

Chapter 11

An Integrated Prevention Science Model: A Conceptual Foundation for Prevention Research

Hanno Petras and Zili Sloboda

Introduction

Prevention science is transdisciplinary that includes the broad domains of epidemiology, intervention development and implementation, and research design and statistical methods (see Fig. 11.1). Prevention science is characterized by complex feedback loops between research and practice (Coie et al., 1993). The objective of prevention science is to test theory-based hypotheses toward enhancing or refining the process that makes individuals' engagement in healthy and non-risky behaviors more likely (Biglan et al., 2011). These theories explain the mechanisms of the prevention process related to specifying intervention targets, identifying preventive activities to address the targets, and determining the most appropriate design, measurements, and analyses to evaluate the process.

Importantly, intervention efforts are commonly challenged by individual and group differences across both time and place affecting readiness to respond to and benefit from the intervention. These differences are the consequence of individual vulnerability for negative and unhealthy behaviors. Vulnerability may be the result of failure to achieve appropriate developmental benchmarks that impede healthy decision-making in stressful or risky situations. As such, one may be at risk at any time over the life course. In addition to differences in the developmental stages with respect to vulnerability, it is also widely acknowledged that individuals are embedded in more proximal and distal ecological domains (e.g., the family, school, peer network, community), which indicate that the success of prevention efforts is also moderated by environmental features. Finally, prevention views individuals from a

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H. Petras (✉)

JBS International, Inc., 5515 Security Lane, Suite 800, North Bethesda, MD 20852-5007,
USA

e-mail: hpetras@jbsinternational.com

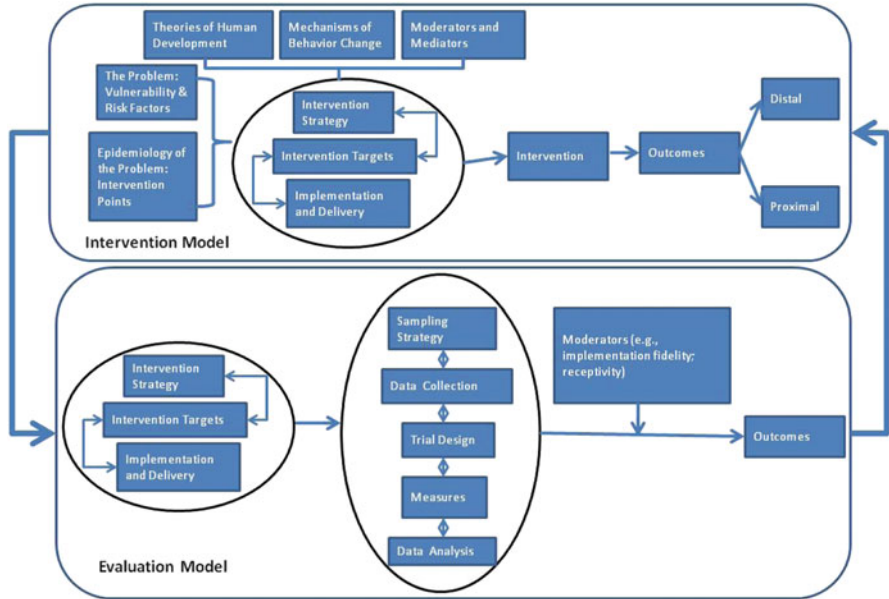


Fig. 11.1 Prevention science cycle

human agency perspective, that is, individuals are not just influenced by environmental toxins, but importantly interact with the environment based on their motivation, intentions, and self-efficacy.

Prevention Science Past and Future

The etiological and preventive knowledge that has been accumulated over the last 30 years was made possible through parallel and cross-cutting research that has striven to determine the causal pathways to mental, emotional, and behavioral (MEB) disorders. As prevention is central to a public health framework, it has guided early prevention research efforts. This framework, based on an infectious disease model, arrays interventions that address the risk statuses within a population—those who are at risk for or susceptible to infection (primary), those who experience the early signs and symptoms of infection (secondary), and those who already have the infection (tertiary). Within this framework, prevention efforts focus on the three legs of prevention—the host, the agent, and the environment (Haddon, 1972). Prevention efforts then would “immunize” or “inoculate” the host or susceptible groups, eliminate the source of the infection (virus or bacteria), or implement environmental modification to make the physical and social environment less suitable for the agent. Indeed, early prevention efforts, particularly those designed for substance use prevention, attempted to “inoculate” young adolescents against the initiation of substance use, particularly tobacco use (Evans et al., 1978).

The longitudinal research required to provide insights into risk factors associated with many MEB disorders was not available until the early to mid-1970s. The findings from this research resulted in two major research efforts that, although related, have different implications. The first effort relies heavily on risk and indicators of risk (i.e., determining the characteristics that differentiate those who go on to having an MEB disorder from those who do not), in many instances controlling for age, race/ethnicity, gender, and other environmental conditions (Hawkins, Catalano, & Miller, 1992). The other train of research examines populations that are considered vulnerable for a variety of reasons or circumstances such as loss of one or two parents or family members, war, natural disasters, and/or other environmental disorganization (Werner, 1989).

It should be noted that none of these groups negates the importance of the other, but each suggests that its perspective has different implications for prevention. The first has dominated and inspired the Institute of Medicine (IOM) (Mrazek & Haggerty, 1994) to advance a new risk-based rubric for prevention programming. This rubric includes universal prevention strategies that target full populations and that evidence some benefits for all outweighing any iatrogenic risks of negative consequences; selective prevention strategies that target subpopulations or groups that are potentially at elevated risk for a disorder but that do not exhibit signs or behaviors associated with the disorder; and, finally, indicated prevention strategies that target those subpopulations that are assessed at elevated risk for a disorder but that do not evidence any associated symptoms of the disorder. The second approach has had less traction in the field but has advanced programs that enhance protective or resiliency particularly among those most at risk. These programs have been shown to have an impact, particularly in life skills development that promotes bonding to family and prosocial groups and to social, emotional, cognitive, behavioral, and moral competence; foster self-determination; and so forth (see Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004; Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002).

Two landmark publications by Hawkins and colleagues (1992) and Glantz and Pickens (1992) are representative of the risk factor approach. Hawkins and colleagues (1992) reviewed and summarized risk factors “evidence” from both epidemiologic and intervention research studies reported in the literature. They divided these risk factors into two categories: those that are related to society and culture or contextual factors and those that pertain to the individual and his/her intrapersonal environment. The contextual factors include laws and norms favorable to substance use behaviors, factors related to availability, those related to extreme economic deprivation, and those related to neighborhood disorganization. The individual and intrapersonal factors include physiological issues, family history of substance use and attitudes toward substance use, poor/inconsistent family management, family conflict, low family bonding, early/persistent problem behaviors, academic failure, low commitment to school, peer rejection during elementary grades, association with substance-using peers, alienation and rebelliousness, and early onset of drug (substance) use. In this same article, the concept of protective factors associated with substance use is presented and includes such

items as parental attachment and conventionality (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Hawkins et al., 1992), although the authors point out that there was a dearth of research on protective factors at that time. While the work of Hawkins and colleagues addresses substance use and to some extent substance abuse, Glantz and Pickens (1992) were more concerned about factors related to substance abuse or substance use disorders with a focus on intrapersonal or biological, psychological, and psychiatric mechanisms.

Interest in protective factors that serve to differentiate those who share similar vulnerabilities but who experience differing MEB disorder trajectories is well represented in the works of researchers such as Garmezzy (1985), Garmezzy (1991), Masten and colleagues (1990), Redmond et al. (2009), Rutter (1985), Rutter et al., (1997), and Werner (1989) who examined protection or resiliency. These researchers define resiliency as a process, capacity, or successful adaption within difficult, challenging, or threatening situations and resiliency factors as those characteristics or processes that play a role in mediating or moderating the effects of exposure to risk.

As important as the concept of risk and protective factors has been to the progress made in prevention programming, few attempted to determine if these factors group into meaningful clusters (Sloboda, Glantz, & Tarter, 2012) or whether they elucidate the actual relationship to MEB disorders per se (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Lacourse et al., 2002). We do know that these risk factors likely represent indicators of other underlying mechanisms that have not been sufficiently explored. For instance, those risk factors that represent individual or intrapersonal risk factors mostly capture constitutional (biopsychological) characteristics such as low IQ, hyperactivity, and concentration problems that likely have developmental and neurobiological origins (Glantz & Pickens, 1992; Hawkins et al., 1992). In addition, behavioral and attitudinal elements such as antisocial behavior, beliefs, and attitudes regarding drug use are also represented as individual/peer risk factors. These are independent factors within the Hawkins individual/peer domain, but the bidirectional influences are obvious. The other risk factor domains (family, school, and community) capture aspects that impede positive socialization experiences due to challenged socialization agents or intrapersonal mechanisms that hinder socialization, such as family conflict, academic failure, failure to attach and commit to prosocial organizations, and low neighborhood attachment, that act as stressors on individual and family performance. The concepts of risk and protection and resiliency suggest the notion of vulnerability, being susceptible or predisposed, or being at risk (i.e., making poor decisions about the level of risk for engagement in a behavior that may have negative social or health outcomes). Furthermore, the findings from this research across MEB disorders generally indicate that, unlike most infectious diseases, these disorders have multiple precursors that often follow different paths or trajectories across the lifespan, thus differing dramatically in outcomes and complexity (Herrenkohl et al., 2000; Jessor & Jessor, 1977).

The IOM 2009 report (O'Connell, Boat, & Warner, 2009) refers to the definition of competence of Masten, Burt, and Coatsworth (2006) that considers competence a "family of constructs" that reflect a capacity for achieving age-salient effective

adaptive outcomes within the individuals' cultural and historical context. Kellam and colleagues (1975) lay these competencies out along a life-course perspective showing the adaptive tasks required within different social fields including the family, school, peers, community, and work settings. The achievement in competencies early in the life course serves to improve the achievement of competencies later in life.

Although the concept of vulnerability has gained more attention in recent years (O'Connell et al., 2009), the field has not developed a standard definition or set of measures for the concept (Cicchetti & Blender, 2006). In general, the concept encompasses the attainment of age-related competencies. More attention is being given to the development of benchmarks for these competencies (see chapters in this book by Graber, Hill, & Saczawa, 2013; Kim-Spoon & Farley, 2013; Rauh & Bergmann, 2013; Rebok, Parisi, & Kueider, 2013).

Etiologic Theories and Socialization

The fact that many risk and unhealthy behaviors are associated with multiple factors has led to the development and application of a variety of etiologic theories, which are often complementary, but nevertheless exist in parallel universes. Depending on the researcher's discipline (e.g., sociology, psychology, biology), different pieces of the puzzle are investigated using different constructs, measurements, samples, and analytic methods. For example, Petraitis, Flay, and Miller (1995) identified 14 different multivariate theories explaining early stage substance use emphasizing cognitions, social learning processes, commitment to prosocial values, and institutions as well as intrapersonal processes. In concert with a lack of comparison and integration of these existing theories, the guidance for the analysis of etiological data and for the design of preventive interventions has been challenged and their international applicability is unknown (Catalano et al., 2012).

To this end, Oetting and colleagues (Oetting, Deffenbacher, & Donnermeyer, 1998; Oetting & Donnermeyer, 1998; Oetting, Donnermeyer, & Deffenbacher, 1998; Oetting, Donnermeyer, Trimble, & Beauvais, 1998) proposed primary socialization theory as an integrated theory for prevention science. There are many definitions of socialization available. The common theme to all of them is that socialization represents a social and psychological interactive process between the individual and primary (and secondary) socialization sources. The focus of this process is on the internalization of societal goals, normative behaviors and cues, values associated with these behaviors, and roles and responsibilities as members of a society. In any society, certain primary socialization agents are responsible for the individual's internalization societal goals, norms, and values. In Western societies and most likely in other societies as well, these agents are usually the family, the school, and the peer clusters (see Fig. 11.2). Recent research has argued that the foundation of these foci is communicated during the early socialization phase through parent-child interactions in five distinct domains, including protection,

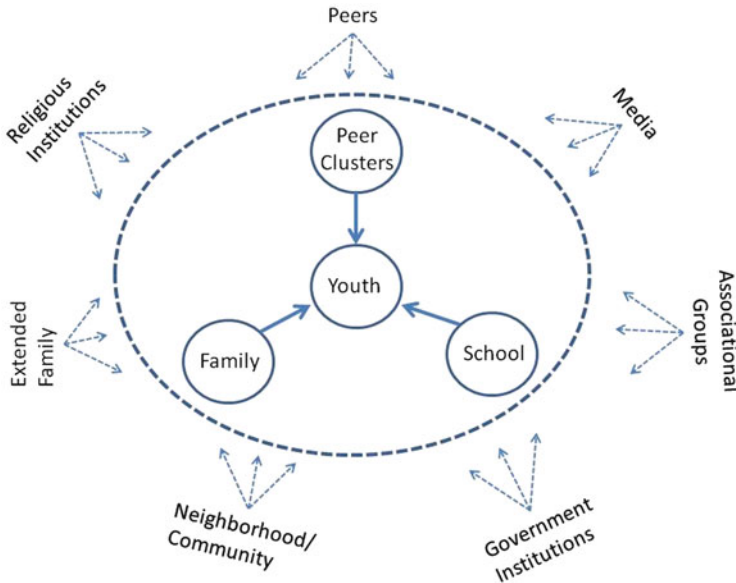


Fig. 11.2 Primary and secondary socialization agents (Leukefeld & Leukefeld, 1999, modified)

mutual reciprocity, control, guided learning, and group participation (Grusec & Davidov, 2010). Internalization of these foci occurs through the provision of positive and negative sanctions depending on whether these requirements are met. It is important to recognize that the socialization process is bidirectional in that individuals are active agents in the process (Kuczynski, 2003). Specifically, individuals differ in their biological preparedness to be socialized and to process relevant information. For example, individuals may have deficiencies in executive functioning and other cognitive impairments, which may make the communication and internalization process more taxing. For example, there is considerable empirical (Jensen, Martin, & Cantwell, 1997; Lahey, McBurnett, & Loeber, 2000; Satterfield & Schell, 1997) and theoretical (e.g., Loeber et al., 1993; Moffitt, 1993; Patterson, DeBaryshe, & Ramsey, 1989) evidence linking ADHD and concentration problems to such socialization challenges. Patterson, Reid, and Dishion (1992) present a good example for this interactive process. They argue that individuals who experience early childhood impairment (i.e., neurological deficits such as attention problems and social problems such as coercive parenting, peer rejection, and school failure) are set on a trajectory characterized by high levels of physical aggression beginning in early childhood and continuing throughout development, resulting in criminal and violent behavior in adolescence and adulthood.

Importantly, weak bonds to socialization agents hinder the communication of societal norms, decrease the individual's commitment to prosocial institutions, and increase the likelihood to interact with deviant peers. All of these processes are recognized risk factors for engaging in deviant and unhealthy behaviors. However,

as suggested by Oetting (1999), risk and protective factors should be organized according to their influence on the primary socialization process and in particular with respect to the extent that they hinder social bonding or prevent the communication of prosocial norms.

The socialization process, the number and types of socialization agents involved, and the roles of the socialization agents themselves change depending on the age and competencies of the individual, with the role changing from one that is directive to one that is more supportive as discussed above. Primary socialization agents generally include the mother or caregiver and the extended family. Secondary socialization agents include school staff and policies, peers, church-related individuals and doctrine, community members and regulations, work-related colleagues and policies, media content, and societal laws. Importantly, while individuals initially (infancy through young adulthood) do not interact with these secondary socialization agents directly, they become over their life course more exposed to and influenced by them.

Socialization and Decision-Making

While some theories view deviant behavior as the result of a rational evaluation process in which costs and benefits of the involved behavior are weighted (Ajzen, 1988; Janz & Becker, 1984; Rogers, 1983), primary socialization theory argues that behaviors, attitudes, and beliefs emerge concurrently from the individual's interaction with the primary and later secondary socialization sources. In other words, while deviant and unhealthy behaviors are learned through active and observational learning, the cognitive representation of the social interaction with socialization agents is the ultimate determinant of individual behavior (Guerra, Nucci, & Huesmann, 1994). Consequently, optimal socialization leads to informed decisions regarding acceptable behaviors when confronted with verbal, behavioral, emotional, and environmental cues.

We have focused on primary socialization given its documented importance for an individual to acquire the fundamental beliefs and knowledge to behave according to a society's culture. While it is recognized that socialization is a lifelong process, also other processes exist that contribute to the individual's attitudes, beliefs, and knowledge with respect to decision-making. In a recent publication, Israelashvili (2012) took on the task to propose a conceptual differentiation between related concepts (i.e., adjustment, adaptation, coping, and socialization). While it is beyond this chapter to discuss these concepts further, the first three concepts address situations in which the individual does not have access to optimal cognitive schemata and a renegotiation process between environmental demands and individual abilities and knowledge is set into motion. This may lead to changes in attitudes and beliefs, increases in the behavioral repertoire, and changes in preferred responses to environmental demands.

Integrating over several behavior change models (i.e., Social Information Processing Theory, Social Learning Theory, and Integrated Behavioral Model), the conceptual underpinning of the decision-making process highlights the strong interaction of biological, psychological, and socio-structural factors that inform how decisions are made and acted on. Major components of the behavioral decision-making process include verbal, behavioral, emotional, and environmental cues and draw on learned repertoires of behaviors. The process itself consists of encoding and evaluating environmental cues and selecting from individually stored behaviors to determine which behavior is the most efficacious to achieve the desired and goal-consistent outcomes (Crick & Dodge, 1994; Lemerise & Arsenio, 2000).

Social Representation of Cues

Social cues are at the core of the decision-making process. Social Information Processing Theory (SIPT; Crick & Dodge, 1994; Dodge & Crick, 1990; Lemerise & Arsenio, 2000) helps explain how social cues prompt behavioral decisions. Social cues may be verbal or behavioral themselves, but cues may also originate from the environment in terms of affordances (Gibson, 1979). These cues may trigger an array of potential behaviors that form a repertoire from which individuals draw those felt to be most appropriate. The selection process is not always spontaneous or reflective and is complex. SIPT hypothesizes that a behavioral response is based on a process involving the above-described activities. As an example, imagine a child is verbally attacked by a classmate and the child needs to classify the event (i.e., attention, encoding) and determine why it happened (i.e., attribution of cause). The child then needs to clarify the goals appropriate for this situation. For example, he/she could maintain a friendly relationship with the classmate or express that the behavior is not tolerated. Finally, the child generates possible responses for the situation and evaluates them in terms of anticipated outcomes, relations to goal(s), and skills or efficacy for enacting the response. The child may consider responding by physically attacking the other student but ultimately will reject this response to prevent the situation from escalating or out of fear that he/she lacks the appropriate physical strength (lack of efficacy) in an assault on the classmate. While earlier SIPT models assumed the process developed sequentially, it is now believed that the different stages of information processing may occur in parallel fashion with the opportunity for several feedback loops.

Given that individuals in complex societies are exposed to a multitude of social cues prompting a behavioral response on a daily basis, most do not execute the complete information processing cycle but rather apply cognitive models of relationships drawing on cues experienced in the past and memories of the outcomes of particular expressed behavioral responses. Familiar situations often prompt quasi-automatic or habitual behavioral responses. While this approach is efficient, it can result in judgment and reasoning errors depending on the generality and quality of the individual's social knowledge and behavioral repertoire. Finally, in addition to

behaviors based on social knowledge as well as active processing, individuals may apply preemptive or script-based processing, which is rapid, automatic, and nonrational in situations that are highly emotionally arousing (e.g., religious or spiritual in nature, interpersonal relationships, matters of great importance or value). Evidence exists to suggest that individuals with low self-regulatory ability apply a preemptive processing style more frequently.

Emotionality and the Decision-Making Process

Standard models of decision-making have typically focused on the effortful, intense-processing, and affectively neutral decision-making process (Chang & Sanfey, 2008) despite the accumulating evidence of the existence of a dual-process model (Poldrack & Packard, 2003). Building on the SIPT model (Crick & Dodge, 1994), Lerner and Arsenio (2000) extended SIPT to integrate affect and cognition. They argue that individuals differ not only in their level of biological competencies and database of past experience but also in their emotional style and regulatory abilities, both of which influence the processing of social/emotional information and decision-making in stressful situations. Damasio (1994) has argued that affect may increase the efficiency of the information processing and decision-making process by attaching somatic markers to specific behaviors or cognitions. If a person is confronted with a similar situation, these somatic markers will narrow or reduce the array of possible alternatives and thus will lead to increases in efficiency. Importantly, experiences are important for fine-tuning the impact of affect on the processing and decision-making process (Damasio, 1994). However, individual variations in temperament and emotion regulation are important moderators influencing the extent to which this will introduce any biases.

Developmental Aspects of the Decision-Making Process

The quality of the decision-making process depends on the individual's quality of cognitive skills (e.g., experiential knowledge, attentional abilities, and mental organizational skills) and the ability to process information and social cues, all of which evolve developmentally over time.

Children's earliest interactions occur in the family before they reach school. They may encounter risk when they experience interaction with parents or caregivers who fail to nurture and have ineffective parenting skills in a chaotic family setting or the caregiver is a substance abuser or a person with mental illness. Sufficient evidence is available showing that the consequences of mothers' intake of alcohol, nicotine, and drugs during pregnancy negatively affect developing fetuses. Such deficiencies impede reaching significant developmental competencies and make a child vulnerable and at risk for negative behaviors later on. By age 2 or

3, children begin manifesting disruptive behaviors and temper tantrums, are disobedient, or demonstrate destructive behaviors. If not properly addressed, these personality traits and behaviors can become problematic later in life.

During middle childhood, increasingly more time is spent away from the family most often in school and with same-age peers. Therefore, competencies developed during infancy and early childhood will greatly influence the extent to which the school-age child will cope and bond with school and prosocial attitudes and their involvement in prosocial activities. Mental disorders that have their onset during this period, such as anxiety disorders, impulse control disorder, and conduct disorders, may also impede the development of healthy attachment to school, cooperative play with peers, adaptive learning, and self-regulation. Children of dysfunctional families often affiliate at this time with deviant peers, thus putting themselves at risk for negative life choices, including drug use, alcohol misuse, and involvement in illegal activities.

Adolescence is a developmental period when the youth are exposed to new ideas and behaviors through increased associations with people and organizations beyond those experienced in childhood and is a time to “try out” adult roles and responsibilities. The desire to assume adult roles and more independence at a time when significant changes are occurring in the adolescent brain also creates a potentially opportune time for poorly thought-out decisions and involvement in potentially harmful behaviors, such as risky sexual behaviors, smoking and drinking, risky driving behaviors, and illicit drug use.

Determinants of the Decision-Making Process

Asserting that behavioral intentions are the best determinants for behavior, the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980), the Theory of Planned Behavior (TPB; Ajzen, 1991), and the Integrated Behavioral Model (IBM; Fishbein, 2000, 2008) argue that intentions are influenced by attitudes toward performing a behavior, norms associated with the behavior, and perceived control over the performance of the behavior considering other situational factors. The individual’s attitudes toward a particular behavior are influenced by the attributed consequences of that behavior, which are weighted by positive or negative evaluations of that outcome. Normative beliefs or perceptions of the frequency by which parents, friends, and peers are likely to perform the particular behavior tap into perceptions of social normative pressures in favor or against the behavior. Returning to the exemplar child mentioned above who had been attacked by a classmate, norms and beliefs are hypothesized to influence every step of the decision-making process. The likelihood of the individual responding with violence will depend on his or her evaluation of consequences for such a response, the standards for conflict resolution in his/her context, the extent to which teachers, peers, and parents will approve of a particular response, and the extent to which such approval matters to the individual. The last concept that will influence the

intentions to perform the behavior as well as the behavior itself is represented by the individual's perceived control over the performance of the behavior. This concept is similar to Bandura's (1997) self-efficacy construct that includes perceived amount of control over and confidence in the performance of a behavior.

Complementary to TRA and TRB, Social Learning Theories (SLT; Bandura, 1977) explain human behavior as a reciprocal interaction among cognitive, behavioral, and environmental determinants. SLT emphasizes that positive behavior is modeled by observing and imitating the behavior of significant others in a particular context. When displaying newly acquired behavioral skills, individuals experience positive support from the environment. This support increases perceived capability and confidence and facilitates positive attitudes toward implementing these and other related new skills.

In summary, TRB and TRA formulate hypotheses about the effects of proximal determinants related to decision-making, behavioral intentions, and behavior. SLT, on the other hand, focuses on the origins of attitudes, norms, and skills, which are the result of the context-specific cognitive representation of the individual-environment interaction.

Vulnerability and Decision-Making

Recent advances in neuroscience have documented the high level of neuroplasticity or reorganization that occurs within and between brain structures regulating emotional (limbic system) and cognitive functioning (prefrontal cortex) from early childhood through late adolescence into young adulthood. As children grow older, their amount of social experiences is likely to increase in both a quantitative (e.g., acquiring new strategies to deal with social situations) and a qualitative (e.g., learning more skillful and adaptive ways for negotiating situations) fashion. This increase in social experience is likely due to the increases in the processing of social stimuli, increased exposure to new situations for which a response template is not available in the long-term memory, and continuing socialization efforts by a large array of agents regarding appropriate behavior with varying outcomes that may or may not be shaped by each occurring situation. Studies have shown that as children grow older they improve their accuracy in assessing social cues and their efficiency in responding to them, from very simple cues to those that are more nuanced and complex. These enhancements in processing skills are complimented by developing more effective ways of representing and organizing social information the short- and long-term memory. Improvements in the organization of cues will be more salient for those social contexts with which individuals are more familiar. In addition to increases in processing efficiency, there is evidence that, as individuals grow older, processing patterns become more rigid with early socialization experiences being more influential in later decision-making.

On the other hand, vulnerability during adolescence appears to be very prominent for making poor decisions because during this period the body and brain are

maturing differentially. It is at this time that the brain's prefrontal cortex undergoes enormous changes. The prefrontal cortex is responsible for executive cognitive functions (e.g., decision-making, self-monitoring, abstract thinking, and forming goal strategies) and oversees behavioral and affective regulation. It is also the last region of the brain to mature functionally. Casey and colleagues (2010) suggest that this is not the only process of change at this time, pointing out that, if that were the case, adolescents would not be different from their younger peers, particularly emotionally. These researchers feel that there is an imbalance in brain development resulting in a disparity in brain systems responsible for affective processing or emotions: the cortical regions of the brain (Fareri, Martin, & Delgado, 2008). These changes along with hormonal and other normal biological changes at the same time present additional challenges to adolescents. The variation in development across same-age peers leads to differential expectations with those appearing more mature to be viewed as more capable of assuming adult roles and those whose physical appearance has not evidenced maturity to be viewed as not being able to assume similar roles. In summary, then, uneven brain system development establishes stresses and erratic emotions that along with variability in physical development provide opportunities for poor decision-making and increase the engagement in risky behaviors.

Interest in the propensity to risk taking focused on the idea that some individuals were predisposed to engaging in behaviors that had the potential for negative outcomes. This led to research that identified the personality characteristics of people who were more often involved in risky behaviors. The most influential work in this area involves the sensation-seeking personality construct described by Zuckerman (1994) as "a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for the sake of such experiences" (p. 27). Many studies have since been conducted to determine the role of high sensation seeking in risky behavior, including the use of alcohol, tobacco, and other drugs (Romer & Hennessy, 2007); high-risk sexual behavior (Romer et al., 2009); and risky driving behavior (Jonah, 1997). Zuckerman (1994) places the origin of sensation seeking in the dopamine brain pathways that drive interest in novel and rewarding activities. Generally, this brain activity increases during adolescence, when it peaks, then gets reduced in young adulthood with general maturity, experience, and recognition of the potential consequences of risk-taking behavior (Romer et al., 2009).

Steinberg (2010) suggests that reward seeking and impulsivity develop differentially and are related to different neural systems. Furthermore, as indicated above, the timing of these system evolutions also is quite different with reward seeking increasing between pre- and mid-adolescence and decreasing in late adolescence into adulthood. However, impulsivity tends to decline from age 10 on. Consequently Steinberg postulates "risk taking in middle adolescence may be due to the combination of relatively higher inclinations to seek rewards and still maturing capacities for self-control" (Steinberg, 2010, p. 216).

In addition to variation in the process of maturation, recent advances in brain imaging have helped scientists understand more on how brain injuries or

impairments can lead to risk-taking behaviors. With the new technologies, neuroscientists have identified the neural circuitry involved in decision-making and reward-related processing within the frontal corticobasal ganglia networks. Fareri and colleagues (2008) review the research to date that supports this finding and the development of these circuits during adolescence.

To summarize, vulnerability with respect to decision-making addresses an array of interactive factors, including aspects of normal brain development and maturation, variability in personality traits and reward-seeking behavior, and structural and functional brain impairments. These diverse sources of influence have in common that they influence certain aspects of or the entire information processing and decision-making cycle by increasing the likelihood of biased information processing and storage and rapid and nonrational goal and behavior selection.

Prevention as a Socialization Agent or Enhancer

Key to the integrated prevention science model is the socialization process that serves as an important foundation for individuals' social information processing and decision-making. As societies become more complex and dynamic, individuals experience diverse networks of socialization agents, which increase the likelihood that they will be exposed to potentially mixed sets of expectations regarding behaviors and cues. It is in these situations that prevention takes on two roles: to reinforce the role of other socialization agents or to assume the role of socialization agent per se.

Objectives and Processes of Prevention (Intervention Targets and Implementation Issues)

Engagement in prosocial behaviors is dependent on a balance between embracing societal- and contextual-specific expectations and having the competencies to do so. Prevention interventions, like socialization agents, have as their goal the internalization of acceptable behaviors that are appropriate for the general society and for specific contexts of everyday life. As discussed above, this process includes modeling and trying on behaviors within a lifeworld of experiences and belief and value systems, understanding social cues, and having the competencies and skills to successfully performing the behaviors.

The major difference between socialization agents and prevention interventions is that the latter formalize and structure the essential elements of the socialization process following evidence-based principles. Prevention interventions are viewed then as preparing individuals by establishing or reinforcing prosocial attitudes, beliefs, and goals. In addition, these interventions provide skills for the appropriate

response to challenging situations based on the interpretation and evaluation of situational cues such as the availability of tobacco, alcohol, and marijuana or opportunities to shoplift or perform poorly in school to enhance making appropriate and healthy decisions. These aspects of prevention intervention are informed by a variety of available theoretical perspectives discussed above representing social control as well as social learning, the fundamental mechanisms of socialization.

Although the ultimate aim of prevention is the performance of positive or non-risky behaviors, the outcomes of prevention focus mainly on the prevention process, behavioral intent, and the acquisition of skills to perform the appropriate behavior with efficacy. The intentions are the result of the decision-making process: gathering, interpreting, and evaluating information within the normative context that supports sets of alternative behaviors.

Prevention targets individuals either directly through a formal intervention program or through existing socialization agents. Examples of the former include school-based prevention curricula and mentoring programs. Prevention interventions have also been developed to enhance the skills of socialization agents such as parenting programs, programs that enhance instructional skills, or monitoring skills such as modeling and rewarding classroom or workplace behaviors.

Prevention Reflecting a Developmental Process

Prevention like other socialization agents reflects outcomes that are developmentally appropriate and address the competencies of the target individuals. Early or primary socialization of infants and children will have different expectations than that of later or secondary socialization. Fundamental to engaging in prosocial behaviors is the development of prosocial attitudes and beliefs, and these in turn grow out of emotional attachments to parents, family members, and members of an individual's community. Furthermore, in congruence with the developmental age and competencies of the targeted individuals, their participation in the socialization process whether through the socialization agents or prevention interventions may be more directive or supportive.

Prevention interventions can assist families and other socialization agents in achieving these goals or may specifically target them through formal program activities. The examples provided below demonstrate for a variety of prevention intervention approaches how the socialization process is applied to prevent targeted individuals from deciding on performing negative behaviors in different contexts.

Prevention as Evidence-Based Socialization: Applications

In the following, we apply our perspective of prevention as evidence-based socialization to three well-known and evidence-based programs, namely, the

Nurse–Family Partnership (NFP), the Good Behavior Game (GBG), and the Life Skills Training (LST).

Nurse–Family Partnership

NFP, originally developed by Olds (1988), is a selected family-based intervention serving low-income, at-risk pregnant women bearing their first child. NFP is designed to reduce an array of negative interdependent outcomes, which are concentrated in low-income families (i.e., poor birth outcomes, child abuse and neglect, welfare dependence, and poor maternal life course). In NFP, during pregnancy through the first two years of the child’s life, nurses trained in women’s and children’s health serve as home visitors. During the home visits, these nurses promote healthy behavior related to pregnancy outcomes, support the mother in building positive relationships with family members and friends, and link women and their family members to additional health and human service agencies. NFP originally evaluated in a small, rural county in New York State was later replicated in Elmira (Kitzman et al., 1997) and in Denver and has shown to improve mother’s health-related behaviors (e.g., substance use), to reduce dysfunctional caregiving (e.g., child abuse and neglect), and to improve maternal life course (e.g., welfare dependency) and antisocial behavior of the adolescent child (e.g., running away and delinquency).

NFP and the Integrated Prevention Science Model (IPSM). Through the integration of theories of human ecology and self-efficacy, NFP argues that the mothers’ engagement in unhealthy behaviors is the result of observing and mimicking the inefficient behavior of prior role models (e.g., their own parents) in concert with a limited reservoir of successful experiences and a lack of information about positive health-related behaviors during pregnancy. These three important aspects of the decision-making process to engage in healthy behaviors during and after pregnancy (i.e., prior experiences and beliefs, personal beliefs about self-efficacy, and evidence-based information) form the targets of the nurse visitations. NFP thus is designed to socialize women to be better mothers by helping them understand the relationship between their own behavior and the health and development of their baby and to aid mothers in establishing realistic goals and achievable objectives, thus enriching their behavioral repertoire to be used in later situations. This training enhances the mothers’ parenting skills and improves the socialization of their children reflected in their positive outcomes.

The Good Behavior Game

GBG, originally developed by Barrish, Saunders, and Wolf (1969), is a universal classroom-centered intervention supporting teachers in managing the classroom. In other words, GBG supports teachers as the educational field-specific agents in socializing elementary students into the role of the student, such as sitting still,

talking in turn, and paying attention. GBG is primarily a group-based behavior modification program, in which teams that display disruptive behaviors, such as verbal and physical disruptions and noncompliance, receive marks on the board. The team with the lowest number of marks is rewarded (Kellam et al., 2011). In addition to 20 small observational, randomized studies that showed short-term improvement in student behavior, GBG was evaluated in a large randomized trial of 2,311 first graders in the Baltimore Prevention trial (Kellam et al., 2008). The GBG intervention has been shown to have both short- and long-term impact on aggressive behavior, substance use, antisocial personality disorder, and criminality (Kellam et al., 2008; Kellam, Rebok, Ialongo, & Mayer, 1994; Petras et al., 2008) and has been replicated in a second trial in Baltimore (Ialongo, Poduska, Werthamer, & Kellam, 2001; Petras, Masyn, & Ialongo, 2011) as well as in the Netherlands (van Lier, Huizink, & Vuijk, 2011) and in Belgium (Leflot, van Lier, Onghena, & Colpin, 2010).

GBG and IPSM. From the IPSM perspective, GBG emphasizes that a child's negative life course occurs and is produced in the interaction with developmentally specific agents, such as the teacher. Specifically, the IPSM indicates that the engagement in aggressive/disruptive behavior, on the one hand, and a teacher's response to such behavior, on the other hand, are the end result of a decision-making process reflective of socialization that has occurred at an earlier point in time. It is well supported that children's level of aggressive/disruptive behaviors in elementary school is in part the result of parents' failure to effectively punishing noncompliant, aggressive, disruptive behavior during the toddler years, the first step in a process serving to train the child to become progressively more coercive and antisocial. When confronted with such children in the classroom, teachers have an array of responses at their disposal varying as a function of their training. Many teachers lack evidence-based skills for classroom management and tend to apply negative responses, such as school suspension, thus further escalating the teacher-student interaction. As such, GBG provides the teacher with tools to make decisions that are more effective in dealing with disruptive students, and, in turn, it teaches students behavioral alternatives for classroom behavior.

Life Skills Training

LST was developed by Botvin in the 1980s as a universal substance use prevention program originally designed to target adolescents when they were in the 7th grade. The initial program that was evaluated consisted of a core curriculum of 15 sessions followed with 10 booster sessions delivered when these students were in the 8th grade and five sessions when they were in the 9th grade (Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995). Over the years, LST has been altered to include a 24-session elementary school program (that has not been evaluated), the 30-session middle school program, and a 10-session high school program. All of the programs focus on substance use and violence through increasing individual self-esteem, instilling prosocial attitudes, and providing life skills including personal self-management

skills, general social skills, and drug use resistance skills. The specifics of these program elements are designed to be age-appropriate. Generally, teachers, peer leaders and other trained adults deliver the program in schools.

LST and IPSM. LST and similar effective universal school-based prevention curricula build on the experiences and research of the 1970s on prevention programs designed to increase knowledge of substance use consequences (Evans et al., 1978), the early work on psychosocial development that intended to enhance personal and social development, and the emergence of Bandura's SLT (1977) and Jessor and Jessor's Problem Behavior Theory (1977). Botvin and his group conceptualized substance use as a socially learned behavior resulting from both social and personal influences. Within this framework, a preventive intervention would involve enhancing individual competencies and providing adolescents problem-specific knowledge and skills that are designed to strengthen prosocial attitudes and behaviors and their skills to resist pressures to initiate substance use. This approach has been found by Botvin and colleagues (2006) to transfer to violence and other risky behaviors. Through the establishment of prosocial norms and enhancing adolescents' competencies to assume age-appropriate roles, LST is an exemplar of prevention as a socialization agent per se (Griffin et al., 2006; Griffin, Botvin, Nichols, & Doyle, 2003).

Conclusions

In this chapter, we have proposed a comprehensive perspective of prevention science, developing a conceptual model that integrates primary socialization models with social information processing and decision-making. In this model, we have emphasized that the ultimate goal of socialization is to instill culturally appropriate norms and values resulting in prosocial, conforming behavior of individuals while ensuring the behavioral reproduction of the society's culture. Applying this perspective to prevention, we conclude that in the prevention process evidence-based socialization content is communicated. This communication can be indirect by training relevant socialization agents or direct by prevention agents subsuming the role of a socialization agent itself. The advantage of this perspective is that it redirects the focus of prevention theories as they address issues related to the socialization process. In addition, since socialization is a universal experience, which might only differ in its content and messaging modality, the applicability of this integrated theory is not confined by geographic and cultural boundaries.

A Devil's Advocate Perspective

Some have argued (e.g., Foxcroft, 2009) that focusing on the cognitive and experiential determinants of the decision-making process is not effective because the ultimate focus of prevention should be on the behavior. Commonly, this emphasis is

supported by referencing Gibson's work on environmental affordances (Gibson, 1977, 1979). Affordances describe environmental features that support the individual's actions and intentions. They are assumed to be independent of the individual's ability to recognize them but are always in relation to the actors and therefore dependent on their capabilities. For example, Washington, DC's subway system has been deliberately designed to reduce crime by omitting public restrooms, luggage lockers, and excess seating to avoid motivated offenders from lingering and assessing targets. In addition, train platforms feature high arched ceilings with few supporting columns to increase the chance for natural surveillance (Mair & Mair, 2003). This example as well as other applications of environmental modifications that have shown success is compatible with the conceptual model for prevention that is presented in this chapter. For affordances to stimulate or redirect behavior, they need to be recognized and interpreted by the individual (Norman, 1988; Zaff, 1995). Importantly, the extent to which these affordances are recognized and interpreted is likely influenced by past knowledge and experiences internalized during the individual's socialization process.

Not all available prevention interventions incorporate a decision-making process or skills development (e.g., keg registration or carding purchasers of tobacco and alcohol). Rather than being skilled based, keg registration or carding purchasers of tobacco and alcohol may reinforce the norm against underage use of these substances but also take the decision-making regarding the use of alcohol or tobacco out of the hands of individuals by presenting a barrier or extra hurdle to deter use. These policy or environmental preventive interventions play a major role in preventing the inappropriate use of these substances, are generally population-based, and are presumably inexpensive to carry out. However, they require the training and active monitoring of the dispensers of these products and ultimately do not provide the required information or skills needed by those targeted by the intervention to internalize the concept that the use of alcohol and tobacco among children and adolescents is unhealthy and often associated with many negative outcomes. From an integrated perspective, it can then be argued that not considering relevant socialization agents responsible for promoting norms and skills for healthy behavior and their impact on individual decision-making will likely diminish the effectiveness of purely environmental interventions.

On the other hand, the criticism against individual/group behavioral interventions such as school-based prevention curricula or even parenting skills training is that unless the programs are sustained over long periods, thus involving multiple generations, they will not have a population impact. Logically then, there is a need for both types of interventions to reinforce the desired behavioral norms of the community and increase the likelihood of success (Flay, 2009). Ultimately, the issue for communities to address is not environmental versus individual interventions but how best to match the targeted outcomes and messages of both (Hawkins et al., 2012).

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