in which it has been evaluated. This “effect” size is usually reported as some form of correlation (a Pearson’s

r or a phi coefficient). The higher the number, the larger the effect.

Third, the overall effect size can then be adjusted. One adjustment is to give more influence to studies with more cases; this is called a “weighted effect size.” Other adjustments can include seeing how the effect size varies by methodological rigor or by characteristics of the offenders (e.g., gender, age, risk level). These factors are called “moderator variables,” because they examine the conditions under which the effect size is larger or smaller. Substantively, they can be important in identifying how effective interventions are for particular types of offenders (e.g., those who are at high versus a low risk of recidivating). Fourth, databases of evaluation studies can be established and added to over time. As the number of studies increases, a more sophisticated meta-analysis can be undertaken, and confidence in the findings potentially rises (see, e.g., Andrews & Bonta, 2010; Lipsey, 2009).

Importantly, meta-analysis is a powerful technique precisely because it has the ability to shape, if not settle, debates over effectiveness—regardless if the debate is over whether class size affects learning outcomes (see, e.g., Glass & Smith, 1979) or whether rehabilitation programs reduce recidivism. Why is this so? Two factors are relevant. First, the assessment is quantitative, not qualitative. If the results are doubted, others can replicate the study (though they rarely do so). If the researcher is sophisticated, potentially confounding variables (e.g., methodology of the studies) can be controlled and their influence statistically removed. Second, meta-analysis offers precision. Thus, it produces a number—an overall effect size—that tells for all to see whether the intervention worked and, if so, how strong its influence was. Unlike a ballot box review, the glass cannot be portrayed as either half empty or half full. In the end, the overall effect size is either positive (reoffending is lowered) or it is not. The number, in short, specifies whether something works or nothing works.

It is unwise, of course, to treat any specific number as an infallible measure of empirical

reality. Still, although a point estimate is just that—an “estimate”—it takes on more believability as the quantity of studies on which it is based increases. In statistical terms, a confidence interval on the effect size of a treatment can be computed. And as is well known, as the N of studies climbs, the confidence interval narrows. When data sets come to have several hundred evaluations, it is difficult to argue that the results being reported are open to dispute. If the confidence interval is narrow and positive, then the effectiveness of the intervention is fairly well established.

In this context, meta-analyses of treatment studies dealt a death blow to the nothing works doctrine. Starting with Garrett’s (1985) study, one meta-analysis after another reported the same finding: Even when all sorts of programs (regardless of quality or content) are thrown into the treatment category, the overall effect of interventions is to reduce recidivism. The overall effect size is modest, about a 10–12% reduction. Still, it is no longer possible to claim that nothing works. Further, this finding has now been replicated in a number of reviews of meta-analytic studies. Because evaluations of juvenile programs are more plentiful, most of these reviews are based on studies assessing interventions with juveniles or with sample of studies that includes interventions with both adults and juveniles (see Andrews & Bonta, 2010; Lipsey & Cullen, 2007; Lösel, 1995; McGuire, 2001).

After this initial finding was reported, the key issue was whether treatment effects were homogeneous or heterogeneous. If interventions all had the same effects, then opponents of rehabilitation could have fallen back on a revised nothing works position—one that stated: “Well, even though there is a positive treatment effect, it is too modest to guide policy.” In fact, the research showed the opposite: The effects of interventions were *heterogeneous*, not homogeneous. In plainer language, some interventions did not work—even had iatrogenic effects that increased recidivism—whereas other programs reduced reoffending substantially (see Andrews, Bonta, & Hoge, 1990; Lipsey, 1992; Lipsey & Wilson, 1998). It is to this issue that we now turn.

What Does Not Work

Mark Lipsey has been the preeminent scholar using meta-analysis to assess the effectiveness of correctional interventions, especially with juveniles (see, e.g., Lipsey, 1992, 1995, 1999a, 1999b, 2009; Lipsey & Cullen, 2007; Lipsey & Wilson, 1998). His findings proved especially influential because he was not known for being a strident advocate for rehabilitation and because he was an expert methodologist (Cullen, 2005). His meta-analyses thus were impeccably accomplished and not easy to dismiss.

In 2009, Lipsey published an important meta-analysis of the data based on studies he had been accumulating for two decades. In his words, the “data used for analysis were based on 548 independent study samples for which information was extracted from 361 primary research reports” (2009, p. 128). Notably, due to the get tough era and the punitive interventions it justified, he was able to compare programs with a human services component—what he called those with a “therapeutic philosophy”—with those that emphasized the imposition of threats and sanctions. And here is a very significant finding: Therapeutic interventions, “such as counseling and skills training, were more effective than those based on strategies of control or coercion—surveillance, deterrence, and discipline” (p. 143).

In fact, the results for the nontherapeutic interventions were mostly dismal. There was no evidence that incarceration reduced recidivism when compared with lower levels of justice supervision such as diversion, probation, or parole (see also Cullen, Jonson, & Nagin, 2011). Deterrence programs (mostly scared straight) slightly increased recidivism, but the amount was so small as to be substantively negligible. However, discipline programs (mostly boot camps emphasizing a “paramilitary regimen”) not only heightened recidivism but also did so in a substantively meaningful way (an 8% jump in reoffending). Surveillance programs (mostly intensive supervision probation or parole) were the only nontherapeutic intervention to lower recidivism (about 6%), but its

effects were half those of more therapeutic programs. Further, these surveillance programs sometimes also delivered human services. Although studies were coded so as to isolate the surveillance component, it remains the case that surveillance might well have been delivered within a human services context. Notably, the best experimental study to date across 14 sites (albeit with adults) found that control-oriented intensive supervision, if anything, increased recidivism (Petersilia & Turner, 1993; see also Cullen, Wright, & Applegate, 1996).

The finding that, in general, punitive sanctions have few crime-reducing effects is reported by scholars using a variety of ways to assess what works with offenders (see, e.g., Andrews & Bonta, 2010; Lipsey & Cullen, 2007; MacKenzie, 2006; McGuire, 2002). A similar finding has been reported in an illuminating meta-analysis conducted by Petrosino, Turpin-Petrosino, and Guckenburg (2014). Based on a meta-analysis of 29 studies, they assessed the impact of processing juveniles through the justice system versus placement in “an alternative non-system condition.” Regardless of the offending outcome used (prevalence, incidence, severity, self-report data), the result was the same: Juvenile justice system processing increased reoffending. Notably, the criminogenic effect of justice intervention with youngsters is consistent with the findings of longitudinal studies examining this same relationship (see, e.g., Krohn, Lopez, & Ward, 2014; Petitclerc, Gatti, Vitaro, & Tremblay, 2013).

It might be beneficial to pause for a moment to ask why these interventions are ineffective. To a large extent, it is because they are based on a crude, commonsense rational choice model that believes offending can be deterred by raising its costs. The programs thus assume that if youngsters are simply watched closely enough, threatened with punishment, sentenced like adults, or placed in paramilitary camps where they are yelled at and forced to endure physical discomfort, they will somehow “decide” not to break the law. Almost magically, troubled

youngsters will acquire the wisdom—or the fear—to pay attention to and avoid the consequences of their bad acts (Cullen, Blevins, Trager, & Gendreau, 2005; Cullen, Pratt, Micelli, & Moon, 2002).

This notion ignores the central findings of developmental criminology, however. Especially for high-risk youths who become persistent offenders, the roots of their criminality typically extend to childhood, if not to the prenatal period. As Loeber and Le Blanc (1990, p. 456) note, “knowledge of the etiology of offending is essential for the development of prevention programs since the modification of etiological factors is the backbone of prevention.” Andrews and Bonta (2010) refer to these underlying causal factors as “criminogenic needs” and maintain that the efficacious treatment of offenders requires “responsive interventions” that are capable of curing them. In the end, programs that mainly watch and threaten offenders do not target etiological factors for change and thus lack responsivity. As Loeber and Le Blanc warned, this omission robs these interventions of their preventative capacity.

What Does Work

Meta-analysis is a conduit not just for knowledge destruction (showing what does not work) but also for knowledge construction (showing what does work) (Andrews & Bonta, 2010). Two important lines of research using meta-analysis have emerged to guide the selection of interventions with juvenile offenders. The first, represented most prominently by the work of Mark Lipsey, seeks to use meta-analysis to uncover the characteristics of successful programs. The second, advocated by a group of Canadian psychologists (the most prominent of whom have been Donald Andrews, James Bonta, and Paul Gendreau), uses meta-analysis to test whether their theory of treatment effectiveness (the so-called RNR model) is supported. We review each of these influential approaches.

Insights from Lipsey's Meta-Analysis

If deterrence and punishment-oriented strategies do not work, what does work for reducing juvenile offending? Lipsey's comprehensive (2009) meta-analysis discussed above offers some important preliminary answers to this question. Five important insights can be drawn from his comprehensive study of juvenile programs.

First, as noted previously, interventions with a treatment philosophy are more likely to reduce recidivism, whereas those with a deterrence or punishment-oriented philosophy are more likely to increase recidivism. Although somewhat informative, this offers very little practical guidance. Indeed, there are numerous treatment-oriented approaches available from which practitioners can choose to exact change among youthful offenders. If treatment does work, which approach is the best, and what are the best contexts in which to deliver these services?

Second, it appears that treatment-oriented programs are just as effective in community as institutional settings. This finding suggests that community-based programs should be developed in local jurisdictions to help reform the vast majority of juvenile offenders not incarcerated. Alternatively, for those offenders who are confined, this secure detention should be accompanied by treatment. The delivery of rehabilitation services in an institutional setting may be challenging, but the research indicates that it can reap savings in subsequent recidivism.

Third, general approaches emphasizing treatment appear to yield similar effects on recidivism. For example, counseling reduces recidivism by 13%, multiple treatment-oriented services (i.e., "a package of multiple services"; Lipsey, 2009, p. 135) by 12%, skill-building treatment by 12%, and restorative interventions by 10%. Lipsey's research reveals that the differences across these approaches are negligible.

Fourth, despite similar effects among the general approaches that have a treatment focus, there is variability across the specific modalities within each treatment approach. Among counseling

programs, for example, mentoring programs and group treatment seem to produce the greatest reductions on recidivism. Within multiple services, case management is more effective than service brokerage. For skill building, programs that target behavioral and cognitive-behavioral skills are more effective than those that target academic, vocational, and social skills. Although all modalities appear to reduce recidivism, some appear to be more effective than others at doing so. Obviously, programs that lower recidivism the most should be given priority over alternative treatment approaches.

Fifth, Lipsey (2009) found that interventions that are implemented with higher quality produce greater recidivism reductions. The importance of implementation cannot be underscored enough, and it is a point we return to below. It is worth mentioning here, however, that achieving high-quality programming in real-world settings can prove quite challenging. Resource constraints, bureaucratic red tape, politics, poor leadership, discontinuity in staff (i.e., staff turnover and/or differing opinions), and other factors can reduce treatment integrity or fidelity (see Alexander, 2011; Latessa, 2004). As a result, practitioner-led interventions tend to perform only half as well as researcher-led interventions (see Lipsey, 1999a). Together, these findings reveal the importance of implementation efforts, if meaningful recidivism reduction is the goal.

Insights from the RNR Model

As noted, an alternative approach to rehabilitation has been developed by Andrews, Bonta, and Gendreau—among others (see, e.g., Andrews & Bonta, 2010; Andrews, Bonta, & Hoge, 1990; Gendreau, 1996). Their strategy was to develop a theory of treatment, rooted in cognitive-social learning psychology. They have spent much of the past three decades inventing, refining, and testing this model (Andrews & Bonta, 2010). Importantly, meta-analysis has been a key method used in this enterprise (see, e.g., Andrews et al., 1990). Indeed, this meta-analytic evidence serves as the backbone of what is

generally considered to be the single-most empirically supported paradigm of recidivism reduction for adult and juvenile offenders alike—what is called the Risk–Need–Responsivity (RNR) Model (Cullen, 2013; Ogloff & Davis, 2004; Polaschek, 2012). Each principle comprising this model—risk, need, and responsivity—and its corresponding empirical evidence is described below.

First, the *risk principle* dictates “who” services should be delivered to. It argues that risk level be determined using a validated risk assessment tool and that the highest risk offenders should be relegated to the most intensive services. Likewise, low-risk offenders should receive minimal services. The logic behind this principle is that high-risk offenders have a greater quantity of—and more deeply embedded—risk factors that require more time and resources to change. Requiring low-risk offenders to attend intensive (or any) correctional treatment, on the other hand, not only removes them from the contexts that serve to help maintain their low-risk status but also places them at greater risk for exposure to high-risk antisocial peer influences. Consistent with Lipsey (2009), greater reductions in recidivism are observed when high-risk offenders are given more intensive services, but negative effects can occur when low-risk offenders are given intensive services (Andrews & Kiessling, 1980; Bonta, Wallace-Capretta, & Rooney, 2000; Dowden & Andrews, 1999; Lowenkamp, Latessa, & Holsinger, 2006).

Second, the *need principle* concerns “what” should be targeted in interventions. Although Lipsey (2009) did not attend to this important component of treatment, other meta-analyses (for a review, see Andrews & Bonta, 2010; Smith, Gendreau, & Swartz, 2009) have identified the core criminogenic (i.e., crime-producing) risk factors—collectively referred to as “the central eight”—that are most strongly predictive of criminal recidivism. They include one unchangeable, or static, risk factor (criminal history) and seven dynamic, or changeable, risk factors: antisocial personality pattern, antisocial cognitions, antisocial peers, leisure and

recreational challenges, family and/or marital problems, education and employment troubles, and substance use and abuse. Addressing these risk factors in treatment can produce recidivism reductions up to 30%. Further, greater recidivism reduction is achieved when more criminogenic needs are targeted; by contrast, targeting factors that are noncriminogenic (e.g., self-esteem, mental illness) can be iatrogenic (for a review of several meta-analyses, see Andrews & Bonta, 2010).

Third, the *responsivity principle* offers directives for “how” interventions should be delivered. This principle consists of general responsivity and specific responsivity. Although specific responsivity (i.e., attending to idiopathic issues when delivering services, such as gender, race, and mental illness) is an important part of this principle, general responsivity is largely the focus of meta-analytic investigations. General responsivity refers to delivering services in a manner that is most conducive to offenders’ learning styles. Namely, this means providing treatment that is consistent with cognitive-behavioral principles. For example, offenders must (1) be *taught* new prosocial skills, coping strategies, and ways of thinking, (2) have *modeled* for them and *practice* new behaviors and skills, and (3) be *reinforced* for engaging in the desired behavior. Adhering to general responsivity yields recidivism reduction up to 23% (see Andrews, Dowden, & Gendreau, 1999).

Importantly, then, the RNR model provides clear guidance on how to intervene most effectively with juvenile offenders: follow the principles of risk, need, and responsivity. Adherence to each of the RNR principles alone translates into meaningful reductions in recidivism. However, when programs comply with all three principles—when they engage in what Andrews and his colleagues call “appropriate” treatment—the effects are additive. Thus, adherence to only one principle translates to a minor 2% reduction in recidivism. By contrast, adherence to two principles elicits a more noteworthy reduction of 18%, and adherence to all three principles can produce up to a 26% reduction in

recidivism. Notably, this pattern of findings holds across juveniles and adults but is even more pronounced in juveniles (see Andrews & Bonta, 2010). Consistent with Lipsey's (1999a, 2009) findings, treatment integrity (i.e., adherence to a particular model or format) "matters," but it has an even greater impact on recidivism reduction when treatment also is "appropriate"—that is, when it adheres to the risk, need, and responsivity principles (Andrews & Dowden, 2005).

Putting good theory into practice remains a daunting challenge. Successful implementation of evidence based practices in corrections is perhaps one of the most important—and yet often forgotten (Gendreau, Goggin, & Smith, 1999)—aspects in the "what works" movement. As previously noted, there are a number of potential barriers facing well-intended correctional practitioners that ultimately stymie effective, consistent, and enduring implementation of evidence-based practices. "In the 'real world' of corrections," observe Andrews and Bonta (2010, p. 397), "weak adherence with RNR is the rule rather than the exception." As Lipsey and Cullen (2007) note, it is necessary to narrow the research–practitioner gap. With the help of meta-analyses, the empirical literature has consistently and robustly shown that RNR works to reduce recidivism; now, the goal should be "making 'what works' work" (Andrews & Bonta, 2010, p. 396).

How can the principles of RNR be effectively implemented in real-world settings? A number of suggestions and strategies have been proposed (see Alexander, 2011; Gendreau et al., 1999; Latessa, 2004). In short, the blueprint for success comes down to staff, context, training, and evaluation. First, staff members are key; they can make or break implementation efforts. Strong leadership is essential, but staff at all levels must be amenable to change and willing to put in the work. Second, the context must be conducive to change. Sufficient resources (e.g., time, money, personnel) must be available to allow for staff to effectively do their jobs. Third, staff must be appropriately and adequately trained. Staff members need not only to be provided with the

theory behind RNR but be given hands-on, step-by-step training on how to put these principles into practice. They need to feel confident and competent in their ability to deliver the intervention, and experienced trainers have a responsibility to ensure that this occurs before letting practitioners "fly solo."

Fourth, successful implementation hinges upon ongoing evaluation of efforts. Programs should routinely perform a "check" on adherence to the RNR model vis-à-vis, ideally, an external program evaluation. Such evaluations provide crucial feedback for improvement and help to increase the likelihood of sustainability of the RNR practices within an agency. Programs such as Effective Practices in Community Supervision (EPICS; Smith, Schweitzer, Labrecque, & Latessa, 2012) and Staff Training Aimed at Reducing Re-arrest (STARR; Robinson, VanBenschoten, Alexander, & Lowenkamp, 2011) and evaluation tools such as the Correctional Program Assessment Inventory (CPAI; Gendreau & Andrews, 2001) are available to aid agencies in their goal toward implementing the correctional practices that are backed by the hundreds of empirical studies included in the meta-analyses reviewed in this chapter.

Summary

Meta-analysis has proven to be a powerful tool in illuminating the characteristics of interventions that work and do not work with juvenile (and adult) offenders. Six major conclusions can be drawn from this literature:

- The nothing works doctrine has been falsified. Rehabilitation works!
- Interventions that are based on coercion, discipline, surveillance, and incarceration are largely ineffective in reducing recidivism.
- Juvenile justice processing is either ineffective or criminogenic.
- Interventions should be based on a therapeutic philosophy and emphasize the delivery of human services that target the causes of recidivism for change.

- “Appropriate” programs—, interventions that conform to the RNR principles—are likely to achieve the largest reductions in recidivism.
- Implementing programs with therapeutic integrity is essential if interventions are to be maximally effective.

Future Research Needs

Corrections had entered an era in which there is an increasing commitment for intervention to be evidence based. The effective use of such evidence, however, rests on continued knowledge construction. Four research needs seem most important to address:

- Many programs—some potentially quite effective—are being delivered but will never be evaluated. More attention needs to be paid to ways to conduct experimental and quasi-experimental evaluations of promising interventions.
- A new generation of meta-analysis researchers needs to be trained to take the place of key scholars such as Mark Lipsey, James Bonta, and the late Donald Andrews. Major data sets of evaluation studies need to be made publicly available by retiring scholars and/or created anew by younger scholars. Quality meta-analyses will depend on quality data sets. Lipsey’s work has been so influential not only because of his substantial methodological expertise and rigor but also because of the quality of the data set on juvenile interventions that he has systematically amassed.
- Meta-analyses should become guided by RNR theory. Studies should be coded by the extent to which interventions conform to the RNR principles of effective treatment. Substantial knowledge thus could be accumulated that assesses whether compliance with these principles generates large treatment effects. If other theoretical models prove promising, their principles should be coded as well. In this way, we can begin to determine with

more precision the characteristics of effective programming.

- More knowledge needs to be developed on how evidence-based programs can be implemented in real-world settings. This task will involve both the dissemination of treatment research (sometimes called “technology transfer”) and devising ways to train practitioners in the delivery of appropriate treatments.

Final Comments

Opinion polls show that the American public strongly favors rehabilitation as a main goal of corrections for adults and, in particular, for juveniles (Cullen, 2013; Cullen, Fisher, & Applegate, 2000; Cullen, Vose, Jonson, & Unnever, 2007; Nagin, Piquero, Scott, & Steinberg, 2006; Piquero, Cullen, Unnever, Piquero, & Gordon, 2010). The existence of these favorable attitudes is important because efforts to expand treatment programs are unlikely to evoke strong opposition. Saving children is something that almost all Americans favor—what has been called a “habit of the heart” (Cullen et al., 2007).

Still, hubris should be avoided at this juncture. To be sure, the nothing works era seems to be over, in part due to the demonstration of positive treatment effects and in part due to the disquieting experience with the punishment paradigm that has spawned an array of ineffective intervention programs. But as noted, it is one thing to identify characteristics of preferred programs and another to solidify “what works” knowledge and then to transfer it to real-world settings where it is implemented with integrity.

Much is at stake. The critics of rehabilitation in the 1960s and 1970s were correct in warning that benevolent intentions do not guarantee the humane and effective treatment of our most vulnerable offenders—juveniles in the hands of the state. Indeed, the task of building a viable evidence-based correction is not finished but only in its beginning stages. To avoid treatment

quackery and correctional malpractice, researchers, policy makers, and practitioners will have to form a holy trinity in their combined commitment to develop and use interventions capable of saving our wayward youths and protecting the public. This commitment must involve, as it does in medicine, a continuing effort to produce replicable knowledge on treatments that work and on how best to deliver them in a system that has the unfortunate potential to do more harm than good.

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Teaniese L. Davis and Ralph J. DiClemente

Introduction

Justice-involved youth face numerous challenges and are extremely vulnerable to negative health outcomes and engage in riskier behaviors compared to their nondetained counterparts. This chapter presents a profile of health problems and risk taking among detained adolescents in the USA, followed by specifically focusing on the increased risk for sexually transmitted infections (STI) and human immunodeficiency virus (HIV) among detained adolescents. Then this chapter will conclude with information on prevention efforts (interventions and policies) aimed to reduce risk for negative health outcomes among detained and justice-involved adolescents.

Risk Behavior Among Adolescents

The Centers for Disease Control and Prevention (CDC) has identified priority health-risk behaviors among adolescents and young adults that contribute to the leading causes of morbidity and mortality. The six priority areas are: (1) behaviors leading to unintentional injury and

violence, (2) tobacco use, (3) substance use, (4) sexual behaviors leading to sexually transmitted infections (STI) and unintentional pregnancy, (5) unhealthy diets, and (6) physical inactivity. These intertwined behaviors can be prevented and frequently begin during or prior to adolescence and continue into adulthood (CDC, 2012b).

Results from the 2011 Youth Risk Behavior Surveillance System (YRBSS) indicated that high school students had engaged in the following risk behaviors within the past year: texted/e-mailed while driving (32.8 %), alcohol use (38.7 %), marijuana use (23.1 %), physical fighting (32.8 %), victim of bullying (20.1 %), suicide attempt (7.8 %), sexual intercourse (33.7 %), and more than four lifetime sex partners (15.3 %). Furthermore, adolescents demonstrated a high-risk trajectory by engaging in behaviors associated with the leading causes of mortality among US adults aged 25 years and older, including smoking cigarettes (18.1 %), eating a diet without fruit (4.8 %) or vegetables (5.7 %), and playing video games for at least 3 h on a school day (31.1 %) (CDC, 2012b).

Behavioral Problems During Adolescence

Delinquency is at its height during adolescence, marked by alcohol, tobacco, and other drug use. School engagement diminishes as adolescents lose interest or experience disciplinary problems

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with authority figures (Robins, 1995). Teenaged adolescents and young adults commit most crimes, with a peak during ages 15–17 years. The age–crime curve holds true for many countries, including the USA (Piquero, Farrington, & Blumstein, 2003). Crime decreases with age; however, there are no clear evidence-based explanations (Smith, 1995).

Juvenile delinquents are adolescents aged younger than 18 years who commit a criminal offense based on local and state laws, under the jurisdiction of the juvenile courts. In the USA, some offenses (murder, rape, assault with a deadly weapon) are under the jurisdiction of adult criminal courts, with one possible outcome including being sentenced to adult prisons. Status offenders are adolescents aged younger than 18 years who commit an offense illegal for adolescents but legal for adults (Morris & DiClemente, 2008).

Juvenile arrests have been on the decline. In 2011, juvenile arrests decreased eleven percent from 2010. There were approximately 1.5 million arrests in the USA of people aged 18 years or younger. This represents a 31 % decrease in juvenile arrests since 2002. Some of the most common offenses included disorderly conduct, drug abuse violations, larceny–theft, simple assaults, violations of liquor laws, and curfew and loitering (Puzzanchera, 2013). In many states in the USA, adolescents less than 18 years of age are within the jurisdiction of the criminal justice system. After being arrested, some adolescents are sent to juvenile court, referred to criminal court, or are processed within law enforcement agencies then released. In cities with populations greater than 100,000 people, a greater proportion of juveniles were routed to juvenile court rather compared to smaller cities. After being arrested, other juveniles are referred to agencies (welfare or other police agency) for assistance (FBI, 2011).

Demographic Profile of Justice-Involved Youth

Data for juvenile arrests includes adolescents aged 10–17 years. The racial profile of juvenile

populations in the USA in 2011 with a majority of juvenile arrests being White (76 %), which included juveniles of Hispanic ethnicity, followed by Black (17 %), Asian/Pacific Islander (5 %), and American Indian (2 %) adolescents.

There are racial disparities in juvenile arrests. Black youth are disproportionately represented in juvenile arrests. While Black juveniles comprised 17 % of arrests, they were overrepresented in arrests for robbery (68 %), murder (54 %), motor vehicle thefts (42 %), simple assault (38 %), burglary (38 %), weapons (37 %), forcible rape (35 %), larceny–theft (33 %), drug abuse violations (23 %), vandalism (21 %), and liquor law violations (7 %) in 2011 (BJS, 2011).

There are also gender-based disparities in juvenile arrests. There has been a rapid growth of females in the juvenile justice system. In 2011, law enforcement agencies reported 429,000 arrests of females under aged 18 years (Puzzanchera, 2013), which is down from 658,000 arrests in 2004. From 2002 to 2011, there were fewer decreases in juvenile arrests among females, compared to males, for multiple offenses, including assault, larceny–theft, disorderly conduct, and violations of liquor laws (Puzzanchera, 2013).

In the past decade while the overall crime rate has declined, the incarceration rate for girls, relative to boys, grew at a much faster rate for all categories of crimes, including violent offenses (Snyder & Sickmund, 2006). Between 1987 and 1996, arrests of adolescent females increased 76 % compared to 46 % among adolescent males. And between 1981 and 1997, arrests of female adolescents for violent crimes increased 103 % compared to 27 % for males. Finally, between 1990 and 1999, delinquency cases involving drug offenses for females increased by 107 %. More recent data suggests a continuation of this trend. Between 1994 and 2003, arrests for most categories of crime increased more for girls than for boys, with simple assault arrests increasing 36 % for girls but only 1 % for boys and drug abuse violation arrests increasing 56 % for girls but only 13 % for boys (Morris & DiClemente, 2008). Although there are fewer adolescent females in comparison to adolescent

male offenders (about 25 % of youth in the juvenile justice system are females), they have often been referred to as a “neglected population” (OJJDP, 2001).

African Americans and women are overrepresented in the juvenile justice system. Two-thirds of adolescent females in the juvenile justice system are of color, primarily Black and Latino. However, African American girls comprise nearly half of adolescent females in detention (Snyder & Sickmund, 2006). In 2008, 54 % of incarcerated adolescents in Georgia were African American (GDJJ, 2009). Over half (51 %) of juvenile arrests for violent crimes in 2011 comprised Black youth with White (47 %), Asian (1 %), and American Indian (1 %) youth comprising the other half of juvenile arrests (BJS, 2011).

Health of Juveniles

Incarcerated adolescents are often excluded from community-based health-care services, instead of receiving most of their health-care services through services provided by the correctional facilities. Therefore, correctional health-care services and the juvenile justice system have an opportunity to improve the health of adjudicated adolescents (Committee on Adolescence, 2001). In a study of juveniles in detention, one-third of juveniles had a regular source of health care, and even fewer had a private physician. Over half reported that they had not received medical care in the past year. Further, less than half had assistance from a member of a supportive network to get necessary follow-up medical care upon release from detention (Feinstein et al., 1998). In a study of male adolescents in detention, 6.4 % of detained males reported their health as “excellent or good,” compared to 34.2 % of a school-based and age-matched sample of adolescents (Forrest & Tambor, 2000). In a review of common health conditions across studies of youth in detention, the prevalence of substance use ranged from 34 % to 59 % for substance use, 19 % to 78 % for mental health, 14 % to 30 % for STIs, and 39 % to 90 % for dental health (Golzari,

Hunt, & Anoshiravani, 2006). Adolescents in juvenile detention facilities have numerous comorbid health disorders and are at greater risk for negative health outcomes with certain health concerns existing prior to incarceration including substance use and abuse, preexisting mental health disorders, STI, HIV, and pregnancy and parenting issues (Committee on Adolescence, 2001).

Adolescent females in the juvenile justice system have a high prevalence of HIV risk factors, including family dysfunction, trauma and sexual abuse, mental health and substance abuse problems, and risky sexual behaviors. One study identified 73 % of adolescent females entering the juvenile justice system as having a history of sexual abuse (Chesney-Lind & Sheldon, 1998); other estimates of sexual abuse range from 25 to 70 %. Most youth have experienced trauma, with recent estimates indicating 84 % experiencing a lifetime prevalence of major trauma (Lederman, Dakof, Larrea, & Li, 2004) and 65 % having experienced PTSD at some point in their lives (Cauffman, Feldman, Steiner, & Waterman, 1998). Adolescent females also have high rates of depression, anxiety, and substance abuse (Crosby, Salazar, & DiClemente, 2004; Morris & DiClemente, 2007; Staples-Horne, 2006; Voisin, Neilands, Salazar, Crosby, & DiClemente, 2008). In recent studies, 75 % of detained adolescent females had mental health problems (Teplin et al., 2006); 75 % report regular use of alcohol and/or drugs (Acoca, 1999), and 34 % had a substance abuse disorder (Lederman et al., 2004). Adolescent females in detention are more likely to affiliate with peers who are delinquent and substance users (Hubbard & Pratt, 2002). With respect to sexual behavior, adolescent females report early sexual activity, sexual abuse associated with early initiation of sex, older male partners, and less condom use (Crosby et al., 2007; Staples-Horne, 2006). This social, psychological, and behavioral epidemiologic profile indicates substantial risk for HIV acquisition. Detailed discussion of HIV risk factors among juveniles is further provided below.

Substance Use

The prevalence of adolescents using substances increased with age as well as the frequency of substance use. Among youth aged 12–17 years, there is a considerable overlap between drinking alcohol, smoking marijuana, and selling drugs, with these substance-related behaviors being more prevalent among juveniles aged 15–17 years. There is a statistically significant association between the frequency and prevalence of substance-related behaviors among adolescents (Puzzanchera, 2009). Since 1990, there has been an increase in illicit drug use among detained juveniles. In 1995, the percent of juveniles who tested positive for at least one drug ranged from 19 to 58 %. Youth who committed violent or property crimes had high rates of drug use. Adolescent males arrested for selling or possessing drugs had higher rates of testing positive for drugs compared to adolescents arrested for other crimes (Drug Use Forecasting Program).

Substance-related behaviors are also significantly associated with other problem behaviors among adolescents. Substance users reported higher levels of delinquent behavior across adolescents aged 12–17 years, including school suspensions, property vandalism, major theft, attack/assault, gang membership, handgun possession, and arrests [Office of Juvenile Justice and Delinquency Prevention Model Programs Guide (OJJDP), 2008]. Research has established that aggression and violent crime are strongly associated with drug use and a range of criminal and delinquent behaviors, respectively (Smith, 1995). Substance use has also been identified as a risk factor for risky sexual behavior. Among African American adolescents, reports of regular or habitual alcohol use were lower than White or non-White Hispanic adolescents. However, Black adolescents have been shown to have the lowest reports of alcohol use and higher reports of marijuana use (Fryar, Merino, Hirsch, & Porter, 2009).

Young Black women who use alcohol have markedly elevated HIV/STI risk. Although

alcohol use and abuse are less prevalent among young Black women relative to women of other race/ethnicities, alcohol use, even at non-abuse levels, is associated with sexual risk behaviors and STIs (Sales, Brown, Vissman, & DiClemente, 2012; Seth et al., 2011). Increased alcohol use frequency among young Black women is significantly and independently associated with acquiring *Trichomonas vaginalis* (Swartzendruber, Sales, Brown, DiClemente, & Rose, 2014), which is known to increase biologic susceptibility to HIV and has been associated with a two- to threefold increased risk of acquiring HIV (Van Der Pol et al., 2008). We also found that young Black women who reported “usually having ≥ 3 drinks per drinking occasion” were twice as likely to test positive for *T. vaginalis* over a 12-month follow-up (Seth et al., 2011). Moreover, alcohol may amplify HIV/STI risk among individuals who use other substances.

Mental Health

Adolescents in detention experience substantially higher rates of mental disorders compared to nondetained youth, with prevalence of serious psychiatric disorders ranging from 60 % to 70 % among detained males and 60 % to 80 % for detained females compared to 7 % to 12 % among nondetained adolescents (Golzari et al., 2006). Over half of females (56.5 %) and almost half of males (45.9 %) in juvenile detention met the criteria for having at least two psychiatric disorders. However, fewer juveniles in detention met the criteria for having only one psychiatric disorder, reported as 17.3 % among females and 20.4 % among males (Abram, Teplin, McClelland, & Dulcan, 2003). Golzari et al. (2006) compiled the prevalence ranges of mental health conditions among juveniles in detention across multiple studies. Categories were any mental health condition (44–85 %), disruptive disorders (32–48 %), mood disorders (7–26 %), and anxiety disorders (9–59 %) (Golzari et al., 2006).

Juveniles with mental health disorders who are detained lack effective treatment. Two-thirds of

the US juvenile detention facilities house juveniles awaiting community health treatment. There are 33 states that detain juveniles in detention centers who do not have any charges against them. There are cases of youth detained while waiting for treatment who are 7 years of age, with the majority of detention centers report detaining juveniles aged 13 years or younger (House Committee on Government Reform 2004).

One-quarter of the facilities with juveniles awaiting placement in a mental health facility have either poor quality or do not provide mental health services for juveniles, with many facilities reporting being inadequately equipped to address the mental health needs of juveniles in detention. High turnover rates that prevent long-term care and lack of training both serve as barriers to providing quality mental health care to juveniles who are detained in detention facilities (House Committee on Government Reform, 2004).

Trauma and Violence Exposure

Exposure to violence is associated with STI/HIV acquisition, unplanned pregnancies, substance use, negative psychological functioning, and recidivism among adjudicated adolescents (Woodson, Hives, & Sanders-Phillips, 2010).

Sexual Health

According to the National Youth Risk Behavior Survey (YRBS) 2009, 46 % of high school students in the USA have had sex (Centers for Disease Control and Prevention, CDC, 2010). By age 18, 60 % of adolescents reported ever having sex. There was a 10 % decline in the number of 15–17 year olds who reported ever having sex from 1995 to 2002 (Guttmacher, 2006). Over one-third (34 %) of the students reported having sex in past 3 months. Six percent (6 %) initiated sex before age 13, and 39 % reported non-condom use at last sex (Centers for Disease Control and Prevention, CDC, 2010). Unintended pregnancy, STIs, and HIV/AIDS are possible outcomes of unprotected sexual activity.

According to Robins (1995), the proportion of adolescent girls becoming pregnant increases each year postpuberty. Three-quarters of a million girls aged 15–19 years get pregnant each year. Many teens (82 %) report their pregnancies were unintended, of which 40 % of the pregnancies were terminated. Pregnancy rates steadily declined between 1990 and 2001, representing a 35 % decrease among teens aged 15–19 (Centers for Disease Control and Prevention, CDC, 2010). In a study of over 800 adolescents entering a detention center in Alabama, 10 % of female detainees were pregnant upon admission to the facility (Puzzanchera, 2013).

Although young people aged 15–24 years represent only a quarter of the sexually experienced population, they represent nearly half of all new sexually transmitted diseases (STD). African American women aged 15–19 had the highest rates of Chlamydia compared to any other age group or sex, representing a 9.8 % increase from 2007 to 2008 (C. f. D. C. a. P. CDC, 2009b). While African Americans represent 13 % of the US population, they represent 48 % of persons living with HIV or AIDS in the country (C. f. D. C. a. P. CDC, 2009a). Reducing risky sexual behaviors during adolescence can ease the burden of disease among adolescents and young adults.

Adolescents are screened for STIs upon entering detention facilities, including Chlamydia, gonorrhea, and syphilis. In 2011, for adolescents aged 12–18 years, males entering juvenile detention facilities, the overall gonorrhea and Chlamydia positivity was 1.2 % and 7.4 %, respectively. For females, the overall gonorrhea and Chlamydia positivity was 4.4 % and 15.7 %, respectively (CDC, 2012a).

Incarcerated African American women are more likely to acquire HIV, either before or after incarceration, than women of any race who have not been incarcerated. The incarceration rate of women in the South is the highest in the USA. For example, the rate in Georgia is 143 % of the national rate, which itself exceeds that of any other nation in the world (Harrison & Beck, 2006; Sobel, Shine, DiPietro, &

Rabinowitz, 1996). Incarceration rates among women are not uniform across races, with the lifetime rate of incarceration for African American women being approximately sixfold higher than that of White women (Beck, Bonczar, & Gilliard, 1993). Furthermore, incarcerated women are markedly more likely to have HIV, compared to women who are not incarcerated, with the prevalence of HIV among incarcerated women (1.9 %) being 11 times higher than among women in the community (Graber, Brooks-Gunn, & Warren, 1995; Maruschak, 2012). In Georgia, the prevalence of HIV among incarcerated women (2.1 %) is higher than the national average and still tenfold greater than women in Georgia (Maruschak, 2012; Wierson, Long, & Forehand, 1993). Infectious diseases are typically acquired in the community before or after, rather than during, incarceration (DeVoux et al., 2012; Hammett, 2006; Hammett & Drachman-Jones, 2006; Macalino, Vlahov, Dickinson, Schwartzapfel, & Rich, 2005; Rich et al., 1999, 2001). Jails are not “incubators” but rather venues for women more likely to have HIV infections than women in general. While national data of the rate of new HIV infections among uninfected African American women released from jails is unknown, the high HIV prevalence among jail entrants in the southeast and high numbers of newly diagnosed women among returnees to jails indicates that women uninfected with HIV are at heightened risk of infection subsequent to their jail stay (DeVoux et al., 2012; Spaulding, Booker et al. 2013; Spaulding, Bowden et al. 2013).

Behavioral Intervention

Programs exist to assist justice-involved youth with both criminal and noncriminal challenges they face. These programs are available both inside (Schmiege, Feldstein Ewing, Hendershot, & Bryan, 2011) and outside detention centers. While having accessible programs for adjudicated adolescents is essential, it is also necessary to have an evidence base for such programs. Given the intersection of females

being more biologically vulnerable to STIs compared to males and disproportionately higher STD rates among female juveniles compared to nonincarcerated counterparts, evidence-based programs are necessary to reduce STD transmission among incarcerated African American adolescent females. HIV interventions for African American females recently discharged from juvenile detention are needed. Several HIV interventions have been published for incarcerated populations have been conducted with predominantly adult males (Bryan, Robbins, Ruiz, & O’Neill, 2006; Grinstead, Zack, & Fageles, 2001; O. A. Grinstead, Zack, & Fageles, 1999), with fewer involving adult women (O. A. Grinstead et al., 1999; Magura, Kang, & Shapiro, 1994). One HIV intervention for adolescent males has been published (Magura et al., 1994). While informative, this study did not meet the criteria of a CDC-defined EBI (CDC, 2011).

The Compendium of Evidence-based HIV Behavioral Interventions (EBI) classified interventions into categories based on the study outcomes. Interventions are grouped as either “best evidence” or “good evidence.” There are 18 interventions targeting high-risk youth, 32 interventions targeting women, and 39 for African Americans. However, there are no HIV prevention interventions with evidence of efficacy during research trials for justice-involved or detained youth (CDC, 2011). In lieu of developing new interventions, adapting evidence-based interventions (EBI) for subgroups is an effective way to address specific needs of groups based on culture, race, ethnicity, religion, or involvement in juvenile justice settings (Castro, Barrera, & Holleran Steiker, 2010). In a review of 16 evidence-based sexual risk reduction interventions for youth in the juvenile justice system, only two interventions were adaptations of CDC-defined EBIs (Tolou-Shams, Stewart, Fasciano, & Brown, 2010), and only one was a gender-specific program for adolescent girls (Kelly, Martinez, & Medrano, 2004).

The development, testing, and national dissemination of evidence-based interventions that address the intersection of substance use and

HIV for African American women are a public health priority. The incidence of new HIV infections among African American women in 2011 (40.0/100,000) was 20 times higher than that for White women. Among African American women with HIV, 60.8 % reside in the South. Individual HIV risk behaviors alone do not account for the disproportionate risk of HIV (District of Columbia Department of Health, 2013; HAHSTA, 2012). Social factors (residing in high HIV prevalence social networks and communities) and structural factors (poor access to services) have been shown to amplify HIV risk and reduce engagement in preventive services, screening, and care (HAHSTA, 2012). However, the use of alcohol and other drugs can also amplify HIV risk among African American women. For example, women of color who use drugs and/or drink are more likely to have unprotected sex or sex with risky male partners than those who do not drink and/or use drugs (Bryan, Schmiege, & Broaddus, 2009; Schmiege, Broaddus, Levin, & Bryan, 2009).

Socioenvironmental influences also contribute to the heightened risk of HIV for African American women released from jail. High HIV prevalence in their community, coupled with high rates of throughput in county jails, creates dynamic HIV networks within medically underserved and socially disenfranchised communities that contribute to community-level HIV incidence (Brener, Billy, & Grady, 2003; Croyle & Loftus, 1993; El-Bassel et al., 1995; Green et al., 2012; Knudsen et al., 2008; Leukefeld et al., 2012; Sheridan, 1996; Thomas & Sampson, 2005; Thomas, Torrone, & Browning, 2010; Tourangeau, 2000). HIV risk is magnified among African American women released from jail (Thomas & Sampson, 2005; Wolitski, 2006) attributable, in part, to risky male partner involvement (CDC, 2013), as a result of residing in communities with a high-risk male partner pool (i.e., men who have been incarcerated, use alcohol and other drugs) (DiClemente, Sales, Danner, & Crosby, 2011; Laumann & Youm, 1999; Millay, Satyanarayana, O'Leary, Crecelius, & Cottler, 2009; Sheridan, 1996; Zimmerman, Atwood, & Cupp, 2006).

Methodological Limitations of HIV Intervention Studies for Women

Rigorously evaluated HIV risk reduction interventions remain one of the most powerful tools for curbing the HIV epidemic. While well-tested interventions exist for incarcerated women in long-term facilities, i.e., prisons (DiClemente et al., 2008; DiClemente, Milhausen, Sales, Salazar, & Crosby, 2005; Laumann & Youm, 1999; Millay et al., 2009; Sales, Milhausen, & DiClemente, 2006; Sheridan, 1996), gaps remain in interventions for women released from jails (Lichtenstein & Malow, 2010). These gaps include underutilization of biomarkers. For example, one jail study identified a decrease in self-reported HIV risk behaviors among drug-abusing women who had been exposed to skill-building interventions but failed to include biological markers of risk reduction, e.g., STI testing to confirm the validity of the findings (El-Bassel et al., 1995). Other gaps in the literature include information on HIV interventions tailored around the cultural and gender-specific issues related to African American women, particularly those released from correctional facilities (Lichtenstein & Malow, 2010), and evaluations with follow-up periods more than 6 months postrelease (Lichtenstein & Malow, 2010) and sample sizes large enough to assess significant changes in outcomes. The largest sample size reported in a recent review of studies involving incarcerated women was 162 (Tolou-Shams et al., 2010).

Risk Reduction Intervention Strategies for Adjudicated Adolescents

Table 31.1 details recent intervention strategies that address existing gaps in available interventions for adjudicated adolescents. Two of the following interventions discussed (Imara and Healthy Teen Girls Project) add to the evidence-based HIV risk-reduction interventions. While efficacy results were not presented for the other

Table 31.1 Risk reduction interventions for adjudicated adolescent girls

Intervention	Sample	Intervention	Outcomes
Imara (DiClemente et al. 2014)	Recently detained African American adolescent girls aged 13–17 at a Regional Youth Detention Center (RYDC)	Three individual and four phone sessions with health educator over 3 months	Imara participants reported significantly higher condom use self-efficacy, HIV/STI knowledge, and condom use skills compared to participants in the usual care condition
Reducing Recidivism Through Holistic Healing Program (Woodson et al., 2010)	African American girls aged 12–18 recently released from detention after their first incarceration; participants selected with documented history of violence	Year-long program that provided housing (dormitory setting), social support, role models, education services, mental health therapy, vocational training, health care, and spirituality support	Efficacy results not reported. Outcome goals were to decrease delinquent behavior and recidivism and provide a successful re-entry into the community
Healthy Teen Girls Project (Robertson et al. 2011)	Newly admitted girls aged 12–17 years at a state correctional facility	18, 60-min group sessions and 1 individual session	Intervention participants reported decreased condom barriers, fewer unprotected sex acts, and fewer occasions of sex under the influence of substances from baseline to follow-up. Intervention participants had higher health knowledge, assertive communication, and condom application scores compared participants in the comparison condition
Multidimensional Family Therapy-Detention to Community (MDFT-DTC) (Liddle et al. 2011)	Juveniles aged 13–17 years reporting substance use problems with at least one parent able to participate in the intervention	3, 2-h multifamily groups including MDFT (drug abuse and delinquency treatment) + family-oriented HIV/STD prevention module	Intervention uptake and participant satisfaction were high among adolescents and family members receiving MDFT-DTC compared to the usual care condition. Efficacy outcomes were not reported

two interventions presented below (Reducing Recidivism Through Holistic Healing Program and Multidimensional Family Therapy-Detention to Community), their wraparound services related to re-entry and inclusion of family, respectively, are promising.

The Reducing Recidivism Through Holistic Healing Program is a theory-based, year-long pilot program for African American female detainees aged 12–18 years recently released from detention after their first incarceration. The purpose of the program is to reduce recidivism among adolescents likely to have repeat offenses by addressing concurrent, multiple risk factors impacting detained adolescents. The eight program components: (1) housing (dorm living provides security), (2) social support, (3)

role models, (4) education, (5) mental health, (6) vocational training, (7) health care, and (8) spirituality (Woodson et al., 2010). While this program addresses co-occurring risk behaviors among juveniles, it is not evidence based.

Given the dearth of HIV interventions for African American adolescent females, a population that is rapidly growing in the juvenile justice system and one that has a substantial social, psychological, and behavioral HIV risk profile, efficacious intervention strategies are needed. Imara is an evidence-based intervention addressing HIV risk among recently detained African American girls aged 13–17 years (DiClemente et al., 2014). The intervention involved 3 one-on-one and 4 phone sessions with a female health educator over a three-

month period. Girls in the Imara intervention condition reported significantly higher condom use self-efficacy, HIV/STI knowledge, and condom use skills compared to participants in the usual care condition.

The design and implementation of HIV/STI programs may need to extend beyond individual-level intervention models (Brody et al., 2012; DiClemente et al., 2005; DiClemente, Salazar, & Crosby, 2007; Voisin, DiClemente, Salazar, Crosby, & Yarber, 2006; Wingood & DiClemente, 2000). Thus, future interventions should also consider involving families, peers, and social networks in the intervention plan. While intervention models may benefit from utilizing a multilevel approach, there is utility in having a range of implementation modalities. While individual counseling may be important to address girls' specific challenges, other modalities, such as group-formatted interventions, have value in enhancing prosocial norms supportive of HIV/STI-preventive behaviors, providing peer modeling and an opportunity to practice prevention skills, and enhance peer social support to initiate and maintain preventive behaviors. Furthermore, new media technologies, such as smartphone applications, and established technology, such as SMS (texting) and mobile phone contacts, can be used to enhance contact between program staff and girls, reinforcing prevention messages, addressing newly emerging health threats, and providing a readily accessible and caring adult to provide guidance. Similar to having comprehensive intervention content, it is important to consider concurrently incorporating multiple intervention modalities. Whatever combination of interventions or implementation modalities selected, intervention strategies can benefit from being designed to be gender and culturally congruent and developmentally appropriate.

Combination Interventions

The field of HIV prevention has evolved over the past decade to emphasize combination interventions, which are more sophisticated and

complex and have the capacity to address a wider array of social determinants and risk factors for HIV (Coates, Richter, & Caceres, 2008; Wingood, Rubtsova, DiClemente, Metzger, & Blank, 2013). Efficacious family-based interventions for justice-involved adolescents are rare yet promising given adolescents are released to family members' care after detention (Tolou-Shams et al., 2010). Adolescents face multiple challenges upon release from detention that impede progress toward goals set while incarcerated. Family and peer networks can both positively and negatively impact adjudicated adolescents' ability to make positive changes (Latham et al., 2012). Multidimensional Family Therapy Detention-to-Community (MDFT-DTC) is a theory-driven intervention targeting substance use, HIV/STD risk, and criminal behavior among adjudicated adolescents. MDFT-DTC involves weekly treatment with youth and family over a 3–6-month period, providing service during incarceration and after adolescents are released and return to their families and communities. While MDFT invited family members to the final group session for adolescents, the intervention did not address family functioning related to adolescent risk behavior or risk factors (Marvel, Rowe, Colon-Perez, DiClemente, & Liddle, 2009).

Wraparound Services

Incarcerated African American women are underserved. Few public health interventions have been developed for African American women leaving jail. Most interventions to reduce HIV among incarcerated persons of either gender have focused on populations in prison, which are long-term institutions (Bryan et al., 2006; Leukefeld et al., 2012; Lichtenstein & Malow, 2010; Wolitski, 2006). However, 95 % of all US inmates pass only through jails, which are short-term facilities with high volume and rapid population turnover (Spaulding, Bowden et al. 2013). Among jailed women, 69 % suffer from drug abuse or dependence, compared to 6.1 % of women in the community (Karberg & James,

2005). Access to medical care postrelease is inconsistent. Southern states, the epicenter of the incarceration epidemic, are the same states that have eschewed Medicaid expansion under the Affordable Care Act (ACA) (Current Status of State Medicaid Expansion Decisions. Webpage on Kaiser Family Foundation website, www.kff.org, 2013). Housing and employment opportunities upon release are often inadequate (Freudenberg, 2002). Nationwide, while on any one day approximately 50,000 African American women are detained in jails, high throughput means 350,000 HIV-negative African American women leave jails each year and confront personal challenges related to housing, employment, and access to affordable health care (Spaulding, Booker et al. 2013). While uncommon, wraparound services and re-entry programs are necessary for women leaving jail.

Aftercare and Juvenile Reentry Programs

Numerous interventions for juvenile offenders occur in detention centers with few providing services for adolescents once they reenter their communities and family structures. Intervening in juvenile detention facilities is not sufficient to address the myriad of challenges surrounding HIV and STD risk for adjudicated adolescent girls. Upon release, girls return to their communities, sociosexual networks, and specifically male sex partners, all of which may confer HIV/STI risk. Thus, while implementation of HIV/STI prevention interventions in detention facilities has value, interventions need to provide continuity of prevention services for girls subsequent to their release and upon returning to their communities. The continuity of services is critical to optimize intervention impact and bridge bridging a potentially dangerous transition from the detention facility to their community (DiClemente et al., 2014). Interventions must consider re-entry into the community and wraparound services for incarcerated adolescents.

Future Intervention Strategies

A more in-depth focus on trauma, in particular, would be beneficial given the lifetime prevalence of this risk factor for HIV/STI. For example, similar to successful interventions designed to reduce traumatic stress and sexual risk behaviors among people living with HIV who have histories of abuse or trauma (Sikkema et al., 2007), HIV/STI prevention interventions for detained adolescent girls may consider providing more in-depth discussion and instruction on specific strategies to manage and overcome fear or anxiety related to past trauma or abuse, as well as fear/anxiety about being assertive in current sexual situations. Doing so may improve the efficacy of STI/HIV prevention programs for adolescents who have trauma histories.

Summary

- Adjudicated adolescents engage in multiple, correlated risk behaviors, including substance use, delinquency, and risky sexual behavior.
- Many adjudicated adolescents have also been exposed to violence and trauma that are significantly related to engaging in risk behavior, namely, HIV/STD risk behavior.
- There is an empirical gap in the literature regarding evidence-based interventions among adjudicated/justice-involved youth related to HIV/STD risk reduction strategies.
- Interventions targeting detained and recently detained adolescents must include wrap-around services and strategies to facilitate successful reentry into adolescents' family and community.
- Interventions that include additional members of adolescents' networks may be more sustainable.

Future Research Needs

- Interventions for adjudicated adolescents must be tested for efficacy and effectiveness in research trials.

- Interventions addressing co-occurrence of risk behaviors and multiple levels of intervention, beyond the individual level alone, among adjudicated adolescents need to be developed and tested for efficacy.
- HIV/STI prevention interventions for detained adolescent girls may consider providing more in-depth discussion and instruction on specific strategies to manage and overcome fear or anxiety related to past trauma or abuse, as well as fear/anxiety about being assertive in current sexual situations.

Recommended Readings

Evidence-based practice to reduce recidivism: Implications for state judiciaries (August, 2007); U.S. Department of Justice. Retrieved from: http://www.vcjr.org/reports/reportskrimjust/reports/ebiredrecid_files/DOCRR%20Lit%20Rev%20Report.pdf

Office of Juvenile Justice and Delinquency Prevention: Model Programs Guide. Retrieved from: <http://www.ojjdp.gov/MPG>

Effective interventions: HIV prevention that works. Retrieved from: www.effectiveinterventions.org

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Part V

Conclusion

Marc Le Blanc

Prologue

When Julien and Lila, two former exceptional graduate students and research assistants, announced that they had conceived a Festschrift book summarizing the current state knowledge in theoretical, empirical, and practical developmental criminology, I was deeply moved by their initiative. I realized that they were extremely generous to slow down their personal research agendas to produce this collection of up-to-date and challenging scholarly papers. They manifested utmost will and patience; I know by experience how challenging it is to keep scholars in line with a theme and a deadline.

The result of their hard work is remarkable and unique. The list of contributors includes many generations of scientists; some began to manifest their interest in developmental criminology in the 1970s and others in the 2000s. They are from a large spectrum of disciplines in the behavioral sciences; some were trained in anthropology, biology, criminology, psychology, and sociology, to name a few. They come from Europe, the USA, and Canada. The diversity of contributors has resulted in a volume that covers a wide array of themes that are essential to developmental criminology. If I were to be critical, I

would say that health policy and practice is well represented in the volume but that the discussion on criminal justice policy and practice is lacking. However, this topic has been abundantly addressed in many criminal career publications.

In my view, this book advances the state of developmental criminology and is an essential reading that will advance the future of this perspective in criminology. There is no comparable collection of chapters in developmental criminology. “Mille mercis” to Julien, Lila, and all the outstanding contributors, for this unique volume.

From a personal viewpoint, I am greatly honored by this Festschrift because it is a good representation of my career in developmental criminology during the last 50 years. In 1964, I began by counting the number of pupils in all the elementary and high schools in Quebec. I was then recruited by Denis Szabo (a pioneering French-speaking criminologist) to participate in a multilevel and multidisciplinary project. I was responsible for the analysis of data on official and self-reported delinquency, both at the community and individual levels. In 1969, I was heavily influenced by Travis Hirschi’s book and I decided to replicate his study with a representative sample of adolescents and a two-wave panel design. At the same time, my colleague and office neighbor, Marcel Fréchette, was starting a psychologically oriented longitudinal project with a population of adjudicated adolescent males and also with a two-wave panel. In addition, I was starting a five-wave evaluation of a psychoeducational treatment program (these programs are

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described by Finckenauer, 1984, and Le Blanc, 1987). We eventually decided to merge these three projects into a program that became the Montreal Two-Sample Longitudinal Study (MTSLS). We followed up these individuals intermittently up until the age of 50. In these merged projects, there was continuity in measures of crime, personality, and social correlates but also heterotypic discontinuity because measures were adapted to each phase of the life course, from adolescence to adulthood.

This epilogue is a critical assessment of the state of developmental criminology. It addresses the two following questions. What is the origin of the criminological perspective on antisocial behavior? Where it should be headed? The chapters in this volume find themselves somewhere between these two questions, as they answer the question: what is the state of developmental criminology?

Introduction

Nearly 200 years ago, Quételet (1831) wrote, “the first scientific treatise ever published on crime” (Sylvester, 1984). Throughout his career, he continued to report data and theorize on the causes of propensities for crime (Quételet, 1869). Quételet developed the four basic precepts that form the foundation of developmental criminology. First, he proposed and tested the developmental law of propensity for crime, namely, the age–crime curve or the cycle of offending. Second, he suggested a developmental mechanism in the criminal career, that is, the aggravation process from minor to major crimes. Third, he anticipated an explanatory perspective of the cycle of offending: “. . .the changes over time in energy (biological) and passions (self-control) of the criminal” (Sylvester, 1984). Fourth, his comparative perspective on offending made him aware of the importance of the distinct characteristics of each society and its history in

the explanation of offending. The age–crime distribution and associated explanations served as a basis for the three paradigms that compose developmental criminology: (a) criminal career, (b) life course, and (c) individual growth paradigms.

Following Quételet, numerous behavioral scientists, from a variety of human sciences, contributed to the further development of these three parallel paradigms in criminology. When we proposed the term “developmental criminology” in 1990, we were referring to “the study of within-individual changes” (Loeber & Le Blanc, 1990); this concept integrated some elements of the criminal career paradigm and the individual growth paradigm in psychology. This chapter lays out a common conceptual and methodological framework for these paradigms with the life-course paradigm. They share five common premises:

- Developmental criminology should be concerned with the whole spectrum of antisocial behaviors, not only crime and its official measures.
- Changes in antisocial behavior and the associated explanatory factors occur as continuous processes throughout life, particularly at transition points between different phases of the life course.
- Changes are observable in the biological, psychological, interpersonal, social, societal, cultural, historical, and antisocial behavior spheres, and they are continually interconnected and embedded across the life span.
- The preferred method for the study of change is the longitudinal research design.
- The accumulation of empirical knowledge on development must inform the development of preventive and treatment interventions.

Developmental criminology was officially recognized as a division of the American Society of Criminology (ASC) in 2012, 61 years after its inception and almost 200 years after Quételet’s observations on the age–crime cycle.

From Crime to Antisocial Behavior

Toward a Common Construct

Theoretical criminologists entertained a long controversy, from the 1950s through the 1970s, on the object of criminology, social deviance versus official crime (Le Blanc & Fréchette, 1989). The individual growth and life-course paradigms use more often a range of antisocial behaviors, while the criminal career paradigm prefers official crime. Criminologists now tend to agree with the proposition of Gottfredson and Hirschi (1990) that all antisocial behaviors are in essence analogous to crimes. Empiricists, starting with Porterfield (1946), used measures labeled “delinquency,” but they included a large set of socially undesirable or antisocial behaviors beyond crimes. It is still a common practice after the Hindelang, Hirschi, and Weis (1981) technical study on the measurement of delinquency that concluded “the best measures of delinquency appear to be those that consider a wide range of delinquent acts committed over a long span of time” (p.218). According to Le Blanc and Bouthillier’s (2003) review of more than 20 studies, the latent construct position received support from numerous empirical studies of self-reported antisocial behaviors as well as officially recorded crimes.

We propose that developmental criminology use as its central object the generic construct of *antisocial behavior* to reduce potential confusions between scientists of different disciplines, from researchers to clinicians. Antisocial behavior refers to a wide range of behaviors and is not limited to Criminal Code offenses, as the term delinquency infers. In addition, this term is often used in psychology, psychiatry, social service, and criminology. Importantly, the existence of an antisocial behavior latent dimension is not contradictory with the fact that specific categories can be studied independently. Despite minor disagreements between researchers on the number of categories of antisocial behavior and their specific content, there is enough empirical evidence, following the

landmark study of Hindelang et al. (1981) and their numerous followers, to argue that there are probably around nine categories of antisocial behavior during adolescence: theft, fraud, vandalism, aggression, drug use, risky sexual behavior, risky driving, misbehavior in school, and family rebellion.

Exploratory and confirmatory factor analyses conducted over the last 40 years in our different data sets have convinced us that the antisocial behavior is a hierarchical construct. Le Blanc and Bouthillier (2003) argued that antisocial behavior is composed of four latent subconstructs: (a) covert behavior, (b) overt behavior, (c) authority conflict, and (d) reckless behaviors (Loeber & Hay, 1997, empirically established the first three latent constructs). These subconstructs are composed of 12 forms of antisocial behavior: five are relative to offending (vandalism, violent behavior, theft, sex crimes, and fraud) and seven to problem behavior. In Fig. 32.1, the circle is the higher-order construct of antisocial behavior, while the ovals represent the theoretical latent subconstructs. The ovals in gray indicate the latent constructs that were identified using hierarchical confirmatory factor analysis in our adjudicated sample of adolescent boys and girls, independently and with measures of both participation and onset. The ovals in white are additional hypothetical components still untested.

In conclusion, we think that research on the hierarchical structure of the antisocial behavior provides strong evidence of the viability of this construct as a study object for developmental criminology. We argue that four innovations will advance the usefulness in this key construct for developmental criminology and all behavioral sciences:

- In order to be an integrative perspective, developmental criminology should adopt the latent construct of antisocial behavior as its dominant study object; this is true for the criminal career, life-course, and individual growth perspectives.
- More empirical tests on this theoretical model should be undertaken. Researchers should test and replicate this model in various types of samples and examine its measurement

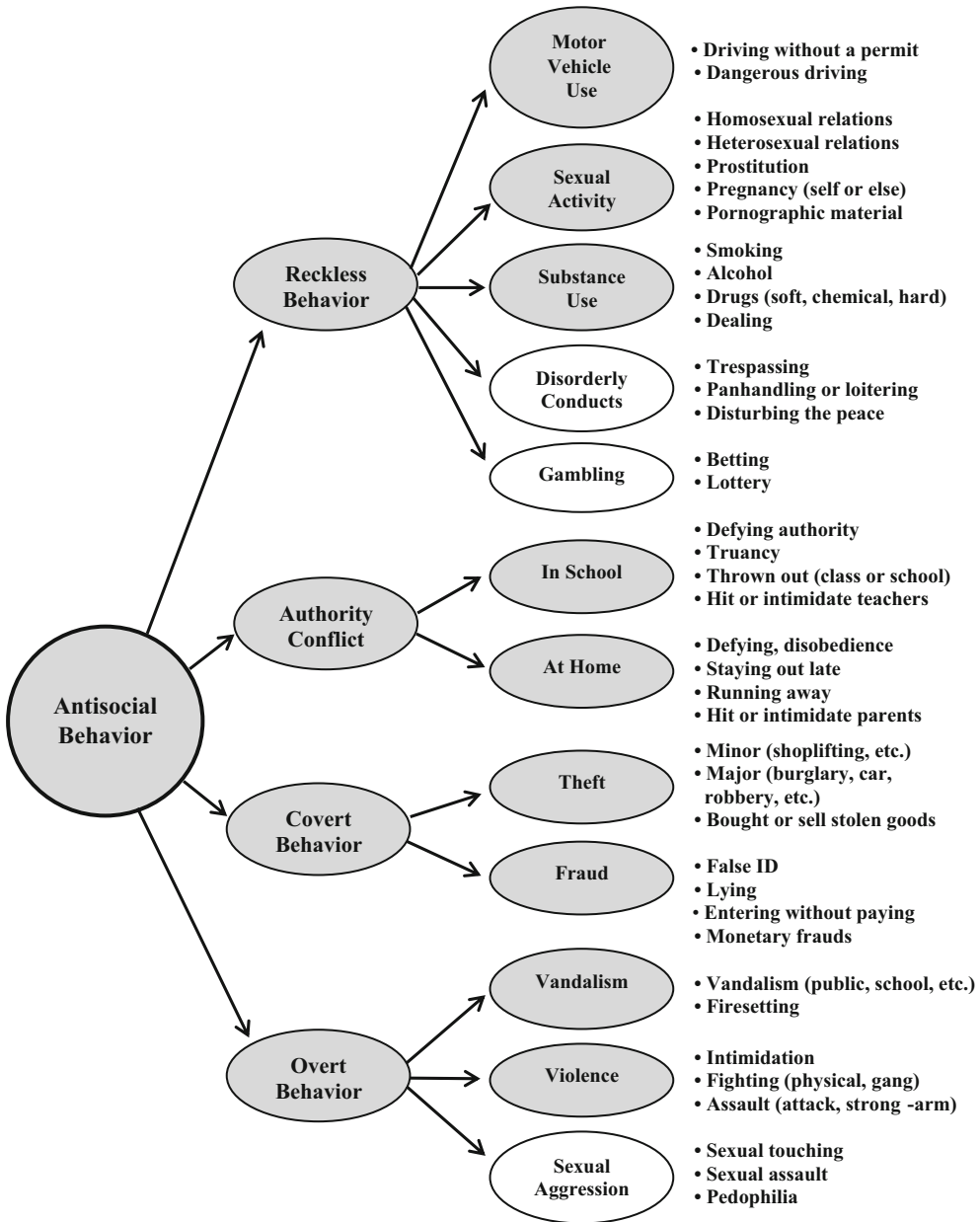


Fig. 32.1 Hierarchical model of antisocial behavior. Note: ovals in gray are from the tested model; those in white are not tested yet. Adapted from Le Blanc (2009)

invariance using structural variables such as sex, race, and social characteristics of communities. To do so, secondary analysis could be undertaken with data from the Office of Juvenile Justice and Delinquency Prevention (OJJDP) longitudinal studies and other data sets, such as the International Self-Report

Delinquency Study (ISRDS: Junger-Tas, Terlouw, & Klein, 1994; Junger-Tas et al., 2010).

- Developmental criminologists observed that antisocial behavior is manifested in different ways across the life span. It is a developmentally heterotypic phenomenon.

In consequence, there is continuity and change in the nature and number of antisocial behaviors that compose this construct in different periods of the life course. The proposed theoretical model is valid for adolescence and emerging adulthood (approximately from age 10 to 30 years), but modifications are needed for later periods of the life course. Very little research has been conducted in operationalizing antisocial behavior during adulthood in the domains of problem behavior at work, risky motor vehicle use, risky sexual activities, intimate partner violence, and other forms of family violence, fiscal fraud, etc.

- The measurement model of antisocial behavior should also be improved by adding more historically current manifestation of this latent construct, for example, by including online or Internet antisocial behaviors such as cyber pornography, online gambling, cyber bullying, online frauds, etc.

The Course of Antisocial Behavior

Developmental criminology was born with research on the age–crime curve. His study object should be the course of all categories of antisocial behaviors. We argue that the course of all these antisocial behavior categories takes the form of a reversed U-shaped cycle. This statement is supported for covert and overt antisocial behaviors in longitudinal research review papers (e.g., Loeber & Le Blanc, 1990; Le Blanc & Loeber, 1998; Piquero, Farrington, & Blumstein, 2003) and empirical books (e.g., Le Blanc & Fréchette, 1989; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Piquero, Farrington, & Blumstein, 2007; Macleod, Grove, & Farrington, 2012). However, for authority conflict and reckless behaviors, there is very little data on their developmental course or cycle. There is some solid evidence but only on the course of specific behaviors such as drug use (White, 2015) and sex offending (Lussier, 2015). Developmental criminologists should investigate all forms of antisocial

behaviors with the descriptive parameter and the dynamical mechanisms described in Table 32.1 of the introduction chapter of this book.

If criminologists consider side by side the reviews of Le Blanc and Loeber (1998) and Piquero et al. (2003), they can conclude that there is an agreement on common descriptors for the criminal career: participation (annual and cumulative), onset, offset, duration, frequency (annual and cumulative), crime mix, and seriousness. However, research on seriousness has been mostly limited to a legal characterization. Other operationalizations of crime seriousness or other behaviors are rare (Le Blanc & Fréchette, 1989, used Sellin and Wolfgang (1964) measure of seriousness) (for drug use, see White, 2015).

Since individuals vary in the timing and the height of their reverse U-shaped cycle in the different antisocial behaviors, the task of developmental criminology is to identify the mechanisms that create the form of this trajectory. Quantitative changes in criminal behavior, in terms of growth and decline, are documented in numerous studies and in the reviews of Le Blanc and Loeber (1998), Piquero et al. (2003, 2007), and Soothill, Fitzpatrick, and Francis (2009). First, changes are manifested by the degree and direction of change. Second, there are also differences in the rate of change. Third, the mechanisms of these growths can be inferred from the relation between the onset of offending and its frequency, variety, crime mix, and duration. Fourth, there is a gradual desistance from criminal behavior. This process is observable before offset through a decrease in frequency and variety and by reaching a ceiling of seriousness.

Qualitative changes refer to modification in the nature of the crime mix of an individual throughout his life. Quételet (Sylvester, 1984) described five steps toward the most violent crimes. Today, this aggravation process is usually subdivided into a developmental sequence comprising a number of hierarchical stages. Le Blanc and Fréchette (1989) showed that there was a developmental sequence in official and

self-reported criminal activity, based on seriousness levels according to ages of onset and offset. In addition, Le Blanc and Loeber (1998) indicated that there is clearly a developmental sequence for some different types of antisocial behavior, such as violence (Loeber & Hay, 1997) and drug use (Kandel, 2002). Qualitative changes can also be analyzed in terms of escalation and de-escalation on a developmental sequence, i.e., moving across the stages of seriousness of a particular category of antisocial behavior. Escalation implies conservation, innovation, and retention of behaviors. Synchronies in the development of different antisocial behaviors take the form of simultaneity and embedding of antisocial behaviors of different types. Finally, these continuous changes form pathways going through parts or the whole sequence. The escalation hypothesis for criminal activity is a strong fact rather than a contentious issue. It is not the case for the de-escalation hypothesis (Le Blanc, 2002). However, escalation is hierarchic rather than embryonic, that is, most delinquents and drug users escalate, but not automatically from the lowest to the highest stages; they can start at any stage and move only to the next one.

Developmental criminology has precisely described the criminal career and the drug use career. However, there is a significant gap in our knowledge on the existence of these mechanisms for all other types of antisocial behaviors. There are indications that the descriptive parameters and dynamical mechanisms should be supported by future empirical tests, but investigations are clearly needed:

- The quantitative and qualitative mechanisms of a criminal career should be systematically studied for all categories of antisocial behavior; this would support their usefulness and increase our empirical knowledge.
- We hypothesize that future research will find, as was the case for crime and drug use, a developmental sequence for all other types of antisocial behavior.
- We expect that the escalation and de-escalation phenomenon that is observed for criminal offenses and drug use will also be replicated for all types of antisocial behavior.

Trajectories of Antisocial Behavior

The quantitative and qualitative changes across the life span create an individual trajectory of criminal behavior, as shown in many studies (Piquero, Gonzalez, & Jennings, 2015). These individual trajectories vary in timing (onset, duration, offset), degree (frequency, seriousness), and nature (crime mix, behavioral sequence, escalation–de-escalation, etc.). In consequence, each individual displays a particular reverse U-shaped course.

Criminologists have addressed the empirical question of identifying developmental trajectories of criminal activity following the Wolfgang, Figlio, and Sellin (1972) landmark study that proposed four trajectories: nondelinquent, one-time, non-chronic, and chronic delinquents. Le Blanc's (2002) review shows a historical sequence in the different statistical methods that were used to identify trajectories of offending. Criminologists began by using transition matrices. Later on, they employed ad hoc dynamic classification (i.e., cross tabulations of measures of self-reported or official offending or other antisocial behaviors measured at two or more waves). In the 1990s, they experimented with group detection methods (i.e., statistical models such as cluster analysis, latent growth curve modeling, group-based latent trajectory modeling). There are now so many published studies on this topic using different measures of offending that it is difficult to keep track of them all. For example, there are trajectories of arrests (Wiesner, Capaldi, & Kim, 2007), convictions (Piquero et al., 2007), self-reported offending (Wiesner & Capaldi, 2003), and violence (Loeber, Lacourse, and Homish (2006). There are also studies of other antisocial behaviors, for example, aggressive behavior (Nagin & Tremblay, 1999), externalizing behaviors (Bongers, Koot, van der Ende, & Verhulst, 2004), gambling (Vitaro, Wanner, Ladouceur, Brendgen, & Tremblay, 2004), drug use (Guo et al., 2002; Farrelly, 2007), cocaine use (Hamil-Luker, Land, & Blau, 2004), and software piracy (Piquero & Piquero, 2006). Piquero (2008) lists 90 such publications between 1993 and 2006, and there are some new ones published

every year. In this book, there are different comprehensive reviews of the literature on developmental trajectories. They are reviewed by Piquero et al. for criminal behavior, by White for drug use and combined trajectories of types of drugs and drug and crime, by Leiber and Peck by races, by Corrado and McCuish for mental health, by Lanctôt for adolescent girls, and by Lussier for sex offending.

All of these studies detect between two and ten trajectories, with an average of three to five, from the “abstinent trajectory” to one characterized by the “serious and persistent behaviors.” The number and the nature of the trajectories vary as a function of the setting (countries, urban and rural settings, cities), the size and composition of the sample (representative samples or justice system samples such as arrestees, adjudicated, parolees), the phases of the life span considered (childhood, adolescence, youth, adulthood), by race (Leiber & Peck, 2015) and gender (Lanctôt, 2015), the length of the follow-up (from a few years up to more than 30 years), and the analytic strategies preferred (statistical parameters of the model, the decision criteria).

Since the beginning of the MTSTGLS research program in 1972, our hypothesis has been that there are three meta-trajectories for all types of antisocial behaviors. These meta-trajectories can be subdivided into more specific trajectories, depending on the statistical techniques that are used, the nature and size of the sample, the length of the life course considered, and the definition of the antisocial behavior variable that is used. We called these meta-trajectories persistent, transitory, and common.

The *persistent offending trajectory* (Le Blanc & Fréchette, 1989) is well known. It was labeled life-course persistent offending by Moffitt (1993). The individuals following this trajectory represent a small fraction of the population who commit a large proportion of all crimes, approximately 50 % of self-reported crimes (Elliott, Huizinga, & Menard, 1989). These chronic offenders represent around 5 % of the population and 45 % of the individuals adjudicated by the juvenile court and placed in residential

institutions or on probation. They commit two-fifths of the crimes known to police and two-thirds of the violent crimes according to Wolfgang et al. (1972). Based on the MTSTGLS data, they start offending during childhood, around the age of eight; the growth in their offending is rapid and important during the first half of adolescence; their offending peaks at the end of adolescence; they maintain a high level of offending until the middle of the twenties; their offending declines and ends, on average, around the middle of the thirties. This trajectory is characterized by high variety, frequency, and seriousness in offending. The growth rate and velocity in offending are rapid during early adolescence, and this trajectory is characterized by acceleration, diversification, and stabilization. During that growth, their offending escalates from the less to the more serious crimes on the developmental sequence of crimes, and it displays high level of innovation, retention, and simultaneity. During the decline, shrinking rate accelerates, frequency decelerates, seriousness reaches a ceiling, and specialization increases. Finally, persistent offenders tend to follow a similar trajectory for many other categories of antisocial behavior, either simultaneously, before, or after their offending trajectory.

The *transitory offending trajectory* (Le Blanc & Fréchette, 1989) is also well known. It is similar to the adolescence-limited offending proposed by Moffitt (1993). The individuals following this trajectory represent approximately 45 % of the population. They commit around 40 % of self-reported crimes (Elliott et al., 1989) and 25 % of the crimes reported to police (Le Blanc, 1995). They start offending during adolescence; the growth in offending is rapid and significant during the middle of adolescence; their offending peaks around age 16; its decline is also rapid at the end of adolescence; they sometimes display an episode of relatively minor offending in their early twenties. This meta-trajectory is characterized by variety, frequency, and some serious crimes against property. The growth rate and velocity in offending are rapid as midadolescence approaches, and this trajectory is characterized by acceleration, diversification,

and a limited stabilization. During that growth, their offending escalates from minor to more serious crimes without violence on the developmental sequence of crimes, and it displays innovation, retention, and simultaneity. During the decline, the shrinking rate accelerates, the frequency decelerates very fast, the seriousness reaches a ceiling, and specialization increases. This meta-trajectory can also be observed during early youth for a few late-onset offenders. In addition, the transitory offender tends to follow a similar trajectory for other categories of antisocial behavior, either simultaneously, before, or after their offending trajectory.

Finally, we proposed the *common offending trajectory* (Le Blanc, 1995; Le Blanc & Fréchette, 1989), which is less described than the two previous trajectories. Offenses of common offenders are occasional in an otherwise law-abiding development for around 45 % of the population. Their crimes occur mainly around the middle of adolescence. They are manifested by minor acts such as vandalism, shoplifting, minor theft, or public mischief. Their annual frequency for each of these types of crime is typically on average less than one. If common delinquency represents 16% of arrests according to Wolfgang et al. (1972) data, it accounts for 9 % of the reported delinquent acts by a representative sample of the population of adolescents (Elliott et al., 1989). This meta-trajectory of offending is an epiphenomenon of adolescence.

We expect that these meta-trajectories can be identified for all forms of antisocial behavior. Empirical trajectories in different antisocial behaviors should also interact. For example, drug initiation has a launch effect on offending at subsequent ages, while the reverse is not true, and in each trajectory, there are continuity and contemporaneous effects for all ages (Le Blanc, 2009).

During the last 20 years, there were numerous studies on trajectories of criminal activity. We

argue that developmental criminology needs for the following research initiatives:

- After the comprehensive review of Piquero (2008), a meta-analysis of all the trajectory studies of offending and drug use is essential to identify similarities and differences in methodology and to synthesize the common results, particularly on the number and nature of offending and drug-using trajectories in the general population and in offenders and drug users' samples.
- Developmental criminologists should investigate the developmental trajectories of all categories of antisocial behavior and systematically compare them with offending and drug use trajectories.
- Researchers should start to analyze the parallel development and complex interplay between trajectories of all antisocial behaviors.

Toward a Mature Research Design for Developmental Criminology

Criminology had to wait more than 100 years after Quételet before new data sets of individual criminal registers of arrests and convictions reached reasonable reliability and validity (i.e., Sellin & Wolfgang, 1964) and before the longitudinal design with new data gathering procedures became in use, such as self-reported narratives of life history and panel interviews and observations. We distinguish three successive periods for the construction of a comprehensive research design. The childhood of panel studies was between the 1930s and 1950s, the adolescence with transition projects of data gatherings in the 1970s and 1980s with participants born between 1950 and 1970, and, finally, the adulthood with studies that were initiated in the 1980s and beyond. Whatever the development of longitudinal designs, there will always be the following question: What are the research designs and analytical strategies that are most fruitful?

A Retrospective Review of Longitudinal Designs

The first constituent of developmental criminology was age or life-course changes. The second distinctive feature was to move away from the use of official data and collect repeated measures of self-reported data in a longitudinal design. In a first phase between the 1930s and 1950s, three methods were applied. The first was the use of the retrospective natural history of a single delinquent, which was done by Shaw (1930) and Sutherland and Conwell (1937). The second method was prospective natural histories of participants that were part of independent samples children displaying school and problem behaviors, as did Robbins (1966), and low- and high-risk boys of a prevention experiment (McCord, 1979; McCord, McCord, & Zola, 1959, McCord, 1981; Powers & Witmer, 1951). These pioneer studies employed various types of data, interviews, and official records of different sources and a small number of waves with differing interval lengths between them.

The third method, pioneered by Sheldon and Eleanor Glueck, is a mix of official criminal career data with longitudinal panels based on data reported by multiple informants on white delinquents and nondelinquents in Massachusetts. The analysis of the criminal careers at different ages, for males and females, is reported in their books on the reformatory studies (Glueck & Glueck, 1930, 1934, 1937, 1943). The results of panel studies of selected samples were published in seven books and numerous articles that are synthesized in two overviews (Glueck & Glueck, 1964, 1974). According to the Sampson and Laub (1993) description of the Unraveling Juvenile Delinquency Study, we can conclude that the Gluecks innovated in several ways. First, they used the first large sample of official serious delinquents in the correctional system. Second, they matched case-by-case delinquents to nondelinquents on age, ethnicity, neighborhood conditions, and intelligence. Third, they were the first criminologists to measure a variety of delinquent

and antisocial behaviors reported by different informants (self, parents, teachers). Fourth, they measured and tested a very long list of potential risk factors from several domains: biological, physical, psychological, social, family life, school and work experience, marital life, and other life events. Data were obtained from multiple informants and multiple official and nonofficial sources. Fifth, they collected various types of data: observations, tests, questionnaires, interviews, and case records. Sixth, they were preoccupied by the validity of their data; for example, they checked interview data with independent sources and social agencies. On the other hand, a weaker aspect of their study was the small number of data points (average age of 15, 25, and 32) and the limitations of their causal analyses (bivariate and multivariate) and their inferences according to Hirschi and Selvin (1967). Sampson and Laub (1993) and Laub & Sampson (2003) recoded the Gluecks data and used contemporary statistical techniques in order to test the current life-course paradigm. These books became exemplar studies of life-course criminology because they focus on the impact of changes in social roles and life events during adolescence and youth, with a follow-up until late adulthood.

The adolescence of longitudinal research is characterized by two major evolutions. First is the rise of the criminal career paradigm and an improved set of longitudinal panel studies, which we call the transition projects. Starting with the Wolfgang et al. (1972) landmark study and their subsequent publications (Wolfgang, Thornberry, & Figlio, 1987; Tracy, Wolfgang, & Figlio, 1990), the criminal career paradigm made an efficient use of official crime records. They explored criminal career descriptors, particularly onset, the status of offender and chronic offender, and their distribution by school and social background variables (sex, race, and socioeconomic status). Their most innovative contribution was to investigate the dynamics of offending as they followed the offenders from the first through subsequent offenses with sophisticated statistical methods. Their results

contributed to advancing new substantive questions such as specialization, offense switching, and shifts in offensivity.

The criminal career paradigm was formalized 14 years later by Blumstein, Cohen, Roth, and Visser (1986) book (*Criminal careers and "career criminals"*). This paradigm suggests that criminal career starts and eventually terminates within a precise length. It develops in frequency and seriousness. There are specific explanatory factors that account for its initiation, continuation, and termination. These cornerstone books proposed a complete paradigm with a specific set of concepts, methodological propositions, crime control strategies, and a research agenda. Criminologists were very productive at investigating this research agenda, particularly in applying innovative statistical techniques, as illustrated by recent reviews of the criminal career paradigm contribution to criminology (Piquero et al., 2003, 2007; Macleod, Grove, & Farrington, 2012). For instance, Piquero et al. (2003) listed some 250 publications on the criminal career.

After the Gluecks studies, criminology had to wait about 20 years before prominent new longitudinal studies were launched. There was three international and two American studies. One began in 1961, the Cambridge Study in Delinquent Development (CSDD) (Farrington, 2003, 2012). The second one started in 1971, the Montreal Two-Sample Two-Generation Longitudinal Program (MTSTGLP) (Le Blanc & Fréchette, 1989; Morizot & Le Blanc, 2003a, 2003b, 2005). The third one is the Dunedin Multidisciplinary Health and Development Study (DMHDS), which recruited the cohort of all children born in Dunedin (New Zealand) in the early 1970s (e.g., Moffitt, Caspi, Rutter, & Silva, 2001). The fourth study is the five-wave Houston Long-Term Multi-Generation Study (HLTMGS) (Kaplan, 1975, 1980, 1984, 1986). Finally, the fifth study is the nine-wave National Youth Study (NYS) directed by Elliott (1994; Elliott, Huizinga, & Ageton, 1985).

These transition studies had in common that their participants were brought up in their childhood and adolescence during the same historical

period, the 1970s and 1980s. They differed from the previous generation of studies in the following ways. First, they also opted for panels of different interval lengths, but they were more numerous. The samples had very distinctive characteristics: a population of 411 men born in 1953 and living in a working class district of London in Great Britain (CSDD), a representative sample of 1,611 Montreal adolescents and 456 adjudicated male adolescents (MTSTGLP), children born from April 1971 through March 1973 in Dunedin (DMHDS), a city study (HLTMGS), and a representative sample of US adolescents (NYS). Second, what distinguished these five studies from the previous generation was that they increased the number of panels and the life-course span covered. Third, they paid more attention to the metric qualities of their measures. All these studies gathered a good representation of the questions, measures, and tests from existing knowledge produced by previous longitudinal projects and the numerous cross-sectional studies that were reported in the criminology, psychology, and sociology literature. Fourth, the three North American studies were theory driven (HLTMGS, NYS, MTSTGLP) rather than multifactorial. The output of these investigations of the criminal career and the individual growth paradigms was a committee that works from 1982 on a blueprint for a New Research Strategy for Understanding and Controlling Crime (NRSUCC; Farrington, Ohlin, & Wilson, 1986), the longitudinal-experimental study.

The 1985 cohort of North American longitudinal studies improved over the studies of the previous period in many ways by adopting many propositions from the NRSUCC. These prominent developmental criminology programs and their results are synthesized in Thornberry and Krohn (2003) book. Five projects began at the same historical period in four American cities of different sizes but without a major city: the Rochester Youth Development Study (RYDS; Thornberry), the Pittsburg Youth Study (PYS; Loeber), the Denver Youth Survey (DYS; Huizinga), the Seattle Social Development Project (SSDP; Hawkins), and the Montreal

Longitudinal and Experimental Study (MLES; Tremblay). The last two programs involved an experimental preventive intervention, as proposed by the NRSUCC.

A great advantage of these studies, for the first time in criminology, is that they offered a potential for the rigorous replication of their results, thus increasing the generalizability of their results on delinquent and criminal behavior development. In addition, three studies were launched with a level of communication and coordination that was never accomplished before in criminology. The Office of Juvenile Justice and Delinquency Prevention (OJJDP) sponsored three projects with a common goal: investigating the causes and correlates of delinquency (RYDS, PYS, DYS). The 1985 generation projects were designed at a time when there was a rather high level of empirical knowledge and the formulation and verification of theories on the causes of delinquency reached some maturity. In consequence, the OJJDP programs adopted similar measures of delinquency and antisocial behavior and some common risk and protective factors from the neighborhood, family, school, peer, routine activities, and psychological domains. This generation of studies also benefited from the development of more sophisticated statistical techniques for longitudinal data analysis.

As suggested by Thornberry and Krohn (2003), it is evident that the OJJDP panel projects set guidelines for future longitudinal studies of antisocial behavior development. First, they recruited large community samples with adequate representation of antisocial participants, and they started during late childhood or early adolescence. Second, they use short interval lengths between repeated measures across a long span of the life course (i.e., childhood, adolescence, youth, adulthood). Third, they selected multiple measures with good metric properties representing the whole range of known or potential risk factors from the psychological and sociological domains; the biological domain was greatly underrepresented except in the PYS and MLES programs. Fourth, they adapted their measures to the three phases of the life course, childhood, adolescence, and youth. Fifth, they gathered data from multiple informants

(participant, parents, teachers, peers, etc.), with multiple methods (interview, questionnaires, observation, tracking of official records, etc.) from multiple data sources (police, courts, correction, social agencies, schools, etc.). In sum, the 1985 generation of longitudinal studies conformed adequately to the guidelines that resulted from previous generations of panel studies and the NRSUCC. However, they did not address important conceptual, methodological, and empirical questions.

The research agenda for cross-sectional and longitudinal studies was set to “theoretical integration” with the Elliott et al. (1985) test of a strain, social control, and social learning integration and the Le Blanc, Ouimet, and Tremblay (1988) test of a multidisciplinary integration of social control and personality theories. This agenda was confirmed and elaborated in Messner, Krohn, and Liska (1989) collections of chapters. As of now, although their empirical output was abundant, the contribution of the 1985 generation is thin to criminological theory development. The projects, as describe in Thornberry and Krohn’s (2003) book, were designed with a variety of theoretical points of view; however, no major theoretical new perspective emerged from them, such as social control theory in 1969 or low self-control theory in 1990. Some projects (RYDP, DYS, SSDP) had a special niche in socio-criminological theories with a common theory of “bonding,” supplemented by other explanations, such as structural, strain, cultural deviance, and social networks. However, the key characteristic of all the OJJDP studies is that they are socio-criminologically multifactorial (RYDS, DYS, SSDP), while two projects integrate biological and psychological risk factors without a clear theoretical explanation (PYS, MLES). In sum, empirical data related to socio-criminological theories are numerous and rich from the OJJDP projects; however, the criminological community is still waiting for a narrative formulation of a comprehensive developmental socio-criminological theory and definitive and replicated tests of such theoretical integration.

The 1985 generation studies offer a fabulous know-how in conducting panel studies, but some

methodological questions are still unanswered. A first set of questions has not been investigated, to our knowledge: Are half-yearly or yearly panels necessary in the investigation of the causes and correlates of delinquency? Do they increase the robustness and the generalizability of the results? Is the measurement of such recent changes significant from a statistical point of view? Maybe there are too many of them and that they are too difficult to analyze. Do they introduce noise in the results that are difficult to interpret or lead to deceptive interpretations? What is the contribution of the yearly changes to theory verification? A second methodological question is why studies tend to increase the length between panels during youth and later on. Is it based on the hypothesis that there is slower growth after adolescence or simply because of funding restrictions? A third set of technical questions is related to the adaptation of the data collection technologies to the conditions of today's numeric world. What is the impact concerning consent, confidentiality, respondents' fatigue, or retention and attrition? For example, is there an advantage in using in-home camera observations, computer or online interviews and questionnaires, space-time budget, social network tracking (e.g., Facebook, Twitter), etc.? What would be the impact of Internet-based data collection, cloud storage, and computing? Stouthamer-Loeber (2012) formulated many technical questions about data collection, data storage, and research conditions that new projects will have to consider seriously. A fourth set of questions concern the diversity of measures in the 1985 generation studies. If we were to launch a new panel study, what would be the more reliable and valid measure of each key concept useful for developmental criminology? What is the sensitivity to detect changes among the different measures used in longitudinal data analysis? Answers may be found to some of these questions in particular projects, but some require the attention of researchers.

The coordination between the three projects funded by the OJJDP program was an unprecedented methodological opportunity for criminology. Indeed, they provided the possibility of rigorous replications of their results on the causes

and correlates of delinquency. Rigor implies similar designs, measures, data analysis, and the joint publication of results, at least side by side. The core of the OJJDP projects offers these conditions, whatever the specificity of each of them. Thornberry and Krohn (2003) commented that "...the studies serve to both replicate and complement each other's findings" (p.315). To our knowledge, no rigorous replications were published with all the research sites using comparable samples, measures, and methods of data analysis. Thornberry and Krohn suggested some "similar results" that are dispersed in numerous publications. When a comprehensive analysis of a phenomenon is undertaken, for example, the Thornberry, Krohn, Lizotte, Smith, and Tobin (2003) book on the role of gangs in delinquency using the RYDS data, no comparable analyses from the other two projects (PYS, DYS) are presented. The OJJDP projects could have attained the essence of science, that is, the rigorous replication of results, but the lack of a coherent programmatic strategy (and perhaps the individualism of researchers) makes this fundamental premise of science impossible. This is unfortunate because this historical opportunity may not happen again.

In sum, the 1985 generation of longitudinal studies is an excellent example of extremely well-conducted studies, but that was disappointing because no comprehensive theoretical integration emerged from them, neither any rigorous cross-site replications of their empirical results on the causes of delinquency and crime. They have produced tens of books and hundreds of refereed articles exploring the endless list of the risk, protective, promotive, and desistance factor universe that was started a hundred years ago with the first panel studies. Identifying these factors is important, of course, but what is needed from these studies is a conceptual organization of all risk and protective factors according to their relative importance in the explanation of antisocial behavior. The work toward this goal in developmental criminology could be prepared with a formalization of theories (Le Blanc & Caplan, 1993) and the use of rigorous replications, as did Caplan and Le Blanc (1985)

for Hirschi's bonding theory and the meta-analysis of Lipsey and Derzon (1998).

The 1985 generation of projects is mainly individual growth studies. They are also part of the life-course paradigm because they gathered and analyzed data on role transitions, for example, from elementary to high school, from school to work, from single life to marriage, from prison to society, etc. They also produced some studies on the impact of the communities' characteristics on the development of delinquent behavior. However, developmental criminology had to wait for two comprehensive multilevel life-course studies for a systematic evaluation of the influences of neighborhood and communities' characteristics: the Project on Human Development in Chicago Neighborhoods (PHDCN; Sampson, Raudenbush, & Earls, 1997) and the Peterborough Adolescent and Young Adult Development Study (PADS+: Wikström & Butterworth, 2006; Wikström, Oberwittler, Treiber, & Harde, 2012). The PHDCN project selects neighborhoods that are measured in three ways: official data, survey of residents, and videotaped observations in their blocks. It also recruited a longitudinal panel of individuals in these neighborhoods that are measured on biological, psychological, and social factors and antisocial behaviors. In this project, it will be possible to investigate how the development of communities, families, and individuals shapes or influences the development of the propensity for antisocial behavior. The PADS+ project adopts a different perspective. Based on an integration of socio-criminological and self-control variables, it investigates how environmental and personal factors interact to explain the commission of criminal acts. For the first time in criminology, the three levels of the phenomenon of crime are considered in the same longitudinal study: the community (criminality), the individual (criminal), and the event (criminal act).

In sum, developmental criminology proposes a mature comprehensive research design through the methodological advances in its three constituting paradigms: criminal career, life

course, and individual growth. Fine-tuning in its methods and techniques will always be needed, but we argue that no major innovations are to be expected in the next few years:

- We propose that the selection of measures in future longitudinal studies be guided by comprehensive multidisciplinary theoretical integrations instead of an endless list of known or potential risk, protective, promotive, or desistance factors.
- The methodological issues and questions discussed above should be taken into account in the design of the next generation of longitudinal studies.
- We suggest that future textbooks on delinquency, crime, and other antisocial behaviors synthesize systematically the parallel results based on the 1985 generation studies.
- Researchers should undertake more secondary analyses about the development of offending and other antisocial behaviors in existing data sets. This could help the essential task of replicating results, particularly with the three OJJDP data sets. The first goal of these replications would be to increase the robustness and the generalizability of the findings. The second goal of these secondary analyses is the identification of historical changes in the course of antisocial behavior and its risk, protective, promotive, and desistance factors between the transition studies and those of the 1985 generation.

Which Analytical Strategies and Methods?

The criminological community faces many dilemmas. One of them is the question of priority: Should it encourage secondary analysis or new projects? We consider that for the next decade, there are many excellent data sets to exploit. There is no urgency to start new projects because they ask for huge investment and the most recent projects are not advanced enough to envision what we should do next. Numerous

theoretical, methodological, and empirical questions can be investigated with existing data sets. New projects should be extremely original to be considered. However, some focus projects may be useful to investigate specific questions.

Another dilemma is reflected by the difference between correlates and causes. According to Hirschi and Selvin (1967), the three criteria to infer causality are a (a) statistical association or a correlation, (b) temporal precedence, and (c) lack of spuriousness (i.e., controlling for other confounding variables) (see also the introduction chapter of this book). The ultimate goal of criminology was to identify causes; it is now to explore systems of causes. Longitudinal studies have the possibility to establish causality because the measures are obtained through a quasi-experimental before-and-after design. This design offers the highest internal validity after the randomized experiment, according to Campbell and Stanley (1966). Le Blanc and Loeber (1998) argued that developmental criminology did not advance much in the identification of systems of causes because researchers did not make full use of the longitudinal design. With a few exceptions, they did not always distinguish between correlates and causes because the temporal order was not respected for all variables in their analysis and, more frequently, because spuriousness checks were limited to a small set of factors. In addition, Gottfredson and Hirschi (1987) argued that longitudinal studies are not necessary because findings on the correlates of crime in these studies merely confirm those of cross-sectional surveys, rather than shedding light on specific causes of offending development. Based on the current state of knowledge, we find this argument hard to refute. In Blumstein et al. (1986) review, recent ones (Benson, 2013, and chapters of this book) and analysis from the 1985 generation studies (Loeber et al., 1998; Thornberry, Lizotte, Krohn, Smith, & Porter, 2003) do not present correlates that are not already known from cross-sectional studies and that are part of a system of causes.

Loeber and Le Blanc (1990) identified and reported examples of six analytical methods in

developmental criminology: concomitant and sequential, predictive, life events, stepping-stones, and cross-lagged analyses. The covariation strategy employs the first two methods. The concomitant change strategy rests on the axiom that the potential causal variables are so proximal with antisocial behavior that it is impossible to identify which comes first. It is an analysis of the parallel evolution of the independent and dependent variables, without the consideration of temporal order, and it has not been applied to multivariate system of explanatory variables. A variation of this strategy is the sequential covariation addressing the temporal sequence, that is, the impact of changes in frequency of the independent variable or its duration on subsequent frequency or duration of offending. For example, one could ask whether increases or decreases in frequency of marital conflict are associated with increases or decreases in frequency of offending. These methods have been used in bivariate data analysis, but we do not know of multivariate statistical techniques that apply to them.

The second strategy, forecasting, is represented by three methods. First, the predictive method has been applied to onset, activation, aggravation, desistance, and offset. The regression techniques can handle numerous spuriousness checks from a particular point in time, but the temporal order is applied only to antisocial behavior. A subcategory of the forecasting strategy is the life-event method, which is concerned with the influence of salient discrete life events on subsequent antisocial behavior. In these analyses, time order and spuriousness are well taken into account. However, changing variable states, such as marital conflict, attachment, etc., cannot be considered. In developmental criminology, Farrington (1986) was the first to perform the stepping-stone analytical method. It is an improvement over the two methods of the forecasting strategy. The procedure is the following: At the youngest age of the sample, the best predictors of next age offending are selected, and this analysis is reproduced at successive ages incorporating previous antisocial behavior and new risk factors specific to this age. This procedure incorporates all kinds

of variable: static or unchangeable (sex, race, etc.), discrete life events (high school, death, marriage, etc.), and dynamic or variable (attachment, marital conflict, etc.). It applies to many data points, but the variables must be measured in the same way at all points. In addition, the stepping-stone method considers spuriousness for all variables used at each data point. The end result of a stepping-stone analysis is the identification of a causal chain.

The third strategy, causal analysis, has taken two forms in developmental criminology. First, the cross-lagged method has been applied to two or three risk factors and waves of data. It considers adequately temporal order and spuriousness for only a few explanatory variables. Thornberry and his colleagues have often used this method (e.g., Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1991). It is an efficient method to address very precise questions, but not to test complex causal models with multiple risk factors and time points. Like others, we have then used path analysis (Le Blanc et al., 1988; Le Blanc, 1997b) or latent trajectory modeling (Morizot & Le Blanc, 2007).

In sum, developmental criminologists have used three strategies and many methods for their data analysis. This diversity in methods was characterized by limitations that have confused correlates and causes and revealed insufficient consideration in the problem of spuriousness. In this case, they used a small set of possible intervening variables (moderators and mediators) compared to all potential risk, protective, and promotive factors. We recommend two priorities for the advancement of knowledge on causal factors in developmental criminology:

- Complex and long-term causal chains should be investigated with the stepping-stone method for all categories of antisocial behavior. They are particularly informative for preventive interventions that are specific for different phases of the life span.
- Developmental criminology is rich with complex longitudinal data sets and application of causal path analysis; however,

developmentalists should use more systematically the latent trajectory modeling approach.

From a Descriptive Maturity to an Unmatured Theoretical Integration

In the first section of this chapter, we demonstrated that the description and understanding of the antisocial behavior construct and the course of offending are well established, both empirically and theoretically. However, except for crime and drug use, scientific knowledge about the other categories of antisocial behavior is limited. This state of knowledge on offending was achieved because of the improvement of longitudinal research designs and the availability of appropriate analytical strategies and methods. However, the explanation of the development of antisocial behavior is still rudimentary for three reasons: (1) the search for an endless list of risk, promotive, protective, and desistance (RPPD) factors, (2) the domination of sociological criminology in the USA, and (3) the absence of life-course formulation in most theories. Table 32.2 in the introduction of this book defines the types of RPPD factors.

The Endless List of Correlates

The ongoing list of RPPD factors has two origins. First, researchers have the habit of going fishing with many intuitive questions to their participants and some of them happened to be correlated to some form of antisocial behavior. Second, empirical tests of theories produce measures of constructs that are correlated with their dependent variable, and they become RPPD factors (Shoemaker, 2010, identifies many of them). Whatever the origins of the RPPD factors, the impact of this theoretical and empirical context was that developmental criminologists favored the multifactorial perspective that was defended by the Gleucks' against most criminologists of their time, particularly

Sutherland (Laub & Sampson, 1991). The classification of the endless list of RPPD factors has been done in three ways: descriptive review, systematic review, and meta-analysis.

The descriptive review method consists in collecting publications on a form of antisocial behavior, identifying the factors that were investigated, classifying and reporting them, and commenting on what should be done in the future. It was done by Howell (2009) and some chapters in this book. These reviews are informative; however, we cannot assess easily their limitations. What is the level of coverage of the literature? Is it multidisciplinary? What are the variations in content between the measures of a given factor? How was assessed the association of the factor with antisocial behavior? What is the difference in time order between studies for the same factor? Was there any test of spuriousness? What is the structural organization of the different factors, either from proximal to distal correlates or their age-graded sequence? And, most importantly, what are the best factors? Some reviews take into account some of these questions (Farrington, 2014a, for risk factors; Farrington, Ttofi, & Loeber, 2014, for protective factors; Kazemian & Farrington, 2014, for desistance factors).

The second method for classifying RPPD factors is the systematic review. A good example is the Hawkins et al. (1998) review of longitudinal studies with predictors of violence. It is a systematic review because each study sample was described; its findings were reported by categories of biological, psychological, and social factors in comprehensive tables with the description of the violence measure, the level of association, and odds ratio for each study. The major limitations of such review are that there is generally no or limited information on spuriousness and that it is difficult to compare the relative importance of all the significant predictors.

The third method for the identification of RPPD factors is the meta-analysis. Lipsey and Derzon (1998) were the only researchers to use this method in developmental criminology. They used an ongoing database of findings of prospective longitudinal studies. These authors separated

their analyses in different age categories (ages 6–11, ages 12–14, ages 15–25) to predict later serious and violent criminal behavior. In this meta-analysis, the association criterion is common (i.e., adjusted effect size), the time order is comparable, and spuriousness is systematically taken into account using statistical tests. The major drawback of this method is that only a small number of longitudinal studies are considered, and the potential factors are typically limited to the socio-criminological domain, with few psychological and no biological factors. However, this method provides the greatest potential for replication.

More recently, Loeber and his colleagues (Loeber et al., 1998; Loeber, Farrington, Stouthamer-Loeber, & White, 2008; Loeber, Slot, & Stouthamer-Loeber, 2006) explored and advanced significantly the multidisciplinary list of risk and protective factors. Loeber, Lacourse, and Homish (2006) proposed a classification of “developmentally graded risk factors,” the concept of promotive factor, and a “developmental model of onset, accumulation, and continuity of risk factors.” In the first case, they classified individual, family, school, peers, and neighborhood factors as appearing at birth, during early and mid- to late childhood, adolescence, and early adulthood. In the second case, they distinguished between protective and promotive factors, both of which associated to a reduction of offending when the probability of subsequent offending is high. In the third case, they model the combination of the onset and continuity over time of new risk factors that accumulate in multiple domains to show that this process increases significantly the probability of antisocial behavior.

There is an important question that developmental criminologists often fail to acknowledge, the timing of RPPD factors (Loeber & Le Blanc, 1990). Researchers seldom refer to the possibility that individuals may be more vulnerable to specific factors only at particular ages or in specific situations. For instance, the central nervous system may be particularly vulnerable to neurotoxins during early periods (e.g., pre-birth or infancy) but much less later in the life course. Moreover, the influence of parental breakup or

divorce may be more significant during certain developmental periods, but not in others.

In sum, the list of RPPD factors appears endless. Is it necessary to search for more factors? Is there a scientific way to limit this search to the most salient and theoretically meaningful factors? Are there changes in the human nature or sociohistorical changes of such magnitude that the lists of RPPD factors cannot be delimited?

- Developmental criminologist should conduct more meta-analyses on RPPD factors because they represent replications resting on two fundamental criteria of science: robustness and generalizability. Systematic reviews are weaker tests on these criteria, and descriptive reviews are informative, but not scientific.
- Longitudinal research should investigate the role of the timing and the nature of categories of factors, for example, an antisocial peer may be a risk factor for the onset of offending during late childhood, and being a member of a gang could be a risk factor of aggravation and continuity of offending during adolescence.
- Developmental criminologists should search more systematically for promotive, protective, and desistance factors. Better knowledge on these factors is important for clinical evaluation and intervention, criminal justice, and policy.

Toward a Developmental Theory of the Causes of Antisocial Behavior

Criminology has a strong theoretical tradition, but the formulation of theories is almost exclusively narrative rather than formalized. The sixth edition of Shoemaker's (2010) book illustrates the diversity of theories, essentially of sociological origin. However, in most cases, their designers do not present the possible developmental formulation of their theories; they do not specify the mechanisms that explain changes in the explanatory variables and how they produce changes in antisocial behavior.

There are theories suggesting a developmental perspective, for example, Lemert's (1951) theory of primary and secondary deviance, Sutherland's

(1947) differential association theory, and Cohen's (1955) subcultural theory. However, the developmental mechanisms are not stated, and these theories are rarely tested empirically with longitudinal data. No theory rests on current scientific understanding of the developmental changes in biological, psychological, and social domains that occur over the life course to explain changing patterns of antisocial behavior. In fact, theoretical criminology has not been really interested by developmental theories. Major textbooks do not have a chapter on developmental theories, and the word "development" is typically not listed in the subject index (Akers, 1994; Lilly, Cullen, & Ball, 1995, 2010; Tittle, 1995), even in the recent edition of Shoemaker (2010). In addition, there is no chapter on developmental theories in recent reviews of longitudinal research (e.g., Liberman, 2008; Benson, 2013). Even Thornberry's (1997) book on developmental theories reviews traditional theories and only explores their potential explanatory power for future antisocial behavior. The authors of the chapters in Thornberry's book defined the concepts of a theoretical domains and state propositions on their relations, but it is limited to some general developmental principles, without specifying the mechanisms of development or integrating theories within a discipline or between disciplines. For example, our chapter on a multilayered control theory devoted only ten of the seventy pages to the developmental perspective (Le Blanc, 1997a).

The great diversity of criminological theories is not synonymous of integrative theories, particularly inside of the socio-criminological realm. Within criminology, theoretical integration became a major concern in 1985 through Meier's collection of papers and Elliott et al.'s (1985) landmark empirical analysis. The concern was the relevance of a socio-criminological integration. The between-discipline theoretical and empirical integration was launched at the School of Criminology of the University of Montreal in the middle of the 1960 as a psychocultural and sociocultural explanation of delinquency (Szabo, Le Blanc, Deslauriers, & Gagné, 1968). One of the first tests of such integration was Le Blanc

et al. (1988) integrating the development of social control and personality. In this section, our comments concern primarily the between-discipline integrations.

Farrington and Ttofi (2015) review some of the empirical evidence on nine developmental theories. It is interesting to note that the course of antisocial behavior is viewed as composed of one dimension (Farrington, Lahey and Waldman, Sampson and Laub, Wikström) and a few trajectories (Le Blanc, Loeber, Moffit) or types of offenders (Catalano and Hawkins, Thornberry and Krohn). As for the explanation of the course of antisocial behavior, some developmental theories are mainly biopsychological (Lahey and Waldman, Moffit), some integrate socio-criminological theories (Catalano and Hawkins, Sampson and Laub, Thornberry and Krohn, Wikström), and some propose causal chains of multifactorial risk factors (Farrington, Loeber). Only one theory adds an integration of socio-criminological theories with psychological traits and theorizes on the course of personality and social control (Le Blanc).

Based on many theoretical and empirical integrations, we proposed a generic multilayered control theory (1997a) to perpetration of a crime, individual criminal activity, and the rate of criminality. It was a control theory in its literal meaning, which is “a mechanism used to regulate and guide the operation of a system.” It was argued that this definition of control was compatible with its meaning in biology, psychology, and sociology.

The formulation of the theory at the level of individual offending was “. . . conformity to conventional standards of behavior occurs and persists, on one hand, if an appropriate level of allocentrism (now self-control) exists and the bond to society is firm and, on the other hand, if constraints are appropriate and models of prosocial behavior are available. The personal and social regulation of conformity is conditioned by the biological capacity of the person and his position in the social structure” (pp. 228–229). Later, we formulated the developmental version of this theory. Six notions were introduced: biological capacity, position in the

social structure, bonding, self-control (or more broadly, personality), models, and constraints (Le Blanc, 2006). Based on the empirical research and our own empirical tests, the theory stated that models and constraints are proximal causes of the development of antisocial behavior, biological capacity and position in the social structure are distal causes, and bonds and self-control are intervening causes.

We reviewed the literature on developmental changes in self-control and social control (Le Blanc, 2006). First, we concluded that it was possible to build a complex measure of self-control that was common for different ages and for a representative sample and an adjudicated group of males (Morizot & Le Blanc, 2003a). This measure corresponds to well-known structural models of personality traits (Morizot, 2015). Second, we analyzed the course of self-control (personality traits) from adolescence to age 40 in our two samples, and we identified quantitative and qualitative changes in developmental trajectories (Morizot & Le Blanc, 2003a, 2003b, 2005). In conclusion, our data and the literature on psychological development suggest that there is ample knowledge on the quantitative and qualitative changes in self-control and that there is an emerging knowledge on the trajectories of self-control in the population and for groups with low self-control. In our theory, the psychological propensity mechanism for antisocial behavior is represented by the continuous interactions between the biological capacity, the changing biological environment, and self-control. This new proposition has to be tested.

After the formalization of Hirschi’s (1969) bonding theory (Le Blanc & Caplan, 1993), we proposed that the level of social control of an individual is manifested by his bonds to persons (attachment and commitment), the informal and formal constraints he faces (rules, discipline, and methods of education in family and at school, informal and formal social reactions and justice sanctions), and the models the person encounters (individual behavioral models around him and routine activities). After reviewing the state of knowledge on social control, we concluded that criminology has made considerable conceptual

efforts in defining and measuring social control constructs and studying their interactions with antisocial behaviors. However, this knowledge was insufficient about the quantitative changes and virtually nonexistent concerning qualitative changes and trajectories of social control over the life course.

In sum, developmental criminology has attained good theoretical and empirical maturity on two of its three fundamental notions, antisocial behavior and self-control. However, even if the conceptualization of social controls is mature, there is a need to rapidly advance our knowledge on the course of social controls and its trajectories. Only then will it be possible to empirically analyze the dynamical causal interactions between self-controls, social controls, and the growth of antisocial behavior across the life course. We also suggested that analytical methods to perform this task are available (Le Blanc, 2006).

Before testing a multidisciplinary integrative developmental theory, the tasks of developmental criminology are the following:

- Increasing empirical knowledge on the course of socio-criminological variables and the changes in structural, strain, subcultural, labeling, bonding, and other explanatory correlates from socio-criminological theories.
 - Advance our scientific knowledge on the developmental course of biological capacity (e.g., genetics), psychological structure (e.g., temperament and intelligence), and self-control in order to progress toward consensual concepts and measures and identify developmental mechanisms and trajectories in these constructs.
 - Test the bivariate interactions over time between pairs of meta-explanatory causes of antisocial behaviors, for example, between the changes in social structure and biological capacity and environment, the development of biological capacity, structural psychological conditions, and self-control; changes in the social structure and social control; and so on.
- Undertake additional tests of comprehensive multidisciplinary integrative theoretical models, such as ours, with modern methods of causal analysis.

Prevention and Treatment

Developmental criminology is the convergence of three paradigms: criminal career, life course, and individual growth. The criminal career paradigm devoted more attention to criminal justice and policy decisions and then the other two paradigms. The individual growth paradigm was dictating the content and targets of prevention and treatment programs, while the life-course paradigm put emphasized that these programs should be specific for different phases of the life course (i.e., before birth; during early, middle, and late childhood; early, middle, and late adolescence; youth; and maturity). Today, developmental criminologists consider risk, protective, promotive, or desistance factors as keys to the conception and implementation of successful prevention and treatment programs for any types of antisocial behavior within the tree paradigms.

Prevention

The antisocial behavior prevention literature is vast and innovative; however, only the prevention of crime has been the object of major synthesis. Lab's (2013) textbook is certainly the most comprehensive and up-to-date (see also Farrington, 2014b). In consequence, policy makers and community leaders have a vast choice of programs. They are classified according to five perspectives or a mix of them. First, classifications of preventive interventions propose a census of programs according to the distinction between primary (e.g., Kim, Gilman, & David Hawkins, 2015), secondary, and tertiary (e.g., Manchak & Cullen, 2015) preventions, to institutions such as school

(e.g., Payne & Welch, 2015; Kim et al., 2015), family (e.g., Pardini, Waller, & Hawes, 2015; Henggeler, 2015), and peers (Melde, 2015) or to age groups (e.g., Tremblay, 2015; Schindler & Black, 2015) or specific types of antisocial behavior and crimes. The second organization of programs, the empirical viewpoint, looks for scientifically confirmed risk factors and retains programs that potentially can limit their impact and reinforce protective factors. The Farrington (1992, 2014) and Hawkins, Catalano, and Miller (1992) reviews adopt such a pragmatic perspective. The third perspective prefers to conceive a program according to a theory of the causes of adolescent delinquency, for example, the Seattle Social Development Model (Catalano & Hawkins, 1996; Hawkins & Weis, 1985) or the Multilayered Integrative Control Theory of the Criminal Phenomenon of Le Blanc (1993), as pertinent ways to organize the spectrum of prevention programs. We proposed a fourth point of view based on offending meta-trajectories identified by developmental criminology and synthesized earlier in this paper (Le Blanc, 1995). As criminology turned the corner of the twenty-first century, criminologists recommended a fifth perspective. Policy makers should concentrate their efforts with evidence-based prevention programs (Office of Juvenile Justice and delinquency Prevention, 2014), particularly those that were experimental and evaluate with follow-ups of a significant length (Welsh & Farrington, 2006).

Each of these perspectives has limitations. General classifications of programs are instructive, but they include innovations that are either not evaluated or with evaluations that are less rigorous. The risk and protective factor perspective suffers from the impossibility to consider simultaneously the whole list of known factors. The theoretical point of view is restrained by the absence of very comprehensive integrative theories with biological, psychological, social, and contextual constructs. The difficulty with the evidence-based strategy is that there is very little scientifically rigorous experimentation of prevention programs. In addition, there is always a large time gap between theoretical and

empirical knowledge that supports the conception, implementation, and evaluation of a complex prevention program, sometimes 20 years or more. In addition, preventionists have acknowledged the difficulty to implement with integrity a program in another context, in another community or school.

These classifications and their component programs are not always truly developmental. They are only anchored to a specific age group even if the participants are followed up during subsequent periods of their life. Until now, prevention programming has been piecemeal. On the one hand, criminologists and practitioners conceive a program for a particular form of antisocial behavior and a specific age group according to their reading of the theoretical and empirical knowledge, and, at best, they evaluate that program. On the other hand, policy makers and community leaders choose a program, thinking about a specific form of antisocial behavior and an age group, for example, intuitively selecting among existing programs in the Model Programs Guide of the OJJDP list, or they mix various contents according to their interpretation of the causes of antisocial behavior. At best, they will apply the process proposed by Communities That Care to rationally select a planning of preventive interventions according to their reading of community needs (Hawkins, Catalano et al., 1992).

Three fundamental principles of developmental criminology need to be taken into consideration to prepare an authentic developmental prevention programming. First, change occurs as continuous process throughout life. In consequence, there are continuity and change in antisocial behavior and among RPPD factors within and between the phases of the life course. In addition, antisocial behaviors and their RPPD factors are heterotypic phenomenon. For example, conflict with teachers may become conflict with the boss after compulsory schooling. As a risk factor, a tenuous bonding to parents may be with the mother during early childhood and with the father during early adolescence, while bonding with a prosocial girlfriend may be a desistance factor only during youth. In consequence, a

particular age-specific efficient prevention programming may be insufficient for a long-term reduction of antisocial behavior. The persistent offending trajectory calls for prevention programs with different targets at each period of the life course because it appears during childhood, grows during adolescence, continues after adolescence, and declines during maturity.

Second, all forms of antisocial behavior are developmentally interconnected, and their courses result into three meta-trajectories: common, transitory, and persistent antisocial behavior. These meta-trajectories are also imbedded into each other. For example, a transitory delinquent was probably a common delinquent earlier on. A persistent delinquent probably seems like a common offender at onset, and after, like a transitory delinquent before becoming persistent. Thus, communities need to implement simultaneously embedded sequential prevention programs with an attention to specific types of antisocial behaviors at certain phases of the life course. For example, aggressive behavior may be a priority during early childhood and drug use during late childhood, while gang affiliation becomes essential for adolescents.

Third, continuity and changes are also observable and interconnected in the biological, psychological, interpersonal, social, and community levels. The parental biological heritage of an individual may be the most distal set of RPPD factors for adolescent antisocial behavior. However, there is a continuous and changing biological environment at every age that needs attention because it may become a risk factor (pollutions, contaminations, sleeping and eating habits, substance use, etc.). In consequence, planning the prevention of antisocial behavior in a community has to involve continuity, content has to be offered for each generation, and it should be adapted to the phases of the life course. For example, a parenting universal preventive intervention should be offered to parents at all ages in a community, from birth to the end of youth, with particularities for each age group. Multiage effective programs are available, for example, for parenting (Webster-Stratton, 2000) and social skills in the A.P. Goldstein tradition

(McGinnis, 2012a, b; McGinnis, Sprafkin, Gershaw, & Klein, 2012).

In parallel to such universal programs, there should be complementary selective programs for poor families, families with low-birth-weight baby, single and young mothers (Bernazzani & Tremblay, 2006; Piquero & Jennings, 2012), and antisocial parents with drug and alcohol problems or involvement with the justice system as well as for disorganized families. Children social skills' training programs are available, and there are age-specific applications with effective results (Lösel & Beelman, 2006; Lösel & Bender, 2012). There are multiple programs to prevent antisocial behavior during preschool years (Schindler & Yoshikawa, 2012) and in school (Gottfredson, 2001; Gottfredson, Cook, & Na, 2012), peer antisocial influence (Rosenbaum & Schuck, 2012), gang prevention (Howell, 2010), and drug use prevention (Fagan & Hawkins, 2012). Recent textbooks also list numerous programs, for example, Lab (2013), Mackey and Levan (2013), and Welsh and Farrington (2012). Many chapters of this book list indicated prevention programs.

We reviewed the question of detection for prevention (Le Blanc, 1998), its strategies, instruments, and ethical issues. Binet and Simon (1907) were the first to screen for antisocial children at risk of becoming criminal later through four criteria: being delayed in their schooling, two teachers indicated much disobedience in class, poor achievement, and low intelligence. Glueck and Glueck (1966) took the relay with family variables. Today, selective and indicated prevention programs use a multistage strategy with multiple informants, with multiple methods, and in multiple settings. Selective or secondary prevention looks for basic structural risk factors, such as poverty, teenage motherhood, or others, or they are nourished by the failures of universal programs. The screening of validity and ethicality comes from the robustness of the chosen criteria in the empirical literature. Indicated or tertiary prevention is nourished by the failures of secondary prevention and complex and rigorous multistage detection operations in a community. The question of screening for

prevention is different from the decision-making and the clinical evaluation in the social services and the adolescent and adult justice systems (Le Blanc, 1998, 2002; Hoge, Vincent, & Guy, 2012).

Let us outline the themes of an individual age-graded prevention programming in a socioeconomically diverse community with a normative prevalence of the three antisocial behavior trajectories. Let us also assume that the best practices are being implemented in the community after an assessment and a partnership effort. In addition to the individual prevention programming, the community is or has implemented programs concerning the physical environment, the necessary neighborhood crime reduction programs and other antisocial behavior prevention measures, the application of situational prevention technologies, and the revision of general deterrence (Lab, 2013). The goal of the community is to implement and maintain a comprehensive age-graded developmental programming. Table 32.1 outlines the themes of a general thematic framework for (1) universal, (2) selective, and (3) indicated programs. It is an unfinished sketch. The themes of the programming could be associated to specific programs proposed under six headings: (1) health; (2) parenting; (3) social skills; (4) preschool, school, and work; (5) peers and routine activities; and (6) child welfare, justice, and correction. For each of these targets, universal, selective, and indicative programming themes are listed.

In sum, the list of RPPD and causal factors of common, transitory, and persistent antisocial leaves no doubt about the first conclusion that criminologists and decision-makers must reach: No factor is a necessary and sufficient cause of the development of antisocial behavior. It is therefore pointless to seek a panacea in the field of prevention. The search for a panacea must be ruled out because successful programs, among those that are strictly evaluated, offer only mixed results. Given that each preventive program addresses only a limited number of factors, not one of them, therefore, is adequate, but some may be more useful and even necessary in a comprehensive programming for the prevention

of antisocial behavior. Faced with such a complex situation and given the relative ineffectiveness of known prevention programs, two attitudes are appropriate for decision-makers and community leaders.

The first option, waiting for the program's effectiveness to be clearly demonstrated, may be a very lengthy process. It is also ethically questionable, at least from a clinical point of view. The second option is to act now, according to the following rationale. If all programs offer mixed effectiveness, perhaps, combining programs in a focused strategy will produce better results in preventing common, transitory, or persistent antisocial behavior. We call this attitude the comprehensive, integrated, differential, and sequential approach to the prevention of antisocial behavior. It is comprehensive because it requires simultaneous action on many risk factors and casual processes. It is integrated because it implies not only universal and specific preventive programs but also concerted efforts of various disciplines, governmental agencies, professionals, and volunteer workers in each community. This approach is differential because, rather than lumping all trajectories of antisocial behavior together, it specifies particular programming for the common, transitory, and persistent trajectories, respectively, universal, selective, and indicated programs. This approach is sequential because it requires a multistage detection procedure; it blends universal, selective, and indicated programs; and it specified particular programs for specific age groups: infants; early, middle, and late childhood and adolescence; and youth. It should be stated, however, that even with a comprehensive, integrated, differential, and sequential programming, it is illusory to believe that preventing all antisocial behavior will be possible someday. That ultimate goal cannot be attained because there will always be RPPD factors appearing randomly or when least expected during the life course. Notwithstanding these comments, there are promising complex programming that should be implemented and evaluated:

- Prevention programming in a community should rest on the basic principles of

Table 32.1 Themes of a developmental, age-graded comprehensive prevention programming

Type of prevention	Target of prevention					
	Health	Parenting	Social skills	Preschool school work	Peer routine activities	Child welfare justice correction
Infancy						
Universal	Home visiting	Response options to situation				
Selective	Low birth weight	Communication problem-solving discipline	Language deficiencies			
Indicated	Special needs: illnesses, handicaps, etc.	Therapy with antisocial disorganized abusive families	Early aggressive behavior impulsivity hyperactive			In-home child welfare agency justice
Childhood						
Universal	Free medical	Booster-specific childhood parental skills	Interaction skills with peers Bullying violence prevention	Skills day care workers and teachers Universal day care Preparing school School climate	Recreation Numeric games After-school programs for working parents	More intensive child welfare or justice exceptional out of home placement
Selective	Free annual examination	Booster advanced skills	More intensive low IQ low self-control	Low IQ, low self-control Academic difficulties	Recreation Numeric games After-school programs for working parents Selection of peers	In-home child welfare agency justice
Indicated	Special physical and mental needs	Therapy with antisocial disorganized abusive families	Coaching low IQ Low self-control Bullies' antisocial behaviors	Aggression bullies Intervention academic difficulties Special programs for potential dropouts	Gang prevention	More intensive child welfare or justice Residential placement
Adolescence						
Universal	Sexuality, eating, sleeping, drugs, exercises	Booster-specific adolescence parental skills	Social skills programs in school plus life skills	After high school	Relation with opposite sex peers	
Selective	Sexuality, eating, sleeping, drugs, exercises	Early-onset antisocial behavior parental coaching	Social skills programs in school plus life skills transitory antisocial trajectory	Programs for potential dropouts Preparation for work School and work	Relation with opposite sex and peers Gang prevention	Child welfare Alternative measures to justice Community correction

(continued)

Table 32.1 (continued)

Type of prevention	Target of prevention			Preschool school work	Peer routine activities	Child welfare justice correction
	Health	Parenting	Social skills			
Indicated (<i>transitory and persistent trajectories</i>)	Special physical and mental needs	Therapy with antisocial disorganized abusive families	Specialized coaching low IQ Low self-control Persistent antisocial trajectory	Programs for potential dropouts Preparation for work School and work	Relation with opposite sex peers Gang prevention Guns	Alternative measures to justice correction Community correction Residential treatment
	Youth					
Universal	Sexuality, eating, sleeping, drugs, exercises	Marital relations Becoming parents	Life and marital skills	Work skills		Deterrence Substances and driving
Selective	Sexuality, eating, sleeping, drugs, exercises'	Young, single, poor mothers and parenting	Life and marital skills	Work skills Special programs for integrating the work market	Gang prevention Guns	Alternative measures to justice correction Community correction
Indicated (<i>transitory and persistent trajectories</i>)	Special physical and mental needs	Therapy with antisocial disorganized abusive families	Life and marital skills	Work skills Special programs for integrating the work market	Guns High crime places Criminal organization	Community correction Residential treatment

developmental criminology: Change occurs as a continuous process throughout life; antisocial behaviors are developmentally interconnected; and continuity and changes are heterotypic, observable, and interconnected in the biological, psychological, interpersonal, social, and community levels.

- The prevention of antisocial behavior must be comprehensive, integrated, differential, sequential, and age graded.
- A group of policy makers, preventionists, and developmental researchers should be in Table 32.1 and add specific programs classified according to the quality of empirical evidence of their effectiveness.
- From a clinical practice point of view, all meta-analyses show results in favor of cognitive-behavioral treatments that are based on Bandura's (1976) social learning theory. It is also the case for prevention of

antisocial behavior in general (Los el, 2001) and in school in particular (Wilson, Gottfredson, & Najaka, 2001).

Treatment

Evaluation of treatment efficacy was initially rather crude. The success of a treatment was assessed by the absence of official recidivism for a rather short period of time, a year or two for instance. Later on, most evaluations adopted the before-after design, and some added a control group using various criminal career measures. Later, personality and social integration measures were sometimes included in the evaluation design.

The result of the Lipton, Martinson, and Wilks (1974) synthesis of 283 studies was interpreted as "nothing works" by Martinson (1974). He later

attenuated this extreme conclusion, but it was too late because it had a dramatic “demonization effect” on correctional treatment. Criminology had to wait for the landmark meta-analysis of more than 450 evaluations by Lipsey (1989) for a more precise portrait of the efficacy of treatments for offenders. This meta-analysis launched a new era of “what works?” (Losël, 2012). A significant effect of treatment is an average 10 % reduction of recidivism over the control group, and the best programs can attain 40 %, whether it is implemented in the community or in residential setting. Treatment programs also improve results on measures of personality characteristics and social integration (Le Blanc, 1987; Lipsey, 1995). The impact of the treatment depends on the characteristics of the participants, the selection, the quality of its implementation and administration, its duration (at least 1 year is needed according to the analyses of Le Blanc, 1987), and the support after the treatment or aftercare (Lipsey, 2009; Le Blanc, 1987).

It is now clear, from a review of studies and meta-analysis by Layton-MacKenzie (2006), those cognitive behavioral programs are the most effective (see also Lipsey & Wilson, 1998, concerning serious juvenile delinquents). Treatments should be multicomponents and provide the following: (a) learning of social and life skills; (b) an educational, vocational, or work component; (c) a cognitive-behavioral therapy (behavioral contract and cognitive restructuring); (d) a drug use regulation activity; and (e) an aftercare and relapse prevention component. It should be noted that a residential milieu should be psychoeducational and provides the following: (a) specific training for educators and youth care workers, (b) a particular physical and social organization into a therapeutic milieu with a democratic participation of the adolescents, and (c) a multicomponent activity program (individualized schooling in the morning; in the afternoon, physical activity every day; and a particular sport each season—football,

hockey, etc., cultural activities: theater, politics, etc.) (Finckenauer, 1984; Le Blanc, 1987; Stein, 1995; Le Blanc & Trudeau-Le Blanc, 2014). Our analysis of a psychoeducational residential milieu suggests it can reduce recidivism by 30 %, if after selection, maturation, implementation, and condition of social reintegration effects are controlled for (Le Blanc, 1987). Manchak and Cullen (2015) review the existing knowledge on residential and correctional treatment for adolescents.

In sum, there is a long and rigorous tradition of short-term longitudinal research in correction treatment. However, programs are generally limited to one or a few years, and the follow-up rarely spans beyond a few years. In their research design, developmental criminologists did not include a special sample of participants in a treatment program, as we did in the MTSTGLSM for a psychoeducational program with a follow-up for 25 years. In consequence, program evaluators are not able to assess the impact of maturation in the evaluation of treatment effectiveness, an important confounding effect according to Campbell and Stanley (1966). In addition, treatment evaluations have not considered the differential effects of programs on different trajectories of offending. Can a particular cognitive-behavioral treatment program be more effective with transitory or persistent offenders? Finally, because the lists of risk factors of onset and continuation are different and because knowledge on desistance factors was largely developed during the last 15 years, the content of treatment programs should be updated, and the criteria program effectiveness should concentrate more on changes in these factors. The challenges are the following:

- Developmental criminologists should consider embedding within their longitudinal studies samples of participants under treatment in order to evaluate the impact of the normative maturation on the treatment efficacy.

- The potential efficacy of treatment programs should be evaluated by distinguishing individuals following transitory and persistent trajectories. A better understanding of the potential differential effects may help improve future treatment programs.
- Treatment programs should adapt their content and efficacy criteria to the existing new scientific knowledge on desistance factors.

Conclusion

The life of developmental criminology spans over 200 years. The criminal career, life course, and individual growth paradigms have merged to form this new perspective in criminology and behavioral sciences. However, there are still many steps ahead. Longitudinal research design has attained maturity but can still be refined. Developmental criminologists should study the development of all forms of antisocial behavior, not only delinquency and crime. The empirical knowledge on risk, protective, promotive, or desistance factors is extremely rich and diversified. However, there is still much to do to synthesize and integrate all the RPPD factors into a grand developmental theory. Scientific knowledge on the development of antisocial behavior as started to inform prevention and treatment practices, but it is still insufficient. I hope that the ideas and suggestions in this epilogue will help the advancement of developmental criminology.

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