G

Gangs and Social Networks

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Synonyms

Hybrid gangs

Overview

Traditional depictions of gang organization have been erroneous or static or were unable to be measured. Relying on these traditional depictions, modern rhetoric regarding organization is that gangs have evolved into hybrid groups that participate in nontraditional behavior such as merging and cooperating with rival gangs. Examining this phenomenon through emic perspectives suggests an alternate explanation. Previous literature has indicated that gangs are very loosely organized, and more recent works have demonstrated that gangs are social networks rather than structured groups. The following essay comparatively examines gang organization through the social network lens.

Key Issues/Controversies

Gang organization has long been a topic of dispute in gang research. Outside of the academic realm remains a pervasive conceptualization of gangs in the American media and law enforcement rhetoric as one of national, highly organized, violent, drug-dealing entities. If this viewpoint were true, then it would indeed be worthy of the fear that it inspires. The problem is that academic research consistently shows that there is little to no validity to this conceptualization (Klein 1995). From the early gang literature, continuing to present day research, there are no strong indications that gangs are highly organized, but instead are loose, fluid affiliations.

If gangs are not the national entities they are believed to be, then what organizational structure do they have? After the millennium, police reports began to note "new" organizational structures that law enforcement agencies were unfamiliar with. This lead to further definitional problems and the introduction of groups referred to as "hybrid gangs." Believed to be significantly different than "traditional gangs" in composition and behavior, hybrid gangs are described as having:

> . . .members of different racial/ethnic groups participating in a single gang, individuals participating in multiple gangs, unclear rules or codes of conduct, symbolic associations with more than one well-established gang (e.g., use of colors and graffiti from different gangs), cooperation of rival gangs in criminal activity, and frequent mergers of small gangs. (Starbuck et al. 2004, p. 200)

More and more law enforcement agencies began reporting this phenomenon,

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specifically as characteristic of late-onset gangs or gangs that appeared in cities post-1990 (Starbuck et al., 2004), and it began entering the collective knowledge of the mainstream. In 2008, the History Channel's series *Gangland* aired an episode called "Sin City." This episode, set in Las Vegas, Nevada, highlights hybrid gangs as an evolutionary advancement and emphatically states that multiple associations among gang members of different gangs are more deadly, but never explains why.

The sensationalism of claims that gangs have reached evolutionary advancement and presented increased danger called for further investigation, more so due to "hybrid gangs" not appearing in the literature beyond Thrasher's (1927) reference to gangs that included different racial/ethnic groups. However, under closer scrutiny, the fluid behaviors associated with hybrid gangs have been appearing in the literature since Yablonsky (1959) argued that gangs were near groups rather than solid organizations. More recently, some research has presented evidence that gangs are porous social networks intertwined with other gang networks and have been so for quite some time (Fleisher 2002). Differing viewpoints may be explained by the use of etic or emic methodology. Etic methodology is the imposition of an outsider's (i.e., law enforcement) interpretation of a phenomenon; in this case the behavior is believed to be a new gang structure. Alternatively, using emic methodology or understanding phenomenon from the respondent's point of view or, in this case, the gang member's point of view explains gang fluidity and nontraditional membership as elements of a social network system (Fleisher 2002; Weisel 2002).

Outside observers may be imputing meanings to gang behaviors that would be understood quite differently from the perspective of the gang member. Examining the literature more thoroughly may help clear up the disputed perspectives on the subject: Is the "hybrid gang" a new phenomenon? Are gangs more like social networks than organizations? Or are these social constructions that amount to "putting old wine into new bottles?"

Structural Typologies

Research has consistently presented gangs as marginally or very loosely organized and widely varied in the activities in which they engage. These findings have led to differing ways in how scholars have interpreted gang structures. For example, in a national survey of 385 police agencies, 45 % indicated that the typical gang was loose knit, and 47 % noted no formal structure in typical gangs (Weisel 2002). However, Weisel (2002) also reported regional differences in gang structure with police indicating more loosely structured delinquent gangs in the Southeast and Midwest, more violent gangs in the West, and more income-generating gangs in the Northeast. Smaller cities were more likely to have delinquent gangs, which engaged in criminal activity but had little involvement with drugs. Furthermore, violent gangs and drug selling gangs most often did not have consistent leadership or a highly structured organization.

Weisel (2002) takes an unusual step and includes in-depth interviews with members of the Black Gangster Disciples and Latin Kings in Chicago and Lincoln Park Piru and Logan in San Diego. Consistent with stereotypes, the Black Gangster Disciples and Latin Kings had extensive organizational structure. In accordance with most literature, the San Diego gangs had little structure, and members considered the groups to be friendship/kinship networks. While some gangs appear to be highly organized, an extensive amount of research indicates that most gangs are not as highly organized as generally believed (Klein 1995; Huff 1996; Decker et al. 1998; Fleisher 1998; Miller 2001).

Attempting to make systematic sense of gang organization has led to a plethora of gang typologies. Although these typologies may be useful in identifying characteristics of a gang at the time of the study, they present the assumption that the gang is static. Typologies focusing on particular criminal activity do not capture the social processes of the gang or a particular gang's relationships with others. Some of the typologies rely on precarious variables such as amount of drug use and type of crime engaged in

or threat level, which have extreme within-group variation and are not stable over time. Klein's (2002) structural typology provides measurable variables and thus more utility, but does not take fluidity, permeability, or networking behavior into account.

Gang structures are anything but static, but the dynamic gang processes of changing, merging, or splintering have rarely been examined in considerable depth. Most authors have been cursory on the subject, and there has been little in-depth investigation. The information that has been gained concerning these processes was obtained, while scholars investigated gang structures and whether or not they had changed over time.

An intriguing contribution to the extant knowledge on the subject comes from Weisel, (2002) whose interviews portray mergers such as the Black Gangster Disciples forming from the combined gangs of the Black Disciples, Gangster Disciples, and High Supreme Gangsters. Interviews in San Diego also revealed that Logan splintered into "Logan Trece" and "Red Steps" as the gang grew larger and natural boundaries emerged. Unfortunately more detailed information about these mergers and splinter groups was not provided. Spergel (1990) argues that splintering develops from internal competition or if more criminal opportunity becomes available. Monti (1993) argues that it is the lack of control over larger gangs that causes them to split and that age-graded cliques are like gang building blocks that can merge, dissolve, and reassemble. Weisel (2002) views the process of merging and splintering through organizational theory, arguing that a path to organizational equilibrium explains why some groups dissipate and others break off from larger groups until a stable number of organizations are reached. This theoretical approach explicitly ignores the gang member worldview in favor of the assumption that gangs can be called organizations.

It is no surprise that relational behavior and emic perspectives are not often considered when discussing gang organization because doing so would recognize gangs as dynamic processes rather than static structures. Processes are much harder to define and subsequently eschewed by agencies that would like clearly labeled categories. Even though gang relationships are often sidestepped, they are nonetheless important. The gang as a criminological topic is predicated on the idea that individuals are committing crime in a group. The group as characterized by names, colors, symbols, and the like has become such a preoccupation that the relationship of "who" is committing crime together has been ignored. Not all organizational arguments have missed this dynamic. In Cloward and Ohlin's (1960) typology of delinquent subcultures, they recognized that criminal subcultures necessitated adult criminals to indoctrinate younger people into illicit activities or at the very least model illegitimate behavior.

Although limited by focusing only on Mexican-American gangs in San Antonio, Texas, Valdez (2003) provides a typology that further bridges gang structure and social network dynamics. One of the gang types is the "criminal-adult-dependent gang," which is a highly organized group that is focused on earning illegal income usually through drug sales. Adults outside of the gang provide the group with weapons, drugs, stolen merchandise, protection, and extensions to their criminal networks. Valdez (2003) notes two subtypes of this category. One of the subtypes is a family network in which the adult criminals are closely related to the gang members. The other subtype is dependent on a prison gang, which exerts control over the street gang. Either way, the importance of gang relationships is stressed. If members of different categorical groups work together, then at what point do organizational lines become blurred or nonexistent?

Hybrid Gangs or Social Networks?

Largely untouched by academic researchers, the "hybrid" gang phenomenon has been discussed primarily by law enforcement agencies such as Missouri's Kansas City Police Department (Starbuck et al. 2004). The "hybrid" gang is not a new term or idea. It was initially used by

Thrasher (1927) to describe gangs of mixed race/ethnicity, but in the modern era, the term encompasses many other characteristics as well. Different than most traditional depictions of gangs, which described gangs as being comprised mostly of lower class and minority males, police in many jurisdictions are starting to report hybrid gangs. These gangs in late-onset localities (i.e., post-1990) have a greater mix of race/ethnicity, with an increase of white youth, the presence of more females, and a larger proportion of middle-class teens (Howell et al. 2002). Additionally, it appears that members may switch gangs or participate in multiple gangs (Starbuck et al. 2004). For example, in San Antonio, 8 out of 15 former gang members interviewed had switched gangs or belonged to multiple gangs, and two gangs had switched their entire allegiance (Bolden 2012). Although San Antonio agencies have reported gangs since the 1950s, the gangs appeared to have the same "hybrid" characteristics that were being pointed out in emergent gangs.

Cooperation between gangs that are sometimes rivals is also noticed by law enforcement, as is the mixing of gang symbols from Chicago- and Los Angeles-based gangs. Just as these gangs are engaged in cafeteria-style offending, they are selecting characteristics of different established gangs. This gives further credence to the idea that gangs have now become popular brand names (Klein 1995). The use of the term "hybrid gangs" to describe groups that have more fluid membership and nontraditional membership (Starbuck et al. 2004) is an illustration of etic methodology,

In emic methodology, the idea of self-identifying oneself as a member of a particular gang becomes relevant. Fleisher (2002) argues that self-nomination as a gang member refers to both an attribute and a relational aspect of membership. Gang research tends to examine membership as an attribute and neglect the relational component. However, it is of great importance that self-nomination is a statement of having a particular relational status to other people. Fleisher (2002) used social network analysis to examine the nature of gang member relationships between females and how these affiliations affected gang participation. In explaining a gang member's ego network, which is the group of people that an individual directly interacts with on a regular basis, Fleisher (2002) found many members had relationships with people from other gangs than their own. Furthermore, while gang members certainly associated with other members of their gang, Fleisher found that none of the gang members knew all of the other members in their gang. The members who knew the most members in their gang only knew 10 % of the members in their gang. The gangs studied ranged from large Midwestern gangs such as the Gangster Disciples and Vice Lords to an independent gang called the Fremont Hustlers. It would seem that his conclusions may not be as relevant to smaller gangs, but Fleisher was revealing that individuals knew, interacted with, and spent time with several other gang members, in different gangs, rather than exclusively with people who identified themselves as being in the same gang.

The actual ego networks of each gang member, or the people they regularly interacted with, were fairly small and often included members of other gangs. Fleisher (2002) argued that the status of gang membership provided social capital and being included in the social networks of other gangs would further increase someone's social capital. While Bolden (2012) notes that gang members often referred to positive interactions with members of other gangs, Decker et al. (1998) provide one of the only studies that actually examined relationships among gangs. Studying 26 Gangster Disciples and 18 Latin Kings in Chicago, as well as 20 members of Logan Heights and 21 members of Lincoln Park Piru in San Diego, Decker et al. (1998) found that relationships with other gangs were very common. All of the San Diego gang members reported maintaining relationships with other street gangs, while 80 % of the Gangster Disciples and 75 % of the Latin Kings maintained these types of relationships. Furthermore, all of the Latin Kings and Logan Heights members

maintained relationships with prison gangs. Eighty-seven percent of the Gangster Disciples and 75 % of the Lincoln Park Piru also maintained relationships with prison gangs. Although some would argue that gang alliances are brittle (Monti 1993), they do not deny that gangs assist each other in varying ways. Decker et al. (1998) provide us with evidence that in spite of often being overlooked, gang relationships are common and these networks may be an important part of the gang experience.

With data from a gang task force in New Jersey, McGloin (2007) also provides evidence that gangs are more aptly described as social networks and rather than being structured organizations, the gang boundaries are dynamic and opaque. Also using social network analysis, Papachristos (2006) did not find cohesion in gangs as a whole, but strong cohesion in subgroups of the gang. These ego networks were responsible for specific crimes and behaviors indicating that crimes are ego network related rather than gang related or motivated (Fleisher 2002). This is an alternate interpretation to the idea of organizational cooperation between rivals in hybrid gangs (Starbuck et al. 2004). Understanding gangs from a social network standpoint can help clear up the ambiguities in determining whether individuals or whole groups work together. It can also examine whether the "hybrid" label is a valid concept or if it is a misinterpretation of kinship/friendship networks.

The gang members in Weisel's (2002) study saw the gang as a friendship network, which is consistent with the findings of Fleisher (2002). Furthermore, though Yablonsky (1973) has been attacked for his depiction of the gang as sociopathic and violent, few have paid attention to his concept of the gang as near group. Yablonsky (1959) reported that gang members had no measurable number of members, no definition of membership, no specific roles, no understood consensus of norms, and no clear flow of leadership to action. Weisel (2002) placed the particular gangs studied in an organizational context because they portrayed orientation towards goals and organizational continuity. However if gangs lack the vast majority of organizational aspects as pointed out by Yablonsky (1959), can they really be considered organizations?

Viewing gangs in an organizational context forces categorical boundaries that may only exist in the mind of the outside observer. As gang characteristics noted by Yablonsky (1959) indicate, there is much more fluidity to gangs and gang members, and gang boundaries may be much more porous. The organizational viewpoint may also lead to an ecological fallacy of assuming that members of different gangs engaging in activity together means gangs are working together. Finally, this idea ignores the viewpoint of gang members that gangs are kinship/friendship networks. Confusing or misinterpreting the relationships of gang members may have led to the present label of "hybrid gangs." Viewing gang processes from a social network viewpoint clears up this confusion by distinguishing relationships among gang members as well as among gangs.

State of the Art

Examination of what law enforcement call hybrid gangs is in its infancy and as of yet has not received serious empirical investigation. Whether gangs have actually changed or these processes have previously existed and been overlooked, the "hybrid" gang label implies fluid membership between gangs, a lessening of violent events in joining and leaving gangs, more interaction among gangs, and a selective mix of identifying elements of well-known gangs. These gangs are also claimed to be late-onset (i.e., post-1990) gangs that are characterized as having an increase in females, an increase of whites, and an increase of middle-class youth. These apparent differences challenge many previously used assumptions of gangs as social islands with impermeable boundaries.

A considerable amount of literature informs us that gangs tend to not be highly organized structures but rather loose conglomerations of

clique structures (Decker and Curry 2000; Fleisher 2002; Klein and Crawford 1967; Papachristos 2006). These conglomerations are not highly cohesive as a whole, albeit stronger cohesion occurs among particular cliques. These smaller cohesive cliques dilute the influence of the overall gang in favor of the immediate people that an individual interacts with. Lerman (1967, p. 71) describes the gang subcultural unit as "a network of pairs, triads, groups with names, and groups without names." What has not been discussed in the literature, with the notable exception of Fleisher (2002, 2006), is who is actually in these particular cliques.

If these smaller cohesive units are in networks, then the most viable framework for examining gang member relationships emerging from previous literature is social network analysis (SNA). Social network analysis is both a theoretical framework and a methodological approach. From a theoretical standpoint, people belong to intricate webs of social relationships that influence their lives in a myriad of ways and affect occupational chances, general opportunities, and perceptions of the world (Simmel 1955; Papachristos 2006). Social networks can be analyzed on the group level through degree centrality and density or by using individual ego networks as the unit of analysis. The ego network refers to the social ties/bond the individual has to other individuals. Until recently social network analysis has rarely been used to study gangs. Klein and Crawford (1967) and, more recently, McGloin (2005, 2007) and Papachristos (2006) have used this framework to examine cohesion of members within a gang, finding that there were cohesive subgroups or cliques but not strong cohesion in the gang as a whole. Fleisher (2006) used nomination of friends to identify ties between members of different gangs such as the Gangster Disciples, Vice Lords, and Stones, which are sometimes rivals. Fleisher argued that affiliation in the same categorical gang was not sufficient to foster sentiment between members. Even if members hung out with each other, they often indicated preference for other friends that were not a part of their own particular affiliation. Preference was also related to the social capital created by network relationships. Social capital in networks makes more actions and opportunities available (Papachristos 2006). Fleisher (2006) argues that even though belonging to a gang provides a level of social capital, gang member relationships are based more on the expanded social capital that a connection provides rather than affiliation with a particular group.

Fleisher (2006) explains that the use of other methods to study gangs has resulted in the concept of the bounded group. Although it makes obvious sense that gang members, like most other people in society, interact in many different social circles and utilize agency in choosing who to associate with, resulting in their not being bound by the gang per se, the conventional depiction of the gang member as the folk devil allows for easy disregard of viewing any behavior of the gang member as normal. Ironically, Cotterell (1996) comes to conclusion that interactional behavior between gang members is actually more fluid and less stable than other adolescent cliques. Cliques are groups of people who spend time together. Usually adolescents belong to many cliques with different sets of friends in varying contexts, such as sports teams, neighborhood friends, and school friends. In gangs, however, membership provides the individual with the social capital to more freely move between cliques. Cotterell (1996, pp. 33–34) describes gangs as "a series of changing microsystems. The individual joins one group for a time, then leaves, and rejoins or moves on to another."

Ayling (2009), who views gangs as organized criminal networks, theoretically argues that the weak links between gang network hubs or "loose couplings" make the gang functionally resilient against both law enforcement suppression and attacks from other groups. Damage done to one hub or clique will not destroy the entire network. Furthermore, the clique type network removes the sluggish and burdensome chain of command, allowing members enough freedom to instantly act and have improvisational responses

to immediate concerns. Using police data, McGloin (2005) identified particular gang members as "cut-points" or the only connection or intermediaries between the different cliques within a gang.

Controversies and Questions

Methodology

Papachristos (2006, 2009) challenges Fleisher's (2006) characterization of gang membership as relational attributes and argues instead that they are social groups based on the patterned actions that are caused by relational ties. Arguing that gangs are groups and not "pedagogical constructs," Papachristos (2009) examines gang network relationships and demonstrates predictable patterns of homicide activity. Fleisher (2006) explains however that methodological choice will cause this discrepancy, and indeed Papachristos uses (2006, 2009) police data to examine gang networks.

Using emic methodology and qualitative interviews in San Antonio, Texas, and Orlando, Florida, Bolden (2010) expands on Fleisher's work, which was conducted with female gang members, by not only identifying ties among male and female members of different gangs but also the nature and consequences of those network ties in regard to "hybrid" gang processes, such as belonging to multiple gangs, switching gangs, and fluidity of joining or leaving gangs. The social network of the gang member allows for expansion of social capital and expanded opportunities in the urban arena.

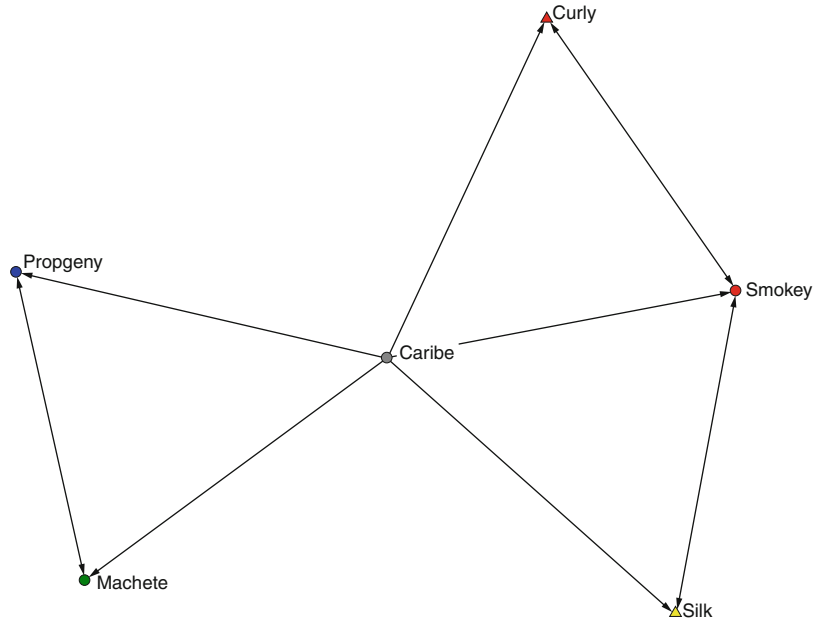
The following example is an ego-network depiction of a gang member in Orlando, Florida (see Fig. 1). **Caribe** self-identifies as belonging to Hoover Folk, yet his most common interactions were with members of different gangs. His social group that he spent time partying and getting high with consisted of two Bloods and a Latin Queen, all of which are the traditional primary enemies to his gang. The other members of Caribe's ego network, a Crip and a member of a Jamaican Posse, are his business associates that he engages in illicit profit-oriented activity with.

Caribe-Hoover Folk	Progeny-ATF Compton Crip
Curly/Smokey-Nine-Trey Gangster Bloods	
Machete-Young Shottaz (independent)	Silk-Latin Queen

This example of one gang member's ego network has profound implications for the study of gang organization, which include:

(a) This is not a categorical group (no shared name, signs, symbols, etc.).
(b) From an etic standpoint, this would be seen as one group and labeled as a hybrid gang. From an emic standpoint, this is not one group, but two separate segments of an ego network.
(c) Criminal activity is being committed by gang members together, but they are not in the same categorical gang. This becomes especially relevant to jurisdictions that define gang activity along the lines of categorical variables.
(d) Rather than gangs cooperating, this illustrates individual gang members cooperating.
(e) If the crime occurring in this network is considered gang crime, which bounded categorical group is attributed with the crime? If these actors commit a homicide together, which gang is credited for it?

Bolden (2010) found that all but 2 of the 48 current and former gang members he interviewed indicated that strong relationships along the lines of kinship, business, friendship, conflict-partners, sports, school, and romance existed between themselves and members of rival gangs. Many of these relationships were primary, in the sense that more time and activity, both criminal and benign, was spent with members of other gangs than members of their own gangs. Also of interest was that 22 of the interviewees were gang migrants from Chicago, Los Angeles, and New York, where they described the same dynamics occurring.



Gangs and Social Networks, Fig. 1 Caribe ego network

Evolution

Though there is more academic support for understanding gangs as social networks than there is for the "hybrid gang" label, the question of emergence still remains. Both Fleisher's (2002) and Bolden's (2010) studies were post-1990, clearly placing the networks studied in the late-gang onset era. This is not evidence that the networking phenomenon is new. It could be that the behavior was not previously noticed. Indeed, four of Bolden's (2010) interviewees participated in gang activity prior to the 1990s (one in the 1960s, three in the 1970s), and all indicated the same relational activities. Furthermore, Reymundo Sanchez (2000) chronicles his criminal activity as a Latin King in the early 1970s, which includes more criminal cooperation with members of other gangs including rivals than activity with the Latin Kings.

The evidence of preexistence, though not strong, indicates that to some extent the cooperation between rival gang members is not a new occurrence. This question remains open, but as it concerns history, it may be that we cannot ascertain the answer. What is more pertinent are the modern conceptions of gang organization. Will evidence that gangs are fluid, dynamic, network structures continue to be overlooked by all but a few in favor of static structural interpretations, or will we deign to entertain other arguments about gang organization?

Social network analyses of gangs are not new but have been relatively unused. Investigative hurdles in this regard are the lack of dissemination of SNA as a viable research option and training in this methodology. These analyses may require specific software programs such as UCINET that researchers have not had any training with. Furthermore, the data used in these analyses have to be very specific, and any quantitative data gleaned from police reporting would need some detailed component of gang member relational ties. Due to this major hurdle, researchers need to find agencies that already keep rich data or direct the data collection process from the onset of a study.

Key studies using social network analysis have been few and far between largely due to the difficulty of gaining access to the required information and the lack of dissemination regarding SNA as a viable option. Expansions of studies of this nature are extremely important

because the question of organization has characterized the field of gang research for quite some time. The vast majority of literature indicates that most gangs are loose-knit pseudo-organizations, yet the idea of an organized group persists in the collective mind of the public and law enforcement. Examining the literature more carefully and more specifically from the gang member's perspective rather than an outsider's viewpoint indicates that the gang is a fluid network of connections between members of different "groups" that give said members the social capital needed for expansion and access in the street. Perceived gang boundaries seem to be more of an imposition of an outsider's insistence on categorical distinctions but may have nothing to do with the actual social activity of the gang member. Indeed, outsider insistence on categorical relationships ignores relational ties and their importance when it comes to who is actually committing crime together. Using alternate tools for study will help our field avoid the trap of adhering to outdated concepts and bring us closer to understanding the phenomenon at hand.

Related Entries

- ▶ Organized Crime, Types of
- ▶ Race, Ethnicity, and Youth Gangs
- ▶ Social Network Analysis of Organized Criminal Groups
- ▶ Social Network Analysis of Urban Street Gangs

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Gendarmerie Policing

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Overview

Gendarmerie is a form of policing that is primarily military in its structure, organization, and chain of command. The form and the name originated in France, but during the nineteenth century, the institution spread across Europe, the European world, and its empires. Generally speaking these institutions functioned alongside other police bodies that were more civilian in appearance and which answered to local government or to ministers whose portfolio was internal domestic or judicial affairs; in contrast the Gendarmeries usually were answerable to a minister of war/defense.

Origins

The contemporary French *Gendarmerie nationale* likes to trace its origins back to the Middle Ages, and the knights commissioned to protect the king's territories while he was absent on crusade. A more plausible beginning is the Edict of Paris (1539) by which François I extended the competence of the provosts of the marshals of the French Army (*les prévôts des maréchaux*) and of their companies (*maré chaussées*) to include anyone guilty of highway robbery within France. By the end of the reign of Louis XIV in 1714, the companies' jurisdiction had been extended to most serious offenses from burglary to murder, from rape to arson, and from popular disorder to coining. But, in keeping with the general complexities of the old regime, there was little uniformity in structure and the ranks. Moreover, many men had purchased their ranks for the various opportunities that such a position offered rather than through any desire to enforce the king's law (see, in general, Luc 2005).

The death of Louis XIV and the end of his incessant wars left a weak treasury and fears that a flood of mendicants and vagabonds would engulf France; the lack of money limited what could be done about these fears. However, in 1720 Claude Le Blanc, the minister of war, initiated a series of reforms designed to improve the *maréchaussées* and thus the internal security of provincial France. Henceforth, the companies were to have a uniform hierarchy and structure, and they were to be financed by the state. The jurisdiction of each individual company was to be tied to a *généralité*, the most meaningful unit of provincial administration; the men, recruited from former soldiers with good records, were to be stationed in bodies of generally four to six men in small barracks that were positioned on the main roads. This was essentially the structure that remained in operation until the French Revolution though there were minor amendments, such as the introduction of a system of patrolling in pairs carrying a *Journal de Service* that was to be signed by a notable such as the mayor or the *curé* in each community that the patrol visited; the *Journal* was inspected monthly

by senior officers. In addition there was a gradual increase in the size of the force from around 3,000 men following Le Blanc's reforms to some 4,000 on the eve of the Revolution.

As with most police institutions, the *maré chaussée* had its critics and its supporters. There were those who protested that patrols were never to be found when they were required and that the men could be high handed, brutal, and corrupt or else too old, too infirm, or drunkards incapable of carrying out their duties. Local administrators disliked the fact that the men were not responsible locally but to the minister of war. The fact that the small brigades were required to supervise ballots for the militia, to check the passports of travelers, and to enforce order at local fairs and village festivals could provoke hostility among local communities. But there is also evidence that the men were accepted, well integrated, and often married into the community that they served. General inspections revealed a few men who were too old or infirm to carry out their tasks and that there was a sprinkling of total incompetents and drunks in the ranks. The guarantee of a pension in 1778 went some way towards removing the aged and physically unfit, and it seems fair to conclude that the institution improved as the eighteenth century wore on. Moreover, the justice provided by the *maréchaussée* through the *pré vôtal* courts was generally quicker, and at least where beggars and the severity of punishments were concerned, it was arguably more balanced and moderate. Comments, both critical and favorable, were to be found in the *cahiers de doléances* that were drawn up at the beginning of the Revolution. There was some disquiet about *prévôtal* justice, but many of the *cahiers* argued for an expansion of the force to improve security (Emsley 1999, pp. 33–5).

The Revolution and Reorganization

A proposal for reform of the *maréchaussée* was on the table at the beginning of 1789, but it was rapidly overtaken by events. Over the next 2 years, there were debates about whether a police institution should be military; one of the principal opponents of a military police was Maximilien Robespierre. There were criticisms of the *pré vôtal* courts, notably by the Comte de Mirabeau, and these were abolished in September 1790. The following February a law was passed reorganizing the force under the new name of the *Gendarmerie nationale*. This suggested a link with the past: the Gendarmerie had been an elite cavalry regiment in the royal household under the old regime and dated back to the fifteenth century. But the adjective "national" stressed its link to the nation and the new legal structure with its promise of equality before the law and the rights of men and citizens. The newly named force remained a military organization; its deployment in small barracks along the main roads was maintained together with its system of patrolling. But while the force was both military and national, appointments were devolved to the new provincial administrations – the *départements*. Moreover, the continuing power struggles of the Revolution and the demands of both civil and international war provided a decade of institutional disruption for the *Gendarmerie* in addition to major problems of law and order maintenance.

In the early years of the Revolution, and following the requests from the *cahiers* for a bigger and better police institution, the *Gendarmerie* was increased to 7,250 men; in April 1792 it was increased again to 8,700. But these were paper figures. Many *départements* failed to recruit to their quotas, and as the war required more and more soldiers to defend the frontiers, the state itself began to deplete the brigades by taking over half of the men back into the army. The reduction in numbers took no account of the country's internal difficulties. In addition to the policing tasks that had been undertaken by the old *maréchaussée*, the skeleton brigades of the *Gendarmerie* had to deal with counterrevolutionary activities, especially the west, with White terror gangs in the south, and also with bandit gangs swollen by deserters and, as successive governments made moves towards a comprehensive policy of conscription, by draft-dodgers. In addition, as with every institution in Revolutionary France, periodically men were

purged as politically suspect. And, while gendarmes were supposed to be functionaries of the state and the nation, a gendarme serving in his region of origin or in his wife's native region faced problems of where his loyalty should lie. The gendarmes' military backgrounds probably ensured that they were less susceptible to such pressures than other police officers, but they were certainly not immune. Moreover, given the variety of languages and patois spoken in France at least until the end of the nineteenth century, it was always useful for a small *Gendarmerie* brigade (as had happened with the old *maré chaussée*) to have one or two local men, well versed in the local dialect.

But if there were problems for the *Gendarmerie* during the 1790s, the institution also ultimately showed itself to be invaluable in helping to reestablish order and imposing the state's concept of both law and the nation. The directory launched a fierce policy of military repression to suppress brigandage and disorder. The consulate continued this policy and took all the credit for its broad success. Once a greater degree of order had been established, it has been argued, the consulate and then the empire developed a security state in which the Revolution's democratic aspirations gave way to a tutelary administration and judicial apparatus that employed surveillance and regulatory control to maintain order (Brown 1997). The *Gendarmerie* played a key role in both the initial military repression and then in the new surveillance system, for which it also provided a small-scale coercive capability should the need arise.

As first consul, Citizen-General Bonaparte had his own ideas about the structure and deployment of the *Gendarmerie*. He favored fewer mounted gendarmes and more men on foot, particularly where the geography was unsuitable for horses. But he also knew how to choose capable subordinates, and in the case of the *Gendarmerie*, he chose tough, no-nonsense, plain-speaking army veterans. General Louis Wirion had experience of organizing the *Gendarmerie* in the 13 new *départements* of the northeast that had previously formed the Austrian Netherlands. Wirion was charged with reorganizing the force in the counterrevolutionary west. General Etienne Radet had commanded the 24th *Gendarmerie* Division that covered four of the most turbulent *départements* of the south. He was beginning to get a grip on the region when Bonaparte first met him on his return from the disastrous Egyptian campaign. As first consul Bonaparte summoned Radet to Paris to draw up plans for reorganizing the *Gendarmerie* as a whole.

Wirion stressed the image of the ideal gendarme as a courageous army veteran who was honest, moral, sober, and literate. He was to be a man that the local community looked up to and trusted; he was to know every part of his district intimately. Radet's ideas were formulated in an organizational order issued at the end of January 1801. This enlarged the total corps to 16,500 men. There were to be 2,500 brigades of six men deployed in the provincial *départements*; two-thirds of these were to be mounted. There were also to be four elite companies, two mounted two on foot, that were to be deployed to protect the first consul (and later the emperor) and his palaces. The officers were all to receive their commissions from the head of state; the other ranks were to be vetted by a *départemental* committee composed of the prefect and two officers from the force. Finally there was to be a headquarter staff under a general appointed as the *Premier Inspecteur Général de la Gendarmerie*. Radet, by his own account, turned down the latter appointment and it went to General (later Marshal) Moncey. Wirion went off to establish the *Gendarmerie* in newly conquered Piedmont; Radet undertook similar tasks across the new French Empire. His toughness and aggression offended many civilian officials; unsurprisingly, when Napoleon needed a man to arrest the Pope in 1809, it was Radet who volunteered.

Moncey was a rather more refined individual than Wirion and Radet, but he could be prickly. Throughout his tenure as inspector general, he remained determined to maintain the *Gendarmerie's* separation from other police institutions within Napoleon's France. But this, according to Joseph Fouché who served as minister of police for much of the period of the

empire, suited Napoleon's intention to pursue a policy of divide and rule when it came to the police. There was a separate military police under General Duroc in his capacity as grand master of the palace. The Prefect of Police had responsibility for policing in Paris and reported to the minister of police, while civilian police, principally the *commissaires*, in the provinces also linked with the minister as well as with his fellows in the interior and justice. Moncey kept his command at a distance from the Ministry of Police; at the same time, he and Fouché confronted each other over a range of issues setting the tone for the "war of the polices" that continued in France for the next two centuries (Lignereux 2003).

The force that developed during the Revolutionary and Napoleonic period set the tone for the future in other ways. It remained proud of its standing as a military body. While it was sometimes useful to send individuals or small groups in civilian clothes to reconnoiter a town or village before a move to search out and apprehend deserters, it was formally stated in the various decrees regulating the institution that gendarmes always acted in uniform. Indeed, this became a matter of pride with many, and in 1857, Captain Frédéric de Bouyn requested an audience with Napoleon III concerned that the corps was being required to act in secretive ways and to investigate people's politics. Nothing in the force's behavior, he explained, "should excite suspicion, nothing should imply that its duties are mysterious and shadowy" (quoted in Emsley 1999, p. 127). The captain's open expression of his concerns stalled his career; others, however, who were less reticent in making political efforts on behalf of the government, tended to prosper.

The legacy of the Revolution and the Napoleonic adventure made it difficult for a state agency like the *Gendarmerie* to stand aloof from the politics of nineteenth-century France. Yet many gendarmes seem to have tried to be as honest, moral, and sober as Wirion, and the regulations insisted. Many individual brigades worked hard on behalf of the communities to which they were posted; they tracked down offenders, provided assistance in time of natural disaster, and so forth. But, in addition to the occasional demands for overt political action, they also had one other duty that could easily bring them into conflict with those communities; it fell to the gendarmes to ensure that when the demand was made, conscripts were collected and brought to the appropriate muster points. It also fell to the gendarmes to go in pursuit of refractory conscripts and deserters. Increasingly the *Gendarmerie*, together with other parts of Napoleon's bureaucratic state, wore down the opposition, but the enormous demand for men in 1813 sparked a new, furious wave of violence and disorder invariably directed at the gendarmes.

Continuity, Change, and Recurrent Issues in the Nineteenth Century

The French Revolution had proclaimed the Rights of Man and, of course, equality along with liberty and fraternity. Gendarmes were supposed to ensure a citizen's rights and to enforce the law equally among citizens, but the political turbulence that accompanied the various stages of the Revolution and the memory of Napoleon's empire that followed its fall left a legacy in which the different varieties of police in France were often seen as tied to, or acting at, the behest of those in power. At different stages of the Revolution, a few gendarmes were accused of disaffection and purged. When the Bourbons were restored for the second time, both Moncey and Radet faced courts-martial. *Départemental* committees, similar to those of the Revolution, were revived by the Bourbons to vet new recruits, and with varying degrees of determination, they also purged those who had shown, or continued to show, zeal for "the usurper." Yet in the various political upheavals of the restoration and the July Monarchy, while the *départemental* companies sent regular reports to Paris about the economy and political attitudes, most of the brigades appear to have aimed to fulfill their basic duties of maintaining order and protecting their local communities.

The elite *Gendarmerie* companies in the capital, whose functions mainly involved public

order and ceremonies, earned the hostility of the Parisians for aiding Charles X's attempted coup in the July days of 1830. A *Gendarmerie mobile* was established in the wake of the 1830 Revolution, revived in 1848 and revived again under Napoleon III. But most of the small provincial brigades, whose daily patrols focussed on supervising and maintaining local tranquility, enforcing regulations and dealing with crime, sat tight during the revolutions and watched events.

As president of the Second Republic, Louis Napoleon feted the institution, but most provincial brigades saw discretion as the better part of valor and avoided confrontations with the peasant columns and the democratic-socialists who resisted his coup in 1851. Nevertheless, when the president became the Emperor Napoleon III, he maintained a close relationship with the *Gendarmerie* until the mid-1850s when, after the Imperial Decree reorganizing the force and outlining the essence of its service as a "continual and repressive surveillance" particularly in the countryside and on main roads, his interests moved more to reforming the police. The close relationship and the concept of "repressive surveillance" led to the concerns expressed by de Bouyn that the brigades were expected to comment on people's politics and to take an active role in elections.

Economic, political, and social life changed significantly in the French provinces during the nineteenth century, and the *Gendarmerie* was required to keep up both with the changes and with traditional sensibilities. The building of railways and movements of workers from different regions and countries led to increases in the workloads of some brigades and, occasionally, a decrease for others. Gendarmes provided coercive support for bailiffs in the eviction of workers from company housing or for local officials wanting to deal with unruly bars. At other times, however, they aided members of the working class and the poor. And this did not just mean acting in time of natural disaster or pursuing those responsible for criminal acts against poor people; a few gendarmes were known to give to charity the occasional monetary reward they had received, while others organized subscriptions to assist beggars. But an officious, self-important brigade commander who sought rigorously to enforce unpopular legislation especially, for example, on poaching or cabarets could provoke serious local hostility. The brigade commander at Bédarieux (Hérault) was one such, and his small barracks suffered the most violent and sustained attack following Louis Napoleon's coup leaving the brigadier, two gendarmes, and a gendarme's wife dead. Another of the Bédarieux brigade, however, was saved when a café proprietor intervened on his behalf; the gendarme had earlier broken regulations so as to permit the proprietor to attend a fellow radical's funeral. An informative statistical analysis of the attacks on gendarmes between 1800 and 1859 suggests a significant decline across the period and a corresponding growth in the legitimacy of the institution among the people in rural communities (Lignereux 2008).

The propertied classes generally showed approval of the force. Official literature painted the gendarme as a man cast in a heroic mold, honest, modest, and courageous. Descriptions of the small barracks sometimes suggested almost a monastic community, although any visit to a small barracks probably would soon have dispelled such a notion. The men, their wives and children, as well as their horses were all jammed in close proximity to each other. Moreover, while in some respects, his legitimacy grew among the plebeian classes; in various forms of popular culture, the gendarme was commonly portrayed as officious, stupid, and a figure of fun. In popular puppet plays, he might appear as an honest upholder of the law, but when up against shrewd working-class heroes like the Lyon weaver Guignol, he always came off second best. Perhaps the best known of the comic manifestations, however, are Gendarme Pandore and Brigadier Dussutour. Pandore, who first appeared in Gustav Nadaud's popular song written (and promptly banned) at the beginning of the Second Empire, feared God, was virile, but not very bright, and never questioned his superiors: "Brigadier, vous-avez raison!" Dussutour was the eponymous "Good Gendarme" of Léon Bloy's short story who confronts a division of invading

Prussians in 1871 with "I demand to see your papers" (see various articles in Luc 2003).

The close links that the *Gendarmerie* had enjoyed with Napoleon III meant that at the beginning of the Third Republic, the institution was regarded with suspicion by Republicans and the Left. There was general agreement that it should not have a political role and that it should stick to pursuing criminal offenders, maintaining order and enforcing various regulations. The *Gendarmerie mobile* was disbanded in 1885, and some advocated replacing the entire force with a *départemental* police while others urged that it be demilitarized. Such major changes were largely prevented because of the inability of the force's detractors to secure a majority among legislators for any one of their proposals during the early years of the new republic. At the same time, the gendarmes themselves could scarcely be faulted for the ways in which they accepted the role of defenders of the republic and enforced measures, such as the anticlerical laws, that critics of the regime opposed.

The Spread of the Model

In May 1806 Napoleon told his brother Joseph, who he had recently installed as King of Naples, that the Gendarmerie provided "the most efficient way to maintain the tranquillity of a country . . . it provides a surveillance half civil, half military spread across the whole territory together with the most precise information" (quoted in Emsley 1999, p. 56). As a part of Napoleon's empire, as a satellite state or as an ally, many regions of Europe had experience of the Gendarmerie model in the first decade or so of the nineteenth century. Even after Napoleon's fall, many of the rulers of these territories tended to agree with the emperor. Radet and Wirion had set up Gendarmeries in various parts of Italy. Under the restored Savoyard Monarchy, the restructured Piedmontese Gendarmerie, called the *Carabinieri Reale*, was to play a significant military role in the unification of Italy absorbing some of the other Italian Gendarmeries as it did so. Various German states had created Gendarmeries during the Napoleonic ascendancy and continued to deploy them thereafter. In Württemberg, however, the German name of *Landjäger* was preferred, and in the Netherlands the former French name of *Marechaussee* was employed.

Even Napoleon's most consistent enemies created Gendarmeries as and when they thought it prudent. The Irish Constabulary emerged out of a series of initiatives taken by British administrators in Ireland and formalized by an Act of Parliament in 1822. The word "constabulary" was employed at least in part because of concerns about the French word Gendarmerie, but unlike its counterparts, the force was never linked to the Ministry of War (the War Office in British parlance). The Irish (from 1867 Royal Irish) Constabulary was seen by many administrators in the British Empire as a model for the kind of police that they required outside of the major centers of population in the colonies, and they often requested Royal Irish Constabulary officers and men to help create a new force. In Quebec what was originally the North West Mounted Police, and subsequently the Royal Canadian Mounted Police, is still known as *La Gendarmerie Royale du Canada*.

The Gendarmerie of Imperial Russia followed the track of its French counterpart beginning as a military unit established to police the Russian army of occupation in France following Napoleon's overthrow. It then acquired authority over the civilian population of Russia, but throughout the nineteenth century, it maintained a close link with the third section of the Tsar's Private Imperial Chancellery, the department responsible for political policing. Political turbulence in Spain during the 1830s led to the creation of the *Guardia Civil* in 1843, but in spite of the name, the force was militarized, under the direction of the minister of war and housed in small barracks virtually from its creation. In the Habsburg Empire, it was the Galician revolt of 1846 and the subsequent revolution of 1848 that convinced the government of the need for a Gendarmerie. States, like Greece and Romania, that emerged from the Ottoman withdrawal from Europe also created Gendarmeries as the best means of cementing the authority of the new rulers across their territories.

In addition to dealing with various forms of criminal activity, most gendarmes across continental Europe maintained a surveillance of the communities in which they served and collected information for the central government about the local economy, political attitudes, and any other apparently significant developments or events. They provided a first line of defense against popular disorder, and perhaps most significantly, they played a role in the evolving relationship between the nineteenth-century bureaucratic state and its people. Gendarmes in their barracks flying the national or imperial flag, celebrating national or imperial anniversaries and festivities, were the living manifestation of the state or empire for rural communities who rarely looked far beyond their immediate district. Across the continent they commonly assumed the same kind of attributes as those in France; they were portrayed in the official literature and their own corps literature as heroic, honest defenders of the law. The *Carabinieri* recruit, for example, was told how he was entering a family of men who depended on each other and who dedicated their lives to the good of others (Grossadi 1879). Gendarmes protected rural communities from bandits, brigands, and wild beasts; they pursued offenders and brought them to justice; they were the first to help communities in times of natural disaster. But there was an obverse side to these roles. If the state's gendarmes assisted the population, the population had to recognize its obligations to the state, and the gendarmes were also there to ensure that taxes were paid and that young men turned up as and when required for military service. Moreover, in the event of any form of labor or political unrest, the gendarmes were usually the first force available for the authorities to deploy against any demonstrators.

The First Half of the Twentieth Century

Although the French *Gendarmerie* carried out the orders of the Third Republic (1870–1940) loyally, in the 20 years or so before the First World War, it was often criticized as being inadequate for its tasks. The brigade structure meant that small disorders could be handled, but there was no *Gendarmerie mobile* available for dealing with significant industrial unrest and political demonstrations. There were a succession of discussions and proposals for reform put before the legislature, but they all foundered. The brigades, many of whom exchanged their horses for bicycles, were too isolated to deal with itinerant offenders or mechanized criminals such as the anarchist *bande à Bonnot*. The institution also suffered a major blow to its reputation during the First World War: for the first time since its creation it provided no front-line combat unit. Gendarmes were, however, deployed immediately behind the front line to enforce discipline and apprehend deserters. The *poilus* (soldiers) joked cynically about gendarmes, who were often noted for their heavy drinking, suppressing drunkenness among the front-line soldiers. They also scoffed that the front line ended where you met the first gendarme.

During the interwar period, the *Gendarmerie* like the rest of the French police, sought to modernize its fight against crime by developing its use of motor vehicles and telecommunications. Young officers appear also to have been keen to develop the corps role in criminal investigation (Haberbusch 2012). In addition to their traditional role in policing the countryside, and again like the civilian police, the *Gendarmerie* became increasingly preoccupied with the threat of communist subversion. A *Gendarmerie mobile* was reestablished in 1921 to deal with unrest, particularly in labor disputes. The right-leaning ministry that took the step had no desire to see the victorious army risking its reputation in such situations. But just over a decade later, the parliamentary committee appointed to investigate the Paris riots of 1934 concluded that at least on that occasion the *Gendarmerie mobile* was poorly led, inappropriately equipped, and lacking in useful intelligence. Yet in spite of the criticisms and the humiliation of its wartime involvement, the *Gendarmerie* remained loyal to the republic.

At the end of the First World War, the fear of communism and Revolution led to the creation of

militarized police in both Germany and the Netherlands. During the summer of 1919 first in Prussia and then in other *Länder*, the nervous authorities set up "Security Police," *Sicherheitspolizei* (or *Sipo*). These heavily armed police were viewed with suspicion by many in the SPD and by trade unionists. They were also suspected by the victorious allies as a means to circumvent the restrictions on the size of the German army. The *Sipo* did not outlive 1920; the Weimar Republic reverted to the more traditional policing structures, and the policing of rural areas by men designated as gendarmes continued through the Nazi period even as different police institutions were unified into the German Order Police (*Ordnungspolizei*). In the Netherlands rioting in Amsterdam in June 1919 led to the formation of the *Korps Politietroepen* which was incorporated into the army in 1922 and functioned alongside the *Marechaussee* and the *Rijksveldwacht* (state police) until the Second World War.

Elsewhere during the interwar years, other Gendarmeries found their loyalties tested by the turbulent politics of the period. In Italy the *Carabinieri's* boasted first loyalty to the king and to Italy enabled it to ride out some of the problems following the Fascist takeover. However, it is at least arguable that a majority in the *Carabinieri* were more in sympathy with the radical Right than with the political Left and the corruption and clientelism of the Liberals. In Spain the *Guardia Civil* was torn over the formation of the Second Republic. Many in the guard saw their duty as maintaining order in Spain and judged a government on its ability to ensure that they were able to carry out this duty. When the Civil War broke out, a significant percentage of the guards went over to Franco, seeing him as a better hope for order in their beloved homeland – and they went over to Franco even if this meant shooting those among their officers who remained loyal to the republic.

The old rivalries between the Gendarmeries, primarily responsible to ministries of war, and the civilian police, responsible to the ministries of justice and the interior, also continued. Events in the Netherlands' municipality of Oss during the 1930s provide a vivid example. The *Koninklijke Marechaussee* fought a successful campaign against serious crime in the district which prompted decorations from the queen for the commander and one of his staff but jealousy among the *Rijksveldwacht* and the municipal police. Subsequently, following a largely fruitless investigation of local municipal and religious authorities and the arrest of a factory owner and an insurance broker, the minister of justice prohibited further investigations and arranged to have the full brigade of the *Marechaussee* transferred elsewhere. Eventually a parliamentary enquiry was called to settle the matter which had turned into bickering between the ministers of justice and the interior as well as the minister of war and the *Marechaussee*. The civilian ministries' dreams of creating a single, unified policing structure had to be shelved, and when reform came, it was imposed by the German occupiers who set out to amalgamate the *Rijksveldwacht* with the *Koninklijke Marechaussee* in March 1941. The aim was to create an institution modeled on the SS and loyal to the new German authorities.

The Second World War brought additional pressures. In France, determined to avoid the criticisms of its role in the previous war, the *Gendarmerie* deployed a combat unit. The combat unit drew on the younger, more energetic, and fitter gendarmes, and while experienced heads are important to policing, the drain on the provincial brigades appears to have had a negative effect. The recruits who came forward to fill the gaps during the German occupation were often well qualified, but many were using the institution as a way of avoiding *Service de travail obligatoire* in Germany and had no serious commitment to the job. In Vichy the *Gendarmerie* was purged of those elements that the government considered undesirable and a threat to France such as Jews and Freemasons. In both Vichy and the occupied zone, gendarmes were involved in enforcing the racial and political policies of the conqueror. In the early years of the occupation and Vichy, very few joined the resistance, but the Germans appear to have had suspicions about the *Gendarmerie* and occasionally picked on both officers and men, and by early

1944, many gendarmes appear to have been paying lip service to orders emanating from the occupying power. In France, Belgium, and the Netherlands, the different Gendarmeries, like other police institutions, faced issues of where their duty lay. The problem was especially acute in Belgium and the Netherlands where the vestiges of prewar governments had gone into exile in Britain. At the close of the war in all three countries, these became questions of the legitimacy for the different forces as members of the resistance and others sought revenge, and scapegoats and gendarmes were challenged and investigated as to whether they had put the emphasis on professional and patriotic duty (Campion 2011). The same problem arose in Greece where, in the wake of the German defeat, the country descended into civil war.

In Italy, loyalty to the king and to the concept of *Italia* enabled the *Carabinieri* to shift with wartime politics. When the war began, they loyally served the Fascist state; when Mussolini was overthrown, they were able to collaborate with the allies fighting their way up the peninsula. *Carabinieri* worked alongside allied military police in attempts to suppress the rampant black market and brigandage that appeared, especially in the south. In those areas that were occupied by the Germans, they collaborated but often in unique ways. The most notable and, as far as the *Carabinieri* itself is concerned, the most heroic example is the self-sacrifice of *vicebrigadiere* Salvo d'Acquisto who, in September 1943, voluntarily went before a German firing squad in order to save 22 innocent hostages. His last words, allegedly, were *Viva Italia*. But the allies were conscious of the *Carabinieri's* involvement with the Fascist state, and a mission, led by a senior English police officer and staffed by men from other British forces, set out to take the Fascist element out of all Italian police institutions. Similar British police missions were deployed in Austria and Germany; in the former the relaxed, some might say idle, attitude of the English commander ensured that Austrian Gendarmerie maintained the traditional characteristics of such a body. Paradoxically in the west of Germany, while the victorious allies were determined to denazify and demilitarize the police, the specifically military police of the Third Reich, the *Feldgendarmerie*, was the last military unit to be disbanded as its experience and discipline was considered too important in the struggle against the postwar crime wave. In postwar Greece, torn by civil war, another British police mission led by a former head of the Royal Ulster Constabulary (which had replaced, but closely resembled, the Gendarmerie-style RIC on the partition of Ireland) was keen to see the Greek Gendarmerie trained first and foremost as ordinary police and subject to civilian authority. Even so, the mission commander also recognized the virtue in a paramilitary Gendarmerie for the warring countryside.

To the Twenty-First Century

The rivalry and occasional friction between civilian police and Gendarmeries continued in the aftermath of the Second World War. Sometimes it sprang from the Gendarmeries' proud military tradition. In France, for example, during the last two decades of the century, morale in both the police and the *Gendarmerie* was periodically undermined by a variety of issues some of which resulted from shifting pressures in the job, such as the emergence of international terrorism and who should take precedence in handling it. There was also cultural change; more working wives and changes in the civilian working world challenged some of the traditional understanding of the gendarme's military commitment and subservience to old-style military discipline. The government could aggravate such concerns by suggesting a redefinition of ranks which brought a degree of unanimity between *Gendarmerie* and police but which also highlighted some better emoluments within the *Gendarmerie* as well as discrepancies between the responsibilities of different ranks in the different institutions. President Mitterand's creation of the *Groupe*

d'intervention de la Gendarmerie nationale (*GIGN*) for his personal protection in the Elysée Palace with its additional responsibilities for anti-terrorism aggravated police-*Gendarmerie* relations, while the use of *GIGN* officers for investigating the president's opponents caused outrage beyond the ranks of the police and tarnished the *Gendarmerie's* image.

Elsewhere political involvement by senior gendarmes did their institutions little credit. Senior figures in the *Carabinieri* were suspected of taking their anti-communism further than was proper in a democracy. It was the refusal of members of the corps to leave their barracks that stifled an attempted coup led by a *Carabinieri* general in 1964. The Greek Gendarmerie was closely tied with the Colonels' junta that seized power in 1967. In the aftermath of the Colonels' fall, the Gendarmerie was united with the town police, yet the new police, while more closely tied to the civilian state, remains a military organization. Following the death of Franco, the *Guardia Civil* remained suspect in the eyes of many on the Left and the attempted coup of February 1981 in which a lieutenant colonel of the *Guardia* and his men seized the lower chamber of the Cortes confirmed such suspicions. The *Guardia Civil* survived the failed coup but came increasingly to resemble a civilian police, though it was not until 2009 that the traditional bicorn hat was replaced (except for ceremonial duties) with a more conventional baseball cap.

As the European Gendarmeries became more like civilian police institutions with, for example, the Belgian Gendarmerie's amalgamation with the country's civil police in 2000 and the bringing together of the *Gendarmerie nationale* and the *Police nationale* under the French Ministry of the Interior in 2009, so a new opportunity opened up for these corps in the wider world. It was argued that soldiers and marines lacked the necessary skills for establishing and maintaining basic law and order in failed states or states emerging from civil war or international conflict (Perito 2004). Police missions to such states as Bosnia, Kosovo, Iraq, and Afghanistan were commonly spearheaded by gendarmes. Even British Police missions under the auspices of the UK's International Police Assistance Board contained a disproportionate number of men from the old Royal Ulster Constabulary or its more civilian successor force (the Police Service Northern Ireland, PSNI) – but this successor force was itself well versed in crowd control and soothing the passions of rival communities (Sinclair 2012).

Globalization, concerns about organized crime on an international level, and the increase in demands for police missions like those to the new states emerging from former Yugoslavia combined to foster the creation of the European Gendarmerie (EGF) in 2006. The EGF, formalized by the Treaty of Velsen in October 2007, brought together gendarmes from corps of five of the EU's member states: France, Italy, the Netherlands, Portugal, and Spain. When Romania joined the EU, its Gendarmerie also became a member, while those of Poland and Lithuania were designated as partners. The intention was to have a force of up to 800 gendarmes available for deployment within 30 days of a request for assistance. The EGF was involved in NATO police missions, notably in Afghanistan, and it provided a small force to advise on security in Haiti following the earthquake of 2010. But the new institution raised fears, particularly about accountability, and there were even suspicions that EGF officers had been deployed to Greece during the disorders engendered by the crisis over Greek debt (see, e.g., www.golenxiv.co.uk/2011/10/foreign-riot-police-now-operating-in-greece/).

Related Entries

- ▶ British Police
- ▶ Comparing Police Systems Across the World
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Gender and Race Differences

► Self-Reported Offending: Reliability and Validity

Gender-Based Violence

► Surveys on Violence Against Women

Gendered Theory and Gendered Practice

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Overview

Theoretical and empirical research on the relationships among gender, crime, and delinquency has grown in scope and sophistication in recent decades. Less apparent, though, is whether and to what extent these advances are reflected in current criminal and juvenile justice practices and policies. This entry briefly reviews major feminist and gendered theories of crime and delinquency and then turns to key laws, policies, and practices to assess whether these theoretical advances translate into improved policy and practice. We conclude with suggestions for how feminist scholarship can help shape gender-specific and culturally appropriate criminal and juvenile justice programming and training.

Introduction

Tough-on-crime and zero-tolerance laws and policies enacted in the United States in recent decades dramatically increased the number of women and girls processed through the criminal and juvenile justice systems. During this same era, another set of laws and policies sought to reduce violence against women and girls and to change the ways in which police, prosecutors, and judges respond to rape and intimate partner violence, in particular. To what extent do these legal reforms, as well as the practices of criminal

and juvenile justice institutions, reflect theoretical advances and new knowledge about gender and crime? To address this question we, first, briefly summarize major feminist and gendered theories and perspectives. Second, we assess the extent to which recent criminal and juvenile justice policies and practices, as well as major legislative initiatives, reflect feminist perspectives. Third, we examine whether these reforms have successfully met feminist objectives or have been eroded and undermined and, if so, in what ways and to what effect. The entry concludes with suggestions for ways in which relevant theory and research might better inform criminal and juvenile justice policies and practices.

Feminist and Gendered Theories of Crime and Delinquency

This section briefly summarizes the principal theoretical perspectives on gender, crime and delinquency before turning to an assessment of their utility and visibility in criminal and juvenile justice policies and programs, as well as relevant legislation. Readers are referred to Chesney-Lind and Morash (2011), Miller and Mullins (2009), and Daly (1998) for more detailed reviews of cutting-edge theoretical work on gender, crime and delinquency, and compilations edited by Chesney-Lind and Pasko (2004), Heimer and Kruttschnitt (2006), and Zahn (2009) for examples of empirical research that has tested and refined these theories. It is also important to note that while much of this literature focuses on women and girls, a number of studies examine masculinities and crime to better understand how and in what contexts men engage in violence, both against women and against other men (e.g., Dobash and Dobash 1992; Messerschmidt 1993).

Most recent criminological research that explicitly examines gender can be categorized as studies of the "gendered ratio of crime," "gendered pathways," "gendered crime," and "gendered lives" (see Daly 1998:94–95). Studies of the *gendered ratio* of crime seek to explain the gender gap in self-reported and official rates of crime and delinquency. Research from this perspective often begins with what is known about male crime and delinquency and asks why women and girls engage in less crime. While some scholars examine individual level influences, feminist criminologists examining the gender gap tend to focus more on gendered social organizations and structural conditions, as these shape the types of offenses and contexts in which girls/women and boys/men commit crimes (e.g., Steffensmeier and Schwartz 2004).

Gendered pathways research examines the trajectories by which women and girls, and men and boys, move in and out of lawbreaking behaviors. Women's and girls' pathways often include histories of victimization and of strategies for coping with that victimization that may themselves be criminalized (e.g., substance abuse, running away, fighting back), further entangling them with the criminal and juvenile justice systems (Chesney-Lind and Pasko 2004; Daly 1992). Some research refers to the "blurred boundaries" between victimization and offending, but even when the boundaries are sharp, the focus here is on the most common paths to criminal and juvenile court and how those paths are structured by gender, race, class, and other sources of inequality.

Studies of *gendered crime* focus on the social context and situational qualities of offending by girls and women and by boys and men. Victimization may be a situational factor resulting in crime, as seen, for instance, when women kill their abusers. In other situations, though, crime and delinquency may be resources for gaining status, desired commodities, revenge, or simply a means of having fun. Much of this research emerges from sociological studies of "doing gender," reminding us that gender is performed in multiple ways, depending in large part upon the resources available, and those resources are themselves structured by gender, race, class, gender orientation, and age, among other dimensions (see, e.g., Miller 1998; Messerschmidt 1993).

Finally, research on *gendered lives* asks how gender structures the kinds of actions and

identities women and girls, and men and boys, employ to survive. Examples are Maher's (1997) detailed analysis of sex work by women drug users and research on the differing types and effects of peer relationships among adolescent boys and girls (e.g., Giordano et al. 2003).

Regardless of which of these approaches is paramount, the most comprehensive theoretical and empirical studies of crime and delinquency attend to the multiple and intersecting ways in which gender, racial, economic, and other inequalities structure individuals' lives and choices in patterned ways. Borrowing from Miller and Mullins, we must study gender and gender inequality "at the macro level (overarching structural patterns of gender inequality and their effects on crime and delinquency), at the meso level (gender inequality within the context of social institutions such as family, school, and neighborhood) and at the micro level (interpersonal relationships within and across gender)" (2009:34).

Feminist Influences on Law, Policy, and Practice

The civil rights and feminist movements have led to major social and legal changes in the United States and, to varying extents, globally. They have provided social recognition for a variety of problems that had previously been defined as simply private harms. Yet empirical research and theorizing about gender, race, class, and other intersecting sources of inequality are not necessarily reflected in contemporary criminal and juvenile statutes, policies, and practices. Policies and programs that ignore how structural and institutional contexts shape and constrain individual lives are likely to be ineffective. As Miller and Mullins (2009) remind us, "taken-for-granted ideologies about gender" result in scholarship "that fundamentally misrepresents and misunderstands the nature of girls' delinquency and produces policies that are misguided at best, and quite harmful at their worst" (2009:31–32).

Legal Reforms

Since the 1970s, a number of significant legislative and policy initiatives have emerged in the areas of rape reform, intimate partner violence, and deinstitutionalization, among other issues. Many of these legal changes resulted from social protests and lobbying by feminist and civil rights organizations and reflect feminist thinking about crime and delinquency. Yet in most cases, the new laws were not as far-reaching as their advocates had hoped, and many were eroded further during the antifeminist backlash of the late 1980s and 1990s.

For example, the rape reforms that swept the United States in the 1970s were seen as a major victory at the time. They provided for rape shield laws, repealed requirements for corroboration, redefined resistance, and in some cases created the criminal statutes necessary for rape prosecutions, including the then novel concept of a crime of spousal rape. Yet as Caringella (2009) demonstrates, they have been largely educational and symbolic in value, with comprehensive rape reform still an unmet goal.

Similarly, public attention to intimate partner violence as a major social problem led in the 1980s to pro-arrest domestic violence legislation and policies in states across the USA and to passage of the Violence Against Women Act in 1994 (and its reauthorizations in 2000 and 2005), the Victims of Trafficking and Violence Protection Act of 2000 (and its reauthorizations in 2003, 2005 and 2008), and the Tribal Law and Order Act of 2010. These laws and policies succeeded in changing public understandings of rape and domestic violence, in particular, and brought these crimes out of the shadows. Yet they stopped short of the larger structural changes envisioned by their advocates and, in some cases, contributed to new problems. Most notably, as of 2000, nearly 60 % of states had passed either mandatory or arrest-preferred legislation, with the unanticipated and ironic consequence of increasing domestic violence arrests and prosecutions of women who were defending themselves against violent partners (Hirschel et al. 2007:265). Public attention to violence against women has also

affected perceptions of women who ultimately kill their abusers. The "battered woman syndrome" legal defense helped judges and juries understand that in certain circumstances, killing one's abuser may be an understandable and even reasonable response to long-term abuse, yet women who did not fit stereotypic images of how battered women should behave did not receive the same level of concern and legal support. This was particularly problematic for women of color. More generally, the new laws and policies were a step forward in many ways, yet did not adequately address the experiences of racially and economically marginalized women, immigrants, lesbians, and transgendered persons who could not assume the same support from police and prosecutors as middle-class white women experienced.

Girls, as well as women, were impacted by these early reforms and by their often unanticipated consequences. The Juvenile Justice and Delinquency Prevention Act of 1974 called for deinstitutionalization of status offenders, the vast majority of whom were girls. Prior to that time, girls were incarcerated for lengthy terms, often longer than boys convicted of felonies, for minor acts such as truancy, running away, and other age-specific or "status" offenses that would not be crimes if the girls were over the age of majority. The intent of this legislation was negated, though, by zero-tolerance school policies, arrests of teenage girls for assault rather than incorrigibility when fighting with their parents, and other new laws and policies that expanded the pool of delinquent girls. These mechanisms, then, have come to be known as net-widening, relabeling, and upcriming (Chesney-Lind and Irwin 2008).

Policies and Practices

The greater willingness by police, schools, and other authorities to punish girls' misbehaviors as crimes, in combination with mandatory incarceration for a variety of drug and other offenses, has resulted in soaring arrest and incarceration rates for girls and women in recent years. However, while the percentage increases in these rates have been quite large, the total numbers of incarcerated females remain small compared to males. As a consequence of the vastly greater number of males in the system and the lack of knowledge about how best to meet the needs of female offenders, studies from the 1970s through the mid-1990s reported limited funds were available for at-risk and delinquent girls (figures range from 3 % to 8 %). In response, the 1992 reauthorization of the Juvenile Justice and Delinquency Prevention Act required that girls have adequate access to services, and federal agencies and research institutes began soliciting proposals for gender-responsive programs and staff training.

A review of the literature on programming for girls and women suggests three primary issues confounding efforts to better serve female offenders. First, as noted above, is the lack of adequate resources dedicated to the specific needs of women and girls. Even where programs have been developed, the funding is too often short term, preventing program sustainability and growth. Second, a number of studies have found that correctional and probation staff prefer working with males, characterizing women and girls as petty, whiney, and manipulative (see, e.g., Martin and Jurik 2007; Gaarder et al. 2004). It appears that the complexities of how and why women and girls become involved in the justice system, and the need to address a broad range of psychological, interpersonal, economic, and physical safety issues for rehabilitation and reentry, can overwhelm staff, especially in a context of inadequate resources. As a result, some probation and correctional officers come to see women and girls as simply overly emotional or needy and distance themselves from the individuals in their care. The third critical factor inhibiting better service provision is the shortage of gender-specific, culturally appropriate, and theoretically informed programming (Foley 2008). Effective programming must recognize and respond to the multiple and intersecting forms of inequality experienced by many of the girls and women in the system. These inequalities operate at structural, institutional, and interpersonal levels, functioning both as pathways into

the justice system and as barriers to successfully stabilizing outside of the system.

In an effort to further our understanding of girls' offending and identify effective, evidence-based strategies for preventing and reducing girls' involvement in crime and delinquency, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) convened and funded the Girls Study Group in 2004. Major outcomes of the Girls Study Group include publication of The Delinquent Girl (Zahn 2009), which is a comprehensive review of the state of the field; development of a curriculum to assist staff in addressing girls' unique experiences and recognizing how gender, race, culture, economic disadvantage, and other factors shape those experiences; and a review of assessment tools to ascertain their suitability for girls (see http://www.ojjdp.gov/programs/girlsdelinquency.html). OJJDP also compiled a Model Programs Guide, which lists programs from prevention through sanctioning to reentry, and they fund a number of gender-specific programs including substance abuse prevention inside and outside of correctional settings, as well as Girl Scouting in Detention Centers, which targets adjudicated or court-referred delinquent girls or girls who are wards of the state.

A second major resource for staff training and program development for delinquent girls was developed by the National Center for Crime and Delinquency (NCCD). Launched in 2008, the NCCD's Center for Girls and Young Women specifically addresses "advocacy, research, assessment services, staff training and evaluation to address juvenile justice and child welfare systems that are designed for boys and ill-equipped to meet the gender-specific needs of girls and young women" (http://justiceforallgirls.org).

The evolution of these programs demonstrates that policy, programming, and training are increasingly influenced by theoretical and empirical research elaborating the ways in which gender matters. Simultaneously, evaluations of these programs and interviews with incarcerated girls and women have advanced theorizing, especially with regard to theories centered on gendered pathways into delinquency and crime. Yet while feminist scholars seek to go beyond essentialized or simplistic models of how gender intersects with race, class, sexuality, gender identity, and other factors to shape the lived experiences of individual girls, the programs in place tend to be far less nuanced.

At the adult level, the National Institute of Corrections (NIC) funded and published a guide to gender-responsive strategies for female offenders (Bloom et al. 2003), maintains an online directory of programs for women involved with the criminal justice system (http://nicic.gov/wodp/), and offers a curriculum to support management and operations within women's prisons that draws at least in part on feminist theoretical and empirical research. Modules include women's pathways to prison, gender-responsive management principles, and methods of addressing staff sexual misconduct, among other topics.

Controversy continues to center, though, on the appropriateness of risk and needs assessment tools developed for use with male inmates – and especially the Level of Service Inventory-Revised (LSI-R) – when working with female offenders (see Morash 2009, for a summary of this debate). The NIC funded a multisite, multilevel (prison, probation, parole) Women's Classification Study to determine, first, whether assessment and treatment of gender-responsive needs pertaining to trauma, abuse, mental health, self-efficacy, self-esteem, parenting, and relationships are relevant to women's future offending and other adverse outcomes, and second, whether adding items tapping these gender-responsive needs improves the predictive validity of assessment tools such as the LSI-R. The research team affirmed that programming to address women's unique needs is relevant for criminal justice outcomes and that including gender-responsive items significantly improves the predictive validity of so-called "gender-neutral" tools (Van Voorhis et al. 2008). They caution, however, that the new instruments are intended for use in gender-responsive, evidence-based treatment centers where practitioners are skilled in addressing women's needs. Moreover, adequate resources

must exist to support programming designed to "empower women, address and accommodate trauma, stabilize symptoms of mental health, accommodate family reunification, teach healthy relationships, facilitate communication with children, provide parenting classes, strengthen vocational, educational, and life skills, and provide gender-responsive substance abuse treatment" (Van Voorhis et al. 2008:19).

On the ground, though, the lack of resources and training significantly impedes efforts to offer gender-responsive programming. Perhaps the best-known program for women in state and county prisons and jails is Girl Scouts Behind Bars. This partnership between the Girl Scouts and the National Institute of Justice, begun in 1992, is designed to renew bonds between girls and their incarcerated mothers.

At the federal level, the Federal Bureau of Prisons' female offender educational, recreational, and job training programs are designed to be comparable to those available to men. While comparable programming is arguably better than no programming, as was the case for women for decades, the lack of gender-responsive programming in these core areas is problematic. Currently, the Bureau of Prisons' gender-specific programs are largely limited to medical and social services related to pregnancy and child birth, and to a 3-month community residential program (Mothers and Infants Nurturing Together) for female inmates who are pregnant at the time of commitment, low risk, and who meet other eligibility criteria. Aside from this program, women inmates in federal prisons may visit with their infants or older children only if the children are accompanied by an adult (http://www.bop.gov/inmate_programs/female.jsp).

Do These Policies and Programs Reflect Feminist and Gendered Theorizing?

While the legislative initiatives, policies, and programs discussed above broke new ground and, in some ways, reflect feminist concerns, they have also reinforced two dominant social constructions of women – first, as victims who must be protected and, second, as needing assistance in order to be "good mothers." Women are seen as rather passive in both of these constructions. There is little recognition that women have agency and are making choices that appear reasonable to them, given the structural conditions of their lives.

Taking steps to stop sexual and other forms of violence against women and recognition of the blurred boundaries between victimization and offending are of critical importance, but feminist and gendered theories remind us that this focus on women's victimization is insufficient for at least three reasons. First, it reinforces stereotypic images of women as weak and in need of protection. Second, it risks treating women as a monolithic, homogenous group rather than recognizing the patterned differences (based on race, ethnicity, class, gender identity, sexual orientation, age, physical ability, etc.) in their experiences and responses to victimization. For example, very few gender-specific programs incorporate culturally appropriate practices or address issues faced by lesbian and transgendered youth. And third, legislation and programming that focus on victimization tend to ignore the central problems of patriarchy, racial discrimination, and economic inequality that coalesce to make women vulnerable to men's violence in the first place. Thus, theoretical and empirical scholarship on gendered lives and gendered crimes reminds us of the complexity of women's and girls' (and men's and boy's) experiences, the multiple sources of inequality and disadvantage that may shape those experiences, and the diverse ways in which they respond to their circumstances (see similarly Hannah-Moffat 2010).

In addition to this focus on victimization, the second theme underscoring much of the programming for female offenders, and especially for those who are incarcerated, is based on their status as mothers or future mothers. These include traditional parenting classes and newer interventions such as prison nurseries, extended visitation for children, and programs such as Girl Scouts Behind Bars. This approach is beneficial, as studies confirm repeatedly that being able to

spend time with their children is very important to the women and their children (e.g., Bloom et al. 2003; Chesney-Lind and Pasko 2004).

Nevertheless, this limited focus on women as mothers risks reinforcing gender, racial, and cultural stereotypes of women as defined by motherhood, hegemonic norms regarding what makes a woman a "good mother," and appropriate societal responses to "good" and "bad" mothers. Previous research has demonstrated that women who are perceived by court officials to be "good mothers" are granted some leniency and are less likely to be incarcerated, whether because their families are seen as capable of providing sufficient informal social control or because of the practical costs of caring for children of incarcerated mothers. Not surprisingly, perceptions of family roles and of appropriate sanctions when "good" and "bad" mothers transgress societal norms and laws have been found to intersect with race, class, and gender orientation. Contemporary legislation that mandates incarceration for a wide range of offenses and circumstances (e.g., probation violations) has resulted in incarcerating more women and, particularly, more poor women of color, than ever before. Yet a primary emphasis of much of the programming for incarcerated women focuses on one aspect of women's lives – trying to help them become better mothers – without adequately addressing other critical problems that they face (e.g., employment, housing, transportation, drug and alcohol addiction) or the systemic issues that shape women's choices.

Future Directions

There is a growing recognition among federal agencies such as the Office of Juvenile Justice and Delinquency Prevention and the National Institute of Corrections, as well as research centers such as the National Center for Crime and Delinquency, of the need for theoretically informed, evidence-based programs that are gender specific and culturally appropriate. Such programs will require sustained funding and ongoing evaluations to ensure that the most effective models are widely available. Lack of adequate resources to develop and maintain programming is especially problematic for incarcerated girls and women. Improved and enhanced staff training and support for probation officers, correctional and detention officers, and other court personnel is also of critical importance. This training should be designed to debunk cultural and gender stereotypes held by staff and provide them with a broader understanding of the multifaceted contexts and complexities of girl's and women's lives.

Increasingly, programming for girls and women incorporates recognition of gendered pathways and the blurred boundaries between victimization and offending. This must remain a central component of gender-responsive programming, but it is not adequate or sufficient to explain the varied and complex situations and structural conditions that result in women and girls – and men and boys – engaging in crime and delinquency. Attention to victimization histories must be augmented in a number of ways, including educational, employment, and interpersonal skill building. Peer and family relationships also must be explicitly addressed. Girls' delinquency often occurs within the context of their friendship and romantic relationships, and past and present family dynamics are often a factor in girls' and women's offending. Finally, programming for adolescents must recognize and address the ways in which concentrated disadvantage in neighborhoods and schools shapes girls' and boys' available options and choices.

In sum, curriculum development and staff training must continue to reflect differences in offending patterns (gendered ratios of crime and delinquency) but must also incorporate new understandings of gendered lives, gendered pathways, and gendered crimes if they are to be effective. Moreover, programming must take into account the structural, institutional, and interpersonal (i.e., macro, meso, and micro) forces and dynamics through which race, gender, and class collectively pattern, shape, and constrain individuals' choices and actions. Simultaneously, scholars are encouraged to partner with

practitioners to develop, assess, and refine theoretically and empirically strong prevention and intervention models grounded in an understanding of the multifaceted ways in which gender matters.

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Gendering Traditional Theories of Crime

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Overview

The major theoretical paradigms in criminology developed with little to no consideration of sex or gender differences in offending. Insights from gender and feminist studies demonstrate, however, that ignoring sex and gender in explanations of crime is to the detriment of the field. In this essay, we discuss contributions of gender and feminist studies to criminology with an emphasis on gender research that developed within the major criminological paradigms as well as research that steps outside traditional paradigms to draw more explicitly from gender and feminist theory. These bodies of research have underscored the need to consider how gender influences male offending, female offending, and the gender gap in offending through shaping power arrangements, opportunities, definitions of the sexes, and identities. We propose that one

of the most promising directions for future work in criminology lies in further integration of traditional criminological perspectives with emerging work on offending rooted in feminist paradigms and not yet integrated with some of the core insights from theories of offending.

Introduction

Research consistently demonstrates that males commit more crime than females. Perhaps because of the persistent gender gap in crime, the major criminological paradigms developed with little concern for understanding female offending. Indeed, early work often ignored females altogether or focused on explaining sex differences in behavior, but did not incorporate gender as a social process that might explain sex differences and similarities in criminal involvement. Insights from gender and feminist studies, however, have shown that ignoring gender prohibits full understanding of the sources not only of female offending but also of male offending and of the gender gap in offending.

In this entry, we discuss the contributions of gender and feminist studies to the major criminological paradigms – control, strain, and learning. In doing so, we discuss research that demonstrates that the variables and processes specified in traditional criminological theories are shaped by gender in ways that contribute to the gender gap in crime. Simply emphasizing that gender shapes these variables and processes, however, proves insufficient for understanding the social forces contributing to the gender gap in crime. As such, we highlight work that has drawn more heavily on feminist theorizing and gender studies to introduce new variables and processes – for example, power arrangements, gendered opportunities and constraints, and cultural meanings of gender – to traditional criminological theories. We maintain that these lines of work underscore limitations in traditional theories and suggest avenues for the expansion of criminological theory that are important not only for understanding the gender gap in offending but for understanding crime generally. We also discuss research on gender and crime that departs from traditional criminological theory to focus on relationships between masculinities, femininities, and intersectionalities and crime. This work has made important contributions to criminology beyond what has been achieved by work focused on traditional theories of crime. It is our view that more theorizing and research must integrate new gendered insights into traditional perspectives to provide more thorough understanding of the structural and social-psychological processes leading to male offending, female offending, the gender gap in offending, and gender/race/class differences in offending.

Theorizing Gender Vis-Vis Traditional Theories of Crime and Delinquency

Early theorizing in criminology provided only cursory explanations for the gender gap in illegality, positing that females have either less exposure to the processes and variables in traditional theories that promote illegal behavior or more exposure to those that control such behavior (Sutherland 1947; Gottfredson and Hirschi 1990). Some scholars have demonstrated that the concepts from traditional theories have gender-differentiated effects on crime and delinquency, proposing that these differences are linked to gendered processes that have remained largely unmeasured and undertheorized (e.g., LaGrange and Silverman 1999; Broidy 2001; Lonardo et al. 2009). There, of course, have been some important advances within each of the criminological traditions – control, strain, and learning – that have drawn heavily from feminist theory and gender studies (Hagan et al. 1987; Chesney-Lind 1989; Heimer 1996; Heimer and De Coster 1999). We discuss the development of each of these traditions and the contributions of feminist and gender studies to these traditions below.

Control Theories

According to control theories of crime, everyone would be tempted to break the law in the absence of social constraints. The prime focus in this

category of theory, therefore, is not why people commit crime but why they refrain from illegal behavior. The most prominent perspectives in this tradition – Hirschi's (1969) social control theory and Gottfredson and Hirschi's (1990) self-control theory – were not formulated to address the role of gender differences in offending, although some research has moved in this direction. The power-control theory of Hagan and colleagues (1987), for example, was specifically formulated to address gender and sex differences in offending and, in so doing, contributed importantly to criminological thinking.

Briefly, Hirschi's (1969) social control theory suggests that bonds to society – attachment to conventional others, commitment to conventional pursuits, involvement in conventional activities, and belief in the single moral order – effectively explain offending regardless of the sex of the offender. Scholars subsequently have suggested that the process of social bonding may be gendered. For example, drawing on feminist theory about relationships to others, some scholars posit that females develop stronger attachments to others and that this is associated with lower rates of female than male offending (e.g., Heimer 1996). Although some scholarship concludes that family bonds influence female and male delinquency similarly (e.g., Kruttschnitt and Giordano 2009), other research supports the proposition that the process of bonding through attachments to others is gendered (e.g., Heimer and De Coster 1999). Additional research supports a gendered bonding perspective, reporting that conventional beliefs control delinquency more strongly for females than for males (Liu and Kaplan 1999). This research generally suggests that understanding sex differences in crime and delinquency may require thinking conceptually about gender and moving beyond the original statements of social control theory.

The same is true in the case of research based on Gottfredson and Hirschi's (1990) self-control theory. Proposed to be gender neutral, the theory posits that sex differences in low self-control – typified by impulsiveness, thrill-seeking, and an inability to delay gratification – are the primary cause of gender differences in law violation. More specifically, sex differences in offending result from the fact that females acquire higher levels of self-control because parents are more likely to monitor and punish misbehavior in daughters than sons (e.g., LaGrange and Silverman 1999). These differences established early in life are presumed to persist into adulthood. Beyond this, researchers have not often explored the possibility that the effect of self-control on illegality can vary across sex or that the processes of self-control may in fact be gendered. Pratt and Cullen's (2000) meta-analysis indicates, however, that the effect size of self-control is larger for females than for males. Theoretical discussion of the gendered reasons for such a difference has been minimal to date. This may reflect the fact that the theory is intended to be general and hence, in effect, gender neutral.

By contrast, power-control theory, developed by Hagan and his colleagues (Hagan et al. 1987), maintains that understanding sex differences in law violation requires a perspective that focuses explicitly on gendered power structures and control processes that relay gendered messages within families. Specifically, power-control theory maintains that gender differences in the control of sons and daughters, via emotional attachments and supervision, can be traced to power relations between mothers and fathers (Hagan et al. 1987). When fathers experience greater power than mothers in the workplace, this is said to translate into greater paternal than maternal power in the home (patriarchal households). When fathers and mothers have equal power in the workplace, they share more or less equally in power in the home (egalitarian households). These power dynamics shape the relative control of daughters and sons, through supervision and emotional attachments, which influences risk preferences and perceptions among boys and girls. These processes ultimately create a sex gap in delinquency that is larger in patriarchal households than in egalitarian households. In more recent formulations of the theory, risk orientations have been replaced with discussions of gender schemas related to appropriate behaviors and characteristics of the sexes

(Hagan et al. 2004). Empirically, research has supported the prediction that the sex gap in delinquency is larger in patriarchal families than in more egalitarian families because of gender-differentiated social control, gendered orientations toward risk, and gender schemas (e.g., Hagan et al. 1987, 2004). While some research fails to replicate some of these findings (e.g., Jensen and Thompson 1990), power-control theory has received a good deal of empirical support. This support demonstrates that traditional control perspectives that fail to consider the way in which gendered power structures shape controls and gendered messages within families offer an incomplete portrayal of the structural and social-psychological roots of law violation among both males and females.

Strain Theories

Strain theories maintain that crime is not an innate characteristic of individuals and instead focus on the social factors that promote offending. A central tenet of these perspectives is that illegality results from failure to achieve positively valued goals. Classic strain explanations focused on failure to achieve economic- or class-based status goals (e.g., Merton 1938; Cloward and Ohlin 1960), which some argue renders them entirely ineffective for explicating the sex gap in offending since females face more structural barriers to success in the economic realm than males (Chesney-Lind 1989). However, macro- and microlevel reformulations of strain theory coupled with insights from feminist and gender studies address this gendered challenge.

At the macrolevel, gender researchers have drawn on Cloward and Ohlin's (1960) extension of anomie/strain theory to emphasize that blocked legitimate opportunities do not always result in illegality because people also face barriers to economic success in the illegitimate world of crime. For instance, Steffensmeier (1983) proposes that the petty, nonserious, and non-lucrative nature of female crime can be explained largely by the fact that male-dominated illegal networks exclude or restrict women from organized criminal enterprises. This theme is one that finds prominence also in ethnographic work on economic street crimes, including robbery, burglary, and drug-trafficking (Miller 1986, 2001; Maher 1997 ; Mullins and Wright 2003). These studies demonstrate that the illegal activities associated with the highest pay, power, and status are largely the domain of males who have access to male-dominated street networks that operate to limit female participation in the most lucrative criminal enterprises in the streets. Daly's (1989) research shows that this pattern of exclusion applies also to white-collar crimes where women's opportunities are restricted by their occupational positions and limited access to both organizational resources and male-dominated criminal networks. Although these studies are not situated specifically in the strain tradition, they speak to strain theories by highlighting the importance of gender in shaping opportunities and constraints in the illegitimate world of crime. More generally, they demonstrate that understanding differences in crime across broad categories of not only gender but also of age, class, and race may require consideration of illegitimate opportunities that often are made accessible through social networks that tend toward homosocial reproduction.

At the microlevel, Agnew (2006) broadens the scope of crime producing strains beyond the economic realm by considering goals related to the pursuit of meaning, interpersonal relationships, and a desire for justice. His general strain theory posits that failure to achieve these goals produces negative emotions that promote crime when individuals lack social supports and legitimate coping resources.

In a gendered extension of this theory, Broidy and Agnew (1997) propose that gender socialization shapes the variables in general strain theory in ways that are relevant for understanding the gender gap in illegality. Specifically, they posit that the types of strains to which males and females are exposed, their emotional responses to these strains, and their coping mechanisms (including social support) are shaped by gender. For instance, they draw on feminist work to suggest that males and females experience different types of strains because they have gender-differentiated goals; females focus on

maintaining relationships, nurturance, and the treatment of others in interaction, whereas males focus on goals related to economic success, personal achievement, and the outcomes of interaction. They propose that the gender-differentiated strains experienced by males and females are relevant for understanding the gender gap in offending because male-typical strains may be more conducive to illegality than female-typical strains. For instance, the male-typical strains of failure to achieve economic goals and criminal victimization are conducive to property and violent offending, respectively. Female-typical strains are less conducive to illegal behavior because such behavior often harms others or damages social relationships. Although research supports the notion that strains align with gender-differentiated goals, there is little evidence that male-typical strains are more likely than female-typical strains to produce crime and delinquency (see Agnew 2006).

Emotional responses to strain have been shown to be gendered in ways consistent with Broidy and Agnew's (1997) proposition that males and females both experience anger, but they do so in ways that are qualitatively distinct. That is, both males and females respond to strain with anger (Broidy 2001). However, female anger is more likely than male anger to be accompanied by depression, which Broidy and Agnew (1997) suggest tempers the impact of anger on their offending. This claim is not supported by empirical research, however (De Coster and Zito 2010). The proposition that coping and social support resources more effectively buffer the impact of strain on illegal behaviors among females than males also has not been supported empirically (see Agnew 2006).

Overall, strains and emotions are gendered in ways consistent with Broidy and Agnew's (1997) propositions. Empirical evidence indicates, however, that the gendering of strains and emotions is fairly unimportant for understanding the gender gap in offending. Instead, gender differences appear to emerge because males are more likely than females to respond to strain and negative emotions through illegal behaviors, suggesting that more emphasis should be placed on understanding the gendered messages males and females learn about appropriate methods for dealing with strain and expressing negative emotions.

The significance of Broidy and Agnew's (1997) research for understanding female offending may lay in the attention it draws to strains outside of the economic sphere. This insight has been at the center of some feminist research that focuses on physical and sexual abuse at the hands of family members as particularly relevant for understanding female crime because females are more likely than males to be the victims of such abuse in patriarchal society (see Chesney-Lind 1989). A common coping strategy for dealing with abuse at home – running away – has been criminalized, leading young girls to the criminal justice system or to the streets, where their opportunities for survival are limited, as discussed above. Given that females are valued as sexual objects in patriarchal society, prostitution becomes a viable survival strategy for these girls even though this strategy would be largely unavailable to similarly situated boys (Miller 1986; Chesney-Lind 1989). Although research shows that males and females are equally likely to respond to family abuse with delinquency (see Kruttschnitt and Giordano 2009), the theme underlying this work is that exposure to abuse, the types of abuse to which youths are exposed, and the reasons for abuse may be intimately informed by power relations in patriarchal society. That is, these studies highlight the importance of focusing on the unique problems and circumstances that lead females into crime and delinquency because they lead lives markedly different from males in patriarchal society. We believe this insight also highlights the importance of considering the ways in which patriarchy uniquely shapes males' lives in ways that may make them particularly crime-prone (e.g., Messerschmidt 1993).

Learning Theories

Learning theories contend that crime is motivated by social factors but move away from an emphasis on blocked goals and stressful circumstances to focus on the socialization and interactional

processes by which individuals develop and internalize attitudes, behavior patterns, and definitions of situations that promote offending. The original statement of learning theory was Sutherland's differential association theory (Sutherland 1947), which was later reformulated as social learning theory (see Akers 1998). As with other traditional theories of crime, learning theories were not formulated to address sex differences in offending; however, because they focus on differences across groups in orientations toward crime and deviance, even the earliest versions included discussion of differences in the socialization experiences of females and males that are linked to differences in law violation (Sutherland 1947: 100–101). Following this observation, research on the gender gap has explored the ways that sex and gender shape the form and content of learning and interactions that lead to offending. The addition of concepts from feminist theory to this tradition emphasizes an important dimension of gender in society that has not been addressed in traditional learning theories – cultural definitions of gender, which like definitions of law are learned in interactions (e.g., Heimer and De Coster 1999).

A major tenet of learning theories of crime is that people learn definitions and behavior patterns that are both favorable and unfavorable to law violation in interactions with others; when a person's definitions and behavior patterns favorable to offending are in excess, law violation is likely to occur (Sutherland 1947; Akers 1998). Factors that affect interactional patterns – like sex and gender – can be expected to shape learning about crime and delinquency. Research shows that, regardless of sex, people learn law violation from interacting with criminal peers (e.g., Smith and Paternoster 1987) and deviant families (Lonardo et al. 2009). In terms of sex differences, research on juvenile delinquency shows that boys break the law more often than girls in part because boys have more deviant friends and, in some cases, because the impact (i.e., size of the effect) of peer influence is larger for boys (e.g., Heimer and De Coster 1999; Bottcher 2001).

Heimer's (1996; Heimer and De Coster 1999) reformulation of traditional differential association theory draws on the feminist argument that, traditionally, females have been more encouraged than males to focus on care, concern, and the maintenance of interpersonal relationships. Their research shows that close relationships with parents are more important for learning delinquent definitions among females and that a more direct parental control – supervision – is more relevant for boys' learning. These findings suggest that gender differences in learning crime cannot be understood in terms of only male-female differences in levels of supervisions and control, as emphasized by Sutherland (1947); rather, theory and research must also recognize that there are significant differences across sex in the mechanisms through which social groups (e.g., parents) communicate and affect the learning of definitions of crime and delinquency.

In addition, Heimer and De Coster (1999) maintain that it is not enough to consider the learning of definitions of the law; theory and research must also recognize that in gender-stratified societies, people are surrounded by strong cultural definitions of gender that become internalized and operate alongside definitions of the law to influence crime and delinquency. Because the dominant or hegemonic cultural definitions of femininity are more inconsistent with harming others (e.g., through theft or aggression) than are dominant definitions of masculinity, gender definitions would seem to be important for understanding criminal behavior. Indeed, research has shown that traditional conceptions of masculinity and femininity are important for understanding aggression and law violation (e.g., Simpson and Elis 1995; Heimer and De Coster 1999; Bottcher 2001). As such, learning theories cannot be limited to a focus on the cultural product of definitions of the law but also must acknowledge the role of definitions of gender.

Gender Studies, Feminist Theory, and Explanations of Offending

Other research on gender and crime – that is not clearly associated with the three dominant traditions in criminology – also emphasizes the

importance of cultural definitions of gender for understanding crime. However, this work stresses the need to consider how race, class, gender, and sexuality shape persons experiences and definitions of gender in ways that deepen our understanding of law violation. We maintain that these developing lines of study are becoming important not for simply understanding gender differences but also for understanding variability in crime and violence among males and among females (De Coster and Heimer 2006).

There is a growing body of research that highlights the importance of hegemonic gender definitions – or culturally dominant ideals about gender. This work draws inspiration from gender studies, especially the theorizing of Connell (1995), which argues that societal definitions of masculinities represent a power hierarchy, with hegemonic masculinities being the idealized masculinity that is accessible to members of powerful groups, such as heterosexual white men from the middle and upper classes. By contrast, marginalized masculinity is constructed by members of oppressed groups as they try to navigate their disadvantages in terms of resources and power. The reaction of marginalized groups to hegemonic masculinity – unattainable to men who cannot demonstrate masculinity via legitimate avenues – can involve the use of violence and crime (e.g., Mullins et al. 2004). Messerschmidt (1993) argues that, over time, violence can become an accepted way to claim masculinity in communities that experience persistent blockage of legitimate avenues for "doing gender". In these settings, men can become culturally accountable to marginalized definitions of masculinity that are characterized by competition through the show of physical power, heterosexuality, and the use of violence (e.g., Mullins et al. 2004; Miller 2008).

Consistent with this, sociological studies suggest that claiming masculinity in extremely disadvantaged urban communities can require demonstrating "nerve" in various ways, including "throwing the first punch, getting in someone's face, or pulling the trigger" (Anderson 1999: 92). Research shows that these conceptualizations of masculinity have important implications for understanding law violation, including street crime and violence against women (e.g., Messerschmidt 1993; Mullins et al. 2004; Miller 2008). Although not born of traditional criminological theory, this line of work has very important implications for understanding variability in offending among males and across groups at different junctures of societal power. While it is clearly important for illuminating the "gender gap," research and theorizing on masculinities and offending has a good deal to offer to criminology *generally* – even to research that does not address sex differences. In short, it shows that "gender matters," in that constructing masculinities is a part of daily life that has implications for crime among men.

What has been less well developed is the relationship between femininities and offending. Some research proposes that normative conceptions of femininity are relatively incompatible with crime and violence (e.g., Simpson and Elis 1995; Heimer and De Coster 1999). This logic, however, has not accounted for variations in femininities but has focused on what gender studies scholars like Connell (1995) call "emphasized" or dominant femininities, which are most accessible to white, middle-class women (see Hill Collins 2004). These dominant femininities – which are inconsistent with the use of crime and violence to solve problems – support hegemonic masculinities and are sometimes not a cultural option for displaying gender among minority and poor women (Simpson 1991; Hill Collins 2004). Consequently, some researchers stress the need to focus on alternative forms of femininities that are more conducive to violence than the hegemonic form, resulting in discussions of "pariah" (Schippers 2007), "bad girl" (Messerschmidt 1997), and "racialized" (Hill Collins 2004) femininities.

Others suggest that females who break the law are not enacting alternative femininities but may be enacting masculinities or using law violation to protect feminine identities (Miller 2001). Indeed, ethnographic studies indicate that females in economically marginalized communities, like males, use violence instrumentally to garner respect and protect identities and

reputations. Unlike males, who often are protecting identities as tough and masculine, females more often use violence to defend themselves against threats to their respectability or reputations as "respectable girls" (Miller 2001, 2008; Miller and Mullins 2006; Mullins et al. 2004). Additionally, it has been suggested that crime and violence by females can be a reaction to men displaying masculinity. For example, girls in gangs may act tough to avoid victimization (Miller 2001, 2008), and women may retaliate with violence and other crimes in response to prior and present abuse at the hands of men (Maher 1997). These examples may well be reactions to dangerous environments shaped by patriarchal power structures and not the enactment of hegemonic or alternative femininities.

Generally, there appear to be a variety of mechanisms through which gendered structures and identities influence crime and violence among females. Further articulation of these mechanisms is an important endeavor for the criminological community because theory and research on multiple masculinities and femininities may be particularly well suited for explicating the ways in which race, class, and gender intersect in the production of race-class-gender patterns of offending (De Coster and Heimer 2006).

Conclusions

This research shows that the variables and processes identified as important in the etiology of offending are gendered in ways that contribute to the sex gap in offending. This, of course, marks an important contribution to the understanding of crime and the sex gap in crime; however, a more comprehensive understanding of criminality by males and females requires consideration of variables and processes rooted specifically in gendered arrangements which have been highlighted in feminist and gender studies.

Researchers have incorporated feminist and gender studies into each of the theoretical traditions discussed, demonstrating the utility of wedding traditional criminology with gender and feminist insights by uncovering structural and social-psychological sources of offending by males and females that are shaped by gender – for example, power arrangements, illegitimate opportunities, and cultural definitions of gender – and that heretofore had been de-emphasized or ignored altogether (Hagan et al. 1987, 2004; Chesney-Lind 1989; Heimer and De Coster 1999). These feminist-informed studies are important not only for having reoriented traditional theories of crime but also for having laid the groundwork for the evolution of research on crime rooted more squarely in feminist and gender studies paradigms. This research, though not rooted in traditional criminology, proves promising for pushing traditional criminology forward as it becomes more fully incorporated into general theories of offending.

An important corrective to traditional criminology derived from emerging feminist scholarship on crime is that biological sex and gender socialization should be decoupled to allow for an emphasis on variations in gendered power, identities, and definitions within sex that give rise to offending differences within sex groups. Gender and feminist studies do not simply contribute to our understanding of the gender gap in crime; they significantly expand our understanding of the causes of crime. What we have learned is that even studies of male crime, for instance, are incomplete without consideration of how gender shapes everyday life. The incorporation of this insight into understanding crime is likely to be at the heart also of understanding variations in offending across groups and individuals situated at various junctures in race, class, and gender hierarchies (see De Coster and Heimer 2006).

An essential direction for future work in criminology lies in the integration of traditional criminological perspectives with emerging work on offending rooted in feminist paradigms. Miller and Mullins (2006) recently advised that the most promising direction for the future of feminist criminology resides in work that enriches its analyses of the gendered lives of males and females with work from the broader field of criminology. We add to this that the most promising direction for the future of criminological

endeavors generally resides in drawing further insights from feminist studies that underscore the importance of considering how gender structures everyday life.

Related Entries

- ▶ Feminist Criminological Theory
- ▶ Gendered Theory and Gendered Practice
- ▶ History of Criminological Theories: Causes of Crime

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General Patrol

► Preventive Patrol

General Strain Theory

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Overview

General strain theory (GST) states that strains increase the likelihood of crime, particularly strains that are high in magnitude, are seen as unjust, are associated with low social control, and create some pressure or incentive for criminal coping. Examples include parental rejection, criminal victimization, a desperate need for money, and discrimination. These strains increase crime for several reasons; most notably, they lead to a range of negative emotions, which create pressure for corrective action. Crime is one possible response. Crime may be used to reduce or escape from strains (e.g., theft to obtain money, running away to escape abusive parents), seek revenge against the source of strain or related targets, or alleviate negative emotions (e.g., through illicit drug use). A range of factors, however, influence the response to strains. A criminal response is more likely when people lack the ability to cope in a legal manner, are disposed to crime, and the costs of crime are low and the benefits are high. This entry describes the current status of GST, and is organized around a set of propositions dealing with (a) the nature of those strains conducive to crime; (b) the reasons why these strains increase crime; (c) the factors influencing or conditioning the effect of these strains on crime; and (d) efforts to apply GST to new areas, such as group differences in crime.

General Strain Theory: Key Propositions

General strain theory was first proposed in 1992 and has since inspired hundreds of research reports (see Agnew 1992, 2006; Agnew and Scheuerman 2011; Hoffmann 2010). This research has tested the theory, proposed revisions in it, and applied it to new areas. It is therefore important to describe the current state of GST. Further, it is an opportune time to do so, given that 2012 was the twentieth anniversary of the theory. This entry draws on the research to present an updated version of GST, stated in the form of several core and secondary propositions. Each proposition is followed by a definition of key terms, the rationale for the proposition, summaries of the relevant research, and suggestions for further research. Given the large body of research on GST, it is only possible to cite previous reviews of GST and certain of the more recent research. And what follows is of course the author's view of the current state of GST; others may argue for additional revisions in and extensions of the theory. In fact, the chapters on GST in this volume by Baron, Slocum, and De Coster propose several major extensions in GST.

As the propositions below make clear, the basic form of GST remains intact. Certain strains increase the likelihood of crime, in part through their impact on negative emotions, with a range of factors influencing the likelihood of a criminal response. But the original statement of theory has been revised and extended in numerous ways. As noted below, the theory now better specifies the types of strain most likely to result in crime, more

fully describes why these strains increase crime, and lists additional factors that may condition the effect of strains on crime. Also, the theory has been extended to explain group differences in crime, offending over the life course, and a broader range of crimes and deviant acts. At the same time, the theory is in need of further development in several areas. Most notably, the theory needs to better explain why some individuals are more likely than others to cope with strains in a criminal manner. Related to this, there should be an effort to better link GST to biological factors and larger social forces – both of which influence the exposure and reaction to strains. And efforts should be made to apply GST to the control of crime and the analysis of the criminal justice system.

The Nature of Those Strains Conducive to Crime

1. *Certain strains increase the likelihood of crime*. Strains refer to events and conditions that are disliked by individuals (Agnew 1992, 2006). Strains are similar to "stressors," but the term "strain" is used to emphasize the fact that GST is derived from prior strain theories in criminology and that it does not focus on all stressors, but rather on a subset of stressors conducive to crime. Strains may fall into one *or more* of three broad categories: (a) the inability to achieve valued goals (e.g., monetary, status goals), (b) the loss or threatened loss of valued stimuli (e.g., material possessions, the death of family members), and (c) the presentation or threatened presentation of negative stimuli (e.g., verbal and physical abuse). For example, an insult may involve the failure to achieve a valued goal (respect), the loss of valued stimuli (respectful treatment), and the presentation of a negative stimulus (the insult itself). The three categories of strain are presented not because they are necessarily distinct from one another, but rather to ensure that researchers consider a broad range of strains.

1a. *Those strains most conducive to crime (a) are high in magnitude; (b) are seen as unjust; (c) are associated with low social control; and (d) create some pressure or incentive for criminal coping*. These characteristics increase the likelihood that strains will impact those intervening mechanisms that lead to crime (see below). For example, strains that are high in magnitude and seen as unjust, such as an unprovoked physical attack, are more likely to make individuals angry than strains without these characteristics, such as an accidental bump. Agnew (2001, 2006) provides further information on these characteristics, including strategies for their measurement. Strains that are high in magnitude are high in degree (e.g., a large versus small financial loss), are frequent, recent, of long duration, and expected to continue into the future. Also, such strains are high in centrality; that is, they threaten the *core* goals, needs, values, activities, and/or identities of the individual. Strains that are seen as unjust typically involve the voluntary and intentional violation of a relevant justice norm or rule. Strains associated with low social control involve little direct control by others, weak attachment to conventional others, and/or little investment in conventional institutions. An example is parental rejection. Juveniles experiencing this strain are usually poorly supervised by and weakly bonded to their parents. Finally, strains that create some pressure or incentive for criminal coping are easily resolved through crime and/or involve exposure to others who encourage or model crime. For example, that strain involving a desperate need for money is readily resolved through crimes such as theft, drug selling, and prostitution. That strain involving the inability to achieve educational success, however, is not so easily resolved through crime. To give another example, strains involving criminal victimization expose individuals to others who model crime.

Several specific strains tend to possess the above characteristics, including parental rejection; erratic, excessive and/or harsh discipline; child abuse and neglect; negative secondary school experiences (e.g., low grades, poor relations with teachers); abusive peer relations; work in the secondary labor market (jobs with low pay, few benefits, poor working conditions); unemployment, especially when chronic and blamed on others; certain marital problems (frequent conflicts, verbal and physical abuse);

the failure to achieve selected goals (thrills/excitement, autonomy, masculine status, the desire for much money in a short period of time); criminal victimization; residence in economically deprived communities; homelessness; and discrimination based on race/ethnicity, gender, and religion. Research suggests that these strains increase the likelihood of crime, with some being among the most important causes of crime (see Agnew 2006; Agnew and Scheuerman 2011; Baron 2009).

Researchers, however, need to devote more attention to certain of these strains, such as discrimination (e.g., Eitle 2002; Simons et al. 2003). Also, researchers should explicitly measure characteristics such as the magnitude and perceived injustice of strains, determining if variation in them affects crime (see Agnew 2006; Rebellon et al. 2009). Unfortunately, the research on GST sometimes employs measures of strain that are rather general; so it is not clear whether the strains examined possess the above characteristics. For example, researchers often measure the experience of strains by employing checklists that ask such things as whether a family member has died. But when explaining crime, it makes a great deal of difference whether the death involved a great-grandmother who died of natural causes (moderate magnitude, little injustice) or a brother who was shot by rival gang members (high magnitude, high injustice). Related to this, there is a need for *qualitative* research on the nature of and response to strains; such research will allow for the detailed measurement of the nature of strains and perhaps suggest other characteristics that should be considered when explaining crime.

1b. *Strains may be objective or subjective in nature, with subjective strains having a greater effect on crime*. Objective strains refer to events and conditions disliked by most people in a given group. Subjective strains refer to events and conditions disliked by the people experiencing them (Agnew 2006). Research indicates that individuals often differ a good deal in their subjective evaluation of a given objective strain, such as divorce. Some individuals view their divorce as the worst thing that ever happened to them, while others view it as a cause for celebration. Subjective strains should have a greater impact on crime since they are more likely to trigger negative emotional reactions and other of the intervening processes conducive to crime (see below). At the same time, objective strains may increase crime even when not subjectively disliked, since these strains may still have criminogenic effects (e.g., they may lower social and self-control). Most studies employ objective measures of strain, focusing on events and conditions assumed to be disliked by most people. The few studies that have examined both objective and subjective strains have produced mixed results; only some find that subjective strains have a stronger effect on crime (e.g., Froggio and Agnew 2007). More research is needed in this area, including research that measures the subjective interpretation of strains in more detail. For example, are strains perceived to be high in magnitude and are they blamed on others (a key component of perceived injustice). Baron (2008) provides an excellent illustration of the potential value of such research, finding that the manner in which unemployment is interpreted has a major impact on whether it affects crime.

1c. *Strains may be experienced, vicarious, and anticipated, with experienced strains having a greater effect on crime*. GST focuses on the individual's personal experiences with strains, but certain vicarious and anticipated strains may affect crime (Agnew 2006; Baron 2009). Vicarious strains refer to the individual's awareness of strains experienced by others. Such strains are more likely to affect crime if they involve close others, such as family and friends; the individual feels some responsibility for the welfare of these others; the strains have the characteristics listed in 1a; and the strains signal a threat to the individual. An example involves the shooting death of a fellow gang member by those in a rival gang. Anticipated strains refer to the individual's expectation that current strains will continue into the future or that new strains will be experienced. Anticipated strains are more likely to result in crime when individuals believe that they have a high probability of occurring in the near future and they have the characteristics listed in 1a. Experienced strains should be

more likely to affect crime than vicarious and anticipated strains, since they pose a more direct and immediate problem for individuals. At the same time, research on criminal victimization indicates that the victimization of close others and the anticipated victimization of oneself may increase crime (Agnew 2002; Baron 2009). Research on other types of vicarious and anticipated strain is needed (e.g., financial hardship experienced by close others, the anticipation of financial difficulties by corporate executives).

1d. *Strains are more likely to affect crime when they are clustered together in time*. The temporal clustering of strains is more likely to result in the criminogenic effects described below, such as the taxing of legal coping resources (see Agnew 2006). And certain research suggests that crime is more likely when several strains are experienced at the same time (Slocum et al. 2005). This clustering effect implies an interaction: The effect of a given strain on crime will be stronger when other strains are present. It is often difficult, however, to examine the many interactions between multiple strains. But researchers can examine both the separate and the cumulative effects of strains, with the cumulative effect being measured in terms of the number of criminogenic strains experienced at the same time or close together in time. Crime should become more likely as this number increases. More research is needed in this area, however. Among other things, the nature of this cumulative effect needs to be better specified. For example, it may be the case that the cumulative strain measure has a nonlinear effect on crime, such that further increases in the number of strains beyond a certain threshold point have little effect on crime.

Why the Above Strains Increase Crime (Intervening Processes)

2. *The strains listed above increase the likelihood of crime for several reasons; most notably, they lead to negative emotional states, which create pressure for corrective action – with crime being one possible response*. Recall that strains refer to disliked events and conditions, with the most criminogenic strains being high in magnitude and perceived as unjust. Not surprisingly, these strains lead to negative emotions such as anger, frustration, and/or depression. These emotions create pressure for corrective action: Individuals feel bad and want to do something about it. Crime is one response. Research suggests that state anger partly explains the effect of strains on crime, especially violence. And research has begun to focus on the mediating role played by other emotions, such as depression (Agnew 2006; Agnew and Scheuerman 2011). It is beginning to appear that some types of strain may be more conducive to certain negative emotions than others, and that some negative emotions may be more conducive to certain crimes than others. For example, anger may be more conducive to externalizing behaviors such as aggression, while depression may be more conducive to internalizing behaviors such as drug use. More research is needed in this area. Research is also needed on the reasons why negative emotions increase crime; for example, anger may increase aggression because it energizes individuals for action, creates a desire for revenge, reduces concern for the consequences of one's behavior, and/or limits the ability to engage in many legal coping behaviors – such as negotiation (Agnew 2006).

2a. *Strains reduce the ability to legally cope, making crime seem like a rational option*. A large financial loss or chronic unemployment, for example, may exhaust one's financial resources, leaving few legal options for obtaining money. Consequently, crime may appear to be the most effective way to respond to strain. As such, strains may sometimes lead to crime in the absence of negative emotions (see Hoffmann 2010).

2b. *Strains may also increase crime because they foster traits conducive to crime, particularly negative emotionality/trait anger and low constraint/low self-control*. This is especially true of chronic strains (Agnew 2006; Colvin 2000). Chronic strains tax legal coping resources, such that individuals are more easily upset when they experience new strains (a key characteristic of trait anger and negative emotionality). Also, certain strains – such as harsh and erratic discipline – may foster low constrain or low self-control.

Individuals must be taught to exercise self-restraint, and this occurs when they are consistently sanctioned for misbehavior in a reasonable manner. There is limited support for these arguments, with several studies finding that strains reduce self-control and, especially, increase trait anger/negative emotionality (Agnew 2006; Colvin 2000). Further, these traits partly mediate the effect of strains on crime. More research is needed here, however, particularly longitudinal research.

2c. *Strains may increase crime because they reduce social control*. Strains frequently involve negative and unjust treatment by others, including parents, spouses, teachers, employers, and those in the criminal justice system. Such strains may reduce attachment to these others, as well as commitment to school, work, and the criminal justice system. Individuals experiencing negative treatment may also limit their contact with these others: in some cases, running away from parents, dropping out of school, divorcing spouses, and quitting jobs. This reduces direct control, since these others are less able to monitor and sanction criminal behavior. Further, these effects may weaken beliefs condemning crime, since ties to those others who teach conventional beliefs are undermined. Beyond that, certain strains – such as chronic unemployment and homelessness – overlap with low social control. Researchers usually do not examine the effect of strains on social control, but several studies – some of which are longitudinal – have found that strains reduce the major types of control (Agnew 2006).

2d. *Strains may increase crime because they foster the social learning of crime*. Strains may increase the likelihood of association with criminal peers, a point emphasized by classic strain theorists (see Agnew 2006). Strains increase association with criminal peers by weakening social control, which frees individuals to associate with criminal peers, and by increasing the appeal of criminal groups. In particular, criminal groups are often seen as a solution to the strains one is experiencing. For example, criminal groups often provide status, protection from others, and opportunities to make money. In additions, strains foster beliefs conducive to crime. Individuals being treated in a negative and unjust manner by others are more likely to develop justifications and excuses for crime (e.g., peer abuse justifies violence, chronic unemployment excuses theft). Several studies provide support for these arguments (e.g., Agnew 2006).

2e. *Strains may have both contemporaneous and lagged effects on intervening variables and crime*. The experience of particular strains most often has a contemporaneous effect on intervening variables and crime. For example, imagine that a parent ridicules a child. This ridicule likely has a fairly immediate effect on the child's anger and attachment to the parent, and may lead to delinquent acts in the near term – such as striking the parent or running away from home. But with time, the child's anger and dislike of the parent fades, along with the likelihood of delinquency. In certain cases, however, strains may have lagged as well as contemporaneous effects on delinquency. This is the case with strains that are very high in magnitude, such as sexual abuse, and with chronic or persistent strains. Such strains may lead to negative emotional *traits*, to long-term reductions in the ability to legally cope, to long-term reductions in social control, and to long-term associations with criminal others and beliefs favorable to crime. For example, parents who regularly discipline their children in a harsh manner may lead the children to develop the trait of negative emotionality, may permanently reduce levels of parental attachment, and may foster the belief that violence is an appropriate response to certain problems. As a result, this chronic strain is likely to have both a contemporaneous and lagged effect on delinquency. When longitudinal data are available, researchers should attempt to estimate the contemporaneous effects of strains on crime and, where appropriate, the lagged effects as well.

Factors that Influence the Effect of Strains on Crime (Conditioning Variables)

3. *There are numerous ways to cope with strains, with a range of factors influencing the likelihood of criminal coping*. Criminal coping is more likely among those who (a) have poor conventional coping skills and resources (e.g., poor

problem-solving and social skills, low self-efficacy, limited financial resources), (b) have criminal skills and resources (e.g., criminal self-efficacy), (c) have low levels of conventional social support, (d) are low in social control, (e) associate with other criminals, (f) hold beliefs favorable to crime, (g) have traits conducive to crime (e.g., negative emotionality, low constraint), and (h) are more often exposed to situations where the costs of crime are low and the benefits high (Agnew 2006). Researchers have added to the list of conditioning variables since GST was introduced in 1992, pointing to the importance of environmental variables such as religious involvement and traits such as low self-control (Agnew 2006; Jang and Johnson 2005). The research on conditioning effects, however, has produced mixed results – and this constitutes perhaps the greatest puzzle regarding GST. Agnew (2006) lists several possible reasons for these mixed results, including methodological problems that make it difficult to detect conditioning effects in survey research, problems in the measurement of certain conditioning variables, and the fact that researchers usually consider the conditioning variables in isolation from one another. Criminal coping should be most likely among those who possess all or most of the factors conducive to such coping, an argument that has received some support (Mazerolle and Maahs 2000).

Research is needed to better investigate these possibilities (see Agnew 2006). Also, researchers should attempt to better draw on the bio-psychological research, which suggests that there are substantial differences between individuals in their sensitivity and reaction to stressors. Biological markers for these differences have been identified, and researchers should examine whether they condition the effect of strains on crime (Moffitt et al. 2011). Further, researchers should draw on the coping literature, which describes a range of strategies that individuals employ to cope with stressors (Agnew 2006). Some strategies appear to be more effective than others, although the effectiveness of particular strategies may vary by the type of stress. For example, religious involvement may be an effective way to cope with the death of a family member, but not with peer abuse. Researches should determine if certain strategies are more often linked to crime and, if so, they should examine the factors affecting the use of these strategies. Related to this, researchers should also examine whether past experiences with strains *reduce* the effect of current strains on crime, particularly in cases where the past strains were successfully resolved. Past experiences with strains may improve one's coping skills and increase one's tolerance of current strains.

Extending General Strain Theory

4. *GST can help explain group differences in crime, including socio-demographic, community, and societal differences*. Certain groups have higher crime rates than others because they are (a) more exposed to the criminogenic strains described above; (b) more likely to react to these strains with negative emotions; and/or (c) more likely to cope with these strains and negative emotions through crime, because they differ in their standing on one or more of the conditioning factors listed above. GST has been used to explain gender, race/ethnic, age, social class, community, and societal differences in crime (e.g., Agnew 2006; Bao and Haas 2009; Brezina et al. 2001; De Coster and Zito 2010; Froggio and Agnew 2007; Jang and Lyons 2006; Kaufman et al. 2008; Perez et al. 2008; Simons et al. 2003; Warner and Fowler 2003). Research suggests that GST applies to a range of groups and that it often helps explain group differences in offending. However, it is somewhat difficult to generalize from these studies. They frequently examine different strains, emotions, and conditioning variables; employ different measures; and examine different types of samples. So at present, there is still some uncertainty about how groups differ in the extent and nature of the strains they experience, as well as in their reaction to these strains. More research is needed here. Related to this, criminologists should attempt to link GST with macro-level theories – which can shed light on why and how groups differ in strains and the reaction to them. GST is a social-psychological theory, but it is compatible with a range of

macro-level theories, including most critical theories, feminist theories, and Institutional Anomie Theory (see Agnew 2006). Such theories discuss group differences in the experience of certain strains (e.g., types of gender oppression) and often provide some insight into group differences in the reaction to strain (e.g., gender differences in values and levels of control).

5. *GST can help explain patterns of offending over the life course, including "adolescence-limited" and "life-course-persistent" offending* (see Agnew 2006; Slocum 2010). Offending increases during adolescence because the social environment and biology of adolescents are such that they experience more criminogenic strains and associated negative emotions, and are more likely to cope with these strains/emotions through crime. Some individuals offend at high rates over much of their lives because (a) they possess relatively stable traits that increase their exposure to criminogenic strains and their likelihood of criminal coping; (b) they are part of the urban underclass, which increases their exposure to criminogenic strains and their likelihood of criminal coping, with an amplifying loop being set into motion – their criminal and other negative responses to strains increase the likelihood of further strains; and/or (c) they experience "stress proliferation," wherein the experience of certain strains leads to further strains (e.g., chronic unemployment leads to family conflict). Several studies have found that the level of strain over time is associated with the level of crime, and recent research has begun to test the explanations for the patterns of offending just described (e.g., Agnew 2006; Eitle 2010; Slocum 2010).

6. *GST can help explain situational variations in crime, with such variations partly due to situational variations in strain – particularly provocations*. Most crime research focuses on the factors that create a general predisposition for crime, but even highly predisposed individuals only engage in crime in certain situations. The routine activities perspective has dominated the explanation of situational variations in crime, arguing that crime is most likely in situations where motivated offenders encounter attractive targets in the absence of capable guardians. But qualitative data suggest that crime is also likely in situations where individuals encounter much strain; most notably, violent crime often results when individuals are provoked by others, with such provocations usually involving verbal and physical abuse. And property crime appears more likely in situations where individuals have a desperate need for money (Agnew 2006; Hoffmann 2010). More research is needed here, particularly survey research that builds on the qualitative studies (see Slocum et al. 2005).

7. *GST can explain a range of crimes and deviant acts beyond street crimes, although the theory should be customized to maximize explanatory power*. GST has been applied to the explanation of white-collar and corporate crime, terrorism, states crimes such as genocide, self-harming behaviors such as suicide attempts and eating disorders, cyber-bullying, police deviance, and other criminal/deviant acts (e.g., Agnew et al. 2009; Agnew 2010a; Hay et al. 2010; Maier-Katkin et al. 2009; Piquero et al. 2010). It is often the case that "customized" versions of GST are developed for each type of crime and deviance, with each version pointing to those strains and conditioning variables that are especially relevant. For example, the strains that prompt corporate crime or terrorism differ somewhat from those that prompt street crimes, although many strains are relevant across a range of crimes.

8. *GST can guide efforts to control crime, with such efforts reducing the exposure to criminogenic strains and the likelihood of criminal coping*. A variety of approaches may be employed here, including (a) reducing those strains conducive to crime (e.g., reducing child abuse, raising the minimum wage); (b) altering strains to make them less conducive to crime (increasing the perceived justice of criminal sanctions through the restorative justice approach); (c) removing people from criminogenic strains (e.g., from abusive homes or schools); (d) equipping people with the traits and skills to avoid criminogenic strains (e.g., teaching people to behave in a less provocative manner); (e) altering the perceptions or goals of people to reduce subjective strain (e.g., reducing

the emphasis on consumerism); (f) improving coping skills and resources (e.g., teaching problem-solving skills); (g) increasing social support (e.g., mentoring programs); and (h) reducing the disposition for criminal coping (e.g., altering beliefs conducive to crime). There have not yet been any attempts to use GST to reduce crime, although GST is compatible with a range of successful crime control programs (see Agnew 2006, 2010b).

GST can also be used to shed light on the nature and operation of the criminal justice system. In particular, strains may influence the focus of the criminal justice system (e.g., high levels of strain in the general population, such as unemployment, may contribute to more punitive criminal justice policies). Related to this, strains may influence public attitudes toward criminal justice (e.g., individuals experiencing certain strains may place more emphasis on punitive approaches). Strains may also influence the attitudes, behavior, and effectiveness of law enforcement, court, and corrections workers (e.g., strains may contribute to police deviance and turnover among prison staff). And strains may influence the attitudes and behavior of those processed by the criminal justice system (e.g., prison strains may affect inmate behavior and recidivism). A few recent studies have applied GST to the analysis of the criminal justice system (e.g., Blevins et al. 2010), and hopefully more work will be done in this area.

Conclusion

General strain theory has much support and has established itself as one of the leading theories of crime. In particular, there is much evidence that the strains identified by the theory impact crime and that they do so partly through negative emotions. GST is also increasingly being applied to new issues, such as the explanation of group differences in crime and offending over the life course. At the same time, certain parts of the research on GST have produced mixed results, particularly research on those factors said to condition the effect of strains on crime; several areas of the theory are in need of further exploration; and numerous opportunities for applying the theory to new areas remain.

Related Entries

- ▶ Anomie and Crime
- ▶ Group Characteristics and General Strain Theory
- ▶ Monetary Strain and Individual Offending
- ▶ Poverty, Inequality, and Area Differences in Crime

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General Theory of Crime

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Synonyms

Low self-control; Self-control theory

Overview

The self-control-crime/deviance link has been well established empirically, with over two decades of studies indicating that self-control is a robust predictor of a host of criminal and analogous behaviors under an equally wide array of methodological conditions. This pattern appears to be such a "given" that the field has largely moved on to other areas of self-control research, such as assessing the other harmful consequences of self-control, like criminal victimization, to testing the degree to which self-control is or is not stable within individuals over time, and to examining the "causes" of low self-control. This entry takes stock of these more recent developments within the self-control tradition.

Introduction

Gottfredson and Hirschi's (1990) self-control theory has stimulated a considerable amount of research and discussion regarding the influence of low self-control on criminal and analogous behaviors. As originally formulated, Gottfredson and Hirschi's (1990) self-control theory predicts

that individuals with low self-control are more predisposed to engage in a host of criminal and analogous acts. This is because those lacking self-control tend to pursue their own self-interest without consideration of the potential long-term consequences of their behavior. Criminal behavior therefore becomes attractive to those with low self-control because it can be exciting and immediately gratifying.

The self-control-crime/deviance link has been well established empirically, with over two decades of studies indicating that self-control is a robust predictor of a host of criminal and analogous behaviors under an equally wide array of methodological conditions (Pratt 2009; Pratt and Cullen 2000). To be sure, research has revealed that those with low self-control are significantly more likely to be a general offender, a versatile offender, a cheater on exams, a software pirate, and even a drunk-dialing user of profanity in public spaces (see Pratt and Cullen 2000; Reisig and Pratt 2011). These findings are sufficiently robust that criminologists have turned their attention to other areas of self-control research, such as the link between self-control and criminal victimization, the stability of self-control over time, and to the biological, familial, and contextual sources of low self-control. Each of these more recent developments is discussed here.

Self-Control and Victimization

It has been well established that, above all, individuals with low self-control are thrill seekers. In the pursuit of self-pleasure, such individuals feel the need to frequently engage in dangerous, reckless, and risky behaviors that provide them with a sense of excitement. Such individuals are unlikely to consider how their behavior may impact others nor would they be likely to spend time contemplating how engaging in such activities might put them at risk for numerous negative outcomes – one of the most serious of which may be victimization. Indeed, a large body of work has demonstrated that those who engage in deviance are more likely to be victims of crime, even when the degree of deviance is minor (e.g., Lauritsen et al. 1991; Turanovic and Pratt 2013a). Researchers have recently expanded upon these conclusions and have started to explore the relationship between self-control and victimization.

Traditionally, the study of victimization has been limited to situational approaches that emphasize the role of opportunity, such as routine activity (Cohen and Felson 1979) and lifestyle theories (Hindelang et al. 1978). Routine activity explanations suggest that individual patterns of behavior increase victimization through the space-time convergence of likely offenders, suitable targets, and the absence of capable guardians, while lifestyle theory similarly puts forth that individuals may engage in daily behaviors that expose them to crime and risky circumstances. In the past decade or so, scholars have broadened the scope of this inquiry by exploring other avenues that may explain victimization risk and looked further into why certain individuals are more likely to find themselves in high-risk situations. In particular, Schreck (1999) extended and reformulated Gottfredson and Hirschi's (1990) conceptualization of self-control into a theory of vulnerability. Schreck argued that the processes that determine individuals' lifestyle choices and exposure to risk could be explained by their levels of self-control. Put simply, because individuals with low self-control are shortsighted and take part in impulsive, unsafe behaviors, they may differentially place themselves in dangerous situations and might be less likely to take the precautions necessary to avoid being a victim of crime.

Specifically, Schreck suggested that each dimension of low self-control – lack of future orientation, risk taking, lack of empathy, low tolerance for frustration, lack of diligence, and preference for physical over mental activity – has the potential to increase individuals' risks of being victimized. In short, each element of low self-control is associated with an aspect of vulnerability, increasing the attractiveness of these individuals (and their belongings) to motivated and opportunistic offenders. For example, since individuals with low self-control tend to have a low tolerance for frustration and are quick to

anger, Schreck argued that these individuals may be more likely to behave in a belligerent manner that can provoke a criminal attack. And since those with low self-control prefer physical over mental tasks, these individuals may be less likely to use their cognitive skills to assess and diffuse hostility. Instead, they may be more likely to react to threat in a defensive or aggressive manner, which may make the situation worse. Having low self-control may also seriously impede a person's ability to carefully and consistently protect his or her belongings. Due to shortsightedness and lack of diligence, such individuals may chronically fail to set alarms, lock doors, and become impatient with procedures associated with arming complex security devices.

Schreck's (1999) extension of self-control theory has received considerable empirical support, both in predicting violent and nonviolent victimization, especially among individuals who also engage in offending. While this area of research is still relatively new, existing studies have consistently found low self-control to be among the most important predictors of criminal victimization – a finding which has held up across a variety of contexts, even when controlling for other robust criminogenic risk factors. Specifically, empirical examinations have demonstrated that self-control increases vulnerability to personal, property, violent, and sexual victimization, as well as the likelihood of fraud and internet theft (Franklin 2011; Holtfreter et al. 2008; Schreck et al. 2006). It is important to note, however, that while self-control can strongly predict victimization in many forms, it has not been found to fully moderate the effects of routine activity/lifestyle variables on victimization. Indeed, self-control has been found to exert both direct *and* indirect effects on victimization. For instance, associating with deviant peers and engaging in "risky lifestyles" (such as offending, substance use, risky sexual behaviors) have also been found to increase the probability of victimization, independent of one's level of self-control (Franklin 2011; Schreck et al. 2006; Turanovic and Pratt 2013b). What these findings have brought to light is that neither self-control nor routine activity/lifestyle perspectives *alone* can fully account for victimization. As a result, scholars have been urged to integrate self-control and opportunity theories together in order to develop a more accurate and comprehensive understanding of victimization and vulnerability (see Holtfreter et al. 2008).

While empirical findings demonstrate the importance of combining self-control and routine activity/risky lifestyle perspectives to predict victimization, there has been substantial variation in how these routine behaviors are captured – most likely because a vast array of actions can potentially be deemed as "risky." For example, in their assessment of low self-control on disaggregated personal and property victimization, Schreck et al. (2006) conceptualized risky lifestyles as violent, property, and drug delinquency in addition to having delinquent friends, while Franklin (2011) incorporated such acts as risky sexual behaviors, illegal drug use, alcohol consumption, and pornography consumption in her assessment of self-control on violent sexual victimization. It is important for scholars to begin to systematically identify which types of risky lifestyles put those with low self-control most at risk for particular forms of victimization.

Because this area of research is still developing, relatively little is known about the effects of low self-control on types of victimization that are largely directed towards women, such as sexual assault and domestic violence. To be sure of the aforementioned studies conducted since Schreck (1999) proposed his vulnerability hypothesis, only a few controlled for gender (e.g., Holtfreter et al. 2008; Schreck et al. 2006), and less have looked at the impact of self-control on the victimization of women independent of men (e.g., Franklin 2011). While the research is in short supply, the findings of these studies are promising enough to invite further explorations into how self-control influences the unique victimization experiences of women.

Additionally, as research in this area progresses, scholars will likely devote more attention to the longitudinal consequences of self-control on victimization. Schreck et al. (2006) demonstrated that those with low self-control are more likely to experience repeated

victimization, but the roles of routine activity/lifestyle factors in this process need to be explored further. Those with low self-control may be less willing, and less able, to restructure their "risky" behavioral routines following an initial victimization incident. For some, victimization may be a mere price to pay for the pleasure of engaging in deviant activities. All told, self-control is not only paramount to the study of criminality – it is also gaining support as a vital component to the study of victimization. While findings have been largely consistent in demonstrating that self-control is a robust predictor of victimization, additional research is still needed to help strengthen and clarify the preliminary work in this area.

The Stability (or Not) of Self-Control

One of the more controversial propositions regarding the general theory of crime concerns the "stability thesis" specified by Gottfredson and Hirschi (1990). They argued that self-control is developed early in childhood, usually by around the age of 10 or so, primarily through parental socialization efforts, and is relatively stable throughout the life course. This proposition is potentially problematic, of course, because of the well-known "age-crime curve," where individual rates of criminal behavior generally rise and peak in the late teen years and decline steeply from the early 20s and beyond. How, then, can the key "cause" of crime remain stable within individuals even though their participation in criminal behavior can vary considerably over time?

Scholars have examined this issue longitudinally with mixed results – where some studies indicate high levels of stability in self-control over time, at least in the short term (e.g., Beaver and Wright 2007), others have found evidence of more moderate correlations between measures of self-control taken at repeated points in time (e.g., Burt et al. 2006). Perhaps most telling is Hay and Forrest's (2006) analysis of data from the National Longitudinal Survey of Youth (NLSY) – a nationally representative longitudinal dataset. While their analyses revealed fairly strong stability in self-control overall, there was a nontrivial portion of the sample (16 %) whose levels of self-control changed substantially between ages 7 and 15.

Of course, an argument could be made that Gottfredson and Hirschi (1990) were really only referring to "relative" stability in this context; that is, the relative ranking between individuals should remain fixed over time even if absolute levels of self-control can change with age. Hirschi and Gottfredson (2001: 90) later clarified this point when they stated that "the *differences* [in self-control] observed at ages 8 to 10 tend to persist. . .Good children remain good. Not so good children remain a source of concern to their parents, teachers, and eventually to the criminal justice system" (emphasis added). Even so, Gottfredson and Hirschi (1990) were never explicit about *why* absolute levels of self-control would increase with age or what would explain the variation between individuals concerning how much or how little self-control would be gained over time.

A more fundamental problem, however, might have to do with the conceptualization of self-control itself (see, e.g., the discussion by Pratt 2009). In particular, criminologists' focus on individuals' *levels* of self-control has caused them to miss another key component within this theoretical tradition: within-individual *variability* in self-control. Indeed, recent research regarding changes in self-control over time (Hay et al. 2006), the disaggregation of the desire to exercise self-control versus the ability to exercise self-control (Tittle et al. 2004), Hirschi's (2004) own recent revision of self-control theory, and especially the recent research on the "depletion" of self-control under stressful conditions (Muravin et al. 2006) all hint at – to a greater or lesser degree – the importance of within-individual variation in self-control from one situation to the next. Since research into this question has only begun to emerge, it appears that the "stability thesis" of self-control is far from settled.

Part of the problem is that getting to this question empirically is no easy task. It requires either one of two things, the first of which would be

longitudinal data with uniform indicators of self-control measured repeatedly over time, so one could assess directly changes that do or do not occur. In this scenario, it would be necessary to have a wide age range; that is, knowing how self-control changes (either absolutely or relatively) between, say, age 13 and 50, would be more empirically and theoretically important than knowing how it changes from age 13 to 15. A second approach would entail the use of experimental data where situational characteristics could be manipulated to induce self-control depletion under a variety of contextual conditions *that might actually occur in "the real world"* (e.g., conditions of economic deprivation and the reality of human interactions that follow from it, including the presence of, e.g., cultural values associated with the "code of the street" as identified). Neither of these approaches come cheap or easy. Nevertheless, pursuing them may be the next necessary step in self-control-crime research. And if additional research uncovers that self-control is, in fact, much more fluid and malleable over the life course than Gottfredson and Hirschi (1990) originally contended, the theory itself may need to be revised.

The Causes of Self-Control

While the link between self-control and crime/deviance has been consistently demonstrated empirically, what is less clear at this point is how self-control is established within individuals. The primary explanation regarding the genesis of self-control in the criminological literature is Gottfredson and Hirschi's (1990) parenting thesis. In short, Gottfredson and Hirschi contend that self-control will develop in children through effective parenting, where parents who monitor their kids' behavior recognize deviant behavior when it happens and punish such behavior consistently will produce in their children the internal control mechanisms necessary for resisting the temptations that criminal and deviant behavior provide.

Support for this proposition is certainly present. Polakowski's (1994) analysis of data from the Cambridge Youth Study; Feldman and Weinberger's (1994) assessment of 81 sixth-grade boys; the student samples analyzed by Cochran et al. (1998) and by Gibbs et al. (1998); and Hay's (2001) survey of 197 urban high school youth have all explored the dynamics of parenting and self-control. Others have followed suit as well (see, e.g., Pratt et al. 2004; Turner et al. 2005; Unnever et al. 2003), with Perrone et al. (2004) analysis of the data from the first wave of the National Longitudinal Study of Adolescent Health (a nationally representative sample of over 13,000 youth) providing some of the most convincing evidence. Indeed, with the exception of Cochran et al. (1998) study of self-control and academic dishonesty, the research conducted thus far generally lends credence to the notion that, net of statistical controls, parental efficacy is important to the process of developing self-control in children.

Nevertheless, empirical evidence has emerged indicating that the processes that establish individuals' levels of self-control are more complex than those specified by Gottfredson and Hirschi. Specifically, research has begun to emerge that examines alternative sources of low self-control. For example, research has found that indicators of biological predisposition (e.g., ADHD, indicators of neuropsychological deficits such as low birth weight and low cognitive ability; please see Kevin Beaver's contribution to this volume concerning the biological and genetic sources of low self-control) are significantly related to levels of self-control independent of measures of effective parenting (McGloin et al. 2006; Unnever et al. 2003). In addition, controls for such biological/neuropsychological factors tend to partially mediate – and in some cases fully mediate – the effect of parenting on the development of self-control (see, e.g., Wright and Beaver 2005). Taken together, this research indicates that certain biological and neuropsychological risk factors need to be considered in the formation of self-control.

Furthermore, criminologists have begun to focus on how different types of neighborhoods influence parenting behavior and, in turn, the development of self-control in children. The

first study in this tradition was Pratt et al. (2004) analysis using data drawn from the National Longitudinal Survey of Youth (NLSY), which found that conditions of neighborhood deprivation significantly influenced measures of parental monitoring and socialization. Furthermore, such neighborhood conditions directly affected the development of self-control in children independent of measures of parental efficacy. A subsequent study by Hay et al. (2006) went a step further and found a significant interaction term between neighborhood conditions and parental efficacy on the development of self-control. As such, this work clearly indicates that community context is yet another factor that must be seriously considered by scholars with regard to the development of self-control in children.

Finally, Gottfredson and Hirschi (1990: 105) suggested that "like the family, the school in theory has the authority and the means to punish lapses in self-control." And as Denise Gottfredson (2001: 48) also observed, "schools have the potential to teach self-control and to engage informal social controls to hold youthful behavior in check." Empirical work has recently emerged that has tested these various propositions. Turner et al. (2005) analysis of the NLSY data revealed two conclusions along these lines. First, indicators of "school socialization" (which closely resembled typical parenting measures associated with the monitoring and supervision of children) were significantly related to the development of self-control independent of parental efficacy. Second, the effects of school socialization on youths' levels of self-control varied according to (i.e., interacted with) levels of parental efficacy, as well as conditions of neighborhood deprivation. In particular, the effect of school socialization on children's development of self-control was strongest when parental efficacy was low and when neighborhood conditions were criminogenic. These results therefore highlight the ability of social institutions – in this case the school – to "pick up the slack" for instilling self-control in children when other mechanisms, such as parents and the community, break down. Put simply, based on the body of empirical research presented above, it is clear that the causes of how and why self-control develops within individuals are far more complex than the simple parenting thesis offered by Gottfredson and Hirschi (1990).

Conclusions

When it comes to Gottfredson and Hirschi's (1990) general theory of crime, there is a lot that we know. For example, we know that the core theoretical proposition specified by Gottfredson and Hirschi – that a wide array of criminal and deviant behaviors are the result of low self-control – is extremely well supported in the criminological literature. Yet in the process of laying out why low self-control should lead to criminal behavior, they also made a number of corollary assumptions to support the self-control-crime thesis, such as those assumptions surrounding the link between self-control and victimization, the stability thesis, and the cause of low self-control.

Accordingly, we seem to know less about these corollary assumptions. On the one hand, it is true that there is convincing evidence of a link between self-control and victimization, that self-control is somewhat stable over the life course, and that parenting "matters" when it comes to instilling self-control in children. On the other hand, there seems to be equally convincing evidence that self-control is quite fluid and flexible within individuals and that the sources of self-control are far more varied and complex than Gottfredson and Hirschi said they should be. On balance, however, they were certainly on the right track.

And there are, of course, a number of other corollary assumptions regarding the general theory of crime that still remain relatively unaddressed. For example, Gottfredson and Hirschi also noted that self-control should predict crime and deviance equally well across various populations and subpopulations of people and that the relationship between self-control and problematic behavior should be roughly similar across racial and gender categories (known as the

"invariance thesis") and that one's level of self-control should influence heavily the nature of one's peer group. Aside from a small handful of recent studies, none of these propositions have been adequately addressed in the literature, so how they end up shaking out for Gottfredson and Hirschi remains to be seen. Even so, from what we do know about the nature and consequences of self-control, it appears that the empirical attention and respect that have been afforded Gottfredson and Hirschi's theory is certainly deserved.

Related Entries

- ▶ Genetic Basis to Self-Control
- ▶ Measurement of Self-Control
- ▶ Social Control and Self-Control Through the Life Course

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Genes, Crime, and Antisocial Behaviors

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Overview

When it comes to explaining the causes of crime, criminals, and antisocial behavior, there is virtually an endless supply of ideas. Some of these explanations are based on mounds of data, such as theories that focus on the assumption that antisocial behavior is produced by peer pressure or exposure to maltreatment early in life. Other explanations, however, teeter on the absurd, such as the belief that all crime is due to the pursuit of economic gain. The point is that virtually any factor that could be linked to crime has, in some way, been spun into a criminological theory. A perusal of any introduction to criminology textbook is quite revealing by showing the tremendous breadth of factors and explanations that have been advanced to explain crime and that have yet to be falsified by the academic community. Interestingly, the factors that do not seem to get very much coverage by criminologists – at least not in a balanced format – are genetic factors. In fact, most criminologists argue that genetic factors have absolutely nothing to do with the development of criminal involvement and that only environmental factors matter (Wright et al. 2008a). Recent empirical-based research has called into question the assumption that genes have no effect on criminal involvement and instead have revealed that genetic factors are the dominant etiological influence for crime and antisocial behaviors (Ferguson 2010; Moffitt 2005; Rhee and Waldman 2002).

Genetic Effects and Antisocial Behaviors

One of the major obstacles to studying genetic effects is trying to provide accurate and reliable estimates of both genetic and environmental effects on crime and antisocial behaviors. One of the more common ways of accomplishing this goal is by making use of a naturally occurring experiment: twinning. There are two types of twins: monozygotic (MZ) twins and dizygotic (DZ) twins. MZ twins share 100 % of their DNA (i.e., they are essentially genetic clones of each other), and they also share the same environmental upbringings. DZ twins, in contrast, share only 50 % of their distinguishing DNA, but they too share the same environmental upbringings. By comparing the similarity on measures of crime/antisocial behavior of MZ twins to the similarity of DZ twins, it is possible to quantify the proportion of variance that is the result of genetic factors and the proportion of variance that is the result of environmental factors. The more similar MZ twins are to each other in comparison with DZ twins, the greater the genetic effect. Why? – since MZ twins and DZ twins are exposed to similar environments, the only reason that MZ twins should be more similar to each other than DZ twins is because they share twice as much genetic material.

Twin-based research thus provides an estimate of both genetic and environmental effects on variance in antisocial behaviors (Beaver 2008). Technically speaking, the proportion of variance accounted for by genetic factors is known as heritability. Unlike social science research that treats all environments as the same, twin-based research has helped to make the distinction between two types of environments: shared environments and nonshared environments. Shared environments are environments that are the same between twins (or siblings) and that systematically increase their similarity. Nonshared environments consist of any environmental factors that are different between twins and that make them dissimilar (Beaver 2008). For example, as it applies to crime, shared environments might include such factors as being reared in poverty or living in a disadvantaged neighborhood. Examples of nonshared environments might consist of factors such as having different peer groups or being treated differently by parents. When summed together, the effects of heritability, shared environmental factors, and nonshared environmental factors explain 100 % of the variance (Beaver 2009).

There has been a great deal of research using twin-based studies to estimate genetic, shared environmental, and nonshared environmental effects on an assortment of antisocial behaviors, such as crime, violence, aggression, and other types of antisocial behaviors (Beaver 2008; 2011; Miles and Carey 1997). The results of these individual-level studies tend to provide slightly different point estimates of heritability, shared environmental effects, and nonshared environmental effects depending on the sample analyzed and the precise measure of antisocial behavior investigated. When aggregated and averaged together, these studies tend to suggest that genetic factors explain about 50 % of the variance in antisocial behaviors, shared environmental factors explain between 0 % and 10 % of the variance, and nonshared environmental factors explain about 40 % of the variance (Beaver 2009; Ferguson 2010; Moffitt 2005). Instead of genetic factors having no effect like most criminologists assume, genetic factors appear to have the dominant effect on antisocial behaviors.

While twin-based research has been quite valuable in the quest for estimating genetic and environmental effects on antisocial behaviors, there are some limitations to this research design. Opponents of genetic research argue that these limitations are fatal flaws that bias the results and thus any findings generated from twin-based studies are not believable. Fortunately, there are a number of other research designs that can also be used to estimate genetic and environmental effects (Beaver 2009). These alternative research designs, moreover, are not host to the same limitations as twin-based studies and thus they can act as "checks" on the twin-based research designs. As long as the genetic and environmental estimates are relatively consistent across all research designs, then the likelihood that the results are being affected by limitations is low. However, if the genetic and environmental effects vary significantly across different research designs, then this pattern of findings would tend to indicate that the results are being systematically affected by the choice of research designs.

One of the alternative research designs that has been used in place of the traditional twin-based research design capitalizes on a relatively rare occurrence wherein MZ twins were separated at birth, adopted by different families, and raised without even knowing they had a co-twin (known as MZAs [monozygotic twins who were reared apart]). Later in life, they are often told by family and friends or discover through serendipitous events that they were born as part of a twin pair. Upon reuniting, researchers are presented with one of the most effective ways to estimate genetic effects. Since MZAs were reared in different environments and by different families, the only reason that MZAs can be similar to each other is because they share 100 % of their DNA. MZAs obviously are quite rare, but scientists at the University of Minnesota have established the Minnesota Study of Identical Twins Reared Apart (MISTRA) and have located more than 100 pairs of MZAs to interview and study (Bouchard et al. 1990). Upon learning of an MZA, investigators on the MISTRA project invite the twins to participate in their study

where the twins undergo a weeklong series of tests designed to measure virtually every human characteristic. Overall, the results of the MZA studies have converged with those of traditional twin-based studies, indicating that genes are highly influential when it comes to crime, aggression, violence, and other antisocial characteristics (Beaver 2009).

Even though twin-based studies and MZA studies reveal results that are relatively consistent, there are still those opponents to genetic research that argue that MZA studies also are host to a number of different flaws. According to such critics, the genetic effects reported in MZA studies are also not believable. Luckily, there is yet another way to estimate genetic effects on antisocial behaviors: adoption studies (Beaver 2009). Adoption studies represent another accurate way to estimate genetic and environmental effects on behaviors and traits. To do so, adoptees are compared to their biological parents (with whom they have had little to no contact) and their adoptive parents (with whom they share no genetic material). The only reason that adoptees should resemble their biological parents on measures of antisocial behaviors is because of the genetic material they share with them. And, the only reason that adoptees should resemble their adoptive parents on measures of antisocial behaviors is because of the environment that they share with them. As with twin-based studies and MZA studies, adoption-based studies have revealed that crime and other types of antisocial behaviors are affected by genetic factors (Beaver 2010; Rhee and Waldman 2002).

Molecular Genetics and Antisocial Behaviors

When the results culled from twin-based studies and adoption-based studies are viewed simultaneously, they paint a very detailed and accurate picture indicating that crime, delinquency, and antisocial behavior in general are influenced in large part by genetic factors. While these studies have provided very compelling evidence establishing the genetic foundations to criminal involvement, they do not provide any information as to the specific genes that are involved in creating crime. The next logical step, therefore, is to uncover the particular genes that are associated with crime and antisocial behaviors. In order to do so, it is first necessary to be exposed to some of the basics of molecular genetics.

Genes are inherited on 23 pairs of threadlike structures called chromosomes. One pair of chromosomes is inherited maternally and the other pair is inherited paternally. Of these 23 pairs of chromosomes, there are 22 pairs of autosomes and one pair of sex chromosomes. For all genes located on the autosomes, there are two copies (one on the maternal chromosome and one on the paternal chromosome). When it comes to the sex chromosomes, there is a slightly different pattern of inheritance. Females have two X chromosomes and thus they have two copies of all genes located on the X chromosomes. Males, however, have one X chromosome (always inherited maternally) and one Y chromosome (always inherited paternally). As a result, males have only one copy of each gene located on the X chromosome and one copy of each gene located on the Y chromosome.

Most of the genes in humans do not vary from person to person which is why, structurally and anatomically speaking, humans look very similar to each other (e.g., two arms, two eyes, two legs, a heart). A small percentage of genes, somewhere around 1–10 % depending on how genetic differences are measured, do vary from person to person (Beaver 2009). Genes that can vary from person to person are known as genetic polymorphisms. For example, genes that are involved in creating height are genetic polymorphisms, which is what produces variation in the height of humans. Alternative versions of genetic polymorphisms are known as alleles (e.g., alleles that make someone tall or alleles that make someone short). Criminologists interested in examining the molecular genetic basis to crime and other antisocial behaviors focus on genetic polymorphisms because only genes that vary can explain variation in antisocial behaviors and traits (otherwise it would be analogous to trying to explain a variable (i.e., crime) with a constant).

Historically there has been much confusion among criminologists and social scientists over how genes ultimately affect criminal behaviors (Wright et al. 2008b). The overarching belief is that there is a single gene that decides whether someone will become a criminal; persons who have this gene will always become a criminal and persons lacking this gene will never become a criminal. This type of deterministic thinking is preposterous. Complex behaviors like criminal involvement are multifactorial meaning that they are produced by a combination of genetic and environmental factors. Moreover, criminal and antisocial behaviors are considered polygenic phenotypes. Polygenic phenotypes refer to human behaviors and traits that are affected by many genes, with each gene having only a small effect on the propensity to engage in crime. Seen in this way, genes work in a probabilistic way, where the presence of certain alleles increase or decrease the probability of an antisocial outcome (Beaver 2009). Each genetic variant, however, would only increase the odds of a crime and antisocial behavior by a relatively small margin, typically less than 10 %. Clearly there is nothing deterministic with this contemporary view of the ways in which genetic factors ultimately affect crime, delinquency, and antisocial behaviors.

During the past decade, there has been a considerable amount of molecular genetic research examining whether the alleles of certain genes predispose someone to engage in crime and violence. Although the results of this line of research have not always been entirely consistent, the main theme running across these studies is that genes that are involved in neurotransmission are the genes most likely to affect criminal involvement. Neurotransmission refers to the process by which neurons communicate with each other. Neurons are brain cells and in order for information to be processed across neuronal networks, adjacent neurons must communicate with each other to pass information from neuron to neuron. Neurons, however, are not physically wired together as there is a small gap – known as a synapse – that exists between neurons. So transmitting information between neurons requires that the synapse be bridged in some capacity. This is accomplished with neurotransmitters, such as serotonin and dopamine, which are chemical messengers that are released from the presynaptic neuron where they cross the synapse and lock into receptors on the postsynaptic neuron.

After the neurotransmitter has locked into the postsynaptic neuron, the neurotransmitters need to be removed from the synapse. There are two main ways that neurotransmitters are purged from the synapse. The first is through a process called reuptake. With reuptake, transporter proteins are released into the synapse where they seek out neurotransmitters, remove them from the synapse, and return them to the vesicles of the presynaptic neuron. The second way that neurotransmitters are removed is through enzymes that degrade neurotransmitters into inactive particles that are then flushed from the synapse. Both reuptake and enzymatic degradation work simultaneously to regulate levels of neurotransmitters. If something interferes with either of these processes or if either of these two processes is not working efficiently, then levels of neurotransmitters may deviate from normality. Importantly, there is a good deal of research linking variation in neurotransmitter levels to a range of psychopathologies, including aggression, violence, suicide, and crime (Brunner et al. 1993; Beaver et al. 2007).

Genes are involved in coding for the production of transporter proteins that are central to the process of reuptake. This is especially important because some genetic polymorphisms related to transporter proteins are functional, meaning that different alleles correspond to differences in the activity level of the transporter protein. For example, different alleles of a genetic polymorphism that codes for the production of the serotonin transporter protein (5HTTLPR) are associated with different transcriptional efficiencies (functional differences that may ultimately produce different levels of serotonin). Similarly, a gene that codes for the production of the monoamine oxidase A (MAOA) enzyme, which is responsible for breaking down neurotransmitters, also has a functional polymorphism (in the promoter region of the gene). Some alleles of this MAOA polymorphism code for the production of

low MAOA activity, meaning that the MAOA is not as efficient at mopping up neurotransmitters from the synapse, while other alleles code for the production of high MAOA activity, which is much more efficient at removing neurotransmitters from the synapse.

Overall, molecular genetic research has provided some evidence tying variants of certain genes, such as dopaminergic genes (e.g., DAT1, DRD2, and DRD4), serotonergic genes (e.g., 5HTTLPR), and genes coding for the production of enzymes (e.g., MAOA and COMT) to various antisocial behaviors (Beaver et al. 2007; Caspi et al. 2002; Brody et al. 2011). These genes tend to have small effects, a finding which is consistent with polygenic explanations of human behavior. Perhaps partially as a result of the small effects associated with genes, genetic association studies are often plagued by an inability to replicate the original results. What this means is that after a study first reports a statistically significant association between a genetic polymorphism and an outcome, replication studies often fail to detect that same association in independent samples. There are a number of potential explanations for a failure to replicate, including the possibility that the original report was a methodological or statistical artifact. Consequentially, replication studies are of utmost importance when attempting to figure out whether a putative candidate gene is indeed related, perhaps causally, to a human trait/behavior.

Gene-Environment Interplay and Antisocial Behaviors

Although molecular genetic research has revealed that some genes are related to a variety of antisocial outcomes, the most cutting-edge genetic research examines the interplay between genetic factors and environmental factors (Moffitt 2005). There are two main types of gene-environment interplay that have been tied to antisocial behaviors: gene-environment interactions and gene-environment correlations. Gene-environment interactions capture the processes by which genetic effects are moderated by environmental factors and/or by which environmental effects are moderated by genetic factors. In short, gene-environment interactions can explain why two people who encounter the same stimuli may turn out quite differently. An example will help to clarify what is meant by a gene-environment interaction. Suppose that a study was examining a group of adolescents who were raised in a disadvantaged neighborhood with high rates of crime, poverty, and homelessness. Exposure to this neighborhood is certainly a criminogenic risk factor that heightens the propensity for engaging in crime and disrepute. Even so, most of the adolescents exposed to such conditions will not turn out to be criminal, but a handful of adolescents will develop into criminals. The million-dollar question, of course, is what accounts for these differential outcomes? The logic of gene-environment interactions can easily answer this question by drawing attention to the fact that for a criminal to develop they must (1) be exposed to a criminogenic environment *and* (2) have a sufficient genetic predisposition for crime. If either of these two factors is absent, then their independent effects are either muted or attenuated significantly. To summarize, then, gene-environment interactions refer to the fact that genetic effects are strongest when paired with environmental liabilities (and vice versa).

Much of the contemporary genetic research examining genetic effects on antisocial behavior and psychopathologies has been guided by gene-environment interactions. What this line of research has revealed is that the effects of specific polymorphisms on antisocial behaviors are structured in part by exposure to environmental liabilities and stressors. For example, the MAOA gene has consistently been found to be related to violence and aggression in males (Caspi et al. 2002; Haberstick et al. 2007; Kim-Cohen et al. 2006). Consistent with the logic of gene-environment interactions, however, the effect of MAOA only surfaces among males who have been abused and maltreated as children. For males who have not been abused as children, there is no effect of MAOA on antisocial behaviors. Similar findings have been observed with other genetic

polymorphisms linked to antisocial propensities. These findings underscore the mutual interdependence of genes and the environment when trying to understand the etiology of criminal and antisocial behaviors.

Gene-environment interactions may also be integral to understanding why there are some problems with replicating molecular genetic findings. Molecular genetic research is often based on clinical, non-nationally representative samples. This necessarily means that the samples that are used to test for genetic associations are differentially exposed to environmental conditions. The respondents from one sample, for instance, may be exposed to severe poverty, whereas respondents from another sample may have been drawn from a wealthy population. If poverty acts as a trigger for a genetic effect to surface (i.e., a gene-environment interaction), then the genetic effect would be detected in the first sample, but not in the second. So, failing to recognize differential exposure to environmental liabilities may be one additional reason for why there is a failure to replicate some genetic associations with criminal behavior.

The second type of gene-environment interplay that has direct bearing on criminology is known as gene-environment correlation. Gene-environment correlation captures the effects that genes have on predicting and explaining variance in environmental measures (Beaver and Wright 2005; Scarr and McCartney 1983). To most criminologists and social scientists, even suggesting that an environment could be affected by genetics seems a bit odd. There is, however, a great deal of empirical evidence indicating that almost all environments are influenced, at least in part, by genetic factors (Beaver and Wright 2005). To understand how it is possible to estimate genetic effects on environmental measures, it is essential to revisit the twin-based methodology. Recall that with the twin-based methodology, the similarity of MZ twins on some behavior trait is compared with the similarity of DZ twins on that same behavior/trait. If MZ twins are more similar than DZ twins, there is evidence of a genetic effect on the behavior/trait. This same twin-based methodology can be employed to estimate genetic effects on environmental measures; the only difference is that an environmental measure is used in place of the measure of the behavior/trait. A pool of empirical research has used the twin-based study to estimate genetic effects on environmental measures, and the results have provided strong support in favor of gene-environment correlations for environments related to crime and delinquency (Beaver and Wright 2005; DiLalla 2002). For example, variance in measures of parental socialization (Beaver and Wright 2007; DiLalla 2002), exposure to antisocial peer networks (Beaver et al. 2009), stressful life events (Dick et al. 2006), and various dimensions of family life have all been found to be affected, to varying degrees, by genetic factors. While the precise heritability estimates ebb and flow across the environmental measures, on average, genetic factors account for around 25 % of the variance in most environmental measures (Kendler and Baker 2006). Some environments, such as exposure to delinquent peer groups, have much higher heritability estimates with genetic factors explaining about around 60 % of the variance (Cleveland et al. 2005).

In addition to twin-based studies, a small number of studies have also explored the possibility that certain genetic polymorphisms might explain variance in measures of criminogenic environments. While this line of research is still in its infancy, there is some emerging evidence linking specific genetic polymorphisms, such as dopaminergic polymorphisms, to negative parental socialization, to contact with delinquent peers, and even to the probability of getting married (Dick et al. 2006). As more and more social science datasets begin to include genotypic information, the number of genes that are found to be associated with specific environmental conditions will likely increase.

Establishing a link between genetic variance and environmental variance is important in unpacking the ways in which genes and the environment work together to produce human phenotypic variation. Nonetheless, simply establishing a link reveals nothing about the underlying processes that account for gene-environment

correlations. Existing research, however, has delineated three different types of gene-environment correlations, each of which explains a different mechanism by which genes account for environmental variance (Scarr and McCartney 1983). These three types of gene-environment correlations are known as passive gene-environment correlation, active gene-environment correlation, and evocative gene-environment correlation.

Passive gene-environment correlation is grounded in the fact that parents pass along two entities to their children: genes and an environment. Given that the child is unable to pick and choose their genes and/or their environment, they passively receive these. Moreover, because both genes and the environment are traced to the same source – that is, parents – the two are likely to be correlated (Beaver 2009; Scarr and McCartney 1983). For example, highly aggressive parents are likely to pass along a genetic predisposition for aggression and violence to their children. At the same time, parents who are highly aggressive are also statistically more likely to abuse their children, live in low SES areas, and not supervise their children closely. All of these environments have been shown to increase the probability of antisocial behaviors. With passive gene-environment correlation, then, children are hit with a "double whammy" of risk factors, wherein they have the genetic predispositions for antisocial behavior and they are also born into an environment that also contributes to antisocial behavior. This process thereby captures part of the reason that criminogenic environments are affected by genetic factors.

The second type of gene-environment correlation is active gene-environment correlation. Active gene-environment correlation avers that genotype pushes or nudges people into certain environments that are compatible with their genetic predispositions (Beaver 2009; Scarr and McCartney 1983). To illustrate, a person who is highly aggressive and violent is likely to seek out environments that are conducive to these predispositions. So, they might join a gang or befriend other people who are violent, too. In this example, choosing a gang is not a random occurrence, but rather is structured in part by the genetic predisposition for violence and aggression. It is important to underscore the fact that there are not genes that are "for" any type of environment; rather, genes operate indirectly, such as via their effects on personality traits. Continuing on with the gang example, a part of the reason a person might choose a gang is because they are genetically predisposed to be violent, not because there is a single gene that tells the person to join a gang.

The last type of gene-environment correlation is known as evocative gene-environment correlation. With evocative gene-environment correlation, genotype elicits certain responses from the environment, which are ultimately correlated with their genotype (Beaver 2009; Scarr and McCartney 1983). A person with a bad temper (a genetically influenced phenotype), for instance, is likely to evoke negative responses from their environment. Evocative gene-environment correlations are virtually synonymous with child-effects models except that the effect is thought to flow directly from genotype. Consider two siblings: one who is genetically predisposed to be unruly and one who is genetically predisposed to be passive and compliant. The unruly child will likely evoke negative and harsh parenting, such as being spanked, while the compliant child will likely escape such discipline. In this case, parental discipline is differentially invoked against the two siblings, but the reason for this difference is the result of the genetically influenced propensities and temperaments of the two siblings.

The saliency of these three types of gene-environment correlation waxes and wanes over different sections of the life course. Passive gene-environment correlation is thought to be most evident early in life, especially during infancy and childhood. During this time period, children are under the control of their parents and have their parents' environment imposed on them. As children develop into adolescence, they begin to gain more autonomy and thus are able to follow their genetic predispositions without as much guidance and control by their parents. By the time of early adulthood when most children have moved out of their parents' home, they are

able to follow their genetic predispositions without interference. Evocative gene-environment correlation tends to have relatively equal effects throughout life. In childhood, for instance, genetically influenced antisocial traits may elicit negative responses from parents; in adolescence, genetically influenced antisocial traits may elicit negative responses from peers and teachers; and in adulthood, genetically influenced antisocial traits may elicit negative responses from employers and from potential mates.

Taken together, the two types of gene-environment interplay – gene-environment interaction and gene-environment correlation – draw attention to the very real possibility that genes and the environment do not represent simple dichotomies (Beaver et al. 2009). Instead, a wealth of scientifically rigorous scholarship has shown that there is a close interdependence between genes and the environment and the way to understand the causes of all human phenotypes – including antisocial ones – is to examine these two influences simultaneously and to model directly the various types of gene-environment interplay.

Conclusions and Future Directions

During the past century, the field of criminology has made some enormous gains in terms of identifying the causes and correlates of crime, delinquency, and other types of antisocial behaviors. For the most part, however, all of these advancements have been on discovering the environmental underpinnings to criminal involvement. With the recent mapping of the human genome and with empirical studies strongly implicating genes in all human phenotypes, the time is ripe for criminology to begin to examine the dual influences of genes and the environment in the genesis of antisocial behaviors. Such an approach does not mean that all existing theories need to be abandoned. Instead, such an approach allows for a fuller integration of findings from biological sciences into mainstream criminological theories. This type of theoretical integration would likely pave the way for an explosion of knowledge about the developmental pathways to crime and violence. The knowledge flowing from this research could then be used to open up newer and perhaps more effective avenues for the treatment and rehabilitation of offenders that would ultimately increase public safety and reduce criminal involvement.

Related Entries

- ▶ Evolutionary Theories of Criminal Behaviors
- ▶ Hormones, the Brain, and Criminality
- ▶ Neurology and Neurochemistry of Crime
- ▶ Synthesizing Biological and Social Theorizing

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Genetic Basis to Self-Control

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Overview

In 1990 Gottfredson and Hirschi advanced a parsimonious and provocative theory of crime that was designed to explain all types of antisocial behaviors. Unlike most dominant criminological theories that focus on social/environmental factors as causes of crime, their theory focused on an individual-level factor – levels of self-control – as the key causal agent for crime, delinquency, and other forms of disrepute. More specifically they argued that persons with relatively low levels of self-control who have a criminal opportunity will, on average, commit more crime and antisocial acts in comparison with people who have relatively high levels of self-control. An impressive amount of empirical research has assessed the potential association between levels of self-control and a host of antisocial behaviors. The results of these studies have been

remarkably consistent in showing that measures of self-control are among the most consistent and strongest predictors of a wide range of antisocial behaviors, including crime, delinquency, and drug use. Moreover, the link between levels of self-control and antisocial behaviors has been detected between genders, across racial/ethnic groups, and within samples collected from different countries (Pratt and Cullen 2000).

Given the robust criminogenic effects associated with levels of self-control, there has been a wave of research attempting to uncover the factors that are associated with causing variation in levels of self-control. Much of this research has been guided by Gottfredson and Hirschi's thesis that levels of self-control are largely the result of parental socialization. According to these theorists, parents who wish to raise offspring with high levels of self-control must engage in three intertwined parental management techniques. First, parents must supervise their children. Second, parents must recognize when their children are engaging in socially taxing or antisocial behavior. Third, parents must consistently correct their children's antisocial behaviors. Parents who engage in these three parenting techniques and who are attached to their children should, on average, raise offspring with relatively high levels of self-control. According to Gottfredson and Hirschi, parents do not have much time to inculcate self-control because by around the age of 10, levels of self-control are formed and remain relatively stable over the remainder of the life course.

A line of research has examined the merits of the parental management thesis and the results of these studies have provided some support in favor of Gottfredson and Hirschi's argument. For example, most studies reveal that measures of parental management techniques predict levels of self-control, with parents who supervise their children, recognize their children's transgressions, and punish their children, tending to raise offspring with relatively high levels of self-control (Gibbs et al. 1998; Hay 2001; Polakowski 1994). However, Gottfredson and Hirschi likely overstated the effects that parents have on sculpting levels of self-control. Numerous studies indicate that measures of parenting only have very small effects on levels of self-control and leave an overwhelming amount of variance unexplained. As a result, there are likely other salient factors that are causing variation in self-control that were not identified by Gottfredson and Hirschi. An emerging pool of research has pointed to the very real possibility that biological and genetic factors may be the dominant source of variation in self-control.

Genetic Influences on Levels of Self-Control

In articulating their theory, Gottfredson and Hirschi were very clear that they did not believe that genetic factors played any role in the development of self-control. However, research from multiple lines of inquiry, including developmental psychology, behavioral genetics, molecular genetics, and neurobiology, points to a very different conclusion – namely, that self-control, self-regulation, and impulse control problems are all affected in large part by genetic factors (Beaver 2009). Studies exploring the extent to which genetic variation accounts for variance in measures of self-control, and related disorders, typically employ samples that consist of twin pairs. There are two types of twins: monozygotic (MZ) twins who share 100 % of their DNA and dizygotic (DZ) twins who share, on average, 50 % of their DNA. Both types of twins, however, are assumed to share environments that are approximately comparable to each other. In other words, the environments of MZ twins are assumed to be no more similar than the environments of DZ twins. As long as this assumption is met (known as the equal environments assumption [EEA]) – and there is good evidence to indicate that it is – the only reason that MZ twins should be more similar to each other than DZ twins is because they share twice as much genetic material. So, genetic effects are detected if the similarity of MZ twins is greater than the similarity of DZ twins. And the greater the similarity of MZ twins in

comparison to the similarity of DZ twins, the larger the magnitude of the genetic effect. The proportion of variance accounted for by genetic factors is known as the heritability estimate.

Although twin-based research designs provide a great deal of information regarding the genetic foundations to behaviors and traits, they also provide some of the most compelling evidence for the role of environmental factors. The reason for this is because the variance that is not explained by genetic factors is explained by environmental factors (plus error). Unlike most social science research that pools together all types of environments, twin-based research designs make the distinction between two different types of environments: shared environments and nonshared environments. Shared environments are those environments that are the same between twins and therefore make twins more similar to each other. Some of the common examples of shared environments are neighborhood conditions, family socioeconomic status, and common parental socialization factors. Nonshared environments, in contrast, consist of environments that are different between twins and that make twins dissimilar from each other. (Nonshared environments also capture the effects of measurement error.) Examples of nonshared environments include peer groups, parenting practices unique to each twin, and even different prenatal environments (especially for non-twin siblings). Together, the heritability, the shared environment, and the nonshared environment account for 100 % of the variance in any measure being studied in a twin-based research design.

Since criminological research focuses almost exclusively on the role of the environment in relation to criminal and antisocial behaviors, they have overlooked and ignored the potential role of genetic factors. As a consequence, much of the evidence that has examined the genetic basis to levels of self-control has to be culled from fields of study outside of criminology. Fortunately, an impressive number of studies have employed twin-based research designs (or variants of them) to examine the genetic origins to traits/disorders that overlap with Gottfredson and Hirschi's conceptualization of self-control. For example, studies have investigated the heritability of self-regulation, impulsivity, and attention-deficit/hyperactivity disorder (ADHD). The results of these studies have consistently revealed that genetic factors explain between 50 % and 90 % of the variance, with the remaining variance being attributable to nonshared environmental factors (Rietveld et al. 2003; Mick et al. 2002; Wright and Beaver 2005). In most studies, shared environmental factors explain none or very little of the variance. Only recently have criminologists begun to explore the genetic underpinnings to self-control and the findings have yielded results that parallel those reported by non-criminologists. Overall, genetic factors explain approximately 40–70 % of the variance, nonshared environmental factors explain between 30 % and 60 % of the variance, and shared environmental factors explain none of the variance. When taken together, the empirical research unequivocally indicates that levels of self-control are scripted, in part, by genetic factors along with nonshared environmental factors (Beaver 2009).

Although twin-based research designs represent a rich analytical tool that can be used to estimate genetic and environmental effects, they are limited in the ability to identify the specific genes and the specific environments that are involved. For instance, knowing that genetic factors account for 40–70 % of the variance in self-control is only part of the puzzle; finishing the rest of the puzzle requires searching for the particular genes which account for variation in self-control. Molecular genetic studies are useful in this regard.

Molecular genetic studies attempt to link variation in specific genetic markers to variation in certain behaviors, traits, and other characteristics (e.g., levels of self-control). To understand the underlying logic to these types of studies, it is necessary to provide some elementary background information about genes. The human genome is comprised of approximately 25,000 genes which are located on 23 pairs of chromosomes (22 pairs of autosomes and 1 pair of sex chromosomes). Because genes are located on pairs of chromosomes, all genes (except those

located on the sex chromosomes for males) consist of two copies: one inherited maternally and one inherited paternally. The information encoded into genes determines virtually every physical characteristic (e.g., eye color, hair color) and influences many other unobservable traits (e.g., personality, cognitive skills). Most genes consist of only one version, meaning that all humans have the same "type" of gene. However, for a small percentage of genes, there exist at least two versions in the population. Genes that vary across people are known as genetic polymorphisms and alternative copies of the gene are known as alleles. To illustrate, suppose there was a gene for height and there were two different versions of the height gene: a short allele and a tall allele. It would be possible to inherit two short alleles (one maternally and one paternally), two tall alleles (one maternally and one paternally), or a short allele (either maternally or paternally) and a tall allele (either maternally or paternally). A person's height, therefore, would be partially a function of the alleles they inherited for this hypothetical polymorphic height gene. In reality, height is affected by hundreds of genes along with environmental factors (e.g., nutrition).

A great deal of research has examined the potential association between certain genetic polymorphisms and ADHD, impulsivity, and attention problems. The results of these studies have provided some evidence tying certain genes – especially those of the dopaminergic system – to these disorders and traits. There is some limited evidence, moreover, that genes of the serotonergic system may be involved in the development of self-control (Beaver 2009). The available evidence suggests that specific genetic polymorphisms tend to have their strongest effects on levels of self-control when they are paired to certain environments. What this necessarily means is that genetic polymorphisms are associated with levels of self-control, but the effects of these genetic polymorphisms are even more pronounced when they are coupled with adverse and criminogenic environments. These types of relationships are called gene-environment interactions, and they illustrate the incredible complexities underlying the causes of human behavior. Given that molecular genetic research involving self-control is still in its infancy, much more research needs to be undertaken to provide a more complete picture of which genetic polymorphisms may ultimately be responsible for affecting variation in levels of self-control. But, as the results of the twin-based studies reveal, genes tend to be the dominant force in structuring the development of self-control.

Neurobiology and Levels of Self-Control

The findings generated from genetic research often produce a great deal of confusion concerning what they actually mean. The media, for example, frequently talks about the discovery of a gene *for* X or a gene *for* Y (e.g., the crime gene, the low self-control gene). In reality, though, genes are not "for" any particular behavior, trait, or other human characteristic; rather, they are responsible for coding for the production of proteins. So, if genetic polymorphisms continue to be discovered that explain variance in levels of self-control, then how do these genetic polymorphisms actually produce varying levels of self-control? Stated differently, if genes do not directly determine levels of self-control, then what is the mechanism that ultimately links genetic variance (i.e., different alleles for specific genetic polymorphisms) to variance in levels of self-control? While there is not a definitive answer to this question, recent research from neurobiology sheds some light on this issue.

A proliferation of neuroimaging techniques have been developed, including functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and single photon emission computed tomography (SPECT), that allow neuroscientists to examine the functioning of the brain when certain tasks are being performed. If a certain region of the brain is activated during a specific task, then it is quite likely that that area of the brain is involved – to some degree – in the skills needed for the successful completion of the task. A line of

neurobiological research has examined brain activity in response to tasks designed to tap self-control, impulse control, judgment, and attention. Very generally, these studies have converged to show that the area of the brain partially responsible for these tasks is the prefrontal cortex (Beaver et al. 2007).

The prefrontal cortex is situated directly behind the forehead and is often divided into three different regions to help delineate the location, direction, and function of each. The first region, the dorsolateral prefrontal cortex (DLPFC), is located in the lateral of the prefrontal cortex and has been shown to be responsible for behavioral modulation, information processing, and memory formation. The second region is referred to as the orbitofrontal cortex and is located directly above the eyes and is interconnected with the DLPFC. The orbitofrontal cortex has been shown to be involved in maintaining goal-oriented behaviors, the regulation of emotions, and to affect decision-making processes. Finally, the medial prefrontal cortex (MPFC) is housed deep within the brain and is connected with the DLPFC. The MPFC is involved in promoting tasks that necessitate a significant amount of concentration.

The coordinated functions of the DLPFC, the orbitofrontal cortex, and the MPFC are typically referred to as executive functions. Although definitions of executive functions vary, they can be generically defined as a suite of functions that are responsible for judgment, decision-making, the ability to delay gratification, the ability to anticipate the consequences of actions, and the ability to modulate behaviors and emotions. Importantly, the definition of executive functions employed by psychologists and neurobiologists overlaps considerably with the conceptualization of self-control as set forth by Gottfredson and Hirschi. In fact, there is both empirical and theoretical evidence indicating that self-control is one of the many tasks that fall within the parameters of executive functions (Ishikawa and Raine 2003).

If self-control is indeed an executive function, then what accounts for variation in executive functions and self-control? As indicated previously, brain science research has revealed that the prefrontal cortex is largely responsible for executive functions. Variation in the structure and functioning of the prefrontal cortex therefore is largely the driving force behind variation in executive functions and thus levels of self-control. For example, some people's prefrontal cortexes are highly active, and, perhaps as a result, they score very high on measures of self-control. Other people, however, have relatively underactive prefrontal cortexes, and they are, on average, more likely to score lower on measures tapping self-control. The point is that executive functions and levels of self-control appear to be tied directly to the structure and functioning of the prefrontal cortex.

Being able to identify what causes variation in the structure and functioning of the prefrontal cortex is thus the key to identifying what causes variation in executive functions and levels of self-control. Neuroimaging research has been instructive in this endeavor, wherein twin studies have been conducted to estimate genetic and environmental effects on variation in brain structure and functioning. The results of these methodologically rigorous and highly influential brain science studies have revealed that upwards of 80 % of the variance in brain structure and functioning in the brain, including the prefrontal cortex, is the result of genetic factors (Toga and Thompson 2005). Consequently, it is now possible to provide a more detailed and scientific answer to why there is variation in levels of self-control. The evidence reviewed above indicates that self-control is an executive function. Executive functions are housed in the prefrontal cortex of the brain and variation in executive functions (thereby including levels of self-control) appear to be largely affected by the structure and the functioning of the prefrontal cortex. Variation in the structure and functioning of the prefrontal cortex is the result of genetic factors and to a lesser extent nonshared environmental factors. It should also be noted that approximately 60 % of the 25,000 genes in the human genome are in some way related to coding for the brain and/or brain development. As a result, there are likely thousands of

genes that affect the structure and functioning of the prefrontal cortex with each of these genes tending to have relatively small effects.

A Biosocial Critique of the Parental Management Thesis

Even though there is a vast amount of empirical research indicating that levels of self-control are under strong genetic influence, the vast majority of criminological research ignores the potential genetic influence on self-control. Furthermore, much of this research also neglects the important contributions of neurobiology. Instead, most criminological studies only examine the role that social factors – especially parenting – have on the development of self-control. Critics of genetic research frequently point out that most of the criminological research shows that social factors are critically important to all types of antisocial behaviors, including levels of self-control. These findings, in short, appear to be at odds with those garnered from genetic and neurobiological research, leading to the question of which body of research should be believed.

In order to address this issue, it is essential to explore the most common type of methodology used in criminological research: standard social science methodologies (SSSMs). With SSSMs, researchers analyze data collected about one focal child (or adolescent) per household. The child's parents and teachers may also be interviewed to collect more detailed information, but the key concern is the behavior and/or traits of the focal child. As it applies to self-control, SSSMs would collect information about the focal child's level of self-control and certain social factors, especially parental management techniques. Statistical analyses are then conducted to determine whether levels of self-control covary with the social factors. If there is a statistically significant association between levels of self-control and the variation in the social factors, then most criminologists and social scientists often interpret the results as being in line with a causal explanation (e.g., Gottfredson and Hirschi's parental management thesis).

There is a serious problem with research that is based on SSSMs – namely, that SSSMs are unable to take into account genetic factors. Recall that twin-based research designs are used to estimate the relative effects of genetic and environmental factors. In order to do so, there must be at least two siblings (e.g., twins) included in the analysis. Unfortunately, criminological research rarely includes more than one sibling in the sample and, in fact, great pains are taken to include only one child per household for statistical reasons (i.e., to preserve independence in observations). By including only one child per household, it is not possible to estimate genetic effects and thus any research that employs an SSSM is making the assumption that genes have absolutely no effect on the behavior or trait being studied (e.g., levels of self-control).

The methodological limitations of SSSMs become all the more exacerbated for studies that examine the effects of parenting on childhood and adolescent levels of self-control. Recall that according to Gottfredson and Hirschi parents must supervise their children, recognize their children's misbehaviors, and consistently punish such waywardness. These three parental management techniques require a substantial amount of time, dedication, attachment, and self-control on the part of the parents. Parents who lack these prosocial traits are unlikely to follow the parental management suggestions offered by Gottfredson and Hirschi. Indeed, there is ample evidence to suggest that parents who lack self-control, parents who have a criminal record, and parents who engage in antisocial behaviors are not the most responsible parents and thus are unlikely to engage in effective parenting tactics.

All of this is critically important because as was discussed previously, levels of self-control are highly heritable. So, if a parent has low levels of self-control they are, statistically speaking, at risk for raising offspring who also have relatively low levels of self-control purely because the parent passed on the genetic material that influences levels of self-control. Research that fails to control for genetic factors (i.e., all research using SSSMs) when examining the potential nexus between parenting techniques

and their offspring's level of self-control and detects a statistically significant association between parenting and self-control may erroneously attribute that association to a parenting effect, when it is really the result of genetic transmission.

In methodological parlance, this type of an association is referred to as a spurious relationship. One common example of a spurious relationship is the well-noted association between ice cream sales and violent crime. As ice cream sales increase, so does violent crime. It would be absurd to think that the consumption of ice cream causes an increase in violence; instead, there is likely a causal factor common to both ice cream sales and violence: temperature. As the temperature increases, people are more likely to consume ice cream and they are also more likely to engage in routines that place them in contact with violent criminals. A spurious relationship therefore can be defined as an association between two variables (e.g., ice cream sales and violence) that disappears after a third variable (e.g., temperature) is taken into account. In social science research, it is nearly impossible to eliminate the possibility of spuriousness, but most research attempts to minimize spuriousness through the use of control variables (or random assignment). Importantly, the only time a control variable needs to be included in a study to prevent spuriousness is when that variable is associated with both the independent variable (e.g., parenting) and the dependent variable (e.g., levels of self-control). If it is only related to one variable or the other, then there is no need to include the control variable to prevent spuriousness.

Now it is quite easy to see how criminological research using SSSMs and examining the association between parenting and self-control is likely biased. Genetic factors are likely affecting the way a parent raises their offspring, and these genetic factors are also passed on to their children in the form of genetic material. So, a parent who is abusive and neglectful likely has low levels of self-control, and the genetic predisposition for low levels of self-control is inherited by their children. Consequently, there is no way to know for certain whether a relationship between parenting and levels of self-control is a true "parenting" effect or whether it represents a spurious relationship when an SSSM is used.

To rule out spuriousness owing to genetic factors, a twin-based research design (or variant thereof) must be employed. Only a handful of studies have used twin-based research designs to examine the link between parenting and levels of self-control. The results of these studies have revealed that once genetic factors are taken into account, there is no association between parental socialization and offspring levels of self-control (Beaver et al. 2009a; Wright and Beaver 2005). These findings have serious implications for criminological research because they indicate that research using SSSMs is likely biased in favor of finding an environmental effect when such an effect is either likely upwardly biased or completely spurious. The use of SSSMs also helps to reconcile the different findings generated by behavioral genetic studies and by criminological studies. Behavioral genetic studies use appropriate research designs that make no assumptions about the role of genetics and the environment. Criminological studies that rely on SSSMs only produce unbiased findings when the assumption of no genetic effect is met. Unfortunately, all of the available evidence strongly suggests that this assumption is violated thereby casting doubt on the accuracy of criminological studies purportedly showing a link between parenting and levels of self-control.

Policy Implications

One of the major attacks leveled against biological explanations of antisocial behaviors and traits, including levels of self-control, is that the policy implications flowing from such research will result in oppressive and inhumane practices. According to this line of reasoning, since DNA is immutable, there is no way to change levels of self-control. In other words, people are born with a fixed level of self-control.

Those who are genetically endowed with low levels of self-control are destined for a life of crime and antisocial behaviors whereas those born with high levels of self-control are likely to lead prosocial and productive lives. This logic is erroneous and is based on the confusion between the physical structure of DNA and the effects emanating from DNA.

While it is true that the physical structure of DNA is nearly impossible to change, it is not true that genetic effects are always constant. Contemporary genetic research has shown that genetic effects change over different developmental time periods, with some genes being switched on at certain periods in the life course and switched off at other times. In addition, the effects of some genes appear to be controlled, at least in part, by exposure to environmental conditions. What this necessarily means is that a gene may have a strong effect in one environment, but no effect in another environment. One gene that was found to be related to levels of self-control was shown to reduce levels of self-control when it was paired with a criminogenic environment, but it was shown to be unrelated to levels of self-control when the criminogenic environment was absent (Beaver et al. 2009a).

The finding that genes are moderated by environmental conditions holds particular promise for prevention and intervention programs designed to change antisocial traits and behaviors, such as levels of self-control. For instance, it is quite possible that intervention and prevention programs could be individually tailored to each person's unique suite of genes to create a more effective treatment program. There is some empirical evidence emerging indicating that such an approach is quite effective. A recent study, for example, revealed that a program designed to reduce externalizing behavioral problems among children was effective for children with a certain genetic variant, but ineffective for children lacking that particular genetic variant (Bakermans-Kranenburg et al. 2008). This type of research remains very new and exploratory and so the true extent of its impact remains to be determined, but it does provide some promise for increasing the effectiveness of prevention and treatment programs.

Biological and genetic research has already had a profound impact on the juvenile justice system. In a landmark Supreme Court decision, the death penalty was abolished for juveniles. The decision to abolish the death penalty was based largely on the findings generated from academic research studies. These studies, however, were not produced by criminologists showing that environmental factors contributed to violence and aggression. Rather, the studies that ultimately swayed the Court's decision were produced by neuroscientists showing that the prefrontal cortex of the brain – the area of the brain that houses the executive function – is not fully developed until the mid-20s. Because the brains of adolescents are structurally immature in relation to the brains of adults, the Court ruled that adolescents should not be held as culpable for murder. Thus, in one of the most progressive policy decisions affecting the criminal justice system, it was biological research, not criminological research, that was the driving force (Beaver 2009).

Conclusions and Future Directions

The 1990s are known as the decade of the brain largely because of the tremendous amount of research that was conducted examining how neurobiological factors are related to different types of human behaviors and traits. Thus far in the 2000s, there has been an immense amount of genetic research trying to tie specific genetic variants to human behaviors and traits. Out of these two intertwined lines of research has emerged incontrovertible evidence indicating that self-control is a largely genetic trait that is housed in the prefrontal cortex of the brain. Despite these insights into the etiology of self-control, much remains unknown about the origins of self-control. Future research, for instance, needs to explore a wider swath of genetic polymorphisms to see which ones affect

variation in self-control. At the same time, it is critically important to study the environmental factors that may moderate the effects of such genes. If this endeavor is successful, then it would likely provide a rich framework from which to create programs designed to promote levels of self-control among at-risk children, youth, and adults. In order to do so, however, criminological research must go beyond the sociological factors first purported by Gottfredson and Hirschi and integrate biosocial data, methods, and findings in order to come to a greater understanding of low self-control and its influence on criminality.

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- ▶ Measurement of Self-Control
- ▶ Social Control
- ▶ Social Control and Self-control Through the Life Course

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▶ Neurology and Neurochemistry of Crime

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▶ DNA Profiling

Genocide

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Overview

Genocide, the definitive "crime of crimes," has produced hundreds of millions of victims who were murdered, raped, sexually assaulted, forcibly displaced, kidnapped, robbed, and mutilated. The most severe violations of human rights are committed during genocidal violence. The sheer number of victims and crimes should imply that genocide is central to the discipline of criminology. Yet, genocide is neglected, marginalized, and undertheorized by criminologists. For the most part, criminologists have been remarkably indifferent to the crime of genocide and failed to incorporate genocide into their research agenda. The unresponsiveness of criminologists to the crime of genocide is part of a broader pattern of collective denial.

Criminologists should have much to contribute to the study of genocide as deviant behavior and social group conflict is at the heart of the legal definition of genocide and a central focus of our discipline. Understanding how and under what conditions people commit deviant acts and why particular groups or behaviors become victimized are undeniably criminological questions. Yet, criminology has been slow moving, unresponsive, and nearly silent towards incorporating genocide within its disciplinary boundaries. This neglect is part of a larger pattern of the discipline's near failure to incorporate any form of international war crimes into their research agenda. Mainstream criminology is preoccupied with interpersonal and intranational criminal acts of violence such as homicide, rape, and robbery leaving the role of the state in acts of crimes underexplored. Far too often, criminologists consider the state as a bulwark of crime rather than the perpetrator of crime. One notable exception is critical criminologists who condemn mainstream criminology for not considering the role of the state as a criminal actor.

A sociological approach to criminology can provide crucial insights, evidence, and theories about genocidal processes by explicitly addressing the collective dynamics of state-organized criminal victimization. Yet, if the past is an indication of the future, then the lack of application and extension of traditional criminological theory to genocide either means that we cannot expect much from mainstream theories or that latent racism and collective denial have hampered attempts to make connections between intranational and interpersonal crimes with international-, group-, and state-sponsored crimes. We may well need to develop new historically grounded theories that better account for state-sponsored collective violence.

The failure of criminologists to speak about genocide is not only a missed opportunity, but it also brings the validity and ethics of the discipline into question. Using the present-day genocide in Darfur as a case study, this entry will discuss the crime of genocide, criminologists silence on the topic, the ways in which criminology can contribute to the study of genocide, current issues and controversies, and future directions and suggestions for criminologists.

Definitions

Determining whether an atrocity is labeled as genocide, crimes against humanity, or ethnic cleansing has serious legal, social, historic, and symbolic consequences. As illustrated in the

ongoing debates on whether the violent conflict in Darfur is labeled genocide is contentious. On one hand is a diverse group that includes Sudanese President Omar al-Bashir and scholar Mamdani (2009) who deny genocide is occurring in Darfur. On the other hand are academics including Eric Reeves (2007) and Hagan and Rymond-Richmond (2008a, b) and the Chief Prosecutor for the International Criminal Court (ICC) who has issued warrants of arrest on the charge of genocide. Defining a conflict is more than merely semantic as each term implies different legal and symbolic consequences and can influence the international community's response to the atrocities. For example, if a violent conflict is labeled a crime against humanity rather than genocide, the evidence needed for conviction is likely reduced, and this naming of the events will lack the symbolic force and probably mean less in the collective memory than would a legal determination of genocide (Savelsberg and King 2011). In fact, all genocides by definition are crimes against humanity, but not all crimes of humanity are elevated to the symbolic significance of genocide. Similarly, the term ethnic cleaning may rightfully describe the intentions of the perpetrators, yet this does not carry the same legal meaning and recourse as a determination of genocide.

Genocide

The term genocide came into existence in 1944 in response to the Holocaust. Raphael Lemkin, a Polish-Jewish lawyer, coined the word genocide by combining the Greek word for race or tribe, geno-, with the Latin word for killing, -cide. In large part due to Lemkin's efforts, on December 9, 1948, the United Nations approved the Convention on the Prevention and Punishment of the Crime of Genocide (Genocide Convention). The Genocide Convention established genocide as an international crime. The legal definition of genocide is found in Articles II and III of the Genocide Convention. Article II defines genocide as any of the following five acts committed with intent to destroy, in whole or in part, a national, ethnic, racial, or religious group:

(a) Killing members of the group
(b) Causing serious bodily or mental harm to members of the group
(c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part
(d) Imposing measures intended to prevent births within the group
(e) Forcibly transferring children of the group to another group

For a charge of genocide, only one of the five acts described in Article II Sections a, b, c, d, and e needs to be met. Article III of the Convention describes the following five acts as punishable:

(a) Genocide
(b) Conspiracy to commit genocide
(c) Direct and public incitement to commit genocide
(d) Attempt to commit genocide
(e) Complicity in genocide

Incorporating genocide into international law represents a historic and momentous advancement in recognizing the act of genocide as criminal. Yet, tragically, establishing genocide as a crime has not eliminated its occurrence. Millions of individuals have been the victim of genocide since it was legally established. Victims include but are not limited to approximately 400,000 civilians in the Vietnam War, over 1 million Bengali in Bangladesh, 100,000 Hutu in Burundi, 1.7 million Cambodians, 200,000 Bosnian Muslims and Croats in the Former Yugoslavia, over 200,000 in Ethiopia, 100,000 Mayan Indians in Guatemala, 50,000–200,000 Kurdish in Iraq, 9,000–30,000 deaths in what is referred to as the Dirty War in Argentina, 8,000 in the Bosnian genocide, and 800,000 Tutsi in Rwanda, and over 400,000 Black Africans have been murdered in Darfur.

While the Genocide Convention provides a legal definition of genocide, legal and social scientific definition may differ. Many scholars have critiqued the legal definition for being too narrow and thereby omitting political groups and social classes from legal protection. Some have extended the meaning of genocide beyond the legal definition to embrace atrocities left outside the meaning of genocide. Examples of altering

the definition include nonlethal acts that threaten the security of members of a group (Lemkin 1946), emphasizing the role of the state (Horowitz 1980), highlighting the one-sided mass killing by the state or other authority (Chalk and Jonassohn 1990), and specifying genocide as "politically motivated mass murder" (Chirot and Edwards 2003: 15).

Crimes Against Humanity

Crimes against humanity are defined differently in the Rome Statute and the statutes of the International Tribunals for the Former Yugoslavia (ICTY) and Rwanda (ICTR). The International Criminal Court (ICC) defines crimes against humanity as acts such as murder, enslavement, torture, rape, enforced prostitution, sexual violence, enforced disappearance, crime of apartheid, and "other inhumane acts of a similar character intentionally causing great suffering, or serious injury to body or to mental or physical health" when they are "committed as part of a widespread or systematic attack directed against any civilian population, with knowledge of the attack."

Collective Denial

Why do so few criminologists study genocide? And why has the work of the few that studied genocide, such as Ralph Lemkin and Sheldon and Eleanor Glueck, been largely forgotten? What can account for a discipline that specializes in crime, virtually ignoring the crime of genocide? Violence, murder, rape, property destruction, and victimization provide the foundation for the vast amount of research conducted by criminologists, yet when these crimes are perpetrated in their most extreme form, as is the case in genocides, criminologists fain interest.

A review of presentations at criminology annual conferences and journal publications exposes the failure of criminologists to speak about genocide. An examination of presentations at two annual crime-centered conferences and articles published between 1990 and 1998 in 13 top criminology journals reveals that out of 19,304 presentations, only 18, or .001 %, addressed genocide and out of 3,138 published article, only 1 was devoted to the crime of genocide (Yacoubian 2000: 12–13). Considering the fact that approximately one million people were murdered in the genocide in Rwanda and the genocide in Former Yugoslavia and two international tribunals were established during this time frame, the silence of criminologists is even more shocking and shameful.

Hagan and Rymond-Richmond (2008a) argue that sociologists and criminologists should incorporate genocide in their research agenda and end their silence on the "crime of crimes." The failure of criminology to engage in the study of genocide is a critique also applicable to its parent discipline, sociology. For example, Fein (1979) reviewed introductory sociology texts from 1947 to 1977 and found that few acknowledged genocide. A survey of texts in anthropology produced a similar pattern of neglect on the topic of genocide (Shiloh 1975).

Methodological Challenges

There are methodological challenges associated with studying genocide; however, they are not insurmountable and should not be used as an excuse for the discipline's lack of research on the crime of crimes. In addition to several methodological challenges, reasons for the limited research on genocide by criminologists include a lack of empathy for the crime because genocide and its victims appear distant since the crime was not likely experienced firsthand, an unwillingness to examine the United State's genocidal origins, perceived low-status topic, and latent racism.

Initial methodological difficulties include the catastrophic and heartbreaking possibility that entire groups and places may be eradicated because of massive killings. Documenting this bloodshed is imperative, but difficult without survivors. Additionally, entering into conflict areas might not be possible. The states' participation in genocide, as perpetrator, silent bystander, or ineffective intervener, as well as their role in covering up the atrocities can make data collection arduous. As is the situation in the genocide in Darfur, states have denied entry to outsiders,

which may include researchers, humanitarian workers, journalists, and even security monitors. In addition to the difficulties of entering into a conflict zone for research purposes is the reality of potential physical and mental harm occurring while conducting research during or in the aftermath of genocide. Further methodological challenges include insufficient education on the topic of genocide in criminology. In fact, Yacoubian (2000: 8) found that only 3 out of 21 criminal justice, criminology, or justice studies programs that offered doctoral degrees provided a course on international crime. Finally, potential genocide researchers may be deterred by the claim that each genocide is so unique and particular that it is impossible to make comparisons or general claims.

Methodological challenges makes studying genocides difficult, yet one solution includes "extending time demands beyond neat packaged and predictable schedules based on survey-research or other easily amenable source of data" (Fein 1990: 6). Research methods available to criminologists and social scientists more broadly have inherent limitations and/or difficulties. Yet, these limitations can potentially be overcome and may lead to methodological advancements. Furthermore, "imperfect" data should not be used as an excuse for not researching genocide or a tactic use to shame scholars into participating in and thereby perpetuating the silence on genocide. "Perfect" data is hard to obtain and potentially impossible as each method suffers from some bias or limitations. Rather than dismiss "imperfect" data, the more challenging and intellectually engaged activity is to make an assessment on the quality of the data and, if appropriate, analyze the data and be transparent about the limitations in publications. Good scholarly work addresses these issues anyway.

Latent Racism

Hagan and Rymond-Richmond (2008a) speculate that genocide has been a marginalized topic of research for criminologists because of latent racism and a belief that the study of genocide is overly emotional and not worthy of academic research. Three individuals devoted a part of their career to writing books and articles about genocide and war crimes, yet few criminologists today acknowledge their efforts. Sheldon Glueck and his wife Eleanor are best known for their contributions to developmental criminology and their research on genocide is nearly forgotten, and Lemkin is barely known to criminologists at all. Laub and Sampson (1991: 1408) speculate that the Glueck's may have suffered from institutionalized anti-Semitism and sexism in American academia. This may account for why they and their research on genocide were marginalized. Horowitz (1980: 3) shares the speculation that research on genocide is limited due to its perceived low academic status and states that sociologists feel "a studied embarrassment about these issues, a feeling that intellectual issues posed in such a manner are melodramatic and unfit for scientific discourse."

Criminological Approach to Genocide

Historically orientated scholars have dominated the study of genocide. While their contributions have been indispensable, theory testing and development has been underdeveloped (Hagan and Rymond-Richmond 2009). Public health researchers have also made important contributions and the benefits their research has provided to genocide victims is commendable and life saving. Yet, they have a distinct approach, which typically only examines deaths in the refugee camps or IDP camps and does not specifically examine the issue of violence death. Nor is there typically an attempt by public health researchers to understand the causes of genocide and to asses blame. In addition, race scholars and political sociologists typically advance the literature and theories of ethnic and national violence. Yet criminologists may have as much to contribute on ethnic violence as sociologists who specialize in race and political issues.

Criminologists should have much to contribute to the study of genocide as deviant behavior, and social group conflict is at the heart of the legal definition of genocide and a central focus of our discipline. Criminologists are fundamentally

concerned with understanding the relationship between victim and the perpetrator; characteristics of perpetrators; social, economic, and communal costs of victimization; effects of sanctions on deterring criminal behavior; and the context in which criminal actions are facilitated. Criminologists should explore if current theories such as strain, social-psychological, control, social learning, social disorganization, collective efficacy, conflict, techniques of neutralization, and feminist theories that are commonly used to explain intranational crimes can also account for the criminal behavior of genocide perpetrators. Alternatively, is there a need to develop entirely new theories? For example, techniques of neutralization may be a crucial process individuals experience as a way to rationale not only interpersonal crimes but also genocidal crimes (Sykes and Matza 1957 and Alvarez 1997). Social-psychological theories of obedience to authority and group conformity, developed from well-known studies such as the Stanford prison experiment, may be essential to understanding collective violence.

Additional questions tailored to the crime of genocide, yet firmly rooted in mainstream criminological concerns, include: Can rehabilitation, reintegration, and or restorative justice reduce violence as it has been shown to do for crimes that are more "traditional?" What effect does being a victim of genocide have on one's likelihood of becoming a perpetrator? What are the financial, emotional, communal, and household effects of being a genocide survivor? Can "bystander effects" be extended to include not only individuals but also states and the international community at large? If there were desistors to the crime, what where their characteristics and the context in which the desistance occurred? What are the physical, biological, economic, social, economic, and regional characteristics of perpetrators? Is there an unequal distribution of genocidal violence in particular locations, and if so why? What role, if any, does concentrated disadvantage and social disorganization have in genocide? Do genocide victims and perpetrators know each other, as is typically the pattern when there is a single perpetrator? Does formal and informal social control deter criminals and reduce future criminal opportunities? Can collective efficacy in the form of mutual trust and cohesion, traditionally theorized to reduce neighborhood crimes, be extended to account for the crime of genocide? Do parallels exist between hate crimes and genocide with the underlying connection being racism and dehumanization?

Competing Understandings of Genocide

Among the established explanations of genocidal victimization are the following six. First is a state insecurity approach that focuses on justifiable reactions to insurgent threats (e.g., Posen 1993). Second is a primordial explanation that emphasizes hatreds so long standing that they are considered exogenous (e.g., Kaplan 1993). Third is the population-resource perspective where competition for life-sustaining resources is considered (Diamond 2005). According to this perspective, opportunities and incentives are greatest, and resources most strained, in densely settled areas. Fourth is the instrumental perspective that emphasizes state-based ethnopolitical entrepreneurs who advance their interests by cultivating public fear and disrespect of subordinate groups (see Hardin 1995; Valentino 2004). Fifth is the constructionist approach that emphasizes racial symbols and identity manipulation by elites (e.g., Kaufman 2001). Finally, the sixth approach is a cognitive framing approach that identifies the shifts that appear during emerging conflicts as ranging from "normal" to "crisis" scripts or frames (Oberschall 2000).

Hagan and Rymond-Richmond (2008a, b) synthesize these six approaches into what they call a critical collective framing approach to explain the atrocities in Darfur. In addition, the theory builds on Coleman's (1986) social action theory and draws on criminological theories including Sampson's (2006) and Matsueda's (2007) concepts of collective and social efficacy and Sutherland's (1947) differential social organization theory. The theory helps to explain the link between microlevel social actions transforming into macro-level systems leading to organized genocidal victimization.

Rape and Genocide

Most people associate genocide as massive killing for the purpose of wiping out an ethnic group in whole or in part. Rape and sexual violence is not as frequently associated with genocide, despite its similar ability to be used as a tool of ethnic cleansing and genocide. As recognized in the groundbreaking *Akayesu* judgment by the International Criminal Tribunal for Rwanda, rape may "constitute genocide in the same way as any other act as long as they were committed with the specific intent."

Horrifically, rape and sexual violence are widespread in genocidal conflicts around the world. Rape is intended to terrorize women, dehumanize victims, destroy families and communities, and or to control the biological and cultural reproduction of women through impregnating victims. The genocide in Darfur exemplifies rape committed as a means to control the biological and cultural reproduction of women. Due to the patriarchal structure of Darfurian society, lineage is determined by patrilineal descent, thereby determining children of Black-African rape victims as Arabic. Intergroup rape is a means of controlling biological and cultural reproduction through "changing the race" and is a powerful weapon of destruction. In the Darfur genocide, there are numerous reports of perpetrators using racial epithets during the rapes and stating their intentions of impregnate female victims. For example, a Black-African genocide survivor reported that her Arabic attacker raped her and said, "You will have Arab babies" (Hagan and Rymond-Richmond 2008a). Another survivor reported that her Arabic attacker screamed, "We will kill all men and rape the women. We want to change the color. Every woman will deliver red. Arabs are the husbands of those women" (Hagan and Rymond-Richmond 2008a).

Estimating the number of rape victims during genocide is exceptionally challenging due to stigma, deaths resulting from health injuries suffered by rape victims, and because their assailants kill some victims after the rape. In the Rwandan genocide, estimated rapes total 500,000. Many of the rape victims were killed shortly after being raped. In Congo, rape estimates vary from 15,000 to 40,000. A study of Darfurian survivors residing in refugee camps in Chad analyzed by sociologists and criminologists Hagan et al. (2009) found that 4 % reported personal sexual victimization. Examining sexual victimization by gender demonstrates that women were sexually victimized at a greater rate than men were. Seven percent of the women in the full sample reported personal sexual victimization.

The stigma and legal ramifications Darfurian rape victims suffer is severe. Raped women are frequently disowned by their family and ostracized by their community. Adding to raped women's pain is a commonly held belief by the Sudanese that unwanted sex cannot make a woman pregnant. Therefore, if a woman becomes pregnant, it is believed that she was not raped. Making matters worse, under Public Order 1991/Criminal Order 1991, sex outside of marriage, premarital sex, and prostitution are prohibited. Rape in Sudan is considered sex outside of marriage or premarital sex done without the consent of the victim. Therefore, survivors of rape can be convicted for sex outside of marriage (called zina) unless they can prove that they did not consent to intercourse. Unmarried women convicted of zina can receive 100 lashes and married women can be stoned to death.

As a result of detrimental social and legal consequences, reports of personal sexual victimization are drastically underreported and women are more likely to report sexual victimization of others than they are to report sexual victimization of self. For example, when Darfurian genocide survivors were asked in the same survey discussed above to report on sexual victimization of other villagers rather than personal sexual victimization, the percent increased dramatically from 4 % to nearly 30 % (Hagan et al. 2009).

Racism and Genocide

Racially specific intent is central to the legal definition of genocide. However, the Genocide Convention has been criticized for being vague

on how to prove intent. The ICTY and the ICTR have provided some clarity for determining perpetrator's intent. The use of racial epithets during an attack has been established in international law as an indicator of motivation and intent. The *Akayesu* decision in Rwanda (UN 1998), the *Jelisi* decision in Bosnia (UN 1999), and the Trial Chamber in *Kayishema* and *Ruzindana* emphasize the importance of spoken language as evidence of genocide.

To understand the motivations and intention of the perpetrators in the genocidal violence in Darfur, Hagan and Rymond-Richmond (2008a, b) relied on the testimony of the surviving victims and witness. The data reveals that the predominately Arabic attackers were yelling racial epithets as they killed, raped, abducted, and destroyed the homes of Black-African villagers. As exemplified below, these epithets involved tropes of slavery and dehumanization:

> "You donkey, you slave; we must get rid of you."
>
> "You blacks are not human. We can do anything we want to you. You cannot live here."
>
> "You blacks are like monkeys. You are not human."
>
> "Black prostitute, whore; you are dirty—black."

The documentation of racial epithets used during the attacks provides evidence that the violence was racially motivated and the intent was racially specific. Hagan et al. (2005) further demonstrate that perpetrators use of racial epithets significantly affected the degree of total victimization during the attack.

Current Issues, Controversies, and Debates

Defining Genocide

As discussed above, defining genocide is a controversial topic. Criticisms include the assertion that the legal definition of genocide is too narrow, thereby excluding groups from protection. Steps forward may include altering the definition of genocide by revisiting sections of the Convention that are frequently critiqued for being ambiguous, namely the issue of intent and what qualifies as "partial" group destruction. Criminologists should seriously consider expanding upon the legal definition of genocide by utilizing insights from their discipline to develop a criminological definition of genocide.

Genocide in Darfur

Among the global atrocities occurring at the time of this writing is a genocide occurring in the Darfur region of Sudan. The genocidal conflict began in February 2003 and is still disastrously ongoing. More than 400,000 Black-African Darfurians have been killed, and 2–3 million have been forcibly displaced (Hagan and Rymond-Richmond 2005). The perpetrators are the Sudanese government and the Janjaweed, who are almost exclusively Arab. The victims are Black Africans. Unlike Southern Sudan, where religious differences are frequently attributed as the cause of conflict, in Darfur, the Arabs and Black Africans practice the Muslim religion. The root cause of the genocidal conflict in Darfur is racial and ethnic hatred (Hagan and Rymond-Richmond 2005, 2008a, b).

A number of significant changes have occurred since the genocide began in 2003. First, the violence that started in Darfur has spread to South Kordofan region. Second, the county of Sudan split into two separate nations. In July 2011, South Sudan officially declared its independence from Sudan. Third, the International Criminal Court (ICC), which became operational on July 1, 2002, has issued warrants of arrest for President Omar al-Bashir, Hussein, Harun, Kushayb, Garda, Nourain, and Jamus for their participation in the genocide in Darfur. The establishment of ad hoc and permanent international criminal tribunals makes it possible to resolve international crimes such as genocide. The International Criminal Tribunals for the Former Yugoslavia (ICTY), the International Criminal Tribunal for Rwanda (ICTR), and the International Criminal Court (ICC) have jurisdiction for the crimes of genocide, crimes against humanity, and war crimes. The

most historically significant warrant of arrest by the ICC is for Sudanese President Omar al-Bashir. This is the first time a sitting head of a state was issued a warrant by the court. Charges filed by Chief Prosecutor Luis Moreno-Ocampo against President Bashir include war crimes, crimes against humanity, genocide, rape, and mass murder as genocide. Of these charges, rape as genocide is the most groundbreaking. Prosecuting the crime of rape as genocide is unprecedented for the ICC and relies on two lesser-known ways of destroying a people: "causing serious bodily or mental harm to members of the group" or "deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part." Prosecuting President Bashir with genocide including using rape as a form of genocide will provide a legal precedence for the International Criminal Court to pursue rape as a form of genocide in the future.

Additional legal means to reduce crime and inequality include enforcing Sudanese laws against rape and eliminating Public Order 1991/Criminal Order 1991. Flogging, amputating, and formalizing the death penalty for a wide range of offenses including adultery, embezzlement, and "corruption" were restored under this order. The order includes numerous criminal acts, which are vaguely defined permitting those in power to select who is criminal and what to call a crime. Women in particular have been targeted, victimized, and controlled under Public Order 1991.

Conclusion and Future Research

The boundaries of criminology must expand beyond focusing on individual criminal actions to include crimes committed by the state. Within the discipline, we can look at the subdiscipline of critical criminology for guidance. The inclusion of genocide into criminological research should be accompanied by revisiting the pioneering work of Glueck, Lemkin, and criminologists who worked on this marginalized topic as well as interdisciplinary appreciation for research on mass atrocities and war crimes conducted by anthropologists, historians, political scientists, social theorist, psychologists, and philosophers.

A second recommendation for future research is to theorize about the ways in which perpetrators of genocide and war crimes more broadly resemble and depart from "ordinary" delinquents more commonly studied by criminologists. Are they a vastly different type of criminal? Can their behaviors be explained through mainstream criminological theories or is there a need to develop new theories to account for war criminals? To what extent can mainstream criminology theories that frequently view criminals as engaging in delinquent behavior account for genocidal violence in which the perpetrator is potentially committing a crime of obedience? In what ways can we account for the role of the state in genocidal violence?

Third, criminologists can make value contributions to understanding the consequences of genocidal victimization. Indeed, one of the most resilient findings in victimology is that victimization does not end after an attack. Crime victims typically continue to suffer socially, economically, and psychologically after an attack. Similarly, victimization does not end after a genocidal attack (Rymond-Richmond and Hagan 2012). Fourth, researchers must study the behaviors, motivations, and emotions of perpetrators. Most of what we know about the motivations of perpetrators comes from the perspective of the victim. While telling and important, augmenting this data with the perspective of the perpetrator could provide vital insights into the causes, process, and preconditions and quite possibly illuminate potential solutions to eliminating genocide.

Fifth, while the Genocide Convention contains two provisions that obligate signatories to the Convention to intervene to halt genocidal violence, it has invoked fairly weak international efforts to intervene. The concept of laws on the books and laws in action has been studied by criminologists and other social scientists to

illuminate and theorize about this disjuncture. Criminologists may be able to contribute to our understanding of why this disjuncture exists between states obligation to intervene in the genocide and their minimal efforts to do so. Moreover, and potentially more importantly, criminologists may be able to identify mechanisms that move from recognizing genocidal occurrences to international intervention.

In addition, the importance of genocide research, the unique contributions criminologists can make, and the increased financial necessity when conducting research abroad should be recognized by funding agencies such as the National Institute of Justice (NIJ). A review of NIJ-funded research projects during the years 1995, 1996, and 1997 demonstrates that $140 million dollars was awarded to 529 different research projects and only one, or .002 %, was tenuously associated with international crime (Yacoubian 2000: 14). Since this review does not address how many of the proposed research projects focused on genocide, it is difficult to know whether the virtual nonexistent NIJ funding is due to a lack of proposals on the topic or whether NIJ also engages in silencing genocide.

The terms "activists" and "scholar" have often been pitted against each other as if one cannot be both. Hagan and Rymond-Richmond (2009) insist that criminologists can conduct methodologically strong, peer-reviewed research that embraces activisms. Outside of criminology, there is a little more acceptance of merging the two together. In sociology, this is referred to as public sociology, and in anthropology, it is called action anthropology. In criminology, the term used to describe Hagan and Rymond-Richmond's research is activists' criminology. As good, reflexive researchers acknowledge, each researcher has their own bias, experience, race, class, gender, and even theoretical inclinations that affect the topics we choose and the lens in which we view our data. Acknowledging positionality does not negate responsible, good research.

Criminologists have a scholarly and moral obligation to build a "new criminology of genocide" (Matsueda 2009). Understanding the context of genocide, the motivations of the criminals, and the cumulative effects of victimization are important steps criminologists can make towards preventing their future occurrence. Furthermore, through the collection and analysis of data, criminologists can play a role in criminal prosecution of the perpetrators by providing information on the participation of the state, the degree of the destruction, and the racial nature of the genocide.

The building of a new criminology of genocide may well require criminologists to move beyond the familiar and comfortable mainstream. This is not completely uncharted. Feminist, Marxism, peacemaking, and postmodernism theory have modeled how this may be accomplished. Sutherland's work nearly 50 years ago on white-collar crime is another example of expanding the boundaries of criminology. It is time Raphael Lemkin's concept of genocide is incorporated into the research agenda of criminologists. If for no other reason, neglecting to study the crime of genocide is to miss an opportunity to make significant contributions to the discipline.

Related Entries

- ▶ Crime Investigations by the International Criminal Court
- ▶ Environmental and Human Rights
- ▶ Feminist Theory in the Context of Sexual Violence
- ▶ Genocide
- ▶ History of Restorative Justice
- ▶ Human Rights Violations in Criminal Court
- ▶ Marxist Criminology
- ▶ Monitoring and Evaluation of Restorative Justice
- ▶ Political Crime
- ▶ Resistance to State Crime
- ▶ Restorative Justice and State Crime
- ▶ State Crime
- ▶ Transitional Justice

- ▶ Victimization, Gender, and the Criminal Justice System
- ▶ Victims and Restorative Justice
- ▶ Victims and the International Criminal Court
- ▶ Victims of State Crime

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Geo-forensic Analysis

- ▶ Applied Geographical Profiling

Geographic Profiling

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Overview

Geographic profiling is a criminal investigative methodology for analyzing the locations of a connected series of crime to determine the most probable area of offender residence. Its major function is suspect prioritization in investigations of serial crime. The technique is based on the theories, concepts, and principles of environmental criminology. Crime pattern, routine activity, and rational choice theories provide the foundation for understanding the target patterns and hunting behavior of criminal predators.

These theories suggest a method for describing the mathematical relationship between offender travel and likelihood of offending. This relationship can be described by a buffered distance-decay function that looks in cross-section rather like a volcano with a caldera. The function is encoded in a computer algorithm. Geographic profiling uses specialized crime-mapping software based on this algorithm to determine the most probable area of offender residence from the spatial pattern of the crimes.

Geographic profiling has turned out to be a robust and versatile methodology. Originally developed for analyzing serial murder cases, it was subsequently applied to rape, arson, robbery, bombing, kidnapping, burglary, auto theft, credit card fraud, and graffiti investigations. A number of innovative applications outside law enforcement also exist, with geographic profiling being used in military operations, intelligence analysis, biology, zoology, epidemiology, and archaeology.

Introduction

Geographic profiling is a criminal investigative methodology for analyzing the locations of a connected series of crime to determine the most probable area of offender residence (Rossmo 2000). Its major function is suspect prioritization in investigations of serial crime. A criminal investigation involves two tasks – finding the offender and proving guilt. Guilt can only be established by a confession, a witness, or through physical evidence. The task of finding an offender, a particular challenge in a "whodunit" investigation of a stranger crime, involves collecting, prioritizing, and evaluating suspects. High profile cases often have thousands of suspects and consequent problems of information overload. In such situations, geographic profiling can assist in case information management.

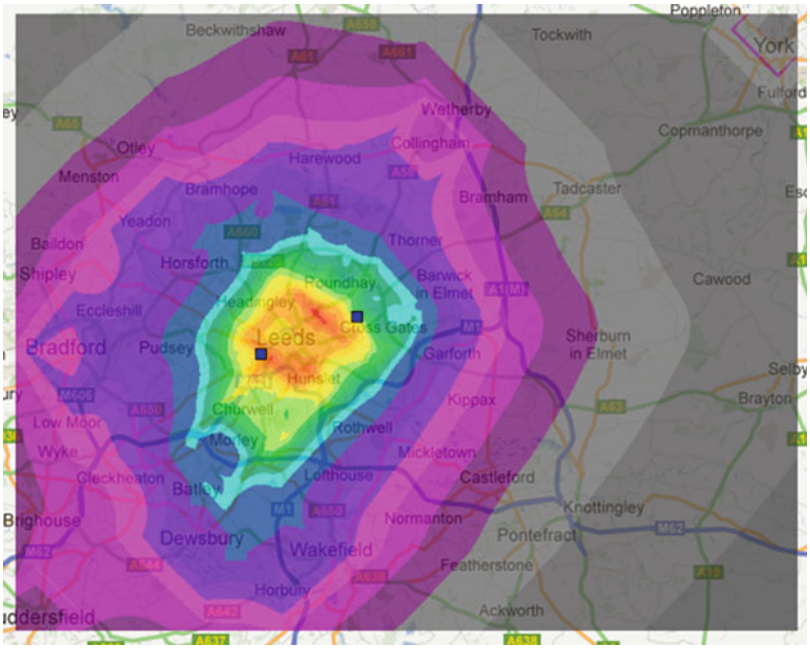
Geographic Profiling

History

Geographic profiling is typically employed in cases of serial violent or property crime, though it can be used in investigations of single crimes involving multiple locations or significant aspects of geography (Davies and Dale 1995; Knabe-Nicol and Alison 2011). Police have long used ad hoc mapping efforts to support certain criminal investigations. The first recorded use of investigative spatial analysis was during the Hillside Stranglers investigation in 1977. The Los Angeles Police Department analyzed the sites where the murder victims were abducted, their bodies dumped, and the distances between these locations, enabling them to identify the area where the killers were based. A similar analysis, using spatial means and distance-time factors, was conducted in 1980 during the Yorkshire Ripper inquiry in England (Kind 1987). More sophisticated models emerged from research conducted at Simon Fraser University's School of Criminology in Canada (Rossmo 1995). The technique was first implemented operationally in the Vancouver (British Columbia) Police Department's Geographic Profiling Section in 1995.

Theory

Geographic profiling is based on the theories, concepts, and principles of environmental



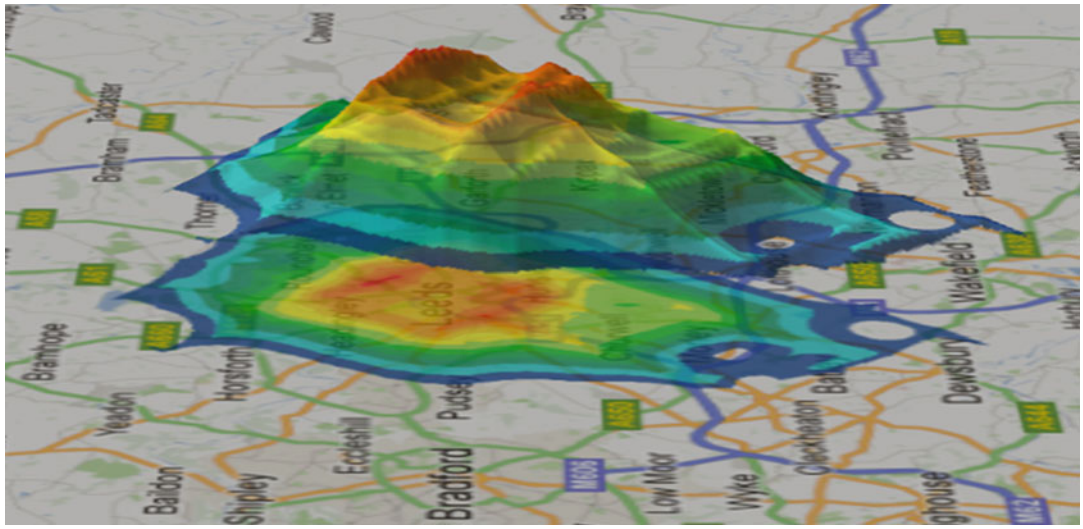
Geographic Profiling, Fig. 1 Jeopardy surface (top 10 %) for Operation Lynx

criminology. Crime locations are not distributed randomly in space but rather are influenced by the road networks and features of the physical environment. This focus on the crime setting – the "where and when" of the criminal act – offers a conceptual framework for determining the most probable area of offender residence. Environmental criminology is interested in the interactions between people and their surroundings and views crime as the product of offenders, victims, and their setting (Brantingham and Brantingham 1981, 1984). The three theories underlying geographic profiling – crime pattern (Brantingham and Brantingham 1981, 1993), routine activity, and rational choice (Clarke and Felson 1993) – provide the foundation for understanding the target patterns and hunting behavior of criminal predators.

Computer Systems

Geographic profiling uses specialized crime-mapping software to determine where an offender most likely lives. The mathematical relationship between offender travel and probability of offending can be described by a buffered distance-decay function that looks, in cross-section, rather like a volcano with a caldera. The function is encoded in a computer algorithm. Working from the point pattern of the crime locations, the computer software produces a jeopardy surface – a three-dimensional probability surface – outlining the most probable area of offender residence (see Figs. 1 and 2 below). Those positions higher on the jeopardy surface (colored red) are more likely to contain the offender's residence, those lower, less likely. A police investigator can then prioritize suspect addresses or other locations by their position on this probability surface.

A geographic profiling program includes an analytic engine, geographic information system (GIS) capability, database management, and powerful visualization tools. *Rigel*, based on the Criminal Geographic Targeting (CGT) algorithm developed in 1991 at Simon Fraser University, was the first commercial geographic profiling system. Two similar geographic profiling programs, *CrimeStat* and *Dragnet*, primarily used for research rather than police operations, were later released in 1999.



Geographic Profiling, Fig. 2 Geoprofile for Operation Lynx

Law enforcement agencies can use geographic profiling software to optimize their limited resources. The performance of a geoprofile is determined by a measure called the hit score percentage (HS%), defined as the ratio of the size of area that has to be searched, following the geoprofile prioritization, before the offender's base is found, to the total hunting area. For example, if the crimes in the series covered 10 square miles, and the geoprofile located the offender in 1.5 square miles, then the HS% would be 15 %. The smaller the HS%, the more precise the geoprofile's focus and the better its performance. An evaluation of geographic profiles prepared for operational cases that were eventually solved showed that the mean HS% was 5 % and the median 3 % (Rossmo 2011).

Process

The process of generating a geographic profile involves a number of steps, beginning with determining which crimes are connected in a series, evaluating the case information, creating the geoprofile, and finally recommending investigative strategies. This process is described in more detail below.

Linkage Analysis

The investigation of a crime series starts with determining which specific offenses are connected together. This procedure is known as linkage analysis or comparative case analysis. Every crime in the pattern can be considered a piece in a jigsaw puzzle; the more pieces, the more information; the more information, the more detailed the overall investigative picture. Linkage analysis identifies case similarities and common suspects, leading to information sharing between detectives and different police jurisdictions. When a case is solved, more crimes may be cleared and the courts can sentence convicted offenders more appropriately.

A linkage analysis requires the comparison of similarities versus differences for both connected and unconnected crimes; connected crimes should show more similarities than differences and unconnected crimes, more differences than similarities. There are three main methods used to link crimes: (1) physical evidence; (2) offender description; and (3) crime scene behavior (Rossmo 2000). If present, physical evidence such as DNA or fingerprints can establish crime linkage with certainty. In contrast, the other two methods are probabilistic in nature; witness descriptions vary in their accuracy, and offenders do not always exhibit the same modus operandi.

Signature – unique behaviors not required for the commission of the crime, such as certain fantasy-based sexual routines in a rape series or the inscription of "FP" (for "fair play") by the New York Mad Bomber – provides a solid link if present; unfortunately, signature is rare. Proximity in time and place between crimes significantly increases their likelihood of being connected.

After a linkage analysis has been completed, the connected crime locations, distinguished by site type, are entered into the system by street address, latitude and longitude, or digitization. These optional entry methods reflect the reality that crime can happen anywhere – houses, parking lots, back alleys, highways, parks, rivers, and even mountain ravines.

Considerations

An exploratory analysis of the data is next conducted. Several different crime factors and environmental elements need to be considered in the construction and interpretation of a geographic profile:

1. Crime sites – While the locations of the crimes are essential to a geographic profile, the types of crime sites are also important. A homicide, for example, can involve separate or combined encounter, attack, murder, and body disposal sites; each site type has a separate analytic meaning.
2. Temporal factors – When the crimes occurred (date, day of week, and time of day) and their chronological order provide valuable context for understanding the crime sites. Temporal information may also provide insight into the offender's routine activities.
3. Hunting style – A criminal's hunting method (defined as the search for, and attack on, a victim or target) influences his or her crime site pattern (Beauregard et al. 2011). Hunting style is therefore an important consideration in geographic profiling.
4. Target backcloth – The target backcloth is an opportunity surface representing the availability of potential targets or victims in a given area. An offender's choice options may be limited if the target backcloth is constrained or patchy (e.g., a criminal preying on street sex workers in a red light district). This may reduce the importance of certain types of crime sites (victim encounters) in the preparation of a geographic profile.
5. Arterial roads and highways – People, including criminals, do not travel as the crow flies. They follow street layouts and are more likely to travel along major arterial routes, freeways, or highways. Crimes often cluster around freeway exits.
6. Bus stops and rapid transit stations – Offenders without vehicles may use public transit or travel along bicycle or jogging paths. The locations of these routes and their access points may be an important consideration for understanding the crime patterns of such offenders.
7. Physical and psychological boundaries – Movement is constrained by physical boundaries such as rivers, lakes, ravines, and highways. Psychological boundaries, resulting from socioeconomic, ethnic, or race differences, also influence movement.
8. Zoning and land use – Zoning (e.g., residential, commercial, industrial) and land use (e.g., stores, bars, businesses, transportation centers, major facilities, government buildings, military institutions) provide important keys as to why an offender may have been in a particular area.
9. Neighborhood demographics – Some sex offenders prefer victims of a certain racial or ethnic group. These groups may be more common in certain neighborhoods than in others, affecting spatial crime patterns.
10. Displacement – Media coverage or police patrol presence can cause spatial displacement, affecting the locations of subsequent crime sites. Any displacement issues have to be compensated for in a geographic profile.

Creating the Geoprofile

Once all these various factors are considered, a scenario, involving a subset of crime locations

most relevant for determining the offender's residence, is created (e.g., non-independent crime sites will be excluded). The next stage is the actual generation of the geographic profile. Conducting hundreds of thousands of iterations of its criminal hunting algorithm, the software assigns probability values (depicted with a color spectrum) to each pixel in what is typically a 40,000-pixel grid overlaid on a map of the crime sites. The final output is a color two-or three-dimensional map that shows the most likely area of offender residence (see Figs. 1 and 2 below). The geoprofile can then be used as the basis for a number of police investigative strategies.

Investigative Strategies

The function of a geographic profile is to focus a criminal investigation. Police agencies have employed a number of strategies over the past 20 years that take advantage of this spatial prioritization. The development of these approaches has been an ongoing interactive process involving investigator input and operational experience (Daniell 2008). Geographic profiling investigative strategies can be broadly divided into suspect-based and area-based approaches, depending on whether individuals or locations are being prioritized. It should be emphasized that a geographic profile is only one of many techniques in the detective's repertoire. However, it can increase effectiveness and efficiency and, in some situations, make possible an investigative approach that would otherwise not be feasible.

Suspect-Based Strategies

Suspect prioritization involves the assessment of individuals, including suspects, persons of interest, and known criminals. One of the benefits of geographic profiling is the ubiquity of address-based record information (estimated to be as high as 85 %). Potential suspects and investigative leads can be found in a variety of databases: police dispatch, record management, and jail booking systems, sex offender registries, and parolee and predatory violent criminal lists.

Data banks are often geographically based, and parole and probation offices, mental health clinics, social services offices, schools, and other agencies located in prioritized areas may provide information of value. Several commercial companies offer law enforcement agencies the ability to search multiple personal information databases. Their systems (e.g., Accurint and AutoTrack) use proprietary data-mining algorithms to sample and select large quantities of data electronically and assign them to individual profiles.

A department of motor vehicles (DMV) record search for a suspect vehicle can be focused by cross matching an offender's description from driver's licenses files and prioritizing the results using geographic profiling. The combined search parameters act as a linear program to produce a manageable list of records.

Area-Based Strategies

Area prioritization involves the allocation of police resources for such activities as surveillance, canvassing, and directed patrolling (for an interesting case example involving a serial burglar, see Rossmo and Velarde 2008). It has also been used to focus intelligence-led DNA screens ("bloodings") in which individuals are prioritized based on geography, criminal record, age, and other relevant criteria. In certain missing person cases that are suspected homicides, geographic profiling can help determine probable body disposal sites or burial areas if a suspect has been identified.

Operation Lynx

Operation Lynx was the name of a major police operation that investigated a series of five brutal rapes in central England from 1982 to 1995. The first victim was attacked in December 1982 in a parking lot in Bradford by a man with a Scottish accent. The offender forced his way into her car and then drove to a deserted airport where he raped her. A month later, the second victim was abducted in a similar manner from the parking lot of a Leeds hospital. Afterward, the offender abandoned her in an industrial area in

the central part of the city. He continued this pattern, raping a woman in Leicester in May 1984 and another in Nottingham in May 1993. The last victim, a student, was attacked in a multistory parking garage in Leeds in July 1995. The offender put crazy glue over her eyes so she could not see him.

These crimes spanned multiple police jurisdictions, resulting in significant investigative problems. Finally, in 1996, the crimes were officially linked. The various police agencies formed Operation Lynx, which eventually became, with over 180 police officers from five different police forces, the largest manhunt in England since the Yorkshire Ripper inquiry. Investigators recovered DNA from semen and blood found at two of the crime scenes, but unfortunately, the offender was not on the UK National DNA Database. They also had a partial fingerprint from one of the victim's vehicles, though it lacked a sufficient number of points for an automated fingerprint identification system (AFIS) comparison. Investigators then decided to try a manual search of the fingerprint files of West Yorkshire Police – a jurisdiction of two million people. A prioritization scheme, one element of which was geography, was developed to focus the search.

In 1997, the Vancouver Police Department was asked to prepare a geographic profile for the case (Rossmo 2000). Unfortunately, even though each rape involved multiple locations, the crime series was spread over 13 years and several areas, suggesting the offender had operated from different bases. Generating separate geoprofiles for each city would have resulted in the critical loss of information. Investigators, however, had linked a stolen Ford Cortina to the second attack. The owner's credit card had been left inside the vehicle, and someone had used it to make numerous purchases throughout Greater Leeds. If this person was the rapist, then the geographic profile could also include these locations.

Proceeding on this basis, a geographic profile was prepared from the 20 locations of the Leeds crimes and credit card purchases. The result focused on two neighborhoods in central Leeds – Millgarth and Killingbeck. Consequently, the manual fingerprint search was narrowed by age (35–52 years), criminal record (minor offenses), residence area (Millgarth or Killingbeck), and Scottish origin, among other parameters. In March 1998, after 940 h of examining more than 7,000 prints, a match was made to a man named Clive Barwell. DNA subsequently confirmed he was the rapist. Barwell resided in Killingbeck, and his address was in the top 3.0 % of the geoprofile; his mother, who used to beat him when he was a child, lived in Millgarth. In October 1999, after Barwell pled guilty in court, he was sentenced to eight life terms in prison. He is still a suspect in the murder of a young woman.

Barwell may have been found sooner, but it turned out he was not Scottish. He had faked an accent in order to mislead police. He was also listed as being in prison during the Nottingham attack; an undocumented release gave him the opportunity to rape again.

In the hunt for Barwell, detectives engaged in 24,324 actions, knocked on over 14,000 doors, tested the DNA of 2,177 men, and reviewed an additional 9,945 suspects. A total of 33,628 names were entered in the inquiry's computer system, more than in any other case in British policing history. Operation Lynx is a dramatic example of the importance of suspect prioritization. Given the multijurisdictional nature and time span of the crimes, the manual fingerprint review would never have been successful without narrowed search criteria and a geographic focus.

Figure 1 shows the top 10 % of the three-dimensional jeopardy surface created with *Rigel* for Operation Lynx in 1997. Figure 2 shows the full two-dimensional geoprofile; the blue square in the southwest of central Leeds marks Barwell's address, and the one in the northeast, his mother's address.

Training

The Vancouver Police Department (VPD) implemented the first geographic profiling training program in 1997. The Royal Canadian Mounted Police (RCMP), Ontario Provincial

Police, British National Crime Faculty (now part of the Serious Organised Crime Agency or SOCA), and the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), among other agencies, have all had personnel trained in the methodology. The National Law Enforcement and Corrections Technology Center-Southeast Region (NLECTC-SE), working with the VPD, expanded geographic profiling training to property crime investigations in 2001 (Rossmo and Velarde 2008). Training is now available for police investigators and crime analysts internationally through various universities and police agencies. Over 600 people, representing 264 law enforcement, intelligence, and military agencies from 14 countries, including Australia, Canada, England, Wales, Korea, The Netherlands, South Africa, Sweden, Switzerland, Thailand, Turkey, and the United States, have now been trained in geographic profiling.

Future Directions

New Applications

Geographic profiling has turned out to be a robust and versatile methodology. Originally developed for analyzing serial murder cases, it was subsequently applied to rape, arson, robbery, bombing, kidnapping, burglary, auto theft, credit card fraud, and graffiti investigations. It has also been used to refine probability calculations in familial searches of DNA databanks (Gregory and Rainbow 2011). Some of the more interesting applications have included the geoprofiling of payphone locations in a murder case, cellular telephone switch tower sites in kidnapping cases, stores where bomb components were bought, locations of credit card purchases and bank ATM withdrawals in a rape case, and, in a historical analysis, the locations of anti-Nazi postcards left on the streets of Berlin, Germany, during the early 1940s. Geographic profiling has also found a number of innovative applications outside law enforcement, including uses in military operations, intelligence analysis, biology, zoology, epidemiology, and archaeology (Rossmo 2012).

Counterinsurgency and Counterterrorism

Traditional military responses to insurgency attacks in Iraq and Afghanistan, often quasi-criminal in nature, are usually not possible because of the civilian nature of the surrounding population. Counterinsurgency operations therefore require intelligence analysis and some form of investigative response. These attacks have underlying spatial and temporal patterns, enabling the use of geographic profiling by military analysts to determine the most probable locations of enemy bases (Brown et al. 2005; Kucera 2005). For example, urban and countryside insurgency problems have included attacks from improvised explosive devices (IEDs), vehicle bombs, land mines, rocket-propelled grenades (RPGs), mortars, and snipers. Insurgents typically obtain their heavier armaments and munitions from supply centers – homes, mosques, warehouses, and various other buildings. For geographic profiling purposes, the insurgent attack locations are equivalent to crime sites, while their supply centers are equivalent to offender bases.

Terrorism is a covert threat, and important patterns can be lost in the large volume of data collected by counterterrorism and intelligence agencies. Geographic profiling models can be used to prioritize suspects, tips, and leads. While it has seemed to some that terrorists, with transnational structures and decentralized networks, lack a geographic structure, it turns out that they do. Many minor terrorist actions are ordinary crimes, such as robbery, theft, and credit card fraud. Even major terrorist attacks of targets specifically selected for their symbolism require the establishment of terrorist cells in the areas of operation. In both situations, a geographic relationship exists, whether it is the target determining the locations of the terrorist cell sites or the terrorist cell sites determining the location of the target. Bennell and Corey (2007) retrospectively applied geographic profiling to terrorist bombings in France and Greece. They concluded that when appropriate assumptions are met (an area requiring further research), geoprofiles of terrorism can be accurate. Rossmo and Harries (2011) analyzed the site patterns of

Marxist and Jihadist terrorist cells in Turkey and Spain and found they possessed internal geospatial structures that could be quantified.

Biology and Epidemiology

Biologists have adopted geographic profiling models to the study of animal predation. The technique has been used to describe foraging patterns of different colonies of bats in Scotland (Le Comber et al. 2006), discriminate spatial search processes and predict nest locations of bumblebees (Raine et al. 2009; Suzuki-Ohno et al. 2010), and investigate the nonrandom nature of white shark attacks in South Africa (Martin et al. 2009).

Geographic profiling has also been used in epidemiology research to locate the origins of infectious diseases, including contaminated water sources for cholera and mosquitogenic breeding pools for malaria (Le Comber et al. 2011). Source populations of invasive species have been identified from geographic profiles of their current locations (Stevenson et al. 2012). The expansion of geographic profiling to these other domains demonstrates the reach and power of the environmental criminology approach.

Future Improvements

Future improvements in geographic profiling require an integration of both scholarly research and operational experience. One area that requires more study is the journey to crime. While many studies have measured the distance between offenders' homes and their crime sites, only a few have examined the exact nature of their crime journeys. Rossmo et al. (2011) mapped and analyzed the spatial-temporal patterns of a group of reoffending parolees on an electronic monitoring program with a global positioning system (GPS). Their research revealed the characteristics of actual crime trips and provided a more nuanced understanding of offenders' spatial patterns. Bernasco (2010) studied the spatial influence of offenders' residential history on their crime locations. He found past residences still influenced where a criminal offended provided he or she had recently moved and had lived in the prior residence for a period of time. Summers et al. (2010) used maps in interviews of convicted property offenders, gaining insights into how they view space and search for criminal targets.

Combining geo-demographics and other area-based information with the point pattern analysis of geographic profiling is another approach with potential (Rossmo et al. 2004). Levine and Block (2011) developed a Bayesian approach to geographic profiling that integrates historic offender residence data with journey-to-crime estimations. However, while Bayesian models may be useful for prioritizing geographic areas, they cannot be used for suspect prioritization as their calibration is based on known offender residences.

Conclusion

The stranger nature of serial crime creates challenges for police investigations. Geographic profiling can help detectives prioritize suspects and manage information in such cases. It is only one of several available tools and is best employed in conjunction with other police methods. As addresses are a common database element, geographic profiling can be used as a decision support tool in a variety of contexts. The overall geographic pattern of a crime series is just as much a clue as any of those found at an individual crime scene.

Related Entries

▶ Biological Geographical Profiling

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Geographical Analysis

▶ Crime Mapping
▶ Inferential Crime Mapping

Geographical Offender Profiling

▶ Applied Geographical Profiling

Geography of Crime

▶ Crime Mapping
▶ Inferential Crime Mapping

Geography of Crime and Disorder

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Synonyms

Ecology of crime; Environmental criminology; Socio-spatial criminology

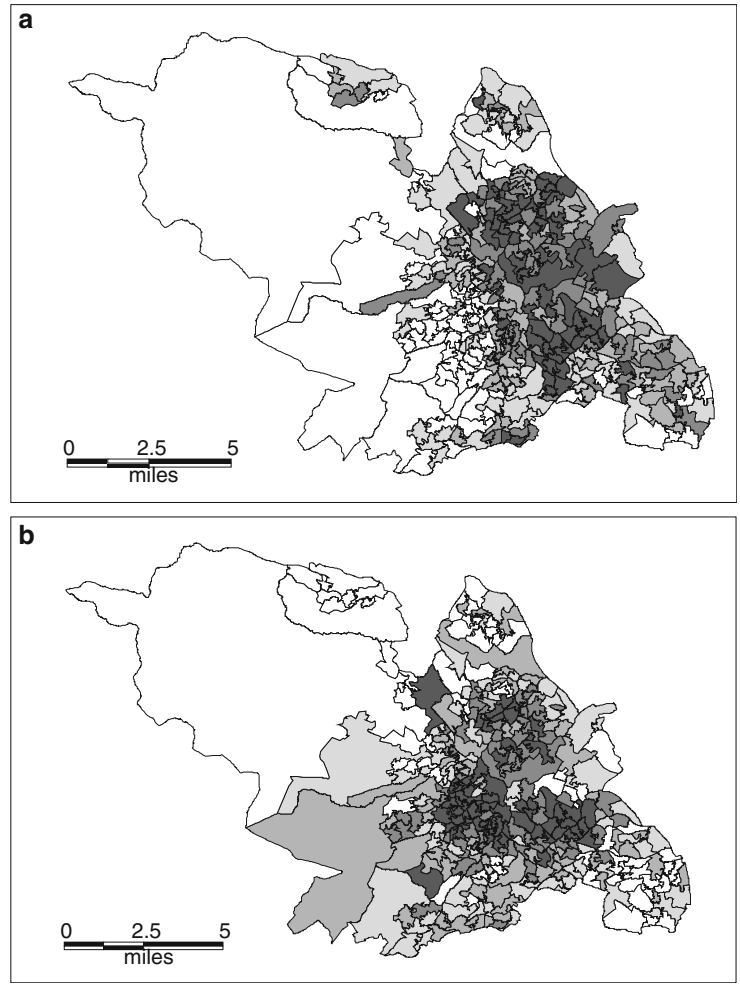
Overview

The study of the geography of crime has a long history, stretching back to the early nineteenth century. After a quiescent period in the middle of the twentieth century, it has now again become a field of strong research activity. However, the interests of scholars in this field have often been divergent: for example, some have been motivated by very practical (crime-preventive) concerns, while others are more interested in explanatory theory; some have mainly focused on neighborhoods, but others see greater merit in studying micro-locations. Not infrequently, work in these different traditions has been pursued in relative isolation, leading to some fragmentation of the field. However, there is now a growing interest in developing a more integrated understanding of geographical criminology (Bottoms 2012; Weisburd et al. 2012; Wikström et al. 2012). This chapter is written from that integrative perspective, with a special focus on arguably the three most important strands of research in the recent geography of crime, namely, the "hotspots approach," the "neighborhood effects tradition," and the "signal crimes perspective." The chapter is organized into three main sections, focusing respectively on space, social structure, and social action.

Three Research Approaches in the Contemporary Geography of Crime

The "hotspots" approach within criminology effectively began with a seminal paper by Sherman et al. (1989), which showed that 50 % of the crime-related calls made to the police in Minneapolis related to just 3.3 % of the micro-locations in the city. This degree of concentration of crime seemed to offer significant potential for targeted crime prevention programs, and such programs have subsequently been successfully developed by scholars and practitioners working in the hotspots tradition (Braga and Weisburd 2010; Weisburd et al. 2010). Indeed, it has been recently argued that "the police can be more effective if they shift the primary concerns of policing from people to places" (Weisburd et al. 2010, p. 7).

The "neighborhood effects tradition" is older and can be traced back to the work of the Chicago School of Sociology in the 1930s. The argument of the Chicagoans was that "socially disorganized neighborhoods" produced more juvenile delinquents than other residential areas with similar populations; in other words, that aspects of the social structures and the culture of certain neighborhoods could lead to the development of criminality in some individuals who would otherwise have remained crime-free. For a time, the existence of such "neighborhood effects" (as opposed to "individual effects" or "family effects") was challenged, but in light of further research evidence, they can now be regarded as clearly established (for a review see Bottoms 2012). For example, in a paper based on data from the Pittsburgh Youth Study, Wikström and Loeber (2000) showed that, after controlling for various individual "risk factors" for offending (such as impulsivity, poor parental supervision, and low school motivation), neighborhood factors remained causally important in generating adolescent criminality, at least in the poorest neighborhoods.



Geography of Crime and Disorder, Fig. 1 City of Sheffield: geographical distribution of offender residences and burglary victimizations, September 2004 – August 2006. (**a**) Map of offender residences (in quintiles, *highest rate darkest*) (**b**) Map of victimizations for offenses of residential burglary (in quintiles, *highest rate darkest*). Note: both maps are based on UK Census lower level super output areas (Source: Bottoms 2012, p. 459; maps prepared by Dr. Andrew Costello)

There are two important differences of empirical focus as between the hotspots approach and the neighborhood effects tradition. First, as their names imply, there is a difference in geographical scale: hotspots are micro-locational, while the study of neighborhoods entails a locationally wider research focus. Secondly, the dependent variable for hotspots researchers is the *criminal event located in geographical space*, while the neighborhood effects tradition, being concerned with potential neighborhood influences on the criminality of individuals, focuses particularly on the *geographical location of offenders' homes*. Yet despite these differences, in real-life research contexts the two approaches are empirically interconnected, because one of the best-established and durable findings in the geography of crime is that – for reasons to be discussed later – *many offenses are committed close to offenders' homes*. This is illustrated in Fig. 1 which displays data on the location of offender residences and of recorded residential burglary victimizations in Sheffield, England, a city with a population of half a million. Sheffield is well known as a "city of two halves," with the population of the eastern half being substantially poorer, and having a lower life expectancy, than those living in the western half. Figure 1a shows that offender residences are very disproportionately concentrated in eastern Sheffield. One might therefore suppose that many offenders intending to burgle might travel the short distance from east to west Sheffield to take advantage of the (on average) much more lucrative theft

opportunities available in the houses in the west. However, although there is clearly some movement in this direction (see Fig. 1b), most of the areas with high victimization rates for residential burglary are, as with offenders' residences, found in the east. Given data of this kind, it is now well established that an important risk factor for a high area victimization rate is that the location lies close to an area of high offender residence. That simple fact is one of the most important reasons why a better integration of research from the "hotspots" and "neighborhood effects" traditions is desirable.

The third strand of research, "the signal crimes perspective," is the most recent. It draws in part from the field of study known as *semiotics* ("the science of signs and symbols"), which focuses especially on the operation of such symbols in communication. Semiotics is relevant to geographical criminology because the signs emitted at particular locations can send messages that significantly affect behavior; for example, research in the Netherlands has shown that signs of disorder in public places (such as uncleared litter) tend to encourage further breaches of norms (including theft), while norm-compliant behavior (e.g., someone sweeping up litter) can encourage other norm-compliant behavior (e.g., helping a stranger who has dropped fruit in the street) (Keizer et al. 2008; Keizer 2010). According to Martin Innes, the originator of the signal crimes perspective (SgCP), criminology lacks "a coherent explanation of the public understanding of crime and disorder and how such understandings are imbricated in the wider symbolic construction of social space." Substantively, SgCP proposes that "*some crime and disorder incidents matter more than others to people in terms of shaping their risk perceptions*" in visiting defined locations (Innes 2004, p. 336, emphasis added). Thus, for example, three spouse murders in a month in a medium-sized town would be very unusual, but would not necessarily create widespread fear, or a sense of threat, in the community at large, because they would be seen as "private matters." By contrast, the abduction and murder of a local schoolgirl on her way to school would almost certainly generate much more fear, and a sense of threat, in the area, because of the *signal* it would transmit about potential risks in the community. In light of this signal, ordinary people might freshly consider as "risky" certain places, people, or situations that they might encounter in their everyday lives; hence signals are seen in SgCP as social-semiotic processes by which particular crimes and disorders might have a disproportionate effect in terms of fear and perceived threat, often in relation to specific locations. It will accordingly be noted that the focus of this third theoretical approach is – by contrast with the first two approaches – on neither area crime rates nor area offender rates *as such*, but rather on the symbolic meanings that people might attach to specific locations as a result of certain acts occurring in or near them or the characteristics of people believed to be present in the location.

From the above account, it will be clear that the three research traditions described, while distinct from one another, are in no sense necessarily contradictory. Coherent synthesis of the approaches, within defined contexts, is therefore in principle certainly possible, and aspects of this complementarity will hopefully become more evident in the ensuing sections of this chapter. In these sections, research results on the geography of crime and disorder will be considered within the framework of the three core dimensions of research in human geography: *space*, *social structure*, and *social action*.

Space

Human beings exist only within physical bodies. Although, in the Internet age, an increasing number of activities can be undertaken in virtual space, physicality remains important for many human activities, notably travel and the use of public space. This first section therefore considers physical places and spaces and their relevance within geographical criminology.

The physicality of humans is, however, not their only characteristic. Uniquely within the animal kingdom, humans possess the gift of language, and the ability to be self-reflexive about

the situations in which they find themselves. In considering humans' use of space, therefore, it is necessary to address *perceptions* of locations, as well as the physical context. Within this dual framework, three topics will be discussed, namely, crime opportunities, hotspots, and the meaning of space.

Crime Opportunities

It is now well established in psychological research that much behavior is situation specific, and that people often act differently if some aspect of a particular type of situation is altered. A striking demonstration of these points was provided by Ronald Clarke and Pat Mayhew (1988), who showed that the suicide rate had dropped suddenly in Britain in the 1970s when the source of domestic gas supplies was switched from coal gas (toxic) to natural gas from the North Sea (nontoxic) and that there was no plausible explanation of this decline other than the change in the nature of the gas supply. In other words, even people desperate enough to try to end their own lives often did not turn to alternative methods when the immediate situational context was altered. Given this and other similar evidence, Ronald Clarke and others have made a special study of the specific situations in which different offenses are committed, with a view to modifying those situations to produce a reduction in crime – an approach known as *situational crime prevention* (StCP). Typically, this might involve strategies such as making goods harder to steal by strengthening security at potential targets, reducing the availability of the means to commit certain crimes (e.g., by restricting sales of guns or knives), or environmental management (e.g., separating the fans of opposing teams at football matches). Such strategies have often led to beneficial results, and there are now many reports of successful StCP initiatives (Felson and Boba 2010: ch. 10). Some of these initiatives are explicitly locational, and a good example is the strategy known as "alley-gating." In working class residential areas in British industrial cities, a favored style of pre-Second World War housebuilding was "back-to-back terraces," that is, rows of terraced houses opening directly on to the street, with small yards or gardens at the rear, backing on to an identical set of terraces in the next street. Normally, a "back alley" is located between the yards/gardens of the two rows of houses. Crime analysts noticed that the entry point for house burglaries in such areas was very often from the rear, and this led to the prevention strategy of "gating" the entrances to the back alleys. Evaluations of such initiatives have shown them to be successful in reducing burglary; moreover – and congruently with the evidence from the gas suicide example – there was no evidence of displacement of burglaries to nearby residential areas (Bowers et al. 2004).

Closely related to the StCP approach is *routine activities theory* (RAT), whose central proposition is that "the probability that a [criminal] violation will occur *at any specific time and place* might be taken as a function of the convergence of likely offenders and suitable targets in the absence of capable guardians" (Cohen and Felson 1979, p. 590; see also Felson and Boba 2010). This approach, which incorporates a specifically spatial dimension (see the italicized phrase), usefully divides the concept of "opportunity" into two component parts ("targets" and "guardianship"), but more importantly, it draws attention to the fact that the routine activities of a population can – often unwittingly – create or restrict criminal opportunities in defined locations. To take an example from a British study, multistory parking lots at train stations used by commuters (where few owners visit the lot during the working day) were shown to have a higher victimization rate than similar parking lots attached to shopping malls (where shoppers are leaving and returning to their vehicles all day, providing a flow of natural surveillance or guardianship). Many examples of a similar kind are provided by Felson and Boba (2010); as they memorably phrase the matter, these examples show how "noncriminal realities give rise to criminal events" (p. 205).

It is therefore a serious mistake to see criminal opportunities as existing in a social vacuum. This point is further illustrated through Patricia and Paul Brantingham's seminal contribution to geographical criminology, first formulated 30 years ago (Brantingham and Brantingham 1981), and

now incorporated within a broader *crime pattern theory* (Brantingham and Brantingham 2008). These authors postulated that most offenders, like most people, feel much more comfortable in areas that they know reasonably well; in consequence, even when – for example – potential burglars are engaging in a search pattern for a suitable target, it is hypothesized that they will usually not wish to venture into residential areas that are completely unknown to them. In other words, the suggestion is that offenders will usually commit crimes in areas already known to them through their routine activities. (Oddly, routine activities theorists until recently paid little attention to this point, being more interested in how targets and guardianship are influenced by routine activities.) Subsequent empirical research evidence has strongly supported the Brantinghams' hypothesis (see especially Wikström et al. 2012: ch. 7), and this body of work clearly helps to explain why many offenses are committed not far from offenders' homes (see above), as well as in other locations in which they regularly spend time, and where there are criminal opportunities (such as downtown areas and leisure outlets). These social realities therefore illustrate the point that a so-called opportunity for crime in a given area is, in the full sense, only an opportunity when it is perceived as such by someone who (i) might enter the area and (ii) is willing to consider turning the opportunity into an act of crime. Otherwise identical physical "opportunities," if located in different social contexts, might differ greatly in the number of passersby who would consider committing a crime at the micro-location, and such differences will almost certainly be reflected in their aggregate victimization levels.

Sometimes, even more complex narratives emanate from discussions of "opportunities for crime"; street lighting is an important example. Improved street lighting was originally advocated as a situational crime prevention strategy in the belief that better lighting would increase the number of people using the location at night (thus providing improved guardianship of the area) and would also make potential offenders more visible (thus making them more easily detectable if they committed a crime). Both these effects were thought likely to deter potential offenders from committing crimes in the relevant area, because the opportunities for successful lawbreaking had been reduced. However, the actual research evidence is more complex. A Campbell Collaboration review of relevant empirical studies has concluded that, while "improved street lighting significantly reduces crime," it was also the case that, in areas with improved lighting, "night-time crimes did not decrease more than daytime crimes" (Welsh and Farrington 2008, p. 2). This finding presents problems for a simple opportunity theory, because if enhanced deterrence were the only mechanism in play, one would expect crime reductions in better-lit areas during hours of darkness, but no difference in crime rates during daylight hours. Accordingly, the Campbell reviewers concluded that the daytime effect was possibly occurring because "improved lighting signals community investment in the area and that the area is improving, leading to increased community pride, community cohesiveness and informal social control." This interpretation therefore seems to embrace not only "opportunities" but also the more normative language of the signal crimes perspective (note the word "signal" in the sentence quoted above, although the SgCP approach is not explicitly mentioned by the reviewers). However, the temporal sequencing of possible "deterrent" and "signal" effects has been insufficiently studied, so – as the authors make clear – further research is needed. But the juxtaposition of the two approaches in the Campbell Review is of great interest.

Hotspots

Like those who have focused on crime opportunities, criminologists who have developed the "hotspots approach" have concentrated on micro-locations. Indeed, they have very usefully shown that the neighborhood level of analysis can be misleading in the geographical study of crime events, because – for example – what might seem overall to be a "crime-prone neighborhood" often contains micro-locations with very varied levels of crime, including some low-crime locations.

These findings have led to a justifiable emphasis on the desirability of using small units of analysis when studying crime events (Weisburd et al. 2009). Accordingly, in a major recent research study in Seattle, to be described later, Weisburd and colleagues (2012) adopted as their unit of analysis the "street segment," that is, both sides of a street between two intersections in a standard North American street grid.

A main motivating reason for the development of the hotspots approach has been crime prevention. However, before researchers could confidently recommend to policymakers a preventive strategy based on hotspots, several issues beyond the simple demonstration of crime concentrations needed to be explored. These included the following:

(i) Perhaps the identified hotspots were ephemeral, so that a different set of hotspots would appear if one were to conduct the analysis for a later year or a series of years.
(ii) Perhaps crime prevention initiatives targeted on specific places would not actually reduce crime at the hotspot.
(iii) Even if the crime prevention effort was successful at the hotspot, perhaps those committing crimes in that location would simply move their activities elsewhere ("crime displacement").

These were reasonable questions, but subsequent research has convincingly dispelled doubts. Briefly, longitudinal analyses have now shown that hotspots in given cities are usually enduring, not ephemeral; rigorous evaluative studies have demonstrated that "hotspot policing" crime prevention strategies can be effective; and displacement is rarely a problem (Braga and Weisburd 2010; Weisburd et al. 2010). This body of work constitutes an impressive contribution to scholarship by hotspots researchers. But in addition – and of great interest to the quest for integration under discussion in this essay – hotspots researchers have begun to pursue the question of the *legitimacy* of crime prevention initiatives at crime hotspots. (On legitimacy and criminal justice, see Bottoms and Tankebe 2012). For example, Braga and Weisburd (2010: ch. 6) have set out in schematic form three different models by which police could in principle seek to control crime at hotspots: these are the "traditional" (or "reactive") model, in which police respond to incidents as they occur; a proactive "strong enforcement" model (such as the widely discussed "zero tolerance" approach to policing); and a proactive "situational prevention" model, focusing crime prevention efforts on targeted micro-locations identified through prior crime analyses. The third of these is the authors' preferred model, and a principal reason given for rejecting the "strong enforcement" model is its potential for legitimacy deficits: "overly aggressive and indiscriminate arrest-based strategies are more likely to generate community concern and poor [police-public] relations" (Braga and Weisburd 2010, p. 229). On this view, therefore, when assessing the policy-relevant features of specific locations, it is necessary to consider not only objective matters such as the concentration of crime events but also more normative and perceptual issues such as the way in which law enforcement agents are viewed in the locality (which will include the historical legacy of past law enforcement, still present in the memories of current residents). Such matters will, however, very often relate not simply to the hotspot itself, but to the wider socio-structural context in which it is set (e.g., a particular policing approach might have been adopted for a whole neighborhood, not simply a specific hotspot). In such circumstances, it becomes necessary to widen the spatial scale of the issues to be addressed when considering policy responses to crime in the hotspot.

Despite the unquestioned importance of the hotspots approach as a development within geographical criminology, early research in this field was subject to some criticism, particularly concerning two alleged omissions: first, that (apart from the discussion of legitimacy) hotspots researchers had paid little attention to hotspots from the potential offender's point of view and, secondly, that they had largely failed to analyze a key explanatory question, namely, *why* do some micro-locations have high crime, while others do not? Fortunately, both of these omissions have been addressed in more recent research.

An important study of hotspots from the offender's perspective was undertaken by Peter St. Jean (2007) in a socially very deprived high-crime neighborhood in Chicago. In qualitative interviews, the researcher elicited persistent offenders' views about optimum micro-locations for drug dealing and robbery. A strong "opportunity" dimension to offenders' locational preferences was shown, and the most favored street blocks for committing crimes were busy road intersections containing commercial premises such as grocery stores, liquor stores, and check-cashing outlets, all of which bring together "people who can be clandestine clients of drug dealers or easy targets for robbers" (p. 197). In more residential areas, however, a further "opportunity" variable seemed to be in play, namely, the vigilance or otherwise of residents, since "watchful neighbors. . .sometimes serve as effective constraints against neighborhood robberies" (p. 208).

The issue of watchful neighbors brings into focus the theory known as *collective efficacy*, particularly developed by Robert Sampson. "Collective efficacy" is defined as *the institutional ability to achieve what a group or community collectively wishes to achieve*; and in criminological research it has been principally utilized in research in small residential areas. It is normally measured with survey items that tap into two linked matters: first, the willingness of residents to intervene for the common good in certain defined situations (such as children spray-painting graffiti on a building) and, secondly, the existence or otherwise of conditions of cohesion and mutual trust among neighbors (on the assumption that one is unlikely to take action in a neighborhood context where the rules are unclear and residents mistrust one another). Various empirical studies have confirmed that, in many local contexts, there is evidence for the crime-reductive effectiveness of collective efficacy (Sampson 2006).

The second main omission in early hotspots research (i.e., why do particular micro-locations have high crime?) has been principally addressed through two major research studies using different methodologies, one in the USA and one in England.

The American research was a multivariate correlational study using a unique 16-year dataset for Seattle for the years 1989–2004 inclusive (Weisburd et al. 2012). As previously noted, the unit of analysis in this study was the micro-locational "street segment." Congruently with earlier research, the study found (i) a strong concentration of crime in "hotspots" (5–6 % of street segments each year accounted for c.50 % of crime incidents) and (ii) with some exceptions, a "tremendous stability of crime at street segments over a long period of time" (p. 56). Eight "trajectory [crime] patterns" were identified. Four of these (comprising 84 % of street segments) were stable over time, ranging in level from "crime-free" to "chronic crime"; the remainder showed increasing (4 %) or decreasing (12 %) trajectories. A multivariate analysis was then undertaken, in an attempt to uncover the factors that would predict a particular trajectory pattern in any given street segment. A principal feature of this analysis was an assessment of the comparative explanatory strength of (i) variables measuring the "opportunity perspective" (roughly, the kind of variables utilized in StCP and RAT) and (ii) variables measuring the "social disorganization perspective" (roughly, variables traditionally used in "neighborhood effects" research). Principal findings in the Seattle research were (i) that both these sets of variables were important contributors to explaining differential crime trajectory patterns in street segments, (ii) that opportunity variables had greater explanatory power than social disorganization variables in predicting variations in crime between micro-locations at any one point in time, and (iii) that social disorganization variables had greater explanatory power than opportunity variables in predicting changes in crime levels in micro-locations over time.

The first author of the Seattle study (David Weisburd) has been one of the leading researchers within the "hotspots" tradition. It is therefore noteworthy that in this study he and his colleagues deliberately set out to "broaden and expand the [traditional] theoretical foundations of the criminology of place" (p. 13), particularly by including variables representing the "social

disorganization" (or "neighborhood effects") tradition – a tradition that, as they observe, had previously been "virtually ignored" by hotspots researchers (p. 43). Moreover, the results of the Seattle analyses strongly support the view that both "opportunity" and "neighborhood effects" dimensions need to be included within any full answer to the question "why are certain micro-locations hotspots, and others not?"

The second piece of recent research that aims to explain "why hotspots are hotspots" is the Peterborough Adolescent Development Study (PADS+) (Wikström et al. 2012). This study, which was conducted in the medium-sized city of Peterborough, England (pop. c. 165,000), differs in three main respects from the Seattle study: it uses a different methodology, it is significantly more theory-driven, and – because it reports data from the early stages of a longitudinal study of criminal careers – it is restricted to juveniles. Despite these differences, its results in no way conflict with the principal conclusions of the Seattle study.

PADS+ was conducted within the theoretical framework of Per-Olof Wikström's "Situational Action Theory" (SAT). SAT postulates that to understand how criminality arises, one needs to consider two matters: first, an individual's *propensity* to commit crime (defined as consisting of both the person's morality and his/her ability to exercise self-control) and, secondly, his/her *exposure to situations of varying criminogenic potential* (where *criminogenic exposure* is defined as "encounters with settings in which the (perceived) moral norms and their (perceived) levels of enforcement. . .encourage breaches of rules of conduct. . .in response to particular opportunities or frictions": Wikström et al. 2012, p. 17). The theory therefore envisages a possible *interaction* as between criminal propensity and environmental (geographical) conditions.

Two main types of "criminogenic exposure," both with a strong locational component, were considered in the Peterborough study, namely, that a young person spent time "unsupervised with peers in an area with high public entertainment" or "unsupervised with peers in a residential area with poor collective efficacy." Both of these conditions, for different reasons, provide increased opportunities for offending. Using a detailed interview-based "time budget" methodology, and measuring crime by self-reported offending on the days for which time budgets were compiled, the researchers found that, overall, a substantially greater number of crimes were committed when young people were in conditions of hypothesized criminogenic exposure than when they were not. For those with a "strong" criminal propensity, the difference in the rate of crime commission when "in" or "not in" a criminogenic environment was particularly marked (for both exposure conditions). On the other hand, those with a low crime propensity committed no crimes whether or not they were in criminogenic exposure conditions; for them, their strong anti-crime dispositions were able to override any temptations offered in criminogenic exposure conditions. Thus, the results show a genuine interaction effect as between the propensity of individuals and the environmental contexts of these locations.

Interestingly, the Peterborough results also showed that those with a high criminal propensity tended to spend more time in conditions of high criminogenic exposure than other young people. This finding therefore emphasizes – as the research of the Brantinghams had suggested in a different way many years before – the particular importance for the geography of crime of the routine activity patterns of those with a high criminal propensity.

The Symbolic Meanings of Places

In developing the "signal crimes perspective" (see above), Martin Innes and his colleagues conducted detailed qualitative interviews in 16 neighborhoods in England and Wales, asking representative respondents what they would identify as the key *potential threats to neighborhood safety* in their area (described in the theory as *signal crimes* and *signal disorders*). Not surprisingly, there was a good deal of local variation in the perceived threats identified in different localities. Nevertheless, a striking and largely unexpected result (although see not dissimilar

concerns raised by Wilson and Kelling 1982) was that various kinds of *physical and social disorders*, not all of which were criminal acts, featured particularly strongly as perceived threats in the public responses *in all areas*. (Examples of such disorders included youths hanging around in groups, drug detritus, litter/graffiti, vandalism, and public drinking.) Indeed, such items were, in almost all areas, perceived as a greater threat to the area than residential burglary. These results appeared to be mainly explicable by the fact that the listed disorders are *events occurring in public space*, often with a strongly repetitive dimension: such events therefore seemed to send a powerful message to residents that "my area is out of control." As one respondent put it to Innes (2004, p. 348):

> Yes, it is daft, it is almost daft, but graffiti is the thing that sort of bothers me more, because it is in my face every day. I mean obviously rape and murder are more horrendous crimes, but it is graffiti that I see.

Thus, even quite minor incivilities in public space can, especially if persistent, be perceived as significant threats to peaceable daily living. This evidence is consistent with more general social scientific research results showing that disruptions of people's everyday routines can be perceived as significantly threatening to their sense of ontological security. Such results accordingly suggest that some earlier scholars in geographical criminology have neglected an important dimension of lived experience by focusing exclusively on crimes, rather than on both crimes and disorders.

Social Structure

The most important social-structural topic of relevance for geographical criminology is that of *social disadvantage*. In some countries, including the United States, this topic has a strongly ethnic dimension, but for reasons of space the discussion here will focus on disadvantage more generally.

A consistent finding in geographical criminology is that offenders' residences are very disproportionately located in more socially disadvantaged areas of cities (see, e.g., Fig. 1a). Given that many offenses are committed close to offenders' homes, it is also the case that socially disadvantaged residential areas usually have higher crime victimization rates than richer areas (see Fig. 1b), and, at least in England, national crime surveys also show that they have the highest rates of repeat disorders. These facts seem to most geographical criminologists to require a serious engagement with issues of social structure, although this view is not universally shared (see Felson and Boba 2010, p. 206, final sentence).

Of these various indicators, the resident offender rate normally shows the starkest contrast between rich and poor areas, and this raises the possible existence of a "neighborhood effect" on offending in such areas. In considering this issue, great care in interpretation is required, as may be seen from the recent meticulous research on juvenile delinquency in the Peterborough study (Wikström et al. 2012). On the one hand, social disadvantage is not explicitly part of the explanatory model tested and affirmed in this research (see above: the model, based on Situational Action Theory, is focused on criminal propensity and criminogenic exposure). Moreover, by no means all of the young people with a high criminal propensity lived in deprived neighborhoods. Nevertheless, in this study the researchers found that "population social disadvantage was a particularly important predictor of the number of resident young offenders" in a given area and that "social disadvantage and its influence on the efficacy of key social institutions such as the family and the school are clearly implicated in the understanding of why some young people develop a stronger crime propensity" (Wikström et al. 2012, p. 239). Clearly, some complex social dynamics lie behind these important results, and the authors intend that future analyses from the Peterborough study will explicate the issues more fully.

From results such as these (see also Wikström and Loeber 2000), it seems a reasonable hypothesis that moving children and young people from very socially deprived areas to less deprived areas should reduce their criminality, as well as

providing other benefits to their families. These matters were tested in a large-scale randomized controlled trial known as the "Moving to Opportunity" (MTO) experiment, which was conducted in five major cities in the United States (Baltimore, Boston, Chicago, Los Angeles, and New York). So far as juvenile criminality was concerned, the results were unexpectedly mixed – on the best available evidence, the hypothesis of reduced misbehavior was confirmed for girls/young women, but boys/young men moving to less disadvantaged areas appeared to become *more* delinquent (Kling et al. 2007; Briggs et al. 2010; Clampet-Lundquist et al. 2011). Possible reasons for this gender difference, and in particular the counterintuitive result for boys, are discussed at the end of this entry.

In considering issues of social disadvantage, it should not be forgotten that patterns of both informal and formal social control can vary in areas of differing social status and that these are of potential criminological significance. This point was drawn starkly to criminologists' attention in the pathbreaking book by Lawrence Sherman (1992) analyzing the results of a series of experiments on police responses to domestic violence. In these randomized controlled trials, six American police departments responded to nonlife-threatening domestic violence incidents (where the assailant was still at the home) *either* by arresting the suspect *or* by some measure short of arrest. The results were more complex than had been anticipated. In summary, Sherman characterized three cities (Minneapolis, Colorado Springs, and Miami) as having shown a deterrent effect following arrest, while in three other cities (Omaha, Charlotte, Milwaukee) arrest appeared to have produced what was called a "backfiring effect" – that is, it seemed to *increase* subsequent violence among arrested suspects, by comparison with controls. This pattern of results naturally raised the question: "what. . .factors might explain the differences between the deterrent and backfiring effect cities?" The data showed that the strongest single area difference was to be found "in the proportion of black suspects, which averaged 63 % in the three backfiring cities. . .compared to 36 % in the three deterrent effect cities" (Sherman 1992, p. 18). In other words, differing *community characteristics* (including social disadvantage) in the six cities seemed to be at least partially relevant to the explanation of the results. On an individual (as opposed to areal) basis, the study also found that arrest was most likely to suppress subsequent violence if the suspect had high "stakes in conformity" (= employed and married) and least likely to suppress it when he had no such stakes (= unemployed and unmarried). Aspects of the interpretation of these results remain tentative, but it does seem from this research that the familial and communal relationships within which a person is embedded can significantly affect the manner in which he responds to an arrest (in principle, from deep shame to resentment against unfair police practices), and that such differences could affect the probability of subsequent violence against a partner. Referring back to an earlier discussion, one might add that the extent to which the policing in a neighborhood appears to its residents to be *legitimate* also seems potentially relevant – and this also might vary by social-structural context.

Before leaving the topic of social structure, a word must be added on the subject of *housing markets*. Housing markets are of great importance for the study of crime and criminality in residential areas, because the mechanisms of such markets strongly frame both who enters a given area as a resident, and how easy or difficult it is to leave the area if and when one wishes to do so. Of course, housing markets are often strongly influenced by economic factors (the rich buy large houses in desirable areas; the poor do not). However, economic factors are certainly not the only variables in play in shaping the operation of a housing market in a given area, for example, cultural questions or the reluctance of older residents to move might be very important in influencing exit decisions, and in some countries the allocative rules of public (or social) housing authorities are also relevant. In consequence, it is even possible for two adjacent areas with nearly identical economic and demographic characteristics to have radically different victimization and resident offender rates, flowing from the direct

and indirect consequences of housing market processes (Bottoms et al. 1989). In short, as Robert Sampson (2009a, p. 90) has rightly commented, "because housing markets act as a mechanism of allocation, . . .they. . .need to be better integrated into sociological and criminological theory."

Social Action

The third and final conceptual dimension to be considered, *social action*, is by its nature more dynamic than the other two – social actions are, after all, usually taken in an attempt to achieve certain consequences. Accordingly, this section contains more discussion of longitudinal theorization and research than previous sections.

The most famous longitudinal theory in contemporary geographical criminology is the *broken windows hypothesis*, originally formulated by Wilson and Kelling (1982) albeit in a somewhat informal and discursive manner. Taylor (2001, p. 98) has usefully formalized the proposed sequential stages of the Wilson-Kelling thesis; slightly modified, these stages are:

(i) Unrepaired low-level signs of incivility (e.g., broken windows, graffiti) appear in an area.
(ii) The local residents tend to withdraw from public areas and become fearful.
(iii) Emboldened antisocial locals commit more petty crimes, signs of incivility grow.
(iv) Local residents become more fearful and withdraw more.
(v) [Frequently but not inevitably]: Serious offenders from other areas note the lack of guardianship in the area and move in.

Thus, according to Wilson and Kelling (1982, p. 32), "the citizen who fears the ill-smelling drunk, the rowdy teenager or the importuning beggar is not merely expressing his distaste for unseemly behavior, he is also giving voice to a bit of folk wisdom that happens to be a correct generalization – namely, that serious street crime flourishes in areas in which disorderly behavior goes unchecked." As regards policy responses, for Wilson and Kelling (p. 36) "the key is to identify neighborhoods at the tipping point- where the public order is deteriorating but not unreclaimable." But others have gone further, linking the "broken windows" approach to zero tolerance policing, as in the following statement by former British Prime Minister Tony Blair (2010, p. 493): "if you tolerate the low-level stuff, you pretty soon find the lawbreakers graduate to the high-level stuff. So cut it out at source: tolerate nothing, not even painting a street wall or dropping litter."

Empirically speaking, the evidence about broken windows is mixed. On the one hand, the Dutch research previously cited shows that a breach of a social norm (such as uncleared litter) does indeed, in the short term, encourage the breach of other norms. On the other hand, those empirical studies that have attempted to evaluate the broken windows hypothesis on a long-term basis have found little supporting evidence for the proposition that "disorder leads to serious crime" (Sampson and Raudenbush 1999; Taylor 2001; Harcourt and Ludwig 2006; Sampson 2009b).

Although further research is needed, on present evidence two matters seem particularly likely to explain the apparent tension between the short-term and long-term effects of "broken windows." The first is that the final stage of the proposed Wilson-Kelling sequence ("serious offenders from other areas move in") might often fail to materialize. St. Jean's (2007) Chicago research (see above) showed that such offenders were usually more interested in nonresidential than residential areas as attractive sites for their activities; moreover, physical (as opposed to social) incivilities in residential neighborhoods were of no special interest to them. Secondly, the suggestion made by Tony Blair and others that one must "cut [incivilities] out at source," or a downward spiral to "the high-level stuff" will inevitably occur, is incorrect. On the contrary, the literature contains several case examples of communities acting successfully at a later stage to ameliorate a downward spiral.

One such example is described in research by Taub, Taylor, and Dunham (1984). These researchers showed that two Chicago neighborhoods *with high crime rates* not only received

positive "satisfaction with safety" scores in a residents' survey but also had rapidly appreciating residential property values. How did this unusual combination of factors arise? In both the areas concerned, "there [were] highly visible signs of extra community resources being used to deal with the crime problem" (Taub et al. 1984, p. 172). This observation has to be set within the context of another finding in the study, namely, that, in evaluating local areas, people make a generalized, *gestalt* judgement, taking into account a range of positive and negative factors, of which crime (and, by implication, disorder) is one. Within such a framework, the injection of "visible signs of extra community resources" is clearly a potentially positive factor.

The term "visible signs," used by these authors, is highly congruent with the later development, within the signal crimes perspective, of the concept of "control signals" (used in SgCP alongside the concepts of "signal crimes" and "signal disorders" – see above). "Control signals" are acts (particularly those taken by officials or by informal community leaders) that communicate ("send signals") to the general public, in a way that helps to promote the general sense of order in a neighborhood. An example within the Taub, Taylor, and Dunham research concerned the neighborhood that includes the University of Chicago. Anxious about decline in the area, university managers invested heavily in the local urban infrastructure and helped to introduce various initiatives that directly addressed citizens' worries about safety in public space – such as a private security force, 24-h "safety buses" and emergency telephones (Taub et al. 1984, pp. 99–102). This whole package of measures seemed to send a strong "control signal"; for while crimes such as burglary remained high (pp. 21–22), as previously noted, the area was perceived by the residents as safe, with rapidly appreciating property values. Thus, utilizing the trilogy of concepts around which this chapter is structured (space, social structure, social action), this was a powerful example of how *social action* can help to shape the future of a neighborhood. It seems likely – although we do not yet have fully confirmed evidence of this – that less dramatic but not dissimilar kinds of social action are not infrequently taken in other apparently declining local areas, with positive effects; and perhaps the apparent effect of improved street lighting on daytime crime levels (see above) results from similar social mechanisms. If these suggestions are correct, they could of course help to explain the lack of long-term evidence in support of the broken windows hypothesis.

It is not accidental, however, that in the above example the University of Chicago is a *corporate actor*. It is much easier for a corporate actor than an individual resident to send successful control signals; indeed, as Taub and his colleagues point out, for an individual household in a declining area, the instrumentally rational course of action will usually be to try to make a fast exit from the area. Thus, effective social action to halt social decline will probably normally require a lead to be taken by a public agency, a major private institution, or an active community organization. Thereafter, however, it is likely that local citizens will respond positively to the lead and feel emboldened to play their part in neighborhood renewal: recall that Keizer's (2010) experimental research in the Netherlands suggests that actions to reinforce prosocial norms, as well as actions that breach such norms, can have a "contagious" effect on the behavior of others in a locality.

Yet a final caveat is required. Sherman's (1992) study of domestic violence showed that police actions such as arrest can sometimes "backfire"; and the same, it would seem, is true also of residents' social action. For various technical reasons, it is not easy to provide a definitive explanation of the strikingly different results for boys and girls in the MTO experiment (see more fully Bottoms 2012). The most plausible account of the counterintuitive result for MTO boys is to be found in a detailed qualitative study in two cities (Baltimore and Chicago: see Clampet-Lundquist et al. 2011). According to this research, one of the factors in operation in these cities was that the adolescent boys who moved to less poor neighborhoods continued, in their new environments, to practice the dominant leisure activity they had learned in their previous home area, namely, "hanging out" with one another in

public places. But, in the changed context, they found themselves less accepted by the local residents (possibly because these residents were wary of adolescent males who were known to have moved from stigmatized public housing projects). Moreover, the new areas had higher collective efficacy than the baseline neighborhoods and therefore – see earlier discussion – more adult interventions with teens. In consequence, "a negative side of collective efficacy" seemed to be apparent, that is, adult interventions were made, but they led to resentment from the boys (Clampet-Lundquist et al. 2011, p. 1171). This example therefore once again illustrates the very complex social dynamics of neighborhoods – dynamics that need to be taken fully into account in the study of the geography of crime and disorder.

Conclusion

Within the broad field of the geography of crime, a great deal of excellent research has been completed in the last two decades. However, much of this work has been conducted in relative isolation from those working in other parts of the field. A strong case can therefore be made for the adoption of a more integrated approach. Such an approach should in particular seek to synthesize more fully the work in the "hotspots," "neighborhood effects," and "signal crimes" traditions, each of which has contributed powerfully to our overall understanding of geographical aspects of crime and disorder. Such a synthesis should lead to improved understanding of the very complex social dynamics in play within this field. Potentially, also, it could have an important payoff in improved crime prevention, given the persuasive case that has recently been made for "the importance of place in policing" (Weisburd et al. 2010).

Related Entries

- ▶ Agent-Based Models to Predict Crime at Places
- ▶ Broken Windows Thesis
- ▶ Crime Location Choice
- ▶ Crime Mapping
- ▶ Criminal Careers of Places
- ▶ Criminology of Place
- ▶ Disadvantage, Disorganization and Crime
- ▶ Early Chicago School Theory
- ▶ Geographic Profiling
- ▶ History of Geographic Criminology Part I: Nineteenth Century
- ▶ History of Geographic Criminology Part II: Twentieth Century
- ▶ Hot Spots and Place-Based Policing
- ▶ Law of Crime Concentrations at Places
- ▶ Neighborhood Effects and Social Networks
- ▶ Public Housing and Crime Patterns
- ▶ Reassurance Policing and Signal Crimes
- ▶ Routine Activities Approach
- ▶ Situational Action Theory
- ▶ Situational Crime Prevention

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German Police Until 1918

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Overview

Federalism is, except for periods during the twentieth century (Nazi Germany and communist East Germany after 1945) a key characteristic of political systems in Germany throughout the nineteenth and twentieth centuries. Due to this focal pattern of the German political system, there had been polices of the respective federal units during these periods, but no national German police. Early nineteenth-century administrative and political reforms established the police in many German states as a state prerogative, which manifested itself by the establishment of Gendarmerie forces. In Prussia, this Gendarmerie was to police the countryside, but in relation to major cities, the Prussian state commissioned municipalities with the establishment and the maintenance of an urban police, establishing state police forces proper in a few cities only. A comparable mixed system was established in some other German states as well. A characteristic, which was shared by almost all the polices in Germany throughout the nineteenth century and even

during the first decades of the twentieth century consisted of the continuity of a comprehensive notion of police and policing, deriving from the Ancien Régime notion of "Polizey," beyond a modern, on law, and order maintenance focused understanding of police. Attempts were made by different actors (the police, the courts, members of the legal sciences) to narrow this comprehensive notion, but did not really touch upon the reality of police and policing in nineteenth-century Germany.

Due to "order" being a core issue of policing in Germany during the nineteenth century, crime and crime control was not a major concern of the police during that period. Until the First World War, only a minority of the major German cities had specialized crime investigation units among their municipal police forces. Because of this situation, the crime investigation department of the Berlin police headquarter became a key institution, as it professionalized increasingly its expertise for investigating complex and spectacular criminal cases.

The emergence of a political police and of political policing at the beginning of the nineteenth century was a correlate of the continuity of monarchist, bureaucratically framed regimes after the Napoleonic wars. Political policing regained momentum with the rise of the organized labor movement during the second half of the nineteenth century, when industrialization did set in Germany. Although political policing was seen by contemporaries as a significant policing pattern, the application of a comprehensive notion of police remained a key strategy for policing the emerging industrial society.

Police and Policing During the First Half of the Nineteenth Century

During the first decade of the nineteenth century, the Prussian government, because of the necessities to modernize Prussia on the background of its defeat in the war against Napoleonic France, a number of institutional reforms and governmental reorganizations were inaugurated, which were to bring the Prussian state into a position of meeting the challenges posed by Napoleonic France. These reforms touched upon the police in Prussia as well. During the Ançien Régime period, the police had either been a matter of urban authorities or had been carried out in the countryside by noble estate owners as part of their privileges. The early nineteenth-century reforms established the police as a state prerogative. This state prerogative was put into practice by the establishment of a – quantitatively – large-scale Gendarmerie, which, in the Prussian case, was to police the countryside, while, as far as the cities were concerned, the Prussian state commissioned municipalities with the establishment and the maintenance of an urban police, establishing state police forces in a few cities only. During the first half of the nineteenth century, the Prussian state established state polices only in those cities, which were seen as hotspots of political opposition and dissent. While the state polices were on the budgets of the Prussian state, it were the municipalities themselves which had to pay for their municipal police. During the 1860s, the Prussian state withdrew its state polices from a number of cities, leaving it to the municipalities to police them with municipal polices, the reason for this withdrawal being a mixture of budgetary considerations and changed security evaluations by the Prussian government.

The installation of the Gendarmerie, following the French example, was meant as introducing the state monopoly of power in the Prussian countryside, where the police until the reforms of the early years of the nineteenth century had been in the hands of the estate-owning nobility. Gendarmerie forces were created – except for Austria and the Habsburg Lands – in most of the German states. The reasons were similar across the states: The central governments in these states, often with new boundaries as a result of the Vienna congress, wanted a penetration of their authority into the whole of the state, were seeing the Gendarmerie as an appropriate instrument for creating some sort of identity among the inhabitants of the respective state and were using this force for policing the vagrant rural underclass, which was seen by contemporaries as

a major threat. In Prussia, the introduction of the Gendarmerie was answered by the estate-owning rural nobility with (in the end successful) large-scale protest and opposition, resulting in a massive decrease of the Gendarmerie force and a restitution of the Ançien Régime model of policing the countryside by combining property titles (estate ownership) and police functions. In Prussia, the figures for the Gendarmerie forces were, in comparison to Gendarmerie forces in other German states, extremely low: In 1848, there were 8 gendarmes per 100,000 of population in Prussia, 52 per 100,000 of population in Baden, 52 in Bavaria, 40 in 1839 in Brunswick, 23 in Hanover, 10 in Saxony, and 25 in Württemberg (Jessen 1991). When looking at these figures and when taking into account, that the Prussian state left the policing of cities in most cases to communal or municipal police forces, then it might look as if Prussia had been underpoliced during the first half of the nineteenth century. But that does not take into account the massive presence of the military in very many Prussian cities. The Prussian military, having garrisons in quite a number of Prussian cities, did have in the respective cities policing prerogatives. In 1840, 53 % of the urban population of Prussia lived in a city, which held a garrison. State and communal or municipal officials continuously relied on the military in any case they considered an emergency for public order and safety. The interventions of the military into everyday urban policing matters have been interpreted as a significant militaristic impact on policing in Prussia during the nineteenth century (Lüdtke 1989). Additionally, the Berlin police headquarters became a key institution for the policing of politics in Germany (Fricke 1962).

Political Policing in Nineteenth-Century Germany

The emergence of a political police and of political policing in Germany at the beginning of the nineteenth century is a correlate of the continuity of monarchist, bureaucratically framed regimes after the Napoleonic wars. During this so-called period of "restauration" after 1815, the monarchist regimes of the German states aimed at defending their regimes against the growing demands of the bourgeoisie for political participation. In order to control political opposition, the Prussian government established after 1815 a number of government commissions. A similar model for supervising the political opposition was adopted by the German Federation, which did set up interstate government commissions not only for controlling opposition movements, but for disseminating information among the governments of the German Federation. The strategies of these government commissions were rather retrospective, focusing on political incidents, which had happened already, although elements of proactive control patterns were introduced as well already during this period. One of the Prussian government commissions became charged with examining the political reliability of teachers, which were to be employed, and with examining the political positions of candidates for the clergy and the judicial professions. This cooperation was enforced after the defeat of the revolutionary movements in the German states in 1848/1849. During the 1850s, when it became visible, that the revolutionary initiatives of 1848/1849 would not gain ground and significance again, these control activities were gradually reduced.

Political policing regained momentum with the rise of the organized labor movement. Together with the introduction of repressive legislative instruments for suppressing the organized labor movement after the foundation of the German Empire, a specific state police commissioners were introduced, which were to supervise the organized labor movement and organized groups of foreigners, such as members of the Polish minority. Municipalities were reluctant to establish political police branches within their municipal police forces, but the Prussian government circumvented these problems by establishing this nucleus of a political police strictly as a state police, thus creating the first political police proper in Germany.

Policing Nineteenth-Century Industrialization and Urbanization

Prussia and other parts of Germany have been, in comparison with countries and regions in Western Europe, latecomers as far as industrialization and urbanization were concerned. In Germany, large-scale industrialization and urbanization did not set in but after the beginning of the second half of the nineteenth century. In Prussia, the major industrial areas with their rapidly growing urban conglomerations were mostly covered up to the first years of the twentieth century by communal or municipal police forces or by a few gendarmes only. It was only in 1909, that in some towns of the Ruhrgebiet area in the West of Prussia, the municipal police forces were transformed into proper state polices (Funk 1986; Jessen 1991; Spencer 1992). In the cities with municipal police forces, the police remained principally part of the state prerogative on the monopoly of power. In these cities, the mayor represented this prerogative by being the official head of the local or municipal police. While the mayor was the head of the municipal administration, elected by the city council he was at the same time, with respect to his duties as head of the police in the respective city, executing state functions and had thus to obey state orders. Due to these specific patterns of police organization, the Prussian state could theoretically intervene in everyday municipal matters, although in practice, the cities had many possibilities for diverting or impeding such attempts. But more important was that municipalities had police competences of their own. Prussian legislation in 1850 and legislation on the municipalities had given the municipalities in Prussia ample competences regarding police matters, as it had provided the legal frame for issuing police ordinances concerning local matters (Jessen 1991). The municipalities operated within this frame extensively by issuing thousands of police ordinances until the First World War.

The overall appearance and organization of municipal police forces in Imperial Germany, not only in Prussia, was connected to Ançien Régime model of the police, the "Polizey." Under this model, policing covered virtually the entire complex of local administration, control, and regulation. This global police model was most visible in the towns that had municipal police forces. By the middle of the nineteenth century, the police in Elberfeld, which had been by that time one of the early industrial towns in Prussia, comprised among others the night watch; the police of strangers and the police of pubs and inns; the health-police and the life insurance-police; the medical police; the police of the religious cults; the educational police; the police of morals and order; the trade's and business' police; the police of measures and weights; the building-police; the fire-police; the police of the roads; the market-police; the police of the hunt; the forest-, field-, and agricultural police; the river-police; and the police of the dogs (Reinke 1992, 1993; Spencer 1992). Shortly before the First World War, communal policemen still spent much of their time carrying out routine duties relating to these duties, such as distributing tax and registration forms, enumerating buildings and animals, keeping lists of children to be vaccinated, and men liable to military service, providing a variety of identity papers needed by citizens, making certain various fees were paid, and licensing and inspecting a wide range of enterprises and activities (Spencer 1992). By the beginning of the twentieth century, numerous older police responsibilities had either lapsed or been transferred to newly emergent, specialized agencies. Fire fighting and street lighting, for example, were removed from police budgets. As urban service providers became more diverse and specialized, social welfare workers began to assume some functions policemen had performed in the past. In some cities, female welfare workers were taking over from the police the placement and supervision of foster children as well as the counseling of "morally endangered" women and girls and of unmarried couples living together, hoping that this approach would prove more beneficial than a police intervention only. At the same time, however, that the police cooperated with the new social workers in

regulating the behavior of those who were poor, transient, or otherwise outside the limits of respectable society, determining what behavior was permissible and what forbidden. All this meant that despite reassignment of duties, little overall narrowing of police functions occurred in the cities (Spencer 1992). The shedding of some older police assignments was counterbalanced by the imposition of new ones. Communal policemen remained deeply involved in many aspects of the daily lives of the city's inhabitants, especially when they were members of the working class. Among police responsibilities were those arising from official concern with public health and sanitation. Before the First World War already, more and more health-related supervising was transferred to technically trained specialized personnel, but much remained for the police to do. Policemen inspected latrines and monitored the removal of wastes. Continued police responsibility for the control of stray dogs was also in part a health measure, linked to prevention of rabies. Furthermore, concern with public health could be used as one justification for the inspection of housing, another major task for the police, even where specialized urban housing inspectors had been appointed. In Düsseldorf in 1909, the police inspected 16,828 dwellings, whereas the city's housing inspectors examined only 2,891. The municipal administration described inspections by the police as a service to tenants, making it possible for renters to bring pressure on their landlords to correct deficiencies (Spencer 1992). At the same time, however, inspections of rental housing provided the authorities with an excuse for increased police observation of the private lives of poorer citizens. Special attention was paid to households including boarders, since worried bourgeois observers of working-class life saw the presence of outsiders in a family setting as fraught with potential for increased immorality. However, efforts to prevent overcrowding and thereby presumably to lessen temptations to promiscuity often proved impossible to enforce because of the lack of alternative accommodations in rapidly growing industrial cities. Representative of the catchall nature of many responsibilities assigned to the police was the decision to entrust them with the maintenance of lost-and-found services. In Elberfeld, the police also took the initiative in establishing and staffing facilities enabling the public to call taxis, with operating costs being paid by the taxi owners. In their expanding regulation of markets, local transport, and insurance contracts, the police cast themselves as the guardians of consumer interests, often arousing the resentment of small traders, carters, and cab drivers in the process (Spencer 1992).

Among the most troublesome of requests for intervention that came to the police were those linked to master-servant relations. Until 1918, police remained responsible for monitoring contracts entered into by domestic servants. When difficulties arose, both sides to a dispute might turn to the police for support. The police could try to mediate or impose fines to force compliance with their decisions, but they could not really make someone work in a household who refused to do so. Disputes between landlords and tenants and among neighbors often proved equally intractable.

With requests for intervention and assistance coming from so many sources, the communal police tried to free themselves from some of their most menial and irksome tasks. But their successes remained limited. In Elberfeld in 1906, for instance, the police informed a local school that they could not, without detracting from "real police responsibilities," repeatedly delegate patrolmen to conduct truants to school. In that same year, however, Düsseldorf policemen accompanied 567 reluctant boys and girls to schools of various kinds (Spencer 1992). During the decades, which preceded the First World War, statistical figures for issuing fines against parents and for accompanying boys and girls to schools showed that these tasks were a main activity of municipal patrolmen (Reinke 1991).

As in the past, many new tasks were transferred to the police simply because they represented a widely dispersed body of public servants, available on an around-the-clock, 7-days-a-week basis, and with closer contact to the daily life of the general populace than most public employees had. In addition, utilization of

the communal police for a wide variety of highly visible services helped legitimate their costly and intrusive presence in the eyes of city councilmen and local taxpayers. A considerable number of the nineteenth-century police functions remained effective until the end of the Empire in 1918, and Elberfed was not unique in this among the major industrial cities in the West of Prussia. However, the continuity of the "Polizey" approach should not be misconstrued simply as conservative administrative behavior. Often, the various police were the nuclei of service-orientated departments of the city administrations. Attempts to narrow and to concentrate police functions on the maintenance of law and order were launched in the decade before the beginning of the First World War, but they became decisive only at the beginning of the Weimar Republic.

Policing the Industrial Society

Policing industrial society implied two approaches for the Prussian police during the Empire: on the one hand, in the tradition of the old "Polizey" model of policing, it meant control of the consequences of industrialization, in terms of environmental damage, control of the conditions of labor, etc., with some of these police activities being executed by the so-called trade and business police ("Gewerbepolizei"). But in practice, the police restricted their activities in this field to controlling and supervising traditional crafts and enterprises rather than intervening in the structures and the development of industrial enterprises.

Policing the industrial society meant of course on the other side the control of the working-class population with its unions and political organizations, mainly the Social Democrats: In the industrial society of Imperial Prussia, they were the main object of the control and repressive activities of the police. The legal system of the German Empire allowed for an extensive control of the working class by the police. Repressive legislation against the Social Democrats ("Sozialistengesetz") constituted the basis for a real police war against the unions and the Social Democrats, which took place from the end of the 1870s to the end of the 1880s. But when this legislation did not find a parliamentary majority any more, other measures were applied: When used against the activities of the organized working class, the exercise of extensive police discretion was very often approved by court decisions; legislations on associations ("Vereinsgesetz") allowed all kinds of police interventions and repression of the political mobilization and organization of the working class; the "Gewerbe-Ordnung," the law that regulated business activities and labor conditions, provided possibilities for breaking strikes (Saul 1974).

The early 1870s after the Franco-Prussian war were the period, when industrialization accelerated its pace in Prussia, resulting in a period of cumulative developments. The economic boom immediately after the Franco-Prussian war was followed by a deep depression with all its economic and social consequences. During these years, there was not only industrial activity, but also the spread of moral panics, and the rise of moral entrepreneurs launching their campaigns. Fears of danger to law and order and the increase of criminality were major themes of public discussion in this period. Although not all the higher public officials in the Prussian state administration took the moral panics of this time at face value, the state police administration seized the opportunity for promoting an increase in the number of royal policemen at the beginning of the 1880s. Starting with a ratio of one policeman to 1,500 inhabitants in the 1870s, the Ministry of the Interior improved this ratio gradually to 1:700 by the beginning of the new century. The state administration put pressure on the municipal police forces to come up with an improved police-population ratio as well, and by the 1880s a ratio of 1:1,500 was recommended for municipal police forces (Funk 1986). The symbolic representation of police forces, which were to expand were often given expression by impressive new police headquarters buildings. Significantly, the police headquarters in Berlin was the second largest building after the royal palace. The rise in the figures of the police personnel did not match the figures for the growth of the

population, in particular in the industrialized West, along the Rhine and in the Ruhr area, were the figures for police personnel per 100,000 of population fell or stagnated during the 1880s before rising steadily again in the 1890s after strike actions by the miners in the Ruhr area (Jessen 1991).

Another measure for coping with the threats, which were seen as endangering society during this period resulted in institutionalizing a separate crime investigation branch within the police, the Kriminalpolizei. The Berlin Kriminalpolizei engaged itself intensively into the scientific policing during the later years of the nineteenth century and became not only in Germany as police institution a celebrity. But the impact of the institutionalization of a separate crime investigation branch remained limited. It remained very much Berlin based with some follow-up establishments in other very large German cities. But only few police headquarters in other Prussian cities institutionalized similar crime investigations in their departments or did so shortly before the First World War only (Funk 1986).

A major test of the effectiveness of police control and intervention was the first big miners' strike in 1889. This strike, whose scale was without precedent in German history, caught the municipal and state administrations completely unprepared. The Prussian Army was called upon; the intervention of the military finally led to a breakdown of the strike movement. But because of the strict military logic, the Prussian army applied against the strike movement and because of complex and difficult Prussian state authority – Prussian military relations, Prussian state authorities refrained until the First World War from using extensively the military as police in industrial disputes (Johansen 2005). Instead, strategies for enhancing the presence of state police in Ruhr area were enhanced. One measure was the establishment of state police administrations in three cities in the Ruhr area in 1909 (Funk 1986; Jessen 1991). Up to that time, these towns had been policed by their own municipal police forces. To this point, the state administration had pursued very ambivalent policing strategies in the Ruhr area, the "Wild West" of the Empire. Before the outbreak of the strike in 1889, policing in this area was carried out at a very low quantitative level, as compared to other parts of Prussia. While the industrial and urban development in the Ruhr area was already progressing rapidly, the Prussian state administration maintained the previously appropriate rural-cantonal administrative organization of this region, with a state representative at its head and a few policemen and gendarmes for policing it. This led to administrative patterns such as industrial villages with more than 100,000 inhabitants. To cope with this insufficient situation, a second measure, besides introducing a state police in three Ruhr area cities, was discussed, which consisted of deploying more Gendarmerie in the area. This measure, which was never put into practice, included an increase of the gendarm-population ratio per 100,000 of population to 28 and the establishment of Gendarmerie barracks. But Prussian state administrators nevertheless headed for turning the Gendarmerie gradually into Prussia core police force for policing the industrialized society. Shortly before the First World War, 45 % of Prussia's Gendarmerie was based near to Prussia's major industrial centers, in the East in Silesia, around the heavily industrialized capital Berlin, and in the West in the Ruhr area and along the Rhine (Funk 1986).

The Recruitment and the Training of Nineteenth-Century Police Personnel

Who could become a member of the police force in Prussia? There are some resemblances to patterns to be observed in France during the nineteenth century. In theory, previous service in the Prussian army for 9–12 years was an absolute prerequisite for being recruited into the uniformed Police in Prussia. Thus, the ranks of the uniformed policemen on the beat were supposed to be filled with non-commissioned officers (NCOs). Military service as a prerequisite for admission to the police served several functions: the NCO policeman was supposed to represent king and state in the everyday life of the

citizen. His superiors expected him to show his derived authority, and, if necessary, to compel compliance to this authority from the public. On the other hand, long training within the military hierarchy was supposed to have made him an obedient servant to his superiors and a reliable instrument for maintaining law and order. But in reality, this recruitment pattern worked partially only. Although the civil service did have a high social ranking, the position of a uniformed patrolman had a low ranking on this list. Getting a job in the police was not what an army NCO necessarily looked for after years of military service. For many NCOs, the job of a policeman was only a transitory phase on the way to a quieter existence in the civil service than the police service could offer. In Berlin, for example, whose royal police was to serve as an example for other polices in Prussia, more than 2,000 policemen left the police force during the 1890s. The Berlin police force totaled about 4,000 men in the middle of the 1890s. A quarter of those who left the police went into other positions within the civil service. Due to these turnover rates, a large number of police posts were permanently vacant. Not only in Berlin, but other Prussian cities also had to cope with this situation. During the 1890s and again during the first decade after the turn of the century, the Prussian state administration tried to solve the turnover problem by reducing the military service requirements for employment in the police force. As a result, more men were drawn into the police service. The 9–12-year's military service remained nevertheless the ideal requirement looked for when conceiving a real Prussian patrolman on the beat. Those policemen who had acquired their post on the basis of the reduced requirements were often considered as some sort of second-class policemen (Reinke 1991).

Vacancies in the civil service, the police included, were announced and advertized by state and city administrations in public lists and journals. But the police posts offered regularly outnumbered applicants from the NCO's ranks. Cities with municipal police forces therefore reduced their employment requirements by recruiting men for the police service who had only fulfilled their obligatory military service after conscription, rather than service as regulars. By the 1880s, and much more so after 1890, cities in the West of Prussia, along the Rhine and in the Ruhr did find it increasingly difficult to recruit candidates with the adequate military background. While some cities reported during the 1890s that they were still managing to staff the municipal police positions accordingly, other cities found the supply of candidates with the requisite military experience falling ever more short of their needs. By 1911, the police department in Düsseldorf, one of the largest cities in the Prussian West, with 46 patrolmen's positions to fill, reported that of 500–600 applicants, only 22 had the adequate military background. Thus, despite persistent pressure from the Prussian state to seek out NCOs for police service, the cities in the Prussian West turned increasingly to the local wage-earning population for recruits. Urban administrators usually did so reluctantly, sometimes continuing to see the ideal policeman not just as someone shaped by long years of military discipline but also as someone from the outside, preferably of rural or small town origin. But the reality was that most applicants were local residents with only minimal military experience. As a consequence, the possibility of recruiting of policemen having personal contacts with organized workers loomed ever more threatening (Spencer 1992).

The training of policemen was carried out on the job and was oriented along the practical requirements of the man's on the beat everyday activities. The patrolman had to get acquainted with his precinct and with the things he was supposed to look after when on the beat. A number of "formalities" were also briefly taught, such as some basic ideas about the penal code of the Empire, the police ordinances that had been issued for the respective city or community, etc. Apart from that, the writing of dictations was part of the training. Often this was essential because the men's ability to write seems to have suffered considerably during the long years of military service. But all in all, serious training did not take place. Around the turn of the century, the Prussian state government as well as municipal police administrations acknowledged an

urgent need for an improvement in the policeman's qualifications. In order to ensure better-qualified personnel, police schools were set up. And additionally, the military habits of the ordinary policeman were no longer deemed sufficient for the handling the everyday problems the police encountered in the growing urban contexts. The more Prussian cities grew and the more complex urban society became, the more qualifications were required from the policeman beyond his authoritarian and military attitude. In 1899, the first police school was established in Prussia, as a school for the Gendarmerie. The Gendarmerie took the initiative, since for this force, which was still part of the military, the problem was the most urgent. In 1901, the first police school for municipal police personnel was set up in Düsseldorf. The costs of the schools were covered by those municipalities who sent their police men there. But usually these schools were relatively small and few policemen were sent to there. In general, municipal administrations accepted the necessity for improving the qualifications of their police personnel, but for financial reasons, they kept down the number of men they sent to these schools.

Similar institutions were being established in other Prussian districts as well at about the same time, beginning with Berlin in 1895. Police schools were intended not only to impart necessary knowledge and approved attitudes but also to raise police prestige. Increased formal training (whatever its content) would bridge the gulf between policemen and respected representatives of the Prussian state. In Düsseldorf, the course for patrolmen lasted 2 months and that for senior officers for 3 months. Students were required to live at the school so that its influence could prevail around the dock. The cities paid the costs for the patrolmen, fearing that if the men were required to use their own resources they would fall into debt, a situation the policemen were strongly encouraged to avoid. The senior officers, expected to come from somewhat more well-off families, had to pay for their own instruction. Cities tried to protect their investment in the candidates by stipulating that those who left their departments after less than 5 years had to repay all or part of the costs of their schooling. Also, attendance at the school was typically reserved for those recruits who had already completed 6–12 months of service. As justification for this fiscally prudent move, police administrators argued that schooling was more meaningful if it followed a substantial period of practical experience. By 1906, the state district administration in Prussia had stipulated that in cities of 10,000 or more, patrolmen either had to attend the police school or pass an examination before being confirmed in their posts. Supporters of the Düsseldorf school were dismayed to find that many communal police departments, to save the cost of instruction, either tried to hire recruits who had already attended a police school elsewhere or else encouraged the taking of the examination. To make certain that the Düsseldorf school had enough students to pay for itself, the Prussian provincial administration before the war was contemplating eliminating the examination option. As a step toward making municipal policemen more credible as rule enforcers by increasing the likelihood that they knew and understood the rules and what they were doing and for what purposes, the Düsseldorf police school represented only a hesitant beginning (Spencer 1992).

A Note on the Historiography of Nineteenth-Century German Policing

Police history had a late start in Germany. Except for a few legal history studies, police history was not part of a mainstream in German historiography but rather the exception until the end of the 1970s (for the exceptions see Koselleck 1975; Maier 1986). In the context of new thematic issues arising during the 1970s and 1920s within German historiography, emerging studies on the history of nineteenth-century police focused on the functions and the role of the police in eminent political issues, which were at the core of politics in nineteenth-century German states, such as the relationship between the police and the military in Prussia (Lüdtke 1989; Johansen 2005) or the emergence of political policing during the first half of the nineteenth century (Siemann 1985).

The first German study, aiming at a comprehensive historical analysis of the police within the economic, political, and social structures of this period, has been published in the mid-1980s by a political scientist (Funk 1986), relating organizational patterns of the police, its everyday practices included, and describing police development in Prussia as a correlate of the increasing economic, social, and political cleavages within Prussia. The author analyzes how the ruling old and the new Prussian elites sought to cope with the threats to the economic, the social and the social order, deriving from what was seen as an overall change, by trying to increase the quantitative and qualitative strength of the state police and the Gendarmerie. The working class and its organizations were among these threats, but urbanization created a major moral panic as well.

While these early studies of a renewed look at the police concentrated very much at the political systems level or did put a focus on Berlin (e.g., Funk 1986), more recent studies, focusing on the local level, in particular on urban policing in other Prussian and German cities, have described the complexities and the contradictions of nineteenth-century policing in Germany and the attempts to modernize and professionalize urban policing (Reinke 1991, 1992, 1993, 2000, 2000a; Spencer 1992; Jessen 1991; Roth 1997). This modernization and professionalization has been seen by the research as strategy for adjusting the police to the growing control requirements, originating from industrialization and urbanization patterns. But urban policing during this period meant not only the enhancement of what could be seen as modern control strategies: a major characteristic of urban policing during this period was the persistence of large-scale welfare functions as part of police functions, thus placing police practices at the turn of the nineteenth to the twentieth century to some extent into the continuity of Ancien Régime *Polizey* models. These patterns resulted in an overpolicing, being abolished only gradually. This continuity created a legacy, which lasted until after the Second World War, when "police" and "welfare" became separated during the occupation of Germany by the victorious Allied forces (Reinke and Fürmetz 2000b).

Related Entries

- ▶ Conceptualizing of Police
- ▶ History of Police Unions
- ▶ History of the Police Profession
- ▶ High Policing
- ▶ National and Local Policing
- ▶ Order Maintenance Policing
- ▶ Police in the Police State
- ▶ Police School Services
- ▶ Role and Function of the Police

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GLM

► Good Lives Model

Good Lives Model

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Synonyms

GLM

Overview

The Good Lives Model (GLM) is a strengths-based theory of offender rehabilitation. The purpose of this essay is to (i) briefly overview the desistance literature; (ii) describe the risk management approach; (iii) highlight its limitations, including its weak fit with desistance theory and research; and (iv) provide a detailed description of the GLM. The GLM incorporates the advantages of the risk management approach at the same time as addressing its limitations. It can be argued that it provides social workers and other professionals with a more comprehensive framework to guide their work with clients in the criminal justice system.

Introduction

The rehabilitation of offenders is a complex process and involves reentry, and ultimately reintegration, into social networks and the broader society. While offenders need to work hard at modifying their personal characteristics that are related to their offenses, the community also has a responsibility to support this personal work with social capital and resources. Once individuals have begun to serve their sentence, they are

entitled to have a chance at redemption and reconciliation. The presumption of human beings' equal value is a cornerstone of a decent and just society. It applies to offenders as much as to all humans. Furthermore, the rehabilitation of offenders is a normative and strength-building process, and therefore, from a practice perspective, both science and ethics are equally important. It is only legitimate to inflict significant harm (i.e., compulsory treatment) upon others when all human beings are regarded as equal in dignity and moral standing (Laws and Ward 2011).

Practitioners need rehabilitation theories to help them navigate through the various challenges and problems that materialize when working with offenders. These rehabilitation theories function as a conceptual map and facilitate effective intervention. Ideally, these maps will provide guidance on important issues such as the overall aims of intervention, what constitutes risk, what the general causes of crime are, how best to manage and work with individuals, and how to balance offender needs with the interests of the community. In recent years, strengths-based or "restorative" approaches to working with offenders have been formulated as an alternative to the very popular Risk-Need-Responsivity model of offender rehabilitation. In short, risk management approaches primary practice focus is on the detection and modification of dynamic risk factors (i.e., criminogenic needs), while strengths-based perspectives aim to create competencies in offenders and reduce risk more indirectly.

Offenders *are* "people like us" (Laws and Ward 2011). It is necessary to start relating to them in ways that reflect this attitude to improve correctional outcomes and reduce reoffending rates. The desistance research is clear that offenders respond well to practitioners who show an interest in them and believe in their capacity to turn their lives around (McNeill et al. 2005). Treating offenders with respect and decency rather than as sources of contamination to be quarantined (not cured) is likely to reduce the risk of practicing an ineffective confrontational therapeutic style (RNR; Andrews et al. 1990). Most information in this text is drawn on the sexual offending literature; although equally applicable to general offending, the GLM was initially developed in reference to the sexual offending literature.

Desistance from Crime

In contrast to the forensic psychology literature's focus on individual factors implicated in offending and reoffending, the desistance literature seeks to understand the lifestyle change process associated with cessation of crime (e.g., Laws and Ward 2011; Serin and Lloyd 2009). To suggest that a reduction in dynamic risk factors solely explains desistance seems to be unconvincing. Such an explanation is arguably somewhat simplistic and does not account for the very nature of human beings. Rather than being passively determined by external circumstances, humans actively seek outcomes that are personally meaningful and valued. The desistance literature disentangles *how* offenders change in regard to dynamic risk factors. Therefore it provides a richness not captured by the forensic psychology literature (Laws and Ward 2011). Available evidence indicates that there are a number of social and psychological factors that assist the desistance process (Laws and Ward 2011). These factors were named, for example, as "turning points" (Laub and Sampson 2003), "hooks for change" (Giordano et al. 2007), a "change in narrative identity" (McNeill et al. 2005), or "making good" (Maruna 2001).

Perhaps the most significant contributions to the desistance literature in recent years are those of Laub and Sampson (2003) and Maruna (2001). Laub and Sampson conducted an extended and comprehensive follow-up of men from Sheldon and Eleanor Glueck's landmark research (Glueck and Glueck 1950). They were interested in factors that differentiated serious and persistent delinquent boys from a matched group of nondelinquent boys. Laub and Sampson found that conventional adult social bonds such as marriage and employment explained variations in crime. Other variables, like childhood adversity,

did not predict these. Specifically, they found that strong social bonds, for example, strong marital attachment and job stability, could facilitate the lifestyle change required for criminal desistance. Their findings have been replicated throughout the desistance literature (e.g., Maruna 2001; see below), and similar findings have been reported in the forensic psychology literature (e.g., Hanson and Harris 2000). Laub and Sampson also replicated the long-standing finding in criminology that frequency of offending decreases with age. They furthermore acknowledged the role of human agency, noting that men who desisted played an active role in their desistance process through making explicit choices to disengage from crime. Maruna (2001) replicated Laub and Sampson's findings regarding the significance of social bonds but also found that human agency or cognitive transformation (i.e., creation of a new, conventional, more adaptive narrative identity) was a key element in desistance. In sum, both external factors (e.g., social support, access to employment opportunities) and internal factors (e.g., making a conscious decision to want a different life) are required to facilitate the lifestyle change process associated with desistance. Desistance is the central aim of offender rehabilitation. In the following paragraphs, the risk management approach and its failure to account for the desistance literature will be contrasted with a recent strengths-based rehabilitation model, the Good Lives Model of Offender Rehabilitation.

The Risk Management Approach to Offender Rehabilitation

The risk management approach to offender rehabilitation emerged from Andrews and Bonta's influential book, *The Psychology of Criminal Conduct* (PCC; Andrews and Bonta 2010). The PCC sought to explain criminal behavior through empirically derived predictors of recidivism using what Andrews and Bonta termed a *general personality and social psychology perspective*. The PCC provides three empirically based principles aimed at reducing offenders' risk of recidivism: *risk*, *need*, and *responsivity* (Andrews and Bonta 2010). Hence, an underlying assumption of the risk management approach is that offenders are primarily containers of risk for recidivism, and the sole aim of offender rehabilitation is to reduce this recidivism risk through adherence to the RNR principles. The risk principle states that the dosage or intensity of interventions should match an offender's risk level. Therefore, low-risk offenders should receive less intense or no intervention, whereas high-risk offenders should be subjected to very intensive treatment. The needs principle incorporates that interventions should target criminogenic needs, also known as *dynamic risk factors*. Those factors are causally related to offending and are changeable. Dynamic risk factors include antisocial attitudes and antisocial associates (Andrews and Bonta 2010) and in the case of sexual offending, deviant sexual interests and self-regulation difficulties (Laws and Ward 2011). The aim of treatment is to reduce dynamic risk factors and, according to the need principle, directing intervention efforts at non-criminogenic needs will prove ineffective. For example, non-criminogenic needs such as low self-esteem and a history of victimization should not be targeted in treatment, given they have not been linked with recidivism (Andrews and Bonta 2010). Finally, the responsivity principle informs the actual delivery of interventions in order to maximize their efficacy. The responsivity principle involves matching the style and mode of intervention to the offender's learning style and abilities (Andrews and Bonta 2010). General responsivity advocates structured cognitive behavior therapy (CBT) interventions, given their general acceptance as the best treatment currently available for sex offenders (e.g., Hanson et al. 2002). Enhancing specific responsivity requires considering cognitive ability, learning style, personality profile, culture, and other characteristics of individual offenders and delivering treatment accordingly. The RNR has been hugely influential in offender rehabilitation initiatives internationally, forming the basis of correctional treatment since its inception in the early 1990s.

Although meta-analyses have found support for the efficacy of RNR-based treatment programs in reducing recidivism among general and sexual offenders (e.g., Hanson et al. 2009, 2002; Lösel and Schmucker 2005), some researchers argue that the available evidence is insufficient to conclude current treatment programs are in fact efficacious (e.g., Marques et al. 2005). Research suggests that a considerable amount of treated sexual offenders recidivates (e.g., Hanson et al. 2002). Thus, substantial scope remains for improving sex-offender rehabilitation and reintegration initiatives. In this entry it is argued that the Good Lives Model (GLM) offers exciting promise for further enhancing the effectiveness of current efforts by addressing limitations of the risk management approach, which are expanded on in the following entry.

Limitations of the Risk Management Model

The most heavily cited criticism of the RNR model revolves around its failure to motivate and engage offenders in the rehabilitation process (e.g., Mann 2000). Attrition from sex-offender treatment programs is particularly high with reported rates as high as 30–50 % (e.g., Ware and Bright 2008), which have been attributed to poor treatment engagement (e.g., Beyko and Wong 2005). Consistent evidence shows that men who drop out of treatment are more likely to reoffend compared to treatment completers (e.g., Hanson et al. 2002; Marques et al. 2005) as well as untreated comparison groups (Hanson et al. 2002). Without addressing the problem of treatment attrition, current treatment programs fail to deliver to groups of sex offenders most requiring treatment (Beyko and Wong 2005) and therefore fail to adhere to the RNR risk principle. Thus, although empirically derived, in reality the risk principle is difficult to adhere to.

What is behind the failure of the risk management approach to engage clients in rehabilitation? At the outset, the risk management approach differs substantially from therapeutic models used with other client populations (e.g., in the treatment of mental health problems) in the orientation of treatment goals, limited collaboration between client and therapist, and limited attention to problems not causally related to the problem behavior (i.e., in the case of offending – non-criminogenic needs such as self-esteem or personal distress). Addressing the first issue, risk management interventions rely profoundly on *avoidant* goals. These treatments try to encourage hypervigilance to threats of relapse and the reduction of dynamic risk factors (Mann 2000). By contrast, *approach* goals provide an individual with direction toward his or her goal. It has been suggested that individuals focused on approach goals concentrate on positive outcomes and thus persevere longer than people motivated by avoidance goals, who tend to focus on threats (Ward et al. 2007). Reframing the overarching goal of treatment (i.e., reducing risk of reoffending) as an approach goal might be "to become someone who lives a satisfying life that is always respectful of others" (Mann 2000, p. 194). This approach goal remains consistent with avoiding relapse. The final goal of avoidance of reoffending can be separated into personally meaningful subgoals that provide offender clients with direction in life, for example, increasing confidence in socializing with adult partners. Thus, by using approach goals, treatment can help offenders live a better, more satisfying life, not just a less harmful one, in ways that are personally meaningful and socially acceptable – and risk reducing (Mann 2000). In fact, it is likely that the combination of approach and avoidance goals is implicated in successful desistance. A balance between something that is hoped for – a better life – and what is feared for, i.e., recidivism, is thought to be more effective in reaching one's ultimate goal (Paternoster and Bushway 2009). The resulting motivation can be seen as additive, because it incorporates avoidance and approach goals. Indeed, Mann et al. (2004) showed that an approach-goal-focused intervention with sex offenders was associated with increased treatment engagement compared to a traditional avoidant-goal-focused intervention.

Secondly, treatment goals in the risk management approach are enforced upon offenders rather than mutually agreed upon in therapy (Mann 2000). This can compromise the

therapeutic relationship. Marshall and his colleagues (e.g., Marshall et al. 2003) demonstrated that confrontational therapeutic styles had a negative impact on attitude and behavior changes. Displays of empathy, warmth, encouragement, and some degree of directiveness facilitated treatment change. This suggests that careful attention to the therapeutic relationship might increase treatment engagement. The didactic, strictly formalized nature of the risk management approach, however, allows limited scope for enhancing the therapeutic relationship.

Third, some researchers have convincingly argued that a sole focus on criminogenic needs obstructs treatment engagement. Sometimes attention to non-criminogenic needs is necessary to establish enhanced well-being and quality of life. This in turn is likely to enhance treatment engagement (Laws and Ward 2011). More specifically, targeting non-criminogenic needs might be a necessary precursor for targeting criminogenic needs through enhancing the therapeutic alliance (Ward and Stewart 2003). For example, attempting to tackle criminogenic needs in the context of personal distress or financial crisis (both non-criminogenic needs) will likely prove fruitless if the more acute issues are not sufficiently addressed.

Another general limitation of the risk management approach is its minimal consideration of reentry and reintegration issues (beside identifying and then actively avoiding high-risk situations). The desistance literature emphasizes the decisive role of environmental systems such as close, supportive relationships and employment in ceasing offending (e.g., Laub and Sampson 2003). Thus, building and strengthening environmental opportunities, resources, and supports should be as central to offender rehabilitation and reintegration endeavors as it is to psychological treatment. Moreover, in the case of treated offenders, environmental factors can facilitate or impede the continuation of treatment-related change to dynamic risk factors. Treatment effects can only be generalized to parole if the environment supports and reinforces newly learned concepts, such as the restructuring of offense-supportive beliefs. If an offender, for instance, is embedded in a criminal subculture, which endorses offense-supportive beliefs, it is unlikely that the effects of cognitive restructuring will last long.

The failure of the risk management approach to engage offender clients in the rehabilitation process is derived from its theoretical underpinnings, or mainly a lack thereof (for a detailed discussion, see Laws and Ward 2011), which ignore the nature of human beings as value-laden, goal-directed beings. The risk management approach seems to be too mechanistic and reductionist – that is, there is an implicit assumption that through fixing a malfunction offenders are (hopefully) restored to their optimal functioning state. Humans, on the other hand, are arguably not simply clusters of mechanisms but also persons with an array of values. Therefore, it is not simply enough to correct personal deficits, or reduce criminogenic needs, and expect individuals who have committed crimes to be rehabilitated. It is important to acknowledge that these crimes were often committed in a misguided pursuit of subjectively valued outcomes. In other words, the theoretical grounding in managing risk, rather than improving the lives of offenders, compromises client engagement and their capacity for change.

In summary, critics argue that the RNR approach commonly current in offender rehabilitation and reintegration endeavors constitutes a necessary, but not sufficient foundation for effective interventions (Ward and Stewart 2003). It is essential subjecting offenders to interventions that are empirically supported; however, there is still much to be done in the arena of correctional practice and that desistance theory and research can offer those working with offenders numerous good ideas and practices. It has been convincingly argued that offender rehabilitation endeavors require a dual focus: reducing risk but also promoting human needs and values through approach goals, thereby engaging offenders in the treatment process. The GLM was developed as an alternative, more comprehensive approach to rehabilitation which is able to accomplish a dual focus. In other words the very nature of the GLM addresses limitations of the

risk management approach, by including motivating offenders to engage in treatment, by addressing desistance issues, and by considering offenders' environmental contexts (Ward et al. 2007; Ward and Stewart 2003). Although developed independently on a theoretical level, the GLM is a natural ally of desistance theory on a practical level. This is because of the overlapping nature of both perspectives' theoretical assumptions and their common stress on the importance of both offender agency and social resources (for a more detailed discussion of this point see Göbbels et al. (2012)).

The Good Lives Model

The Good Lives Model (GLM), first proposed by Ward and Stewart (2003) and further developed by Ward and colleagues (e.g., Ward and Gannon 2006), is a strengths-based approach to offender rehabilitation. It is a strengths-based rehabilitation theory, because it is responsive to offenders' particular interests, abilities, and aspirations. It also directs practitioners to explicitly construct intervention plans that help offenders to acquire the capabilities to achieve the things that are personally meaningful to them, however in a socially appropriate manner. It assumes that all individuals have similar aspirations and needs and that one of the primary responsibilities of parents, teachers, and the broader community is to help each individual to acquire the tools required to make our own way in the world. Ideally, this is achieved through socialization in childhood and adolescence. Criminal behavior results when individuals lack the internal and external resources necessary to satisfy their values using pro-social means. In other words, criminal behavior represents a maladaptive attempt to meet life values (Ward and Stewart 2003). Rehabilitation endeavors should therefore equip offenders with the knowledge, skills, opportunities, and resources necessary to satisfy their life values in ways that do not harm others. Inherent in its focus on an offender's life values, the GLM places a strong weight on offender agency. That is, offenders, like all human beings, actively seek to satisfy their life values through whatever means available to them. The GLM's dual attention to an offender's internal values and life priorities and external factors such as resources and opportunities give it practical utility in desistance-oriented interventions. In addition, the GLM as a theory has the conceptual resources to incorporate desistance ideas because it also stresses agency, interdependency, and development. In other words, there is natural resonance between desistance theory and the GLM because of their overlapping theoretical ideas and broad way of conceptualizing the relationship between human beings and their social world.

The GLM is a theory of offender rehabilitation that contains three hierarchical sets of assumptions: general assumptions concerning the aims of rehabilitation, etiological assumptions that account for the onset and maintenance of offending, and practical implications arising from the first and second sets of assumptions. Each set of assumptions will be detailed, followed by a summary of empirical research investigating the utility of the GLM.

General Assumptions of the GLM

The GLM is grounded in the ethical concept of human dignity (see Ward and Syversen 2009) and universal human rights. The GLM perceives human beings as agents, rather than passive recipients who are determined by external circumstances only. That is, the GLM is concerned with individuals' ability to formulate and select goals, construct plans, and to act freely in the implementation of these plans. A closely related assumption is the basic idea that offenders, like all humans, aspire to certain states of mind, personal characteristics, and experiences. These are defined in the GLM as *primary goods*. Following an extensive review of psychological, social, biological, and anthropological research, Ward and colleagues first proposed ten classes of primary goods. In more recent work (e.g., Ward and Gannon 2006; Ward et al. 2007), they separated the goods of friendship and community to produce 11 classes of primary goods: (1) life (including healthy living and functioning),

(2) knowledge, (3) excellence in play, (4) excellence in work (including mastery experiences), (5) excellence in agency (i.e., autonomy and self-directedness), (6) inner peace (i.e., freedom from emotional turmoil and stress), (7) friendship (including intimate, romantic, and family relationships), (8) community, (9) spirituality (in the broad sense of finding meaning and purpose in life), (10) happiness, and (11) creativity (Ward and Gannon 2006, p. 79). While it is assumed that all humans seek out all the primary goods to some degree, the weightings or priorities given to specific primary goods reflect an offender's values and life priorities. Moreover, the existence of a number of practical identities, based on, for example, family roles (e.g., parent), work (e.g., nurse), and leisure (e.g., rugby player), means that an individual might draw on different value sources in different contexts, depending on the normative values behind each practical identity.

Instrumental goods, or s*econdary goods*, provide concrete means of securing primary goods and take the form of approach goals. For example, completing an apprenticeship or university degree might satisfy the primary goods of knowledge and excellence in work, whereas joining an adult sports team or cultural club might satisfy the primary good of friendship. If offenders engage in certain personally valued activities, it is likely that dynamic risk factors are reduced in an indirect manner. Thus, the GLM targets approach goals directly and avoidance goals indirectly.

Etiological Assumptions of the GLM

According to the GLM there are two primary routes that lead to the onset of offending: direct and indirect (Ward and Gannon 2006). The direct pathway is implicated when an offender actively attempts (often implicitly) to satisfy primary goods through his or her offending behavior. For example, an individual lacking skill to relate to potential partners may try to acquire the good of intimacy by committing date rape. The indirect pathway is implicated when primary human goods are frustrated over and over again. This can lead to a ripple or cascading effect that culminates in a criminal offense. For example, conflict between the goods of intimacy and excellence in work might lead to the breakup of a relationship and subsequent feelings of loneliness and distress. Maladaptive coping strategies such as the use of alcohol to alleviate distress might, in specific circumstances, lead to a loss of control and culminate in sexual offending (Ward et al. 2007).

Four types of difficulties in offenders' attempts to secure primary goods have been proposed. First, and most common in the direct route to offending, is the use of *inappropriate strategies* (secondary goods) to achieve primary goods. For instance, a preferential child sexual offender might not be able to achieve the good of intimacy with an adult partner and consequently tries to secure the good by molesting a child. Second, an individual's implicit good lives plan might suffer from a *lack of scope*, meaning that a number of goods are neglected in his or her life plan. For example, an offender might neglect the good of excellence in work and may feel incompetent because of his lack of achievement. These feelings might accumulate to a high degree of life dissatisfaction and can cumulate to sex offending. Third, *conflict* in the pursuit of goods might result in acute psychological stress and unhappiness. Fourth, an individual might lack *internal and external capabilities* to satisfy primary goods in the environment he or she lives in. Internal capabilities include relevant knowledge and skill sets, while external capabilities include environmental opportunities, resources, and supports.

Empirically identified criminogenic needs are conceptualized in the GLM as internal or external obstacles that interfere with the acquisition of primary goods. Indeed, as outlined by Laws and Ward (2011), each of the primary goods can be linked with one or more criminogenic needs. Taking the primary good of agency as an example, impulsivity might obstruct good fulfillment. Similarly poor emotional regulation might block attainment of inner peace.

Practical Implications of the GLM

To reiterate, the aim of correctional intervention according to the GLM is the promotion of

primary goods, or human needs that, once met, enhance psychological well-being and functioning. In applying the GLM, assessment begins with mapping out an offender's good lives conceptualization by identifying the priorities given to the various primary goods. This is achieved through (i) asking increasingly detailed questions about an offender's core commitments in life and his or her valued day-to-day activities and experiences and (ii) identifying the goals and underlying values that were evident in an offender's offense-related actions. Once an offender's good life conceptualization is understood, future-oriented secondary goods aimed at satisfying an offender's primary goods in socially acceptable ways are formulated collaboratively with the offender and translated into a good lives treatment plan. Treatment does not have a one-size-fits-all approach but is individually tailored to assist an offender implement his or her good lives intervention plan and simultaneously address criminogenic needs that might be blocking goods fulfillment. Accordingly, intervention might include building internal capacity and skills and maximizing external resources and social supports to satisfy primary human goods in socially acceptable ways.

Ward et al. (2007) outlined a group-based application of the GLM based on seven modules typical of current best-practice sex-offender treatment programs: establishing therapy norms, understanding offending and cognitive restructuring, dealing with deviant arousal, victim impact and empathy training, affect regulation, social skills training, and relapse prevention (RP). They highlighted that most modules were associated with an overarching primary good, consistent with the notion that dynamic risk factors can be considered maladaptive means of securing primary goods. For example, an overarching good in the understanding offending and cognitive restructuring module is that of knowledge, attained through providing offenders with an understanding of how their thoughts, feelings, and actions led them to offend. The social skills training module is associated with the overarching goods of friendship, community, and agency. Offenders' individual good lives plans should inform the nature of interventions provided in this module. Some offenders, for example, may value other primary goods such as excellence in play and work over the good of friendship; thus, basic social skills training will likely suffice. Other offenders, however, may highly value intimate relationships; thus, intensive therapeutic work on intimacy and relationships might be required. This illustrates that the GLM promotes tailoring or treatment to individual offenders.

Willis et al. (in press) give specific recommendations on how to integrate the GLM successfully into cognitive-behavioral and risk management treatments. The basic assumption of humans as active agents implies that intervention planning should be collaborative. In addition, clients should be informed about their risk assessment results and should be explained to them. The GLM promotes individualization of treatment. In treatment, appropriate secondary goods should be acknowledged, reinforced, and incorporated together with future-oriented approach goals. For instance, an offender may be particularly ambitious and hardworking and thereby be very successful in his or her profession. In contrast, he or she might not be able to meet the good of relatedness with appropriate secondary goods. The offender might express the desire to reconnect with his or her family, make more friends, and find an intimate partner, and so on. Due to the holistic orientation of the GLM, also these non-criminogenic needs are addressed. The GLM has a dual focus. It capitalizes offender well-being *and* reduction of recidivism risk. Therefore, the offender does not introduce himself with only with offenses, sentencing information, and criminal history. The offender as a person is acknowledged by the therapist and other group members, rather than being reduced to his criminal offense. Offenders are treated as "people like us" (Laws and Ward 2011). As a consequence, offenders are also informed about the GLM and links between treatment modules and the acquisition of a good life. In contrast, hostility, negative labeling of the client, and the use of confrontation are all inconsistent with the GLM approach. In addition, the therapist should not be seen as a teacher or as superior to the

clients. Clients are fellow human beings, who are active participants in the therapeutic process. Another crucial aspect is the GLM's emphasis of the client's environment. The offenders learn to attain valued goods with appropriate secondary goods to assure an offense-free life. This involves the work of a multidisciplinary team (correctional workers, nurses, healthcare workers, therapists, etc).

Empirical Research Supporting the Utility of the GLM

The most commonly cited criticism of the GLM is its lack of empirical support (Andrews and Bonta 2010). However, the GLM is not a *treatment* theory, but is rather a rehabilitation framework that is intended to supply practitioners with an overview of the aims and values underpinning practice. It functions as a broad *map* which needs to be supplemented by specific theories smaller in scope concerning concrete interventions such as cognitive-behavioral treatment techniques (Laws and Ward 2011). Thus, the criticism that the GLM (itself) has not been empirically supported misses the point. Rather, it is intended to provide a more comprehensive framework for offender practice than currently exists. However, programs can be – and are – constructed that reflect GLM assumptions and these can (and should) be evaluated. But in this case they are best construed as GLM consistent programs and are not the GLM itself (Laws and Ward 2011). To reiterate, the GLM provides an overarching rehabilitation framework, but does not prescribe specific intervention content (Willis et al. in press). Importantly, treatments that are developed within the framework of the GLM have to adhere to its basic and etiological assumptions. If there is a lack in fidelity with the GLM, the treatment might not work or might be, in the worst case, not beneficial. Due to its individual, flexible, and holistic focus, the GLM does not provide clinicians with rigidly structured treatment manuals. However, structure is needed to assure that central treatment targets are addressed and risk of reoffending will be reduced.

Keeping these general points in mind, recent programs have incorporated principles of the GLM with RP-based treatment, with positive results. For example, Ware and Bright (2008) recently reported preliminary results following the incorporation of GLM principles into their sex-offender treatment program, concurrently with the introduction of open treatment groups, meaning offenders work through treatment modules at their own pace (in contrast to closed treatment groups whereby group members start and finish together). Since the implementation of these changes, the treatment attrition rate has reduced, and staff have reported feeling more effective and positive in their work, likely benefiting their therapeutic relationship with clients. In another study, Lindsay et al. (2007) demonstrated the incorporation of GLM and RP principles with sex offenders using two case examples. They reported the dual focus on improving quality of life and managing risk-enhanced treatment engagement and provided offenders with a pro-social and personally meaningful life focus. Both offenders remained offense-free 5 years following their referrals for treatment. Consistent with reports of the GLM's effectiveness with sex offenders, the GLM has also been successfully applied with a high-risk violent offender (Whitehead et al. 2007) reported that the implementation of GLM principles facilitated treatment readiness and promoted long-term reintegration goals.

Other studies have empirically examined the underlying assumptions of the GLM. Willis and Grace (2008) retrospectively coded child molesters' release planning and found that the presence of secondary goods (i.e., socially acceptable approach goals relating to one or more primary goods) was a protective factor against any type of recidivism (i.e., sexual, violent, or general recidivism), again implicating the importance of goods fulfillment in the desistance process.

Barnett and Wood (2008) investigated how imprisoned sex offenders had operationalized the primary goods of agency, relatedness, and inner peace at the time of their offending. A lack of scope in good lives conceptualizations (e.g., through neglecting inner peace) and problems and/or conflict in the means used to pursue

each good were evident. This supports the notion that difficulties fulfilling primary goods are implicated in offending. More recently, the GLM was applied to a sample of released child molesters and showed that the majority of primary goods were endorsed with high importance, supporting the premise that the GLM primary goods represent a set of universally sought after human values (Willis et al. 2010). In addition, it was found that positive reentry experiences at 1 and 3 months post-release (in terms of accommodation, social support, and employment) were associated with increased primary goods attainment 6 months post-release, suggesting that positive reentry experiences provided external capabilities for the implementation of good lives plans and eventual realization of life values.

In sum, the GLM has demonstrated preliminary effectiveness in addressing key limitations of the risk management approach to offender rehabilitation. This was done by enhancing treatment engagement, fostering desistance, and paying increased attention to environmental contexts. Moreover, a growing body of research supports the GLM's underlying assumptions.

Conclusion

Individuals with a history of criminal offending are more than bearers of risk, and as such, rehabilitation and reintegration endeavors require more than managing risk. The risk management approach has been hugely influential, and the primary RNR principles should not be rejected. Rather, the principles of risk, need, and responsivity should be integrated within a broader, strengths-based rehabilitation theory, the GLM. Through acknowledging that offenders are people like all human beings, the GLM engages offenders in the process of desistance, thereby bettering their lives and the lives of people they come into contact with. A problem with risk management practice models is that they tend to be overly focused on individual offenders and lack sufficient theoretical and ethical resources to enlarge their vision to the broader social and cultural vista. In other words, if the ultimate aim is to help individuals to cease offending and stay on the straight road, it is necessary to have a just, caring, and mutually accountable society.

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Governance

▶ Judicial Leadership and Performance

Graft

▶ Corruption

Green Criminology

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Overview

The term "green criminology" emerged in the 1990s to describe a critical and sustained approach to the study of environmental crime (Lynch 1990; South 1998). This chapter provides an outline of the distinctive features of green criminology, its main concepts and foci of analysis, and the continuing debates that mark its further and continuing development as a bona fide perspective within criminology.

Generally speaking, green criminology takes as its focus issues relating to the environment

(in the widest sense possible) and harm (as defined in ecological as well as strictly legal terms). Much of this work has been directed at exposing different instances of substantive social and ecological injustice. It has also involved critique of the actions of nation-states and transnational capital for fostering particular types of harm and for failing to adequately address or regulate harmful activity. Given the pressing nature of many environmental issues, it is not surprising that many criminologists are now seeing environmental crime and environmental victimization as areas for concerted analytical and practical attention.

From a criminological perspective, any attempt to take up the challenge offered here will require rigorous and sophisticated analysis of the social dynamics that shape and allow certain types of activities harmful to the environment (including humans and animals) to take place over time. This sort of analysis, in turn, demands that environmental issues be framed within the context of a sociological and criminological imagination (White 2003). That is, study must appreciate the importance of situating environmental harm as intrinsically socially and historically located and created. Interpretation and analysis thus has to be mindful of how current trends reflect the structure of global/local societies, the overall direction in which such societies are heading, and the ways in which diverse groups of people are being affected by particular social, economic, and political processes.

The Foundations of Green Criminology

Green criminology refers to the study by criminologists of environmental harms (that may incorporate wider definitions of crime than that provided in strictly legal definitions), environmental laws (including enforcement, prosecution, and sentencing practices), and environmental regulation (systems of civil and criminal law that are designed to manage, protect, and preserve specified environments and species and to manage the negative consequences of particular industrial processes) (White 2008).

The key focus of green criminology is environmental crime. This is conceptualized in several different ways within the broad framework of green criminology. For some writers, environmental crime is defined narrowly within strict legal definitions – it is what the law says it is. For others, environmental harm is itself deemed to be a (social and ecological) crime, regardless of legal status – if harm is done to environments or animals, then it is argued that this ought to be considered a "crime" from the point of view of the critical green criminologist.

Specific types of harm as described in law include things such as illegal transport and dumping of toxic waste, the transportation of hazardous materials such as ozone depleting substances, the illegal traffic in real or purported radioactive or nuclear substances, the proliferation of "e"-waste generated by the disposal of tens of thousands of computers and other equipment, the safe disposal of old ships and airplanes, the illegal trade in flora and fauna, and illegal fishing and logging.

However, within green criminology there is also a more expansive definition of environmental crime or harm that includes (White 2011):

- Transgressions that are *harmful to humans, environments, and nonhuman animals*, regardless of legality per se
- Environmental-related harms that are facilitated by *the state*, as well as *corporations and other powerful actors*, insofar as these institutions have the capacity to shape official definitions of environmental crime in ways that allow or condone environmentally harmful practices

The definition of environmental crime is, therefore, contentious and ambiguous. Much depends upon who is defining the harm and what criteria is used in assessing the nature of the activities so described (e.g., legal versus ecological, criminal justice versus social justice) (Beirne and South 2007; White 2008).

For many green criminologists the biggest threats to environmental rights, ecological justice, and nonhuman animal well-being are system-level structures and pressures that commodify all aspects of social existence that are based

upon the exploitation humans, nonhuman animals, and natural resources and that privilege the powerful over the interests of the vast majority. It is for this reason that assessment of environmental injustice requires critical scrutiny of how states themselves intervene with regard to specific environmental harm issues.

An eco-justice perspective refers to the broad orientation of green criminology which is largely directed at exposing different instances of substantive social and environmental injustice. From an eco-justice perspective, environmental harm is best seen in terms of justice, which in turn is based upon notions of human, ecological and animal rights, and broad egalitarian principles. A key issue is the weighing up of different kinds of harm and violation of rights that may involve stretching the boundaries of conventional criminology to include other kinds of harms than those already deemed to be illegal.

Most green criminology is informed by at least one of the three approaches that collectively make up an eco-justice perspective. These include *environmental justice* (where the main focus is on differences within the human population: social justice demands access to healthy and safe environments for all and for future generations), *ecological justice* (where the main focus is on "the environment", as such to conserve and protect ecological well-being, e.g., forests, is seen as intrinsically worthwhile), and *species justice* (where the main focus is on ensuring the well-being of both species as a whole, such as whales or polar bears, and individual animals, which should be shielded from abuse, degradation, and torture).

A major factor that influences the study of environmental harm, therefore, relates to the specific interests that count the most when conceptualizing the nature and seriousness of the harm. For example, when criminalization does occur, it often reflects human-centered (or anthropocentric) notions of what is best (e.g., protection of legal fisheries, legal timber coups) in ways that treat "nature" and "wildlife" simply and mainly as resources for human exploitation. The intrinsic value of specific ecological areas and particular species tends to be downplayed or ignored.

Nevertheless, recent years have seen greater legislative and judicial attention being given to the rights of the environment per se and to the rights of certain species of nonhuman animal to live free from human abuse, torture, and degradation. This reflects both the efforts of eco-rights activists (e.g., conservationists) and animal rights activists (e.g., animal liberation movements) in changing perceptions, and laws, in regard to the natural environment and nonhuman species. It also reflects the growing recognition that centuries of industrialization and global exploitation of resources are transforming the very basis of world ecology – for example, global warming threatens us all, regardless of where we live or our specific socioeconomic situation.

Studying Environmental Harm

Green criminology provides an umbrella under which to theorize and critique both *illegal* environmental harms (i.e., environmental harms currently defined as unlawful and therefore punishable) and *legal* environmental harms (i.e., environmental harms currently condoned as lawful but which are nevertheless socially and ecologically harmful). How harm is conceptualized is thus partly shaped by how the legal-illegal divide is construed within specific research and analysis.

There are a number of intersecting dimensions that need to be considered in any analysis of environmental harm (White 2008). These include consideration of who the victim is (human or nonhuman), where the harm is manifest (global through local levels), the main site in which the harm is apparent (built or natural environment), and the time frame within which harm can be analyzed (immediate and delayed consequences). Many of the main features pertaining to environmental harm are inherently international in scope and substance.

Indeed, the categorization of environmental harm is varied in that there are different ways in which environmental crimes have been conceptualized and sorted. For instance, Carrabine et al. (2004) discuss environmental crimes in terms of

primary and secondary crimes. Green crimes are broadly defined simply as crimes against the environment. Primary crimes are those crimes that result directly from the destruction and degradation of the earth's resources, through human actions. Secondary or symbiotic green crime is that crime arising out of the flouting of rules that seek to regulate environmental disasters. The first set of crimes relates to the harm as being bad in itself; the second relate to breaches of law or regulation associated with environmental management and protection.

In recent years researchers have studied a wide range of environmental harms associated with both "green" issues and "brown" issues. In the former the work has been motivated by either a concern with species justice or an interest in conventional environmental crimes such as illegal fishing. For instance, work over the past decade has been carried out in respect to crimes such as lobster poaching (McMullan and Perrier 2002), animal abuse (Beirne 2009), the illicit trade in endangered species (Wellsmith 2010), and deforestation (Boekhout van Solinge 2010).

In regard to "brown" issues, the production and disposal of waste is a matter of significant concern to academic researchers interested in questions of environmental harm. Relevant examples of such research include the role of organized criminal syndicates in the dumping of waste (Ruggierro 1996), inequalities associated with the location of disadvantaged and minorities' communities near toxic waste sites (Pellow 2007), and the global trade in electronic waste (Gibbs et al. 2010a).

The range of substantive topic areas that green criminology is presently investigating is growing. So too, the complexities involved in studying environmental harm are likewise being acknowledged. For example, the detection and origins of some types of environmentally related harm may be unclear due to significant time lags in manifestation of the harm. Here it is important to acknowledge the notion of cumulative effects. For example, this could refer to the way in which dioxins accumulate in fish flesh over time. It could also refer to the cumulative impact of multiple sources of pollution as in cases where there are a high number of factories in one area (such as places along the US-Mexican border). Diseases linked to asbestos poisoning may surface many years after first exposure, and this, too, provides another example of long-term effects of environmental harm. Persistent use of pesticides in particular geographical areas may also have unforeseen consequences for local wildlife, including the development of new diseases among endemic animal species (as has been suggested has occurred in the case of facial tumor disease now rampant among the Tasmanian devil population in Australia).

As extensive work on specific incidents and patterns of victimization demonstrates, it is also the case that some people are more likely to be disadvantaged by environmental problems than others. For instance, studies have identified disparities involving many different types of environmental hazard that especially adversely affect people of color, ethnic minority groups, and indigenous people (Bullard 2005). There are thus patterns of differential victimization that are evident with respect to the siting of toxic waste dumps, extreme air pollution, chemical accidents, access to safe clean drinking water, and so on (Williams 1996). It is the poor and disadvantaged who suffer disproportionately from such environmental inequalities.

The kinds of harms and crimes studied within green criminology include illegal trade in endangered species (e.g., trade in exotic birds or killing of elephants for their ivory tusks), illegal harvesting of "natural resources" (such as illegal fishing and illegal logging), and illegal disposal of toxic substances (as well as pollution of air, land, and water). Wider definitions of environmental crime extend the scope of analysis to consider harms associated with legal activities such as clear-felling of old-growth forests and the negative ecological consequences of new technologies such as use of genetically modified organisms in agriculture (e.g., reduction of biodiversity through extensive planting of GMO corn) (see, e.g., Walters 2011). Recent work has considered the criminological aspects of climate change (see White 2012), from the point of view of human contributions to global warming

(e.g., carbon emissions from coal-fired power plants) and the criminality associated with the aftermath of natural disasters (e.g., incidents of theft and rape in the wake of Hurricane Katrina in New Orleans).

Differences Within Green Criminology

There is no green criminology *theory* as such. Rather, as observed by South (1998), there is what can loosely be described as a green "perspective." Elements of this perspective generally include things such as a concern with specifically environmental issues, social justice, ecological consciousness, the destructive nature of global capitalism, the role of the nation-state (and regional and global regulatory bodies), and inequality and discrimination as these relate to class, gender, race, and nonhuman animals. The green criminology perspective, therefore, tends to begin with a strong sensitivity toward crimes of the powerful and to be infused with issues pertaining to power, justice, inequality, and democracy.

Green criminology has emerged in the last 20 years as a distinctive area of research, scholarship, and intervention. It is distinctive in the sense that it has directed much greater attention to environmental crime and harm than mainstream criminology and has heightened awareness of emergent issues such as the problems arising from disposal of electronic waste (e-waste) and the social and ecological injustices linked to the corporate colonization of nature (including biopiracy and imposition of GMO crops in developing countries). Within the spectrum of ideas and activities associated with green criminology, there are nonetheless several different kinds of analytical framework.

While the link between and among green criminologists is the focus on environmental issues, important theoretical and political differences have become more apparent over time. For example, some argue that green criminology must necessarily be anticapitalist and exhibit a broad radical orientation (Lynch and Stretesky 2003). Others, however, construe the task as one of conservation and natural resource management, within the definitional limits of existing laws (Herbig and Joubert 2006; Gibbs et al. 2010b). Still others promote the idea that the direction of research should be global and ecological and that new concepts need to be developed that will better capture the nature and dynamics of environmental harms in the twenty-first century (White 2011).

Typically there are important differences within green criminology around issues pertaining to the distinction between "harm" and "crime." These differences do not stem solely from disputes over the legal/illegal divide however. There are also profound disagreements with regard to victimization and varying conceptions of justice. For instance, there may be differences *within* a particular area of work, such as debates over "animal rights" versus "animal welfare" in the case of concerns about species justice (Francione 2010). There are also disagreements in terms of priorities, values, and decision-making *between* particular areas of green criminology (Beirne 2011). This is evident, for example, in debates over multiple land-use areas. This kind of dispute can involve those who argue that human interests should come first (from the perspective of environmental justice), or that specific ecological niches be protected (from the perspective of ecological justice), even if some animals have to be killed or removed from a specific geographical location. From the point of view of species justice, however, big questions can be asked regarding the intrinsic rights of animals and the duty of humans to provide care and protection for nonhuman species.

The hallmark of green criminology, regardless of diversity of opinion and the plurality of views, is that proponents argue that criminology ought to take seriously environmental crimes, and in doing so to rethink how it does what it does, and how it might conceptualize the relevant issues. It is interesting in this respect that a number of prominent criminologists are now utilizing their expertise from mainstream areas of criminology (e.g., situational crime prevention, general

strain theory) to study specifically environmental issues such as illegal trade in elephant tusks and social problems arising from climate change (Agnew 2012; Mesko et al. 2010; Lemieux and Clarke 2009). Green criminology is not only expanding in its own right but simultaneously there is a greening of criminology more generally.

Differences within green criminology are not only apparent at the level of theoretical focus and orientation. They are also manifest when it comes to responding to environmental crime or harm. From a critical green criminology view, for example, environmental harm is related to exploitation of both environments and humans by those who control the means of production. Analysis of global capitalism provides answers to questions such as why it is that human societies simultaneously respect and protect certain creatures (especially animal companions such as dogs and cats) while allowing and even condoning the dreadful treatment of others (as in the case of factory farming of battery hens to produce eggs) (Beirne 2009). It also allows us to better understand why it is that we strive to preserve some environments (via creation of national parks) while at the same time ensuring the devastation of particular ecosystems (such as clear-felling of old-growth forests).

Environmental harm takes place within the overarching context of a distinct global political economy. Most writers within the green criminology perspective concentrate on exposing specific types of criminal or harmful environmental actions or omissions. In doing so they have provided detailed descriptions and analyses of phenomena such as the illegal trade of animals, illegal logging, dumping of toxic waste, air pollution, and threats to biodiversity. In many cases, the corpus of work identified within this field has highlighted issues pertaining to social inequality, speciesism, ecological and environmental injustice, and crimes of the powerful. What is less common, however, are examples of study that locate these harms, crimes, injustices, and corrupt practices within the context of an explicit theoretical understanding of the state or economic relations. In other words, it is rare to find a sustained political economy of environmental harm.

Yet, analysis of broad trends indicates that it is systemic imperatives and historical transformations associated with global capitalism that, in today's world, ultimately shape what it is that individuals do with their lives and their environments. Even a cursory examination of dominant world political economic trends reveals the close link between capitalism as a system and environmental degradation and transformation. The sphere of production is dominated by the production of commodities, the advance of technology and biotechnologies, and the exploitation of labor (particularly in so called Third World countries) in the service of mass production of goods and services that, in turn, demand a high turnover rate. Extensive and intensive forms of consumption are essential to the realization of surplus value – that is, profit depends upon a critical mass of buyers purchasing the mass-produced commodities. The link between production and consumption is found in the form of specific kinds of distribution processes (e.g., transportation of goods and services, retail outlets, storage, roads, railways, bridges, and ships) and exchange mechanisms (e.g., finance capital, credit availability) that sustain and contribute to extensive use of natural and human resources. Economic efficiency is measured in how quickly and cheaply commodities can be produced, channeled to markets, and consumed. It is a process that is inherently exploitive of both humans and nature.

In essence, the competition and the waste associated with the capitalist mode of production have a huge impact on the wider environment, on humans and on nonhuman animals (e.g., in the form of pollution and toxicity levels in air, water, and land). These same processes pose major threats to biodiversity and the shrinking of the number of plant and animal species generally. This is related both to the legal and illegal trade in species, as well as to mass industrial production and extensive use of genetically modified organism (GMO) technologies.

Differences in opinion over the nature of global political economy, and over the tactics and strategies most likely to bring about desired social and ecological transformations, manifest in different approaches to how responses to environmental harm are construed (White 2008). One approach is to chart up existing environmental legislation and provide a sustained socio-legal analysis of specific breaches of law, the role of environmental law enforcement agencies, and the difficulties and opportunities of using criminal law against environmental offenders. Another approach places emphasis on social regulation as the key mechanism to prevent and curtail environmental harm, including attempts to reform existing systems of production and consumption through a constellation of measures and by bringing nongovernment and community groups directly into the regulatory process. A third approach presses the need for transnational activism, with an emphasis on fundamental social change. What counts is engagement in strategies that will challenge dominant authority structures and those modes of production that are linked to environmental degradation and destruction, negative transformations of nature, species decline, and threats to biodiversity. Social movements are seen to be vital in dealing with instances of gross environmental harm.

By its very nature, the development of green criminology as a field of sustained research and scholarship, will incorporate many different approaches and strategic emphases. For some, the point of academic concern and practical application will be to reform aspects of the present system. Critical analysis, in this context, will consist of thinking of ways to improve existing methods of environmental regulation and perhaps to seek better ways to define and legally entrench the notion of environmental crime. For others, the issues raised above are inextricably linked to the project of social transformation. From this perspective, analysis ought to focus on the strategic location and activities of transnational capital, as supported by hegemonic nation-states on a world scale, and it ought to deal with systemic hierarchical inequalities. Such analysis opens the door to identifying the strategic sites for resistance, contestation, and struggle on the part of those fighting for social justice, ecological justice, and animal rights.

There are major political divisions within the broad spectrum of green criminological work (and indeed within green political movements), and these have major implications for whether action will be taken in collaboration with capitalist institutions and state authorities, or whether it will be directed toward radically challenging these institutions and authorities. Similarly, there are significant tensions between ecological justice and species justice approaches, as indicated in the following observation:

> The [green environmentalists] rarely champion the sites of their concerns with rights talk, whereas for [animal rights advocates] their very focus is the criterion for moral standing and holding of rights. This crucial deep-seated difference is already present in green criminology in environmentalist notions such as 'fisheries' and 'harvests' and 'conservation', all of which are the stuff and fodder of animal welfare and sustainability but mostly anathema to animal rights. (Beirne 2011: 354)

To put it differently, some green criminologists view nature instrumentally, and harm is viewed through the lens of legality; others view the exploitation of nature, particularly in relation to animals, as intrinsically bad and harmful. How or if this "moral fissure" can be overcome is of major interest to many currently working within the broad area of green criminology.

Conclusion

Green criminology has many different substantive contributions and theoretical dimensions. Debates will continue over how best to define concepts such as harm, crime, and victim; over the moral calculus that weighs up human, ecosystem, and animals interests and rights; and over which interventions will achieve what kinds of intended and unintended outcomes. Dialogue around these issues will ensure lively and healthy deliberations over environmental matters now and into the future.

The development of green criminology has led to new interests, new conceptualizations, and new techniques of analysis. This is because there is increasing acknowledgement of environmental problems and the relevance of this to traditional criminological concerns with social injury and social regulation. There is also greater awareness of the interconnectedness of social and environmental issues. For example, matters relating to poverty, health, indigenous people's rights, exploitation of nonhuman nature, corporate business wrongdoing, state corruption, and so on are seen in many instances to be inseparable. As well, there is recognition of the need for multidisciplinary approaches to the study of environmental harm, involving cooperation between different "experts," including those with traditional and experiential knowledge associated with culture and livelihood (such as indigenous peoples and farmers and fishers), as well as sensitivity to ideas and research generated in intellectual domains such as law, police studies, political science, international relations, zoology, biology, philosophy, sociology, and chemistry.

These kinds of observations and interrelationships are forcing a rethink of the social and natural universe and a reconceptualization of the relationship between humans and nature in ways that accord greater weight to the nonhuman when it comes to assessing issues such as environmental harm. In practical terms, this translates into new and overlapping domains of consideration within green criminology itself: hence, the concern with transgressions against humans, environments, and animals.

Related Entries

- ▶ Crimes Against Animal Life
- ▶ Crimes of Globalization
- ▶ Ecoterrorism
- ▶ Environmental and Human Rights
- ▶ Environmental Regulation and Law Enforcement
- ▶ History of Green Criminology
- ▶ Organized Crime and the Environment
- ▶ State-Corporate Crime

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Group Characteristics and General Strain Theory

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Overview

Although general strain theory was developed to explain differences in offending across individuals (Agnew 1985, 2006), recent scholarly efforts suggest that the theory offers significant insight into group differences in offending. These efforts suggest that group differences in exposure to strain, emotional reactions to strain, and access to resources for dealing with strain and negative emotions contribute to different rates of offending across various groups. In applying this argument to sex differences in offending, the theoretical emphasis has been on how patriarchal structures inform gender socialization and gendered roles, which ultimately shape stress exposure, emotional and behavioral responses to stress, and the efficacy of legitimate coping resources for dealing with strain (Broidy and Agnew 1997). Explications of race differences in offending emphasize the role of additional structural arrangements and race discrimination in shaping the relationship between strain and offending (Kaufman et al. 2008). Cross-national research guided by general strain theory has been somewhat sparse, but explanations for research findings on samples of non-United States residents have emphasized that cultural values shape the strain process in ways that may contribute to understanding differences in offending cross-nationally. A particular strength of general strain theory for understanding group differences in offending is that it allows for consideration of how structural arrangements and cultural values coalesce to create group variations in crime and delinquency. An important direction for future research is to consider the ways in which the structural arrangements emphasized in the race literature and cross-national studies coalesce with the cultural beliefs about gender at the heart of the literature on sex differences to provide insight into variations in offending across groups and individuals situated at various junctures in gender-race-class hierarchies and race-gender-nationality locations.

Introduction

General strain theory is among the most prominent individual-level explanations of offending (Agnew 1985, 2006). The theory posits that strain leads to negative emotions – including anger, frustration, and depression – that promote offending when resources for legitimate coping are limited. Although the theory was developed to explain differences in offending across individuals, recent scholarly efforts indicate that the theory also offers significant insight into group differences in offending. Generally, theoretical and empirical efforts suggest that group differences in offending can be attributed in part to structural and cultural forces that shape

group differences in exposure to strain, emotional reactions to strain, and access to resources for dealing with strain and negative emotions. This broad argument has been applied most commonly to understanding differences in offending across sex, race, and neighborhood groups but likely applies equally well to societies and to groups situated at various junctures at the intersections of race-gender-class and race-gender-nationality.

Sex Differences

A gendered extension of general strain theory offers that the theory can explain why males are more likely to engage in illegal behaviors than are females, positing that the strains most frequently experienced by females and males, emotional and behavioral reactions to strain, and the availability of legitimate coping resources are shaped by gendered roles and gender socialization (Broidy and Agnew 1997). The first hypothesis in this gendered perspective centers on sex differences in the types of strains most often experienced by females and males.

One of the crime-producing strains emphasized by general strain theory is failure to achieve positively valued goals. Drawing on gender research, Broidy and Agnew (1997) note that gender socialization emphasizes different goals for females and males. Females in patriarchal society traditionally are socialized to be concerned with maintaining relationships, finding meaning in life, and how people are treated in interactions; by contrast, males are taught to focus on economic success, personal achievement, and outcomes of interactions. As a result, females and males are likely to experience different types of goal-related strains. Relational strains – such as conflict in close relationships, network events, and suicide attempts of loved ones – align with feminine concerns, whereas, agentic strains – including economic failure, academic failure, mistreatment by others, and criminal victimization – are linked with masculine concerns. Consistent with these gendered concerns, adults often occupy gendered roles that require more emotion work and caretaking from females and emphasize the primacy of economic responsibilities for males (e.g., Kessler and McLeod 1984). Like gender socialization, the gendering of social roles in patriarchal society informs the types of strains – relational and agentic – to which males and females are most exposed and those they are most prone to experience as stressful (e.g., Kessler and McLeod 1984).

Broidy and Agnew (1997) propose that the differentiation of relational and agentic strains is pertinent for understanding sex differences in offending because agentic strains are more likely than relational strains to promote crime. For instance, criminal victimization and mistreatment may be particularly conducive to violent crime; failure to achieve economic goals can provoke property crime. Relational strains are less likely to encourage illegal behavior because such behavior can threaten social relationships or harm others.

Although some empirical evidence documents that females report more exposure to relational strains and males report more agentic strains (e.g., Kessler and McLeod 1984; De Coster 2005), there is little evidence that agentic strains are more criminogenic than relational strains (see Agnew 2006). This lack of evidence can be attributed to the fact that empirical assessments of general strain theory most often use composite scales of strain that do not separate relational and agentic strains. Studies that differential between types of strain typically include measures of either relational *or* agentic strains or include measures of both but do not examine which is more criminogenic.

The second hypothesis offered in Broidy and Agnew's (1997) gendered perspective proposes that emotional reactions to strain are shaped by gender socialization. Agnew (1985) has given primacy to the negative emotion of anger, positing that anger is the emotion most likely to lead to offending because it energizes individuals for action and leads to a desire for retaliation. Given that males and females are equally likely to respond to strain with anger, Broidy and Agnew (1997) emphasize that understanding sex differences in offending requires consideration of qualitative distinctions in the experience of anger among males and females. Specifically,

they propose that female anger is more likely than male anger to be accompanied by depression, anxiety, and sadness because females are socialized to view anger as inappropriate and also may worry that their anger may jeopardize valued social relationships.

This distinction in how males and females experience anger is relevant for understanding why males are more likely to offend than females, according to Broidy and Agnew (1997), because the depression that accompanies female anger may mitigate anger's impact on law violation. Although research demonstrates that female anger is more likely than male anger to be accompanied by depression and sadness, limited evidence suggests that depression actually exacerbates the impact of anger on offending (De Coster and Zito 2010). Since the feminine experience of anger – concurrently with depression – is more conducive to offending than the masculine experience, the key to understanding links between gender, emotions, and illegality in general strain theory may reside in gendered expressions of emotional responses to strain rather than in gendered experiences of emotions.

An emphasis on expressions of emotional responses to strain is consistent with a large body of work on emotional displays and with Broidy and Agnew's (1997) proposition that illegitimate responses to strain and negative emotions may be shaped by gender socialization, gendered roles, and cultural beliefs about gender and emotional displays in patriarchal society. Consistent with much prior theorizing, they note that femininity is the antithesis of crime and violence but that masculinity is consistent with and may even promote illegality. In addition, feminine roles are more likely to limit access to crime as a coping strategy than are masculine roles. As such, males with limited access to legitimate coping resources are likely to respond to strains and negative emotions with illegal behaviors; similarly situated females may respond with eating disorders, suicidal ideation, distress, or other mental health problems. Indeed, empirical evidence demonstrates gender distinctions in the expression of problems (e.g., Horwitz and White 1987; Kaufman 2009).

The final hypothesis in Broidy and Agnew's (1997) gendered perspective offers that males are more predisposed to illegality and have fewer legitimate coping resources. That is, males are more likely than females to engage in crime without thinking (predisposition) and are more likely to lack the social skills necessary for legitimate coping and the maintenance of socially supportive relationships. These differences are linked once again to the fact that gender socialization emphasizes the development of relational concerns for females and agentic concerns for males. The expectation is that legitimate coping resources, social support, and noncriminal predispositions – buffering factors – protect females to a greater degree than males from offending in the face of strain and negative emotions. Although research often supports the claim that females possess more coping and social support resources than males (Thoits 1995), these resources do not buffer the impact of either strain or negative emotions on offending more for females than for males (e.g., Morash and Moon 2007; Jennings et al. 2009). However, criminal predispositions – captured with measures of aggressiveness and low self control – exacerbate the impact of strain on illegal behaviors more for males than for females (e.g., Liu and Kaplan 2004; Cheung and Cheung 2010).

Overall, Broidy and Agnew (1997) propose that general strain theory can effectively explain why males engage in more law violation than do females. Their overarching framework emphasizes that males and females occupy gendered roles in society and are socialized to have concerns and goals that are consistent with traditional expectations for their gender. This shapes their experiences of strain, emotional reactions to strains, and their coping resources, social supports, and criminal predispositions. Empirical studies support the propositions that the types of strains to which males and females are exposed, emotional responses to strain, and expressions of negative emotions are gendered. However, current evidence does not support the claim that the gendering of strains and emotional responses to strain are relevant for understanding sex differences in illegal behaviors. Instead, sex

differences appear to emerge because males are more likely than females to *express* negative emotions illegally and because the effect of strain on offending is more likely to be exacerbated by criminal predispositions for males than for females.

Perhaps the greatest limitation of the empirical literature to date is the failure to differentiate sex from gender. That is, tests of the propositions specified by Broidy and Agnew (1997) typically have assumed that gender socialization is perfect, ignoring variability within groups of females and males with respect to how much traditional gender socialization and gendered expectations shape their goals, emotions, predispositions, and reactions to strain and negative emotions. Research that includes direct measures of the extent to which individuals embrace traditional definitions of gender would provide a more accurate assessment of Broidy and Agnew's (1997) hypotheses than what has been offered to date.

Race and Neighborhood Differences

Theory and research on race and offending in criminology most often emphasizes the broad structural forces that shape offending. Consistent with this, discussions of race and offending from a general strain perspective emphasize the role of discrimination and neighborhood disadvantage in the etiology of race patterns of offending.

Strain theorists highlight several mechanisms through which race discrimination can produce elevated rates of offending among Blacks in particular. Perhaps the most obvious argument is that discrimination is a form of strain – failure to achieve the valued goal of justice or presentation of a negatively valued stimulus – that produces negative emotions and criminal coping (see Kaufman et al. 2008). Indeed, Agnew (2001) defines race discrimination to be among the strains most likely to produce crime because it is likely to be seen as unjust and is high in centrality/magnitude because it threatens core values and identities. Consistent with this, research demonstrates a link between race discrimination and offending among Blacks that is mediated at least partially by anger and depression (Simons et al. 2003).

Race discrimination can also influence race patterns of offending by situating Blacks in neighborhoods where strains proliferate, they are exposed to angered/frustrated individuals, and access to legitimate coping resources is limited (Kaufman et al. 2008). Much research demonstrates that the racial segregation of disadvantaged urban neighborhoods arises in part from economic constraints (often produced by discriminatory practices in the labor market and discriminatory practices in housing markets). Given this, Agnew's (1999) general strain theory of neighborhood crime rates provides important insights into elevated rates of crime among Blacks, who often are concentrated in the most disadvantaged neighborhoods.

One mechanism through which disadvantaged neighborhoods create elevated crime rates, according to general strain theory, is through the generation of strain (Agnew 1999). Consistent with this, research shows that residents of disadvantaged areas are more likely than those in more advantaged areas to experience a wide array of strains, including harassment and threats, criminal victimization, and witnessing violence (e.g., Warner and Fowler 2003; Kaufman 2005). Importantly, studies demonstrate that the disproportionately high offending rates among Blacks can be attributed partially to their greater exposure to major events, such as criminal victimization and witnessing serious violence (Eitle and Turner 2003).

The concentration in disadvantaged areas of individuals who experience a wide array of strains translates into a high concentration of angered/frustrated individuals in these areas, which increases the chances of interacting with angry/frustrated people in what can be thought of as a "charged environment" (Bernard 1990; Agnew 1999). This, of course, is an additional source of crime-provoking strain for residents in disadvantaged neighborhoods. When confronted with this and other forms of strain generated by disadvantage and race, individuals are likely to blame their situation and their angry feelings on

external factors, which increases the chances of illegitimate coping (Bernard 1990; Agnew 1999).

The likelihood of illegitimate coping is also increased by the fact that disadvantaged neighborhoods provide individuals and groups with few legitimate coping resources. For instance, retaliatory crime is a means through which groups can deal with victimization of self or loved ones, particularly when models of effective coping and access to police, court, and psychiatric resources are largely unavailable. Retaliatory crime, in fact, may become a necessity in these areas to help avoid the strains of future victimization and identity threats (Mullins et al. 2004).

In sum, general strain theory offers that elevated offending rates among Blacks may be explained both directly and indirectly by discrimination experiences. Race discrimination has been shown to be a source of strain that leads to negative emotions and offending (Simons et al. 2003), but it impacts crime also through the role it plays in concentrating minorities in disadvantaged urban neighborhoods. These neighborhoods are characterized by high rates of offending in part because they expose residents to strains – such as victimization of self and loved ones, mistreatment/harassment, and hostile interactions with angry people – that are particularly criminogenic. Limited access to legitimate coping resources in disadvantaged areas only exacerbates the criminogenic nature of these strains.

Although research supports the argument that strains emanating from disadvantaged neighborhoods help mediate the impacts of race and neighborhood disadvantage on offending (e.g., Kaufman 2005), much less emphasis has been placed on assessing whether legitimate coping resources interact with strain in the production of race and neighborhood crime patterns. Perhaps this is because some studies find that race differences in levels of exposure to strain are relevant for understanding racial patterns of offending, but differences in the likelihood of responding to strain illegally are negligible in explicating these patterns (Eitle and Turner 2003). This might imply that differential access to coping resources is not of primary importance for understanding race and neighborhood patterns of offending. Given that research on neighborhoods, race, and strains is relatively sparse, however, the role of coping resources – particularly at the neighborhood level – requires further exploration.

National/Societal Differences

Although cross-national research from a general strain perspective has been relatively sparse (see Agnew 2006), there is sufficient evidence to suggest that the theory has meaningful insights to offer for understanding variability in rates of offending across societies or nations. For instance, cross-national comparative studies show that nations with high rates of economic inequality – a structural source of strain – have higher homicide rates than nations characterized by less inequality (e.g., Messner 1989; Pratt and Godsey 2003). Importantly, the impact of economic inequality on homicide rates is tempered by national-level social support resources (see Pratt and Godsey 2003). This suggests that cultural values – the value of being supportive of citizens – may significantly shape the extent to which strain impacts offending across nations.

This suggestion bears out most prominently in studies of general strain theory on non-United States samples, which often invoke cultural arguments to explain why certain strains may be more or less criminogenic in other nations than in the United States. Research findings support the applicability of general strain theory in samples of Chinese, Philippine, South Korean, Israeli, and Ukrainian samples (Landau 1997; Maxwell 2001; Bao et al. 2004; Morash and Moon 2007; Botchkovar et al. 2009; Cheung and Cheung 2010). However, the conclusions of these studies generally suggest that cultural values shape the types of strains that may be most relevant for understanding offending within various nations. For instance, mistreatment by teachers appears to be a particularly important source of crime-producing strain among South Korean adolescents. Morash and Moon (2007) propose that the importance of this strain may be rooted in

both South Korean cultural norms that emphasize emotional and physical punishment as achievement motivators and Confucian values that emphasize academic achievement as a prerequisite for success in social and economic realms.

Studies that fail to replicate links between specific strains and offending that have been established in American samples most often conclude that cultural differentiation provides the key to understanding why some strains are relevant in some nations and not others. For example, the strain of coercive parenting leads to delinquency among American adolescents but not among Chinese adolescents (compare Hay 2003 and Cheung and Cheung 2010). An explanation offered for this difference is that coercive parenting is consistent with the collectivist ideology of China, which encourages the subordination of the individual to family and community. In American society, where individualism is lauded, coercive parenting is likely to be experienced as a stressful infringement on individuality, thereby resulting in delinquent responses (Cheung and Cheung 2010). Youths from the Philippines respond to aggression between caretakers with delinquency but are not vulnerable to delinquency when faced with physical aggression by their caretakers. Maxwell (2001) explains this by offering that the general cultural acceptance of physical punishment in the Philippines may buffer the relationship between caretaker aggression and delinquency often reported in samples of American youths (e.g., Smith and Thornberry 1995). Finally, Botchkovar and colleagues (2009) conclude their study of general strain theory in Ukrainian, Greek, and Russian samples by noting that their general strain scale may have proven ineffective in the prediction of offending decisions among their Greek and Russian samples because it failed to consider that cultural values may shape the types of strains that are most relevant for understanding criminal intentions (Botchkovar et al. 2009).

Generally, these studies suggest that general strain theory has much to offer for understanding rates of offending across nations. To date, the majority of studies have provided ad hoc cultural explanations for why various strains are particularly relevant or irrelevant for explicating offending in different nations. Research on the applicability of general strain theory across societies would be strengthened by a theoretical framework that takes into consideration structural and cultural variations between nations and derives hypotheses about how these variations might shape the types of strains, emotions, and coping resources most relevant for understanding variations in offending across societies.

Conclusions

Despite the fact that general strain theory was developed to explain individual offending, recent scholarship demonstrates the theory's relevance for illuminating sex, race, neighborhood, and societal rates of offending. Explanations for sex differences in offending have focused primarily on gender socialization and gendered roles rooted in patriarchal structural arrangements; race differences have been discussed as emanating from neighborhood structural arrangements that are shaped by race discrimination and economic factors; and societal-level arguments have focused on economic structures and cultural values. A strength of general strain theory for understanding group differences in offending is in its ability to consider how structural arrangements and cultural beliefs coalesce to predict offending rates across groups. Given the emphasis on intersectionalities and crime in the broader literature on offending, an important next step for general strain theorists may be to further unite some of the cultural and structural arguments that have been offered in the literature to help explicate patterns of offending across race-sex-class or race-sex-nation groups.

One avenue for pursuing this goal would be to consider that some of the structural factors discussed as relevant for understanding race and neighborhood patterns of offending may shape the gendered roles and socialization that Broidy and Agnew (1997) propose shape strains, emotions, coping resources, and offending across sex groups. Intersectionality theorists propose,

for instance, that race discrimination and economic disadvantage have made it such that the feminine roles and ideals lauded in patriarchal society have never applied to Black girls and women. As such, Black families socialize their daughters in ways that differ from how White families socialize their daughters. This means that Black females are less likely than their White counterparts to embrace the cultural form of femininity and feminine roles highlighted in Broidy and Agnew's (1997) discussion of sex and crime. This insight may prove relevant for understanding how race discrimination, community disadvantage, and gender socialization operate simultaneously in a general strain theory framework to help explicate patterns of offending across gender-race-class. One can also envision consideration of how variability across nations in cultural beliefs about gender may shape the strain process differently for males and females in different nations, thereby providing insight into variability in the size of the sex-gap in crime across nations.

Related Entries

► General Strain Theory

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Group Crime

► Co-offending and Offender Attributes

Group-Based Trajectory Modeling

► Group-Based Trajectory Models

Group-Based Trajectory Models

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Synonyms

Group-based trajectory modeling; Latent class growth modeling; Latent trajectory modeling; Semi-parametric group-based method

Overview

Group-based trajectory modeling is a powerful and versatile tool that has been extensively used to study crime over the life course. The method was part of a methodological response to the criminal careers debate but has since greatly expanded in its applications. The current state of the art of group-based trajectory modeling is complex, but worth becoming familiar with so as to recognize the variety of uses to which this tool can be applied. The method has attracted unusually robust criticism for a statistical tool. Researchers should aim to use it and other statistical tools as effectively as possible.

Introduction

Criminologists have long been interested in studying crime as a longitudinal phenomenon. Recent interest stems from vigorous debate surrounding the interpretation of the fact that criminal behavior bears a robust curvilinear relationship with age, quickly ramping up to a peak in the late teen years, and declining thereafter. Part of the criminal careers debate of the 1980s concerned the interpretation of this aggregate relationship. The peak around age 17 may reflect patterns of offending among all offenders, or it may reflect an influx of offenders with relatively short criminal careers around their teen years. In short, the question is whether individual criminal careers resemble the aggregate age-crime curve. This is one of the many questions that group-based trajectory modeling – a general statistical tool for uncovering distinct longitudinal patterns in panel data – can answer.

Group-based trajectory modeling can best be understood in contrast to its alternatives. The most common alternative to group-based trajectory modeling is hierarchical linear modeling, also known as general growth curve modeling. This alternative identifies the average trend over time and quantifies the degree of variation around this average. It is relatively parsimonious because it assumes a specific error distribution around the overall average, typically Gaussian. Group-based trajectory modeling, in contrast, makes no assumptions about the distribution of parameters. Rather, it assumes that the distribution can be approximated by a finite number of support points. Group-based trajectory modeling is related to hierarchical linear modeling in the same way a histogram is

related to mean and standard deviation. The mean and standard deviation quickly provide information about the distribution of a variable, but a histogram can provide more detailed information on the shape of the distribution. Both are approximations of a more complex reality. Given a specified number of groups, group-based trajectory modeling attempts to discover a set of longitudinal paths that best represents the raw data. Group-based trajectory modeling is a powerful tool for uncovering distinct longitudinal paths, particularly when significant portions of the population follow a path that is very different from the overall average.

Group-based trajectory modeling is a versatile tool, not limited to revealing distinct longitudinal paths. Once the best group-based trajectory model has been chosen, the researcher may proceed by: (1) describing characteristics of the groups (i.e., characteristics of their growth patterns and covariates); (2) predicting group membership based on preexisting characteristics; (3) evaluating the group-specific effects of time-varying covariates and testing whether such effects vary by group; (4) using groups as independent variables to predict later outcomes; and (5) incorporating measures of group membership as control variables in regression models or propensity score matching protocols. Attesting to its utility and the ease of interpreting its results, although group-based trajectory modeling was developed to answer specific questions posed by the criminal careers model (Nagin and Land 1993), the method has been used to model trajectories of abdominal pain symptoms in pediatric patients (Mulvaney et al. 2006), fungal growth on the forest floor (Koide et al. 2007), and of course, extensive use in the study of longitudinal patterns of criminal activity (Piquero 2008).

This entry will proceed by first describing some of the theoretical background for the emergence of group-based trajectory modeling. The bulk of the entry will be devoted to describing the state of the art of the method including the basic components of the model, how to choose the number of groups, and several model extensions. Next, it will cover a number of controversies surrounding the method as well as some possibilities for further development.

Background

A central fact of criminology is that a small portion of the population commits a large share of crime. Goring (1913) found that just 3.4 % of the population accounted for about half of all convictions in England. This finding was repeated in a Philadelphia birth cohort: 5 % of the cohort accounted for over half of all police contacts (Wolfgang et al. 1972). This rediscovery of the concentration of offending occurred around the same time that the rehabilitative focus of punishment gave way to rationales of deterrence and incapacitation, creating demand for theoretical accounts and statistical tools that identified high-rate or "chronic" offenders as a distinct group

Alfred Blumstein and colleagues (1986) promoted a criminal careers framework that could be used to describe the volume of crime committed over an individual lifespan, including age of onset, rate of offending, age of termination (desistance), and career length. The criminal careers paradigm suggested that each of these parameters warranted investigation and, possibly, distinct theoretical explanations. It also provided a way to distinguish "career criminals" from others, through their long criminal career length. In opposition to this perspective, Travis Hirschi and Michael Gottfredson (1983) claimed that the criminal careers model did not provide any special insight into age and crime. They claimed the age-crime curve was invariant across social context and no sociological variable was able to account for it. They deemed longitudinal research a waste of resources since the correlates of crime are consistent across age. These two positions formed the basis for the criminal careers debate.

These developments set the stage for a number of theoretical and statistical advances in the 1990s. On the theoretical side, Robert Sampson and John Laub (1993) drew from Glen Elder's

life-course framework (1994) to develop an age-graded theory of informal social control. The life-course framework presents a way of thinking about individual development. Anything that can be measured once can be measured repeatedly, and stringing these measurements together over time creates a *trajectory*. Embedded within, and providing meaning to these trajectories are life *transitions*, which, if they redirect the trajectory onto another path, are called *turning points*. In contrast to Sampson and Laub's age-graded theory, Moffitt's (1993) typological theory of antisocial behavior posited that the age-crime curve is made up of two groups with distinct trajectories of antisocial behavior and distinct etiologies.

The criminal careers debate engendered several methodological advances as well. Rowe and colleagues (1990) used Rasch modeling to arbitrate between Hirschi and Gottfredson's parsimonious latent trait theory and the contention of the criminal careers model that each component of the criminal career may require distinct theoretical explanation. And in 1993, Nagin and Land introduced the group-based trajectory model to address several theoretical puzzles posed by the criminal careers model. This paper modeled longitudinal patterns of individual offending using a finite mixture model of time-varying rates of offending. This established the groundwork for a long line of statistical advances that have profoundly affected the field of criminology.

State of the Art

Overview

Any phenomenon or characteristic that evolves over age or time in an identifiable population may be an appropriate candidate for group-based trajectory modeling. This tool has the potential to draw out common patterns and help the researcher to make sense of the data. Group-based trajectory modeling produces a parsimonious summary of a complicated distribution of longitudinal developmental trajectories using a finite set of developmental trajectories and their estimated population prevalence. In contrast, hierarchical linear modeling and latent curve analysis summarize this complicated distribution even more parsimoniously, with a single developmental trajectory representing the average, and some characterization of the nature of variation around this average, obtained by imposing fairly strict distributional assumptions.

As opposed to these strict distributional assumptions, group-based trajectory modeling is agnostic on the nature of the distribution of growth parameters. It allows for the possibility for meaningful subgroups within the population that follow distinct developmental paths. The nature and definition of these "subgroups" has fueled a considerable amount of debate. It should be recognized that these groups may only be identified *after* the developmental paths that define them have already unfolded. That a distinct group is identified by the model does not speak to the issue of prospective identification of the group. Groups must be understood, like simple regression parameters, as useful simplifications and summaries of a complex reality.

Group-based trajectory models can be put to a variety of purposes. Once groups are obtained, description of each group's developmental paths and antecedents can be very useful. For example, if high-rate stable, medium-rate decreasing, and low-rate offending groups are identified by a particular model, the proportion of each group possessing certain risk variables can provide information of etiological significance. More generally, group membership may be treated as a dependent variable, something to be predicted as accurately as possible. Covariates may be added to the model to assess group-specific effects of certain conditions or life events on the developmental outcome of interest as well as whether these effects statistically differ between groups. Group membership can also be treated as an independent variable in a number of different ways. Variables representing group membership can be used in regression models to parsimoniously control for complicated developmental histories. Groups may also be used as the basis

for matching or incorporated into a propensity score matching framework. These and other uses will be described below after first presenting data requirements, parameterization, and practical issues to address in choosing the "correct" model.

Practical Requirements

The group-based trajectory model requires panel data. There must be repeated measurements of a particular dependent variable within some unit of analysis. The unit of analysis depends on the purposes of the researcher and availability of data. To give a sense of the range of questions this method can be applied to, all the following units of analysis would be appropriate and several have been used in published research: person (delinquent, police officer, and academic), residence, street segment, journal article, sports team, gang, prison, terrorist organization, state, country.

There are currently three pieces of software able to estimate group-based trajectory models: MPLUS, the PROC TRAJ add-on to SAS, and the traj add-on for Stata. Estimation specifics in this entry will refer to PROC TRAJ, the most complete implementation of the method. Using this software, panel data must be structured in wide format: one line for each unit of analysis, with repeated measures of the dependent variable, time, and time-varying covariates represented using distinct variable names.

There are three broad distributional categories permissible for the dependent variable in PROC TRAJ: logit, censored normal, and Poisson. The censored normal distribution is flexible enough to incorporate cases of upper censoring, lower censoring, both, and neither. And the assumptions of the Poisson model can be relaxed using a zero-inflated Poisson parameterization. Categorical dependent variables and other distributions not listed here are not supported in PROC TRAJ.

Balanced panel data is not required. Any unit with one or more observations will be used in estimating the final model. Generally, at least three repeated measures within each unit are preferred to estimate a stable and meaningful model. The independent variable can be represented in units of age, time (years/months/etc.), or other sequence. It is often desirable to create a meaningful zero value in the independent variable. For example, if estimating trajectories in young adulthood, age can be transformed so that zero represents age 18, and other ages are interpreted relative to age 18. This allows the estimated intercept of each group to quickly be interpreted as the predicted value at age 18. Centering the independent variable and scaling it down by dividing by 10 or 5 also helps the model to converge more readily.

It is worth thinking carefully about the scale of the independent variable, as transforming it can result in very different trajectory models. Consider, for example, the implications of a group-based trajectory model of marijuana use in adolescence with three types of age scales: untransformed age, age relative to the age of onset for marijuana use among those who ever reported using, and age relative to high school dropout among those who ever dropped out. The first scaling of age provides a model that characterizes longitudinal patterns of marijuana use in the population of interest. The second represents desistance/persistence patterns after initial use, and the third reveals marijuana use patterns relative to a potential turning point event.

Finally, it should be noted that the unit of time need not proceed in lock-step for each observation. For example, the model will estimate ideal group-based trajectories from age 14 to 22 even if one-third of the sample is observed only from ages 14 to 18, another third from 16 to 20, and the final third from 18 to 22. The final groups would have to be interpreted with great caution however, since they represent 8-year trajectories when no single individual is observed for more than 4 years.

Estimation

Equations used in this entry draw heavily from Nagin's (2005) detailed presentation in *Group-Based Modeling of Development*. Three subscripts will be used throughout: i refers to the unit of analysis, t to time or age, and j to group. Corresponding to these, N refers to the

number of units in the model, T to the number of time periods, and J to the total number of groups in a particular model. The general form of the data used for group-based trajectory models is a set of longitudinal observations for each unit i:

$$Y_i = \{y_{i1}, y_{i2}, \ldots, y_{iT}\}$$

The set of parameters to be estimated for groups 1 through J represents a growth polynomial with respect to the unit of time. The order of the polynomial is specified prior to estimating the model, and can vary across groups. In SAS's PROC TRAJ implementation of group-based trajectory modeling, the polynomial order of each group's growth curve can range from 0 to 5. Below, for the sake of example, I present a cubic growth curve for each group j.

$$f(y_{it}) = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3 + \varepsilon_{it}$$
$$\pi_1, \pi_2, \ldots, \pi_J$$

$f(y_{it})$ refers to a link function for the outcome of interest. This can either be the censored normal, Poisson, or logit link. In all cases, we are modeling a polynomial on age/time that defines the shape of the trajectory for each group 1 through J. Although the TRAJ procedure lists group membership percents (π_j) among its parameter estimates, it actually estimates $J - 1$ parameters (θ_j) that are used to produce these probabilities. While group membership percents are bounded between 0 and 100 and must sum to 100, theta parameters are completely unbounded. This is useful in estimating the likelihood function. The two sets of parameters are related as follows:

$$\pi_j = \frac{e^{\theta_j}}{\sum_{j=1}^{J} e^{\theta_j}}$$

Because J − 1 group membership percents define the remaining group membership percent, only J − 1 parameters have to be estimated, and θ_j is set to 0, so that it equals 1 when exponentiated. This part of the estimation procedure is the same no matter which type of dependent variable is used.

The goal of estimation is to obtain a set of parameters that maximize $P(Y_i)$, the probability of observing Y_i, the full set of individual developmental trajectories. The likelihood for each individual is obtained by summing the product of the estimated size of each group and the likelihood that the individual belongs to each group, J products for each individual. Estimates are obtained using maximum likelihood estimation with a quasi-Newton algorithm. As a by-product, if the assumptions of the model are sound, it benefits from known properties of maximum likelihood estimates.

Importantly, the model assumes conditional independence: conditional on membership in group j, deviations from the group-specific growth curve at time t is not correlated with deviations from the group-specific growth curve at time $t - 1$. In other words, conditioning on group membership, there is no serial correlation in the residuals. This is a stronger assumption than that made by standard growth curve models (CIA at the individual-level), but growth curve models also assume a multivariate distribution of parameters, which group-based models do not.

The three types of link functions entail additional parameters and modeling decisions. Censored normal models allow for censoring at either the upper or lower bounds and can also accommodate uncensored normal distributions. Lower and upper censoring limits must be provided to model this kind of distribution. If limits are set that are far outside the observed range of data, these limits do not figure heavily in the likelihood function and essentially the uncensored normal distribution is estimated. Otherwise, the model assumes the existence of a latent trait y^* that is observed only if the dependent variable is within the upper or lower censoring bounds. When y^* is outside the bounds, the observed value, y, is equal to the upper or lower bound. Additionally, censored normal models have the option of estimation of random intercepts and slopes, allowing one to estimate a hierarchical linear model with one group or growth mixture models with multiple groups. Other link functions do not provide this option in PROC TRAJ.

The logit distribution is appropriate for dichotomous outcomes such as arrest, conviction, incarceration, gang membership, high school dropout, etc. Similar to the censored normal distribution, the link function for the logistic distribution assumes the existence of a latent trait y* such that y = 1 if y* > 0 and y = 0 if y* ≤ 0. If left untransformed, the growth curves from the logistic model are in terms of y* which is the log odds that y = 1.

When the dependent variable is count data such as number of arrests, the Poisson distribution may be appropriate. This distribution requires that the dependent variable take only nonnegative integer values. This type of model was in fact the first presentation of group-based trajectory models because "lambda" in the criminal careers model corresponds directly to lambda in the Poisson model: the rate of offending. Nagin and Land (1993) added a parameter for intermittency that doubles as a way to account for more zero counts than expected from the Poisson distribution. This zero-inflated Poisson (ZIP) model breaks up the probability of a zero count into two components: the probability of a zero count because lambda actually equals zero, and the probability of a zero count by chance when lambda is greater than zero. There are several options for how to specify this model using the "iorder" command in PROC TRAJ. The simplest is to estimate a single parameter for zero inflation across all groups. This can be relaxed in two ways: by estimating group-specific zero-inflation parameters, and by estimating higher order polynomials for the zero-inflation function. Additionally, exposure time can be incorporated into the model to account for different intervals between waves or across units.

Further details on the likelihood functions for these three distributions can be found in Nagin (2005, pp. 28–36).

Choosing the Final Model

PROC TRAJ does not directly reveal the best number of groups. Rather, given a set of data, a model specification, a predetermined number of groups, and starting values (optional), it obtains parameter estimates. There is a danger that these estimates represent local solutions, particularly with very complicated models. The only way to guard against this is to try different sets of starting values to determine if a better solution is obtained. But even the best solution for a specified parameterization and number of groups may not be the best overall solution. A major part of finalizing a group-based trajectory model is choosing the number of groups, tied up with this is the choice of polynomial order and other characteristics of the model.

The model choice set consists of the set of models considered as candidates for the final model. Nagin (2005) recommends a hierarchical decision-making process to reduce the number of models in this set, since it is impossible to try every possibility. The first step is to choose the optimal number of groups. Holding constant other modeling options, vary only the number of groups and assess model adequacy to determine the optimal number of groups. In the second step, specifications for each group are altered until the best solution is obtained, holding constant the number of groups. For example, in Poisson models, should zero inflation be modeled, and if so, should it be general or group-specific and should it be constant or vary over time? The optimal number of groups with general zero inflation may be different from the optimal number of groups with group-specific zero inflation, so this decision point may need to be included in the model choice set at Step 1.

There are a variety of criteria for arbitrating between models to choose the best solution. The most commonly used criterion is the BIC score, based on the log likelihood. The model with the higher BIC score (less negative) is preferred. Given a set of models, the probability that model j is the "correct" model is given by:

$$\frac{e^{(BIC_j - BIC_{MAX})}}{\sum_{1}^{J} e^{(BIC_j - BIC_{MAX})}}$$

While this may seem to provide a clear guideline for choosing the right model, it is sometimes ignored or downplayed, particularly

when the optimal solution according to the BIC score is a very large number of groups. Other quantitative criteria can provide evidence of model adequacy as well.

After model estimation, the probability that each unit belongs to each group can be calculated using the likelihood function. These posterior probabilities are part of the PROC TRAJ output dataset. Each unit's maximum posterior probability is used to assign units to groups. The maximum certainty for group membership is 1, and the minimum is anything larger than $1/J$. The mean posterior probability of group assignment conditional on assignment to that group (AvePP) is indicative of how well that group was identified. Nagin (2005, p. 88) provides a rule of thumb that these average posterior probabilities should be above .7 for each group. However, there is no formal test using this measure that indicates whether a model should be rejected. The minimum group-specific average posterior probability can be compared across models to get a sense of better-performing models. Additionally, an overall average posterior probability can be obtained by averaging every unit's maximum posterior probability, equivalent to a weighted average of group-specific average posterior probabilities, and a rough correlate of entropy, estimated in MPLUS.

Second, combining group-specific average posterior probabilities and estimated group sizes, one can calculate group-specific odds of correct classification. This essentially compares the ratio of the odds of correctly classifying individuals into group j based on the AvePP value, to the odds of correctly classifying individuals into group *j* based solely on the estimated proportion of the sample that belongs in group *j*. It is an odds ratio:

$$OCC_j = \frac{AvePP_j/(1 - AvePP_j)}{\hat{\pi}_j/(1 - \hat{\pi}_j)}$$

where AvePPj is the group-specific average posterior probability. Nagin's (2005, pp. 89) rule of thumb is that each OCC should be above 5. Again, however, this is not a formal test, but useful for comparing fit across models.

Nagin also suggests that estimated group probabilities can be compared to the proportion of the sample assigned to the group. Models with more divergent figures are less preferred. No hard limit or even rule of thumb is suggested however, other than "reasonably close correspondence" (2005:89).

PROC TRAJ also has the capability to produce confidence intervals for group membership probabilities and group-specific trajectories. These can also be produced using traditional or parametric bootstrapping. In general, as these confidence intervals widen, models are less preferred.

Finally, solution $J + 1$ may be rejected because the additional group is not substantively different from any of the groups in the J group solution, for example, when one group is split into two parallel groups. Sometimes a solution is rejected because it identifies an additional group estimated to comprise only a very small fraction of the population, which has limited external validity.

Focusing exclusively on the BIC score can lead to models with little utility. For example, when using a very rich dataset with large N and large T, the upper limit on the number of groups may outstrip their empirical and/or theoretical utility. A more reasonable approach takes into account a variety of model diagnostics to choose the best solution. Unfortunately, there is no ironclad rule for any of these diagnostics. Even the BIC, which seems to offer some certainty to the model choice problem, is highly influenced by the model choice set, and can lead to models which seem to capitalize on random noise. In the end, professional judgment must be exercised in choosing the best model. Taking all diagnostics into consideration, the most defendable and useful model should be retained.

Post-Estimation

As noted in the previous section, after the model is estimated, for each individual and each group, a posterior probability of group membership is estimated. In addition, a categorical variable is created based on posterior probabilities that classifies each unit in a group based on the maximum posterior probability. These are useful

in many ways besides model diagnostics. First, they can be used to create group profiles. Second, they can be used as control variables in regression models. Finally, they can be incorporated into matching frameworks.

For each application, there are two options: classify and analyze vs. expected value methods. To illustrate, if we wish to determine the proportion of each group that are male, using the classify-analyze method, we would simply cross-tabulate the categorical group variable with the gender variable. The main shortcoming of the classify and analyze method is that it does not take into account uncertainty in group assignment. When average probability of group membership in a particular group is 75 %, for example, it does not seem advisable to take categorization into the group at face value. Using posterior probabilities takes this uncertainty into account. The expected value method requires a few extra steps to estimate the proportion male in each group. To estimate the proportion of group 1 that is male, calculate the mean for the "male" variable using posterior probabilities for group 1 as a weight. This is repeated for each group. Each person contributes to this group-specific mean proportional to the probability of membership in that group.

The same options are available when incorporating measurements of group membership into regression or matching models. One danger in this type of application, however, is that regardless of which method is chosen, estimation error in group classification is not taken into account. Failing to take this estimation error into account results in biased standard errors. This measurement error can be accounted for using bootstrapping methods.

Model Extensions

Since introducing the PROC TRAJ procedure (Jones et al. 2001), Nagin and colleagues have added a number of modifications and extensions to the model (Haviland et al. 2011; Haviland and Nagin 2005, 2007; Jones and Nagin 2007; Nagin 2005). The discussion here will focus on bootstrapping to obtain confidence intervals, testing equality of coefficients, trajectory covariates, and group membership predictors. Dual trajectory analysis, multitrajectory analysis and incorporating group-based trajectory modeling into matching protocols will be briefly touched upon as well, with reference to other sources for a full treatment.

We can place confidence intervals around any single parameter estimated via group-based trajectory modeling since standard errors are provided for every estimated parameter. However, certain values of interest are functions of multiple estimated parameters. Group membership probabilities are a nonlinear function of $J - 1$ theta parameters and the growth curves themselves are products of polynomials sometimes transformed through a link function or otherwise modified through extra parameters of the Poisson and censored normal specifications. There are several approaches that can be taken to address this problem and place confidence intervals around these estimates.

A typical approach to bootstrapping would create a large number (500, for example) of samples by resampling from the original dataset with replacement, and reestimate the trajectory model on each of the samples to generate a distribution of parameters, group membership proportions, and/or levels of each group's developmental trajectory to obtain a confidence interval free of distributional assumptions. While this approach is possible using PROC TRAJ, it can be very time intensive. Further, it's not clear that trajectory groups have consistent meaning across bootstrap samples.

Nagin (2005) suggests using parametric bootstrapping to obtain confidence intervals. Instead of resampling and reestimating the model, parametric bootstrapping simulates the exercise by using the means of the parameter estimates and the variance/covariance matrix. These are taken as values defining a multivariate normal distribution, for which a large number of draws are estimated, and then confidence intervals are obtained the same way they usually are, by appropriate percentile ranks. Because the multivariate normal distribution is well defined, taking even 10,000

replications is much easier than even 500 replications via traditional bootstrapping.

Jones and Nagin (2007) propose a third alternative for generating confidence intervals around growth curves. They introduced a "ci95m" option in PROC TRAJ that provides 95 % confidence intervals around growth curves using Taylor polynomial expansion to approximate the standard errors of combinations of parameters. These confidence intervals can be plotted using the "%trajplotnew" macro. Regardless of how confidence intervals are obtained, they are useful for establishing the precision of a group-based trajectory model. Distinct groups become less interesting if their confidence intervals overlap. Similarly, we change our assessment of a 5 % high-rate offending group if we learn that the confidence interval for the group's size ranges from 1 % to 20 % versus 4 % to 6 %.

Jones and Nagin (2007) also introduced an important macro add-on for PROC TRAJ that allows one to easily conduct Wald tests for equality of coefficients (%trajtest). This can be used to test equality of growth parameters across groups and has a number of important applications in combination with other extensions of PROC TRAJ described below.

The life-course paradigm organizes the study of human development around longitudinal trajectories, life transitions, and turning points. If a life transition shifts an individual's developmental trajectory onto a new path, it is a turning point. This suggests a counterfactual type of analysis, answering the question of what would have happened for individuals in situations which they did not experience. Group trajectories, because they represent a group of individuals that are similar with respect to their developmental path and related covariates, provide an important source of plausible counterfactuals to test for these kinds of effects. Group-specific trajectories can easily be generalized to accommodate m time-varying covariates (x_1 through x_m):

$$f(y_{it}) = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3 + \alpha_1^j x_{1it} + \alpha_2^j x_{2it} + \ldots + \alpha_m^j x_{mit} + \varepsilon_{it}$$

Trajectory covariates can test a wide range of hypotheses from life-course criminology. The specific interpretation of these covariates depends on how they are entered into the model. The simplest strategy is to enter a series of dummy variables reflecting being in a particular life state such as being married, in a gang, employed, etc. This results in group-specific estimates that are easy to interpret, but does not capture the dynamic element of turning points. It does allow for an easy test of whether the effects of that life state depend on group membership, using the %trajtest macro. It assumes constant effects over time/age and over years in the state. If marriage is introduced in this manner, it imposes an assumption that the effect of marriage depends neither on when a person gets married nor length of marriage. A more flexible method consistent with the life-course paradigm would enter a dummy variable for being in a particular state, age interacted with this dummy variable, as well as a counter variable for years in the state. This would allow the effect of marriage to vary according to when one gets married and to increase or decay depending on how long one stays married.

While posterior probabilities and group membership categories can be used to create group risk profiles, these profiles are of limited use because of error estimates biased due to lack of incorporation of group estimation error. But these risk variables can be incorporated directly into trajectory models, allowing all parameters to be estimated at the same time and with correct standard errors.

The trajectory model changes in several important ways when risk variables are incorporated into it. The shape of the trajectories in the optimal solution may change, and posterior probabilities depend not only on levels of the dependent variable but also on risk variables. Group membership probabilities are estimated conditional on a set of risk variables (x_1 through x_r, for r risk variables). Multiple thetas are estimated for each group. These are used to generate predicted group probabilities for specified sets of risk variables.

$$\theta_j = \sum_{r=1}^{R} \theta_{jr} x_r = \theta_{j0} + \theta_{j1} x_1 + \theta_{j2} x_2 + \ldots + \theta_{jR} x_R$$

With risk variables, the intercept theta estimates can be used to calculate group membership probabilities when all risk variables are equal to zero. If all risk variables are centered at their means before estimating the trajectory model, then the intercepts would represent theta estimates at the average. The differential impact of risk variables on group membership probabilities can be tested using the %trajtest macro, and confidence intervals around theta estimates or group membership probabilities for specific sets of risk variables can be calculated using bootstrapping.

When more than one dependent variable is of interest, either because of comorbidity of developmental trajectories, heterotypic continuity or a developmental predictor of a developmental outcome, a couple options are available in PROC TRAJ. Dual trajectory analysis (Jones and Nagin 2007; Nagin 2005, Chap. 8) is a very flexible extension of standard trajectory analysis. The basic requirement is that two dependent variables are meaningfully linked via the unit of analysis. Each unit should have repeated observations for both dependent variables. The dependent variables need not be distributed the same way, need not be measured at the same time nor have the same number of measurements, and the estimated number of groups need not be identical. The two dependent variables are linked through a shared variance-covariance matrix and a set of group membership probabilities for one series that are conditional on group membership in the other series. These allow the full set of unconditional, conditional, and joint group membership probabilities to be estimated. Conditional group membership predictors can be included as well.

When more than two dependent variables are of interest, the parameter space for extending the dual trajectory analysis quickly becomes unwieldy. But when the focus is on only two or three dependent variables, multitrajectory modeling is available in PROC TRAJ using the "MULTGROUPS" option (Jones and Nagin 2007). This type of model is constrained in that no cross-classification is estimated across dependent variable types. Instead, each group is defined by a set of trajectories across two or three dependent variables. This simplification greatly reduces the number of parameters that need to be estimated while still providing a rich portrayal of group heterogeneity. As with dual trajectory analysis, the distribution of the dependent variables, the number of observations (T) need not match, and the timeframe need not overlap. The main restriction is that the number of groups must be the same, and of course no cross-classification is estimated.

Recent work incorporates group-based trajectory modeling into a matching framework (Haviland and Nagin 2005, 2007). The basic insight of this work is that developmental histories can serve as important proxies for more complicated processes, and matching within developmental history group serves to balance numerous characteristics – not only the dependent variable of the trajectory model, but numerous related developmental trajectories and risk variables correlated with these trajectories. Haviland and Nagin (2005, p. 4) think of these groups as "latent strata in the data." Of course, the power of this method depends quite a bit on the extent to which the developmental history being modeled is linked to the selection process for the treatment of interest.

If treatment is random conditional on group membership, this method can provide a convincing measure of turning point effects, where estimated effects are group specific, but can be aggregated through a weighted average to obtain population average effects. Haviland and Nagin's method establishes developmental paths preceding potential turning points. Within each path, there are two possibilities, one might experience the turning point event, or not. Those individuals within the developmental group who do not experience the turning point event serve as natural counterfactuals for those that do. Assessing differences longitudinally after the turning point event allows us to see whether differences between the two groups emerge, and

whether those differences increase, remain stable, or decay over time. To the extent that they persist, evidence for the existence of a turning point is shown. Life-course research also suggests that the response to a turning point event may depend on prior developmental histories. This method allows one to explicitly test that hypothesis. To the extent that groups do not balance important treatment predictors, the group-based trajectory model can be incorporated into a more general propensity score framework, either with propensity score models embedded within each trajectory group, or posterior probabilities of group membership incorporated into a single propensity score model.

Controversies

Group-based trajectory modeling has attracted an unusual amount of criticism of a surprisingly harsh tone. Objections to group-based trajectory models center around the meaning of "group" and the relative merits of alternative statistical models.

Since the concentration of offending was publicized by Wolfgang and colleagues (1972), the search for the high-rate offending group *before* they engage in the bulk of their crimes has taken up a great deal of resources. In fact, reliably prospectively identifying the chronic offender has been something of a white whale of criminology for decades. Blumstein and Moitra (1980) showed that retrospective identification of groups in Wolfgang et al. did not hold up prospectively, so that the "chronic offender" label was not useful for selective incapacitation of "career criminals." More recently, Sampson and Laub (2005) have shown that although retrospective offending groups can be identified in their Boston data, even very rich sets of theoretically based predictors cannot reliably distinguish between the groups prospectively. The central point is that even though high-rate offending "groups" can be identified retrospectively either through simple decision rules as in Wolfgang et al. (1972), or through more statistically sophisticated methods such as group-based trajectory models, clustering or other finite mixture models, prospectively, for policy and theoretical purposes, these "groups" do not exist. This is not to say that these groups have no significance, but that their identification in a group-based trajectory model is just the starting point. If the researcher wants to make the case that a specific group is important, that argument must be grounded in theory (Brame et al. 2012) and there must be some demonstration that the group exists outside a single group-based trajectory model.

Critics of this method either over-interpret the significance of groups or imply that because of the nature of the model, other less sophisticated researchers will reify the groups. But of course, the search for the "chronic offender" that Blumstein and Moitra (1980) debunked demonstrated that sophisticated models are not needed in order for reification of a high-rate offender typology to occur.

Many critiques of group-based trajectory modeling are premised on the notion that another statistical tool is superior. Generally speaking, there are three options for summarizing longitudinal developmental patterns: group-based trajectory models, hierarchical linear models, and growth mixture models. Each of these models simplifies a more complex reality in a different way. The differences boil down to how heterogeneity in developmental patterns is characterized. Hierarchical linear models characterize heterogeneity as a jointly normal distribution of parameters centered around the overall average. Group-based models characterize heterogeneity using a mixture of a finite number of growth curves that are support points of a complex distribution. Growth mixture models combine the two strategies, modeling jointly normal distributions of parameters around each group's average trajectory. Arbitrating between these choices depends on the nature of the research problem and the purposes of the analysis. Nagin (2005) points to complexity of the continuous distribution as an important guide when choosing between group-based and hierarchical linear models.

Future Directions

To date, although group-based trajectory modeling has been extensively employed in the criminological literature, its uses have usually been limited to descriptive exercises. More sophisticated applications such as Haviland and Nagin's matching method and correct modeling of standard errors using some form of bootstrapping have been less often employed. It is hoped that future work using the method will realize its full capabilities.

Despite the lack of uptake of these more sophisticated features, further development of the model has the potential to greatly benefit the field. The range of dependent variable distributions, although sufficient for most applications in criminology, could be expanded. For example, multinomial, categorical, and quantile group-based trajectories could have immediate applications. Advances such as multitrajectory modeling could be generalized to any number of dependent variables, allowing for complex characterizations of developmental history typologies and perhaps an even stronger basis for identifying latent strata in the data. And the problem of local solutions could be tackled and better understood by incorporating an automated start value algorithm, which is currently offered in the MPLUS implementation of the model.

Conclusion

Group-based trajectory modeling is a powerful tool that can be put to a very wide variety of uses alongside hierarchical and growth mixture models. Through careful, thoughtful use, it can test a number of important theoretical hypotheses (Brame et al. 2012).

Related Entries

- ▶ Age-Crime Curve
- ▶ Career Criminals and Criminological Theory
- ▶ Desistance from Crime
- ▶ Group-Based Trajectory Models and Developmental Change
- ▶ Identification Issues in Life Course Criminology
- ▶ Longitudinal Crime Trends at Places
- ▶ Longitudinal Studies in Criminology
- ▶ Moffitt's Developmental Taxonomy of Antisocial Behavior
- ▶ Onset of Offending
- ▶ Optimizing Longitudinal Studies in Offending
- ▶ Social Control and Self-Control Through the Life Course

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Group-Based Trajectory Models and Developmental Change

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Overview

The widespread availability of panel data on unlawful behavior has stoked criminological interest in statistical methods that are capable of quantifying developmental change. One such method is the group-based trajectory model of Nagin (1999, 2005; Nagin and Land 1993), which has become an essential tool for quantitative criminologists who conduct analysis with longitudinal data. It has been widely utilized to study the development of delinquent and criminal behavior in a variety of American and cross-national contexts.

The appeal of the group-based trajectory model stems from the fact that it explicitly allows for heterogeneous developmental pathways, without imposing any assumptions about the distributional properties of the heterogeneity. Instead, heterogeneity of unknown form is approximated using a discrete mixture of two or more distributions. This is in contrast to other conventional panel data estimators, which require the analyst to impose untestable (ergo, unfalsifiable) assumptions about the form of the heterogeneity, namely that it varies continuously in the population (usually in the form of a normal distribution).

This essay proceeds as follows. First, some background on the group-based trajectory model, as used in criminology, will be provided. Second, details on the estimation of the model will be given by way of an empirical illustration. Third, more flexible uses of the model, beyond quantifying developmental change, will be described. The essay closes with some concluding remarks.

Background of the Group-Based Methodology

The rationale of the group-based trajectory model is provided by Heckman and Singer (1984), in an analysis of the determinants of unemployment duration. They argued that insufficient attention had been devoted to *population heterogeneity*, or temporally persistent unobservables which underlie relative differences across individuals in spell length. The problem is that failure to adequately control for population heterogeneity produces bias in structural parameters of interest. They observed further that theory rarely provides guidance about the distribution of unobservables: "The choice of a particular distribution of unobservables is usually justified on the grounds of familiarity, ease of manipulation, and considerations of computational cost" (p. 272). In a parametric analysis of single-spell duration data, they demonstrated that structural estimates (for age, education, marriage, tenure of the previous job, unemployment benefits, unemployment rate, and unemployment duration) were extremely sensitive to the distribution chosen to model unobservables, each of which was *ex ante* theoretically plausible. Indeed, they

concluded that "there are as many different 'structural models' as there are distributions of heterogeneity" (p. 276).

In an econometrically dense exposition, Heckman and Singer (1984) then proposed a non-parametric estimator intended to minimize the impact of (arbitrary) distributional assumptions on parameter estimates. Their method entailed the specification of a finite number of underlying distributions or "points of support" for the distribution of unobserved heterogeneity, each with unique location (mean) and shape (variance) parameters. Importantly, no single parametric distribution produced estimates that harmonized fully with the non-parametric estimator. Furthermore, their simulation showed that, while it did not reliably estimate the underlying mixing distributions, the non-parametric estimator was quite successful at recovering structural parameters and reproducing sample duration times.

In criminology, two developments had a more immediate influence on the origin of the group-based methodology: the criminal career paradigm of the 1980s and taxonomic theories of unlawful behavior of the 1990s. First, the 1980s gave rise to the criminal career perspective, which partitions the aggregate age distribution of crime into two distinct phenomena: the fraction of the population that is criminally active at any given age (participation), and the number of crimes committed per year by any given active criminal (frequency) (Blumstein et al. 1986). Crime prevention policies could then be classified as to whether their impact on the crime rate was through participation or frequency. This perspective led to the parameterization of the essential features of an individual's "criminal career," including age of initiation (A_0), age of termination (A_N), length of the criminal career ($T = A_N - A_0$), and offending frequency (λ, or lambda), or the number of crimes committed per year while criminally active.

The second major influence on the development of the group-based trajectory model was taxonomic theorizing about the unfolding of delinquent and criminal behavior over the life span, most prominently in the work of Moffitt (1993). She theorized that the population is comprised of two distinct groups or "taxons" that differ in meaningful ways in the causes, consequences, and developmental courses of unlawful behavior. The "life-course-persistent" pathway characterizes a comparatively small fraction of the population, but is distinguished by early onset, temporal persistence, and involvement in a large class of antisocial behaviors, originating in neuropsychological deficits that interact with environmental disadvantages. The "adolescence-limited" pathway, on the other hand, characterizes the lion's share of the population, and is distinguished by pubertal onset, acquisition from mimicry, maintenance through social reinforcement, and discontinuity as the maturity gap is successfully bridged. In short, the life-course-persistent pathway is pathological, whereas the adolescence-limited pathway is normative.

A key empirical requirement of both the criminal career paradigm and taxonomic theory is availability of long-term panel data on individual offending, along with a grouping procedure capable of identifying distinct classes of offenders. With panel data and latent class methodology, then, it becomes possible to answer a variety of unresolved questions: Is λ constant or age graded over the duration of the criminal career? Do all individuals follow the same basic criminal career, perhaps differing only in degree, or are there distinct groups in the population? How many groups exist in the population? Do different groups of offenders have distinct etiological pathways?

With the foregoing econometric and criminological developments as background, Nagin and Land (1993) introduced the group-based trajectory model to criminology. They applied the non-parametric approach of Heckman and Singer (1984) to panel data on criminal behavior, in the process providing preliminary answers to questions of interest for the criminal career paradigm and taxonomic theories. In their analysis, they used data on criminal conviction frequency spanning ages 10–30, from the Cambridge Study in Delinquent Development. They characterized their method as a

non-parametric, mixed Poisson model. Their key findings are summarized below, but statistical details on their model are reserved for the next section.

Nagin and Land (1993) settled on a four-group solution, producing a number of important findings. The first result concerned the form of λ over time, and revealed that conviction frequency has a pronounced relationship with age. When they constrained the sample to have a common age trajectory (i.e., a common peak age) that differed only in level, conviction frequency was shown to reach a single peak at age 18 and then decline by a considerable margin by age 30. The second result addressed heterogeneity in criminal careers, and revealed substantial differences across groups in the essential features of the age distribution of criminal conviction. Peak ages ranged from 14 to 22, and the groups varied considerably in the shape of the age-conviction curve, exhibiting a pronounced peak at an early age followed by a rapid decline ("adolescence limited"), slow acceleration and deceleration but the most frequent convictions at all ages ("high-rate chronic"), and a flatter, more chronic age profile ("low-rate chronic"). The third result concerned the differential predictability of group membership from a number of background risk factors, revealing a variety of differences in both degree and kind. For example, the high-rate chronic offenders were distinguished by the presence of delinquent siblings and more widespread involvement in antisocial behavior (e.g., lying, truancy, heavy drinking, marijuana use), while the low-rate chronic offenders were distinguished by unusually low intelligence. The adolescence-limited offenders, on the other hand, were distinguished from the chronic offending groups by more popularity among peers and better school performance.

The Nagin and Land (1993) study was closely followed by further efforts to explore the utility of the group-based trajectory model for studying the essential features of criminal careers (D'Unger et al. 1998; Land et al. 1996; Land and Nagin 1996; Nagin et al. 1995). Across numerous datasets, these studies have found that there is a general tendency to extract four–five trajectory groups, with some commonality in the basic contours of the trajectory profiles. One group can be classified as non-offenders or intermittent offenders, one group can be described as adolescence-limited offenders, and one group can be classified as chronic offenders. Oftentimes, the latter can be further stratified into two subgroups: a high-rate chronic and low-rate chronic group.

Estimation and Evaluation of the Group-Based Trajectory Model

The group-based trajectory model is a semi-parametric approach to modeling longitudinal outcomes. Described simply, the method groups subjects into more homogeneous latent classes based on their longitudinal sequence of behavior. It is in the class of finite mixture models discussed at length by McLachlan and Peel (2000). The group-based model is parametric by specifying a probability distribution governing the realization of the response variable (e.g., normal, logistic, Poisson), as well as by specifying the functional form of the response as a polynomial in age or time. The group-based model is non-parametric in terms of specifying the population as a multinomial mixture of two or more such distributions ("points of support"), with the parameters of each component of the mixture estimated freely. The group-based trajectory model has been shown to have desirable properties in applications where the components in the mixture are well separated (Brame et al. 2006; Loughran and Nagin 2006).

To walk readers through an empirical application, data on self-report offending from the National Longitudinal Survey of Youth 1997 (NLSY97) will be analyzed. The response variable is a variety scale composed of 20 dummy indicators, ranging in seriousness from minor offenses such as petty larceny (less than $50) and destruction of property, to more serious offenses such as aggravated assault and robbery. For each offense, respondents are coded "1" if they reported engaging in the behavior since the last interview (or ever prior to the initial

Group-Based Trajectory Models and Developmental Change,

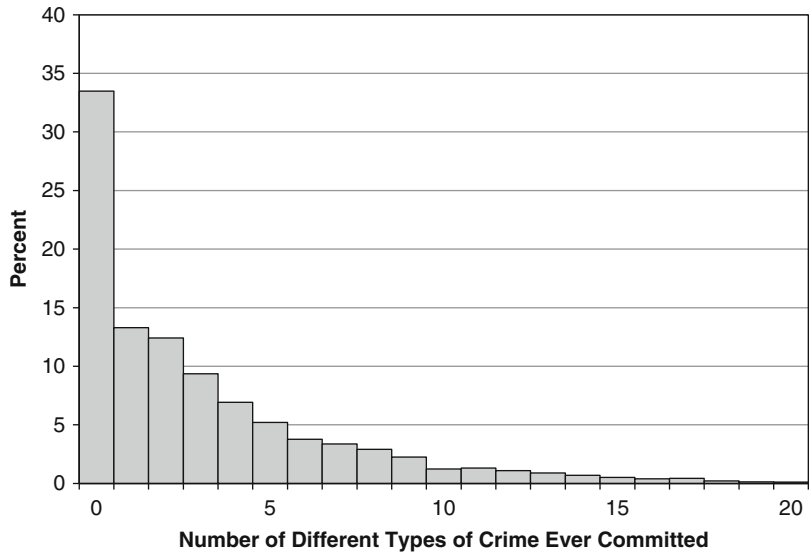


Fig. 1 Histogram of cumulative self-report crime variety (Note: $N = 8{,}984$. Percentages are weighted. This figure represents the distribution of delinquent/criminal behavior across the first seven waves of the NLSY97, using all available information from respondents. Source: National Longitudinal Survey of Youth 1997, Rounds 1–7)

interview) and coded "0" otherwise. These indicators are then summed at each interview, yielding a measure of the number of different kinds of criminal acts committed. A histogram of the cumulative distribution of the variety scale is provided in Fig. 1. To create this figure, a lifetime indicator (using information from all available interviews) for each of the 20 criminal acts was constructed for each respondent, and was then summed. Two-thirds of the NLSY97 sample (66.5 %) reports involvement in unlawful behavior at some point during the first seven interview waves.

Before proceeding with the analysis, Fig. 2 provides an illustration of the age-graded nature of delinquency/crime in the NLSY97 data. It exhibits the classic features of the age-crime curve, with a peak of almost 1.3 different types of crime per year during the 14–16 age range, followed by a steady decline through the late teens and a leveling out at under 0.3 in the early 20s. Basically, the group-based trajectory model will be used to ascertain whether this average developmental pathway characterizes all youth in the sample (to a greater or lesser degree, at least), or whether qualitatively distinct pathways are evident in the data.

To formalize the group-based trajectory model, Y_{it} represents a count of the number of different kinds of criminal behaviors (i.e., crime variety) reported by subject i ($i = 1,\ldots,N$) in time t ($t = 1,\ldots,T$). It is natural to presume that Y_{it} is a Poisson random variable with density:

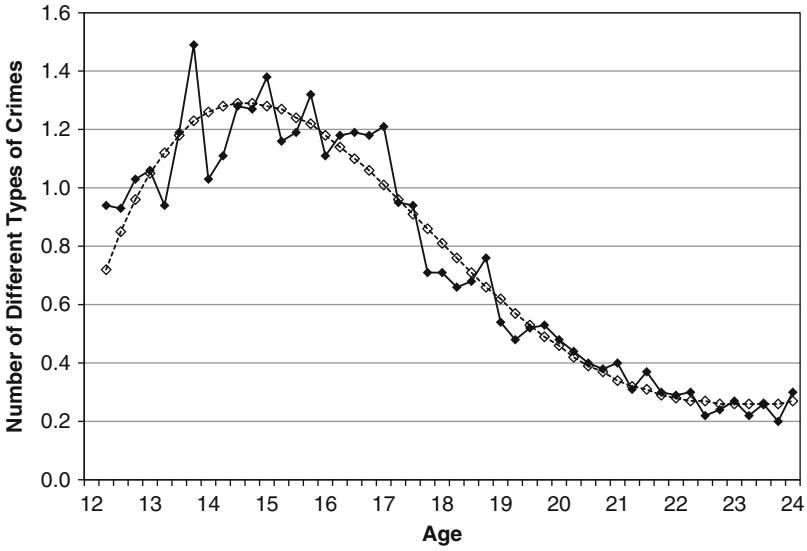
$$f(Y_{it}) = Pr(Y_{it} = y|\lambda_{it}) = \frac{e^{-\lambda_{it}}\lambda_{it}{}^{y}}{y!}$$

wherein λ_{it} represents an individual's underlying rate of offending, or the number of different kinds of crimes committed per unit of time (e.g., per year). An individual's (logged) offending rate, given membership in trajectory group j, is then modeled as a polynomial function in age:

$$ln\left(\lambda_{it}^{j}\right) = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3$$

Here, age is assumed to follow a cubic functional form, although other polynomials are obviously possible. The parameters define the shape of the trajectory, and the j superscripts denote group-specific parameters for $j = 1,\ldots,M$ trajectory groups. So if a one-group model is specified, four shape parameters are estimated; if a two-group model is specified, eight shape parameters are estimated; and so on.

Estimation of the group-based trajectory model proceeds by way of maximum likelihood.



Group-Based Trajectory Models and Developmental Change, Fig. 2 Age distribution of self-report crime variety (Note: $N = 8{,}984$. Estimates are weighted but are not exposure adjusted. The *dashed lines* are predicted values fit from a fourth-order polynomial in a linear model with random effects. Source: National Longitudinal Survey of Youth 1997, Rounds 1–7)

Define a vector $\mathbf{Y_i}$ to represent the longitudinal sequence of individual i's self-report crime variety:

$$\mathbf{Y_i} = \{Y_{i1}, Y_{i2}, \ldots, Y_{iT}\}$$

Then let P($\mathbf{Y_i}$|j) represent the conditional distribution of $\mathbf{Y_i}$ given membership in group j, in other words, the probability of observing individual i's crime "trajectory" conditional on his being in group j. In the current example, this is constructed from the Poisson probability distribution. An important assumption of the group-based trajectory model concerns the conditional independence of the sequential realizations of Y_{it}, which allows us to write the conditional distribution of $\mathbf{Y_i}$ as:

$$P(\mathbf{Y_i}|j) = \prod_{t=1}^{T} f(Y_{it}|j) = \prod_{t=1}^{T} \frac{e^{-\lambda_{it}^{j}} \lambda_{it}^{j\,y}}{y!}$$

where

$$\lambda_{it}^{j} = e^{\beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3}$$

Now, let π_j represent the probability of membership in group j. Thus formalized, the unconditional probability of observing individual i's longitudinal sequence, or the marginal density of $\mathbf{Y_i}$, can then be recovered by aggregating across M conditional distributions:

$$P(\mathbf{Y_i}) = \sum_{j=1}^{M} \pi_j P(\mathbf{Y_i}|j)$$

Finally, in a sample of N independent individuals, the sample likelihood is formed by the product of N such marginal densities:

$$L\left(\pi_j, \beta_0^j, \beta_1^j, \beta_2^j, \beta_3^j | Y_{it}, Age_{it}\right) = \prod_{i=1}^{N} P(\mathbf{Y_i})$$

A SAS-based procedure, Proc Traj, has been developed by Jones et al. (2001; Jones and Nagin 2007) to estimate the group-based trajectory model as parameterized above. One practical challenge to estimation of group-based trajectories is model selection, specifically, decision making about the optimal number of trajectory groups. Nagin (1999) advocates use of the Bayesian Information Criterion (BIC) rather than the log likelihood, because trajectory models are not formally nested in the way required to conduct a likelihood ratio test. The BIC is estimated by:

$$BIC = ln(L) - \frac{1}{2} K ln(N)$$

Group-Based Trajectory Models and Developmental Change, Table 1 Model summaries from trajectory group solutions

Model summary	2-group solution	3-group solution	4-group solution	5-group solution
Parameter estimates	9	14	19	24
Log likelihood	−66,247.15	−62,187.58	−60,521.25	−59,388.47
BIC	−66,288.11	−62,251.30	−60,607.74	−59,497.71
2 × (ΔBIC)	–	8,073.62	3,287.12	2,220.06
Probability correct model	0.00	0.00	0.00	1.00

Note: $N = 8{,}984$. The models use information on self-report crime variety from the first (1997) to the seventh (2003) interviews. Although the coefficients are not shown, a cubic functional form in age is specified for each trajectory group. The first row from the bottom is the log Bayes factor approximation, and contrasts a model with j + 1 trajectory groups to a model with j trajectory groups. Values in excess of 10 are regarded as very strongly supportive of a model with j + 1 trajectory groups. The bottom row provides the posterior probability that the referent model is the correct model, when equal weight is placed on the prior probability that each model is the correct one

where ln(L) is the log likelihood, K denotes the number of parameters, and ln(N) is the log sample size.

Table 1 provides the BIC and other quantities of interest from models assuming two–five Poisson mixtures for the NLSY97 data. Computing twice the difference in BIC's between two models provides a useful guide to decision making about the number of components in the mixture (Jones et al. 2001), as does the posterior probability that any given model is "correct" when more than two models are being compared and equal weight is placed on their prior probabilities (Nagin 1999). The latter is estimated by the formula:

$$\frac{e^{BIC_j - BIC_{max}}}{\sum_j e^{BIC_j - BIC_{max}}}$$

where BIC_j is the BIC from the referent model, and BIC_{max} is the maximum BIC of all of the models under consideration. By both of these criteria, Table 1 shows that the preferred solution is the model with five trajectory groups. (Note that this example is not intended to be a formal analysis of the optimal number and shape of the crime trajectories. It is strictly intended to serve as an illustration. A formal analysis for this author would require sequentially adding more components to the mixture until the model can no longer converge, adjusting the order of the polynomials for the trajectory groups to identify the optimal fit, examining the utility of including an inflation parameter in the Poisson model, and experimenting with a variety of start values to evaluate the robustness of the final solution).

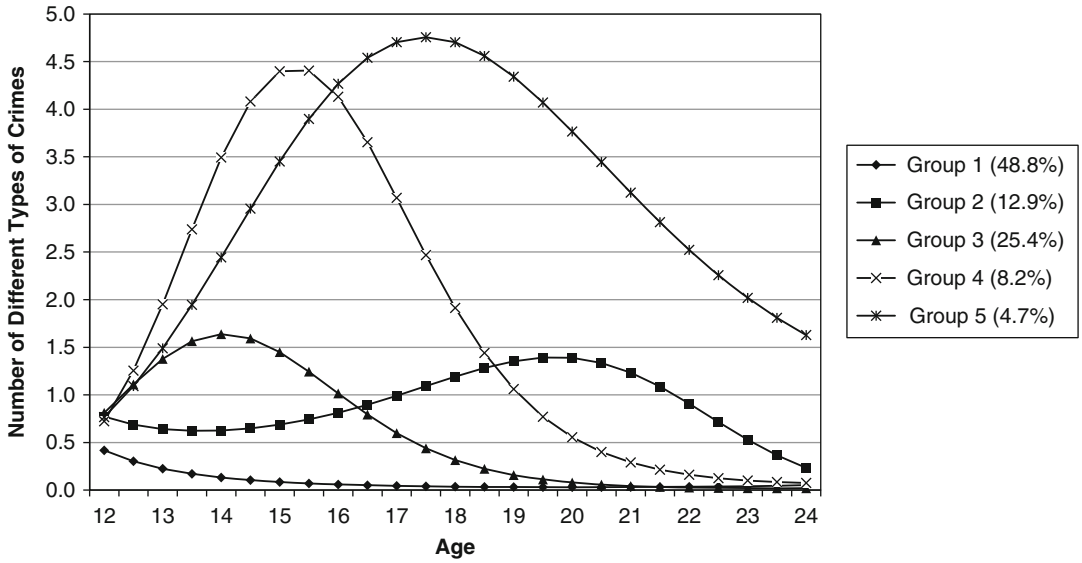
Results from the five-group solution are provided in Table 2. The output from Proc Traj includes the parameter estimates characterizing the shape of the trajectory for each group and the proportion of the population that is estimated to follow group j's pathway, as well as estimates of the probability that a subject belongs to each trajectory group. The latter are known as "posterior probabilities" (not to be confused with the posterior probability that a model is correct, as estimated from the formula above). To aid interpretation of the parameter estimates characterizing the shape of the trajectories, they are plotted against age in Fig. 3.

One of the first things to notice about the parameter estimates and plotted trajectories is just how heterogeneous the developmental pathways of delinquent/criminal behavior are in the NLSY97. The model suggests that about one-half of youth – Group 1 (49 %) – follow a non-offending pathway, or at least a highly intermittent one, as the offending rate is non-zero but quite low during the teenage years. One-third of youth – Groups 3 and 4 (25 % and 8 %, respectively) – follow an adolescence-limited pathway that peaks at 14–15 years of age, but at very different levels. Specifically, Group 3 peaks at about 1.5 different crimes while Group 4 peaks at almost 4.5 different crimes. (Substantively, a value of 1.5 on the variety scale translates into about 3.5 total crimes per year – one criminal act every 3.5 months – while a value of 4.5 on the

Group-Based Trajectory Models and Developmental Change, Table 2 Parameter estimates and model diagnostics from the five-group trajectory model

	Group 1	Group 2	Group 3	Group 4	Group 5
Coefficients					
Constant	13.999 (11.4)	30.438 (11.0)**	−56.527 (13.1)***	−65.660 (14.9)***	−27.751 (8.39)***
Age	−1.861 (2.06)	−5.885 (1.87)**	10.124 (2.34)***	11.082 (2.57)***	4.251 (1.40)**
Age Squared	0.055 (0.12)	0.365 (0.11)***	−0.575 (0.14)***	−0.587 (0.15)***	−0.199 (0.08)**
Age Cubed	0.000 (0.00)	−0.007 (0.00)***	0.010 (0.00)***	0.010 (0.00)***	0.003 (0.00)*
Diagnostics					
Population (%)	46.0%	13.9%	26.1%	9.0%	4.9%
Sample (%)	48.8%	12.0%	25.4%	8.2%	4.7%
Mean post. prob.	0.91	0.87	0.83	0.86	0.93
OCC	11.9	41.5	13.8	62.1	257.9

Note: N = 8,984. Estimates are exposure adjusted and weighted. The age profiles for this model are displayed in Fig. 2
* p < .05, ** p < .01, *** p < .001 (two-tailed tests)



Group-Based Trajectory Models and Developmental Change, Fig. 3 Age distribution of self-report crime variety, by Trajectory Group (Note: Parameter estimates for this trajectory model are shown in Table 2)

variety scale represents about 23.2 total crimes per year – about two criminal acts per month. This was determined by mapping mean crime frequency onto crime variety.) A bit less than one-fifth of youth – Groups 2 and 5 (13 % and 5 %, respectively) – appear to follow a chronic pathway, but again at very different levels. Group 2 peaks at about 1.5 different crimes while Group 5 peaks at more than 4.5 different crimes. However, both groups continue offending well into their 20's, when all other youth have, for all intents and purposes, desisted from crime.

Having selected the optimal model and described the five trajectory groups, an important next step is to diagnose how well the model fits the data. Nagin (2005) outlines a variety of diagnostic criteria, including the discrepancy between the proportions of the population and sample in each trajectory group, the mean posterior probabilities of group assignment, and the odds of correct classification (OCC). Each of these criteria is shown in the bottom half of Table 2.

One diagnostic involves a comparison of the proportion of the population that is estimated to

follow a given trajectory, with the proportion of the sample that is "assigned" to the same trajectory. The former proportion, π_j, is a component of the likelihood function:

$$\pi_j = \frac{e^{\theta_j}}{\sum_{j=1}^{M} e^{\theta_j}}$$

where the normalization, $\theta_1 = 0$, ensures identifiability (note, $e^0 = 1$). The sample counterpart is derived from the posterior probabilities, or the model-predicted probability that an individual is assigned to each trajectory group. Formally, the probability that any given sample subject is assigned to trajectory group j, given her longitudinal sequence of criminal behavior, is estimated by appealing to Bayes' theorem:

$$P(j|\mathbf{Y_i}) = \frac{\pi_j P(\mathbf{Y_i}|j)}{\sum_{j=1}^{M} \pi_j P(\mathbf{Y_i}|j)}$$

The proportion of the sample assigned to each group is determined using the maximum posterior probability assignment rule, in which each subject is classified into the trajectory group with the highest posterior probability. The population and sample proportions shown in Table 2 suggest no major discrepancy between these two proportions.

A second useful diagnostic is an inspection of the mean posterior probabilities. These are determined by assigning subjects to trajectory groups using the maximum posterior probability assignment rule, and then computing the mean posterior probability among the individuals assigned to each group. Nagin (2005) suggests that a mean in excess of 0.7 is evidence of good classification. In the current example, shown in Table 2, the lowest mean posterior probability is 0.83 (Group 3), indicating good model fit by this criterion.

A third diagnostic is the "odds of correct classification" (OCC), which uses the mean posterior probability as well as the population proportions. It is computed for each trajectory group in the following manner:

$$OCC = \frac{\overline{\mathrm{P}}(j|\mathbf{Y_i})/\left(1 - \overline{\mathrm{P}}(j|\mathbf{Y_i})\right)}{\widehat{\pi}_j/\left(1 - \widehat{\pi}_j\right)}$$

Nagin (2005) indicates that an OCC in excess of 5.0 indicates good model fit. Among the estimates in Table 2, the smallest OCC is 11.9 (Group 1), confirming that the model provides good classification of sample subjects to trajectory groups.

Extensions of the Group-Based Methodology

There are manifold uses for the group-based trajectory model, beyond its clear descriptive capability as shown in the previous section. For example, the model can be used to quantify the degree to which the developmental history of crime modifies the causal effect of a nonrandom "treatment" on subsequent criminality (e.g., employment, school dropout, marriage, gang membership, incarceration). There are at least two pernicious problems in the estimation of treatment effects on crime from nonexperimental data, which the trajectory methodology is well positioned to remedy. The first problem is that treatment assignment may not be independent of the response variable of interest. The second problem is that the impact of treatment may not be uniform across the population of interest. Manski (1995) refers to the first as the *selection problem*, and to the second as the *mixing problem*.

The selection and mixing problems were demonstrated in a study by Apel et al. (2007), who were interested in quantifying the effect of first-time, formal employment at age 16 on delinquent behavior. They estimated trajectories of delinquency from ages 11 to 15 among those who had not yet transitioned into the formal labor market and identified four distinctive clusters of individuals – conformists, decliners, low-level risers, and high-level risers. The selection problem was evidenced by the fact that the low- and high-level risers were more likely to be employed in excess of 20 h per week at age 16, confirming the differential selection of highly delinquent youth into "intensive" employment. The mixing problem was illustrated by the fact that, whereas

for most youth the treatment effect was zero, the high-level risers experienced a significant decline in delinquent behavior when they began working intensively at age 16. In this study, then, the developmental history of delinquency was correlated with selection into treatment and also modified the existence and magnitude of the treatment effect of employment on delinquency.

A study by Haviland and Nagin (2005) assessed the effect of first-time gang membership at age 14 on violent delinquency. Their trajectory model identified three groups of youth based on their history of violence from ages 11 to 13 – low, declining, and chronic. Consistent with the selection problem, youth in the chronic trajectory were much more likely to join a gang at age 14 compared to their non-chronic peers. Consistent with the mixing problem, the effect of gang involvement exacerbated violent behavior among all three trajectory groups, but did so particularly among the chronic group.

There are many more uses of the group-based trajectory model than estimation of treatment effects than can be fully described here. Many of these are outlined in Jones and Nagin (2007). First, time-invariant regressors can be introduced into a model of group assignment, which involves introducing covariates into the model for π_j. Second, time-varying regressors can be modeled, in addition to age, in order to allow the impact of such covariates to vary by trajectory group. Third, distinct but related (i.e., co-morbid) behaviors can be modeled using the dual trajectory methodology, in order to examine how such behaviors jointly unfold. Fourth, Haviland and colleagues (Haviland and Nagin 2007; Haviland et al. 2007) have demonstrated the utility of the group-based trajectory model in combination with propensity scores to study the impact of non-random treatments on antisocial behavior.

Conclusion

In criminology, the group-based trajectory methodology arose in response to a desire to provide answers to unresolved questions that arose from the criminal career tradition, and to evaluate the empirical validity of taxonomic theories of criminal offending over the life span. It has since evolved into a general analytical approach capable of answering a variety of questions of interest to behavioral scientists. Its use is widespread not only in criminology (Piquero 2008), but in other disciplines such as clinical psychology (Nagin and Odgers 2010).

The strength of the group-based trajectory model is the flexibility gained by approximating unobserved heterogeneity of unknown density using a discrete distribution rather than the traditional approach of assuming a single continuous density, usually the normal or gamma. Yet the model is not without controversy (see Eggleston et al. 2004; Sampson and Laub 2005; Skardhamar 2010). The view of this author is that most of this controversy stems from how the groups produced by the model are used in applied settings, namely, the tendency to label and reify the groups rather than treat them as the imperfect approximations that they are.

One particularly promising use of the group-based trajectory model is as a way to control flexibly for age in panel models of criminal behavior, a recent application of which is provided by Ezell and Cohen (2005). They showed that valid inferences about the impact of time-varying regressors on criminal behavior depend crucially on how one controls for age-graded developmental change. Models which imposed a uniform age distribution for their sample resulted in substantial overestimates of the impact of time-varying regressors. Their solution was two-pronged. In the first step, they estimated a group-based trajectory model. In the second step, they entered the posterior probabilities into a panel model (except one, for the group which served as a contrast), and interacted each posterior probability with age (as well as age squared and age cubed).

There is no doubt that the group-based trajectory model is an indispensible tool in the panel data expert's toolbox. At a minimum, Heckman and Singer (1984) advocated use of non-parametric

estimators – the group-based trajectory model is one such estimator – to evaluate the plausibility of estimates from more conventional, parametric specifications of the distribution of unobservables. It is difficult to find fault with such advice. Panel researchers who are serious about causal models of criminal behavior would be well advised to follow it.

Related Entries

- ▶ Age-Crime Curve
- ▶ Career Criminals and Criminological Theory
- ▶ Criminal Careers
- ▶ Desistance from Crime
- ▶ Group-Based Trajectory Models
- ▶ Moffitt's Developmental Taxonomy of Antisocial Behavior
- ▶ Pathways to Delinquency

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Growth Curve Models with Categorical Outcomes

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Overview

Motivated by the limited available literature on the treatment of longitudinal binary and ordinal outcomes in a growth modeling framework, the goal of this entry is to provide an accessible and practical introduction of this topic for a criminological audience. The parameterization of categorical latent growth models is explained by integrating aspects of the more familiar conventional latent growth models and generalized linear models. Emphasis is placed on the process of model building, evaluation, and interpretation. The entry contains an elaboration of how to include predictors of developmental change in the model for covariate-related hypothesis tests along with remarks regarding of the importance of auxiliary information for assessing model validity and utility. Finally, several model extensions including nonlinear change, generalized growth mixture modeling, and longitudinal latent class analysis are discussed.

Introduction

Criminologists typically encounter data on crime and deviance which is skewed and discrete, thus violating the assumptions of ordinary least square (OLS) regression models, which require that the outcome variable is continuous and is (conditionally) normally distributed. Many criminological studies involve binary outcomes, such as arrest versus no arrest, or unordered categorical outcomes, such as judge and jury consensus or disagreement on conviction versus acquittal. Other outcomes consist of categories, which represent a natural ranking or ordering, such as offense severity or self-reported attitudinal items measured on a Likert scale ranging from strongly disagree to strongly agree. Finally, some outcomes in criminological inquiries consist of counts of a particular event, such as the number of police contacts or the number of arrests. Generalized linear models (GLM), originally formulated by Nelder and Wedderburn (1972), represent a flexible generalization of OLS regression to accommodate skewed and discrete outcomes in a regression framework. In addition to classic textbooks (e.g., Agresti 2002; Long 1997), ample guidance exists on direct applications of GLMs for cross-sectional binary, unordered, and ordered categorical outcomes (e.g., Britt and Weisburd 2010) as well as for count outcomes (e.g., MacDonald and Lattimore 2010) in criminological research.

Beyond the explanation and prediction of cross-sectional outcomes, describing and predicting the developmental course of individuals' involvement in criminal and antisocial behavior is a central theme in criminological inquiries. It is well-known that only repeated observations of individuals across time allow for explicit modeling of intra individual change processes and enable the charting of interindividual differences in intra individual age-crime curves including the manifest features of onset, continuation, and cessation in criminal activity (Piquero et al. 2007). In particular, longitudinal data permits proper inferences about stability and change in individual trajectories, differences across individuals with respect to their trajectories, and the predictive effects of time-invariant risk and vulnerability factors as well as time-dependent life events on those trajectories (Piquero 2008). Given the ever-growing interest in not only describing but testing hypotheses related to individual differences in criminal behavior across the life course, more researchers have endeavored to collect longitudinal data on samples of individuals and are making use of statistical models that effectively and

appropriately utilize those repeated measures data. In the last two decades, latent growth modeling (LGM; also known as growth curve modeling, latent trajectory analysis, hierarchical linear modeling, linear mixed models, etc.) has emerged as the preferred analytical choice. This preference is in part due to the fact that LGM is more flexible than repeated measures analysis of variance or observed change score analysis in dealing with missing data, unequally spaced time points, complex nonlinear developments, and, importantly, non-normally distributed and discretely scaled repeated measures (Curran et al. 2010).

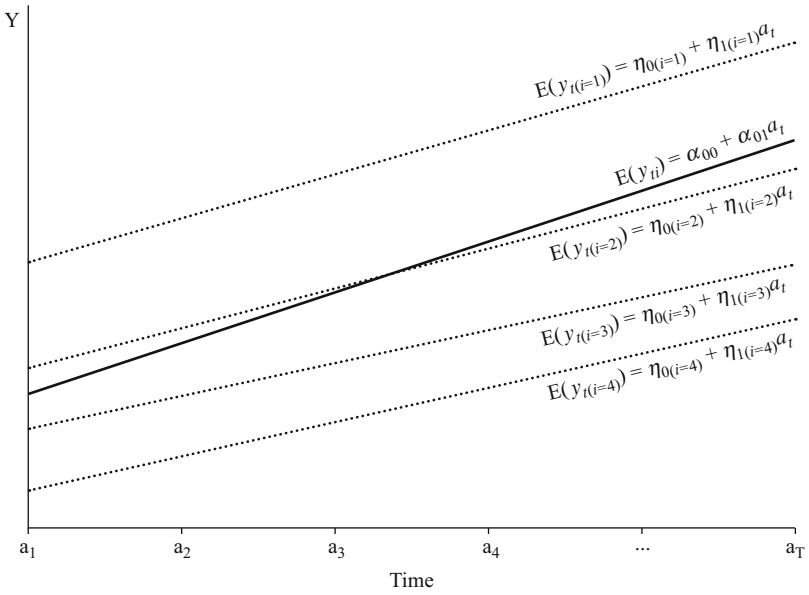
Along with their increasing popularity, vast resources have accumulated to instruct researchers in the application of LGMs with longitudinal continuous (e.g., Bollen and Curran 2006; Muthén 2004; Petras and Masyn 2010) and count outcomes (Kreuter and Muthén 2008; Nagin and Land 1993). With the exception of Feldman et al. (2009); Mehta et al. (2004); Muthén (1996); and Skrondal and Rabe-Hesketh (2004), the discussion regarding the treatment of binary and ordinal outcomes in a growth modeling framework is, by comparison, quite limited, especially for the applied criminology audience. Thus, the goal of this entry is to provide an accessible and practical introduction to the study of change using binary and ordinal repeated measures. The remainder of the entry is organized as follows: First, the conventional growth model for continuous outcomes is briefly introduced followed by a presentation of generalized linear models with binary and ordinal outcomes. Then the process of modeling repeated binary and ordinal measures in a latent growth modeling framework is advanced. This entry is concluded with a summative discussion including an overview of model extensions and alternatives.

Conventional Latent Growth Models

Modern growth models generally treat longitudinal outcomes in one of two ways: (1) as multilevel outcome data, where time or measurement occasions at "Level 1" are nested within persons at "Level 2"; or (2) as multivariate outcome data, where the repeated outcome measures are multiple indicators for latent growth factors values for each individual. Taking a multivariate approach, intra individual change is captured by the measurement model for the growth factors, describing the relationship between individual growth factor values and the observed outcomes over time, and interindividual differences are captured by the structural model, i.e., the mean and variance-covariance structure of the growth factors, describing the distribution of the growth factors in the population of individuals.

Although it is possible to specify analytically equivalent unconditional and conditional growth models across the multilevel and (multivariate) latent growth modeling frameworks, estimated via full-information maximum likelihood (FIML), utilizing the latent variable approach affords access to a variety of modeling extensions not as easily implemented in other frameworks, e.g., models that simultaneously include both antecedents and consequences of the change process, higher-order growth models with multiple indicators of the outcome at each assessment, multiprocess and multilevel growth models, and models that employ both continuous and categorical latent variables for describing population heterogeneity in the change process (for more on growth modeling in a latent variable framework, see, e.g., Bollen and Curran 2006; Muthén 2001, 2004). Given this greater flexibility, it is the multivariate approach to longitudinal data in a latent variable modeling framework that we focus on herein.

The latent growth model specification is a restricted form of a more general structural equation model (SEM; Kline 2010). In the SEM formulation of a latent growth model, there are T repeated measures, $y_t (t = 1, \ldots, T)$, that serve as the indicators or manifest variables, where T is the number of time points or waves during which study participants were assessed. For a *linear* latent growth curve model, there are two latent factors: an intercept growth factor, η_0, and a slope growth factor, η_1. The measurement and



Growth Curve Models with Categorical Outcomes, Fig. 1 Individual trajectories (*dotted lines*) for a hypothetical random sample of four individuals ($i = 1, 2, 3, 4$) drawn from a population with a mean growth trajectory given by the *solid line*

structural portions for an unconditional linear latent growth model are given by

$$\begin{aligned} &\text{Measurement model:} \\ &\quad y_{ti} = \eta_{0i} + \eta_{1i}a_t + \varepsilon_{ti}, \\ &\text{Structural model:} \\ &\quad \eta_{0i} = \alpha_{00} + \xi_{0i}, \\ &\quad \eta_{1i} = \alpha_{10} + \xi_{1i}. \end{aligned} \tag{1}$$

Here, y_{ti} is the observed outcome y for individual $i (i = 1, \ldots, n)$ at time $t (t = 1, \ldots, T)$, a_t is the time score at time t, η_{0i} is the random intercept factor (i.e., the expected outcome on y for individual i at time score $a_t = 0$), and η_{1i} is the random linear slope factor (i.e., the change in the expected outcome on y for individual i for a one unit increase in time, on the scale of a_t). The values for a_t are fixed to define the slope factor as the linear rate of change in y on the observed time metric; for example, in a panel study for which participants were assessed annually for T years, we might use $\mathbf{a} = (0,1,2,\ldots,T-1)'$ so that one unit on the time metric defined by $\mathbf{a}$ is one year. Typically, the first time score, a_1, is fixed at zero so that the intercept factor can be interpreted as the expected response at the first time of measurement. The ε_{ti}s represent independent and identically distributed measurement and time-specific errors on the y_{ti}s at time t, and the ε_{ti}s are usually assumed to be uncorrelated across time. In the structural model, α_{00} is the population mean of the individual intercept factor values, α_{10} is the population mean of the individual slope factor values, ξ_{0i} is the deviation of η_{0i} from the population mean intercept, α_{00}, and ξ_{1i} is the deviation of η_{1i} from the population mean slope, α_{10}. The distribution of individual intercept factor values and slope factors values is assumed to be multivariate normal, as is the distribution of the ε_{ti}s; the growth factors are assumed to be uncorrelated with the errors. Figure 1 displays the expected individual trajectories (dotted lines) of a hypothetical random sample of four individuals drawn from a population with an overall mean growth trajectory given by the solid line. Intra individual change is represented by each of the individual-specific trajectories (each with person-specific intercept and slope values), and interindividual differences are represented by the variability in individual-specific intercept and slope values relative to the overall mean intercept and slope values.

Extending now to the conditional latent growth model, hypothesized predictors of the

interindividual differences can be included in both the measurement model (for time-varying predictors and time-invariant predictors with unrestricted time-varying effects) and the structural model (for time-invariant predictors of the intercept and slope factors) as given by

Measurement model:

$$y_{ti} = \eta_{0i} + \eta_{1i} a_t + \pi_{1t} w_{ti} + \varepsilon_{ti},$$

Structural model: (2)

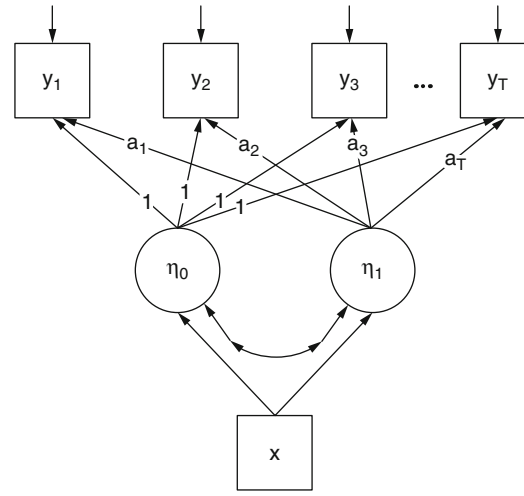
$$\eta_{0i} = \alpha_{00} + \alpha_{01} x_i + \xi_{0i},$$
$$\eta_{1i} = \alpha_{10} + \alpha_{11} x_i + \xi_{1i},$$

where π_{1t} is the difference in the expected outcome, y_t, corresponding to a one unit difference in the time-varying covariate, w, specifically at time t; α_{01} is the difference in the mean of the intercept factor corresponding to the one unit difference in the time-invariant covariate, x; and α_{11} is the difference in the mean of the slope factor corresponding to the one unit difference in the time-invariant covariate, x. The conditional growth model with a predictor for the growth factors is depicted in path diagram form in Fig. 2 using the following diagramming conventions: latent variables are represented by circles, observed variables are represented by rectangles, linear directional relationships are represented by single arrow paths, correlational relationships are represented by double arrow paths, and error terms are represented by unanchored single arrow paths.

Now that we have provided a brief overview of conventional latent growth modeling in a latent variable framework, we next introduce the foundations of binary and ordinal logistic regression followed by discussion of how repeated measures of a categorical outcome can be analyzed in this same latent variable framework.

Generalized Linear Models for Binary and Ordinal Outcomes

As mentioned in the introduction, categorical and limited dependent variables are quite common in criminology research. These types of outcome variables, be they cross-sectional or longitudinal, violate most if not all the assumptions of the linear models in standard use for continuous outcomes. Generalized linear models (GLMs) are a family of regression models that extend OLS regression to accommodate noncontinuous outcomes while still working with outcome predictors in a linear regression framework. There are different (often equivalent) approaches for parameterizing and estimating GLMs (Long 1997; Skrondal and Rabe-Hesketh 2004). For the purposes of this entry, we will introduce a somewhat less standard specification, known as the *latent response variable* (LRV) formulation for ordinal outcome variables. Our choice of the LRV formulation is based on the ease with which it enables the extension of the latent growth model specification given in the previous section to include categorical longitudinal outcomes.



Growth Curve Models with Categorical Outcomes, Fig. 2 Path diagram for a conditional linear latent growth model with continuous outcomes and a time-invariant predictor of the growth factors

In the latent response variable formulation, it is assumed that the observed ordinal outcome, y, is a discretized form of an underlying continuous latent response variable, y^*. For example, consider the binary (0/1) outcome of clinical depression, *depress*. One could imagine an underlying continuum of depression, *depress**, such that individuals whose values of *depress**

exceeded a certain level, or threshold, would all be observed with binary outcome *depress* = 1. In general, the relationship between a binary outcome, y, and the latent response variable, y^*, is given by

$$y_i = \begin{cases} 1 \text{ if } y_i^* > \tau_1 \\ 0 \text{ if } y_i^* \le \tau_1, \end{cases} \quad (3)$$

where τ_1 is the *threshold* for y^* and $\Pr(y = 1) = \Pr(y^* > \tau_1)$. As another example, consider the four-category ordinal outcome, *oppose*, measuring opposition to or disapproval of the death penalty for first degree murder with response categories on a Likert scale: *strongly approve/support* (0), *approve/support* (1), *disapprove/oppose* (2), and *strongly disapprove/oppose* (3). One could imagine an underlying continuum of opposition or disapproval, *oppose**, such that four different ranges of *oppose** defined by three cut points or thresholds map onto the observed values of *oppose*. In general, there are $J - 1$ thresholds that define the relationship between a latent response variable, y^*, and its J-category ordinal form, y, such that

$$\mathrm{y_i} = \begin{cases} 0 \text{ if } -\infty < y_i^* \le \tau_1 \\ 1 \text{ if } \tau_1 < y_i^* \le \tau_2 \\ \vdots \\ J-1 \text{ if } \tau_{J-1} < y_i^* \le \infty \end{cases}, \quad (4)$$

where τ_j is the j^{th} *threshold* for y^*, delineating responses $j - 1$ and j on the scale of y. In this LRV formulation, $\Pr(y \le j) = \Pr(y^* \le \tau_{j+1})$ and $\Pr(y = j) = \Pr(y^* \le \tau_{j+1}) - \Pr(y^* \le \tau_j)$, where $j \in \{0,1,\ldots,J\text{-}1\}$, $\tau_0 = -\infty$, $\tau_J = \infty$, and $\tau_0 < \tau_1 < \ldots < \tau_{J-1} < \tau_J$. The continuous latent response variable, y^*, is then expressed as the sum of a mean and error term given by

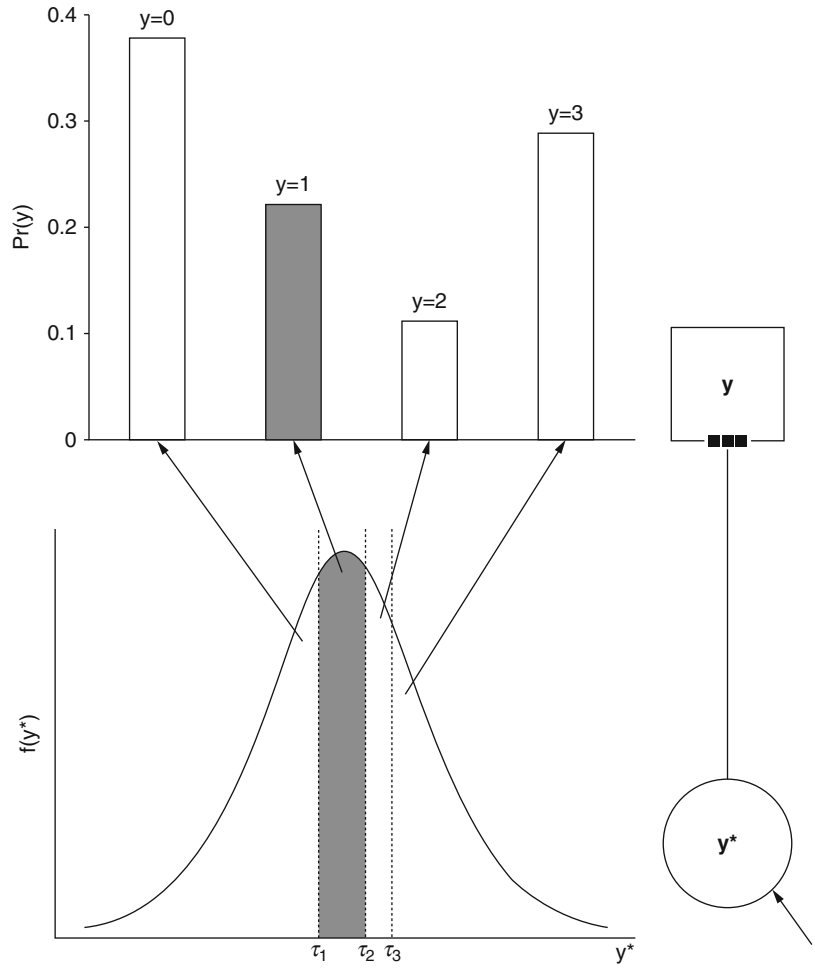
$$y_i^* = \mu_i + \delta_i. \quad (5)$$

The distribution and scale of the error, δ, must be specified a priori by the analyst; the two most common distributions for δ are the standard normal distribution and the standard logistic distribution. Figure 3 provides a visual representation of the latent response variable formulation for an ordinal outcome with four response categories. The bottom portion of Fig. 3 depicts a standard logistic distribution for y^* with three corresponding thresholds, (τ_1, τ_2, τ_3). All individuals in the population with y^* values between τ_1 and τ_2 will manifest the response value $y = 1$, and the shaded area under the probability density curve for y^* between τ_1 and τ_2 is equal to the probability of the $y = 1$ outcome, as depicted in top portion of Fig. 3. Figure 3 also displays the path diagram representation of the relationship between y^* and y. The three solid squares at the point where the path from y^* meets y indicate the deterministic relationship specified between given values of y^* and resultant observed values on y defined by the three thresholds, (τ_1, τ_2, τ_3).

The conditional model for ordinal outcomes is specified so that the observed predictors of the categorical outcome are related to cumulative response probabilities via the latent response variables as follows:

$$\begin{aligned} y_i^* &= \mu_{i|x_i} + \delta_i, \\ \mu_{i|x_i} &= \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_k x_{ki}. \end{aligned} \quad (6)$$

Figure 4 displays a plot of linear regression model of latent response variable, y^*, underlying a four-category ordinal outcome, versus a single predictor, x. As with a standard linear regression model, the expected values of y^* given x falls along the line, $\beta_0 + \beta_1 x$, and the distributions of y^* values in the population at each given value of x are the same in shape and variance (as shown in Fig. 4 by the probability density curves at the x-values, $x = x_1$, $x = x_2$, and $x = x_3$). For model identification, the intercept, β_0, is suppressed, i.e., fixed at zero. The linear model implies that the difference in the expected value of y^* corresponding to a one unit difference in x is equal to β_1 across the entire range of x. The conditional model given in Eq. 6 also makes the assumption of *threshold invariance*, that is, assuming that the thresholds defining the



Growth Curve Models with Categorical Outcomes,
Fig. 3 Graphical and path diagram representations of the latent response variable formulation for an observed ordinal outcome with four response categories

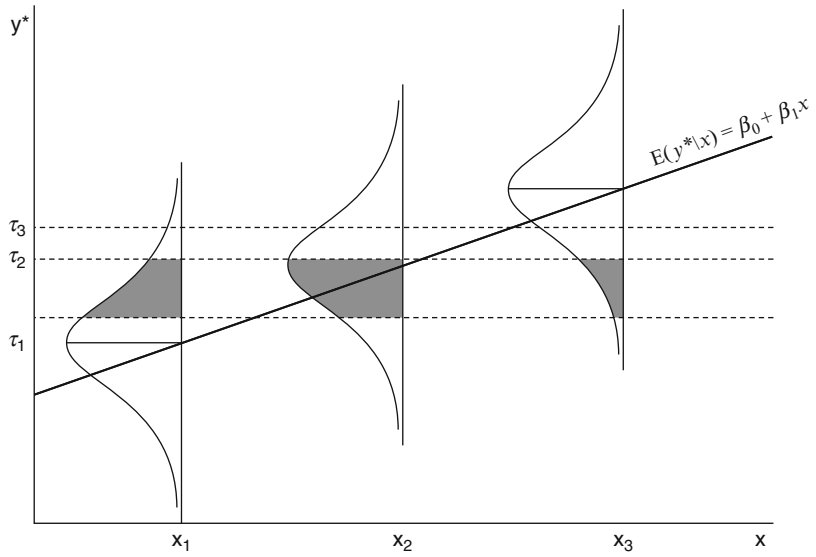
relationship between y^* and y do *not* depend on (i.e., are invariant) relative to x. To assist in visualizing how the linear functional relationship between y^* and x and the assumption of threshold invariance translate to the relationship between observed response probabilities of y and x, the three thresholds for y^*, which do *not* depend on x, are drawn as horizontal lines in Fig. 4. The area under the probability density function for y^* between τ_1 and τ_2, corresponding to $\Pr(y = 2|x)$, at $x = x_1$, $x = x_2$, and $x = x_3$, is shaded making it easy to see that even though the mean of y^* shifts linearly across the range of x, the response category probabilities do *not* change linearly or even monotonically.

Using a standard logistic distribution for δ, the linear regression for y^* on a single predictor (easily replaced with a linear combination of multiple predictors as given in Eq. 6) and the assumption of threshold invariance translates to the following relationship between the response category probabilities and the predictor:

$$\Pr(y_i \le j|x_i) = \frac{1}{1 + \exp\left(-\tau_{j+1} + \beta_1 x_i\right)}, \quad (7)$$

or, equivalently,

$$\log\left(\frac{\Pr(y_i \le j|x_i)}{\Pr(y_i > j|x_i)}\right) = \tau_{j+1} - \beta_1 x_i. \quad (8)$$



Growth Curve Models with Categorical Outcomes, Fig. 4 Plot of the linear regression line for a latent response variable, y^*, underlying an observed four-category ordinal outcome variable, y, versus a single predictor, x. Probability density curves depict the distribution of y^* values at three different values of x. Dashed horizontal lines show the threshold values for y^* delineating the four value ranges mapping on to the four response categories of y. Shaded areas of the probability density show the changing Pr $(y = 2|x)$ across the three values of x

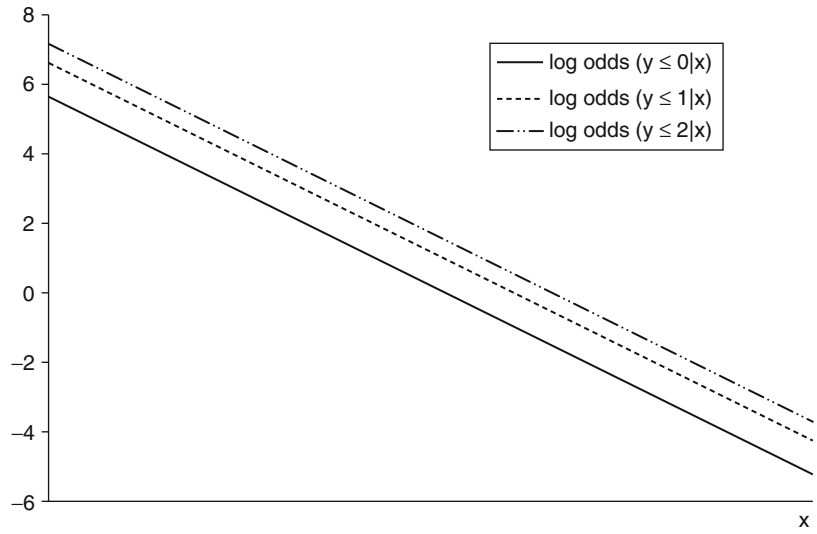
For a binary variable (with $J = 2$ categories), Eq. 8 reduces to the familiar logistic regression equation:

$$\log\left(\frac{\Pr(y_i = 1|x_i)}{\Pr(y_i = 0|x_i)}\right) = -\tau_1 + \beta_1 x_i. \quad (9)$$

In Fig. 5 we can see the representation of the relationships between the cumulative response category log odds and the predictor as described in Eq. 8 – that cumulative log odds for the different response categories all vary linearly as a function of x and that the lines for each of the three cumulative log odds are *parallel* with the distance between them determined by the differences in the threshold values.

The functional form of each of the three lines in Fig. 5 and the fact that they are all linear is a direct consequence of linearity assumption for the relationship between y^* and x. Assuming a linear relationship between y^* and x constrains the relationship between y and x such that cumulative response category log odds differ identically and linearly for every one unit difference in x. Consequently, β_1 is interpreted not just as the difference in the expected value of y^* corresponding to a positive difference of one unit on x but also as the log odds ratio for responding at or below a given response category (rather than above) corresponding to a *negative* difference of one unit on x, i.e., the odds for a response less than or equal to category j differ by a factor of exp $(-\beta_1)$ for every one additional unit on x, for all $j = 0$, 1, or 2. Thus, the cumulative odds for each response category differ identically and proportionally for every one unit difference in x. The linearity assumption is also known as the *proportional odds* assumption.

The equidistance between each pair of lines in Fig. 5 across the full range of x is a direct consequence of assuming that the thresholds defining the relationship between y^* and y do not depend on x. Thus, the differences in the cumulative log odds across the response categories (i.e., the vertical distance between the lines) at any given value of x are constant across all values of x. The assumption of *threshold invariance*, meaning that the thresholds do not depend on x, is also known as the *parallel regression* assumption. Both the proportional odds assumption and the



Growth Curve Models with Categorical Outcomes, Fig. 5 Plot of the cumulative response log odds for y versus x based on a linear regression model of y^* on x with threshold invariance

parallel regression assumption can be relaxed (and tested), and this will be mentioned again in the growth modeling context in the next section.

Building upon the overviews of both conventional latent growth models and cross-sectional latent response variable models for binary and ordinal dependent variables, the intersection of these two modeling approaches that enables the study of change in binary and ordinal longitudinal outcomes is introduced next.

Latent Growth Models for Binary and Ordinal Outcomes

The specification for the latent growth model for binary or order categorical outcomes is built on the same latent response variable formulation used with cross-sectional data. It is assumed that there is a continuous latent response variable, y_{ti}^*, underlying the observed response on the J-category ordinal outcome, y_{ti}, for individual $i(i = 1, \ldots, n)$ at time $t(t = 1, \ldots, T)$ with the relationship between y_{ti}^* and y_{ti} given by

$$y_{ti} = \begin{cases} 0 \text{ if } -\infty < y_{ti}^* \le \tau_{1t} \\ 1 \text{ if } \tau_{1t} < y_{ti}^* \le \tau_{2t} \\ \vdots \\ J-1 \text{ if } \tau_{(j-1)t} < y_{ti}^* \le \infty \end{cases}, \quad (10)$$

where τ_{jt} is the j^{th} *threshold* for y_t^*, delineating responses $j-1$ and j on the scale of y_t. Usually, in the model building taxonomy, it is common to begin with models that make the assumption of *longitudinal threshold invariance*, meaning that the set of $J-1$ thresholds, $(\tau_{1t}, \ldots, \tau_{(J-1)t})$, are the same at each wave; i.e., $\tau_{jt} = \tau_j, \forall t$. The longitudinal threshold invariance assumption can then be evaluated by testing the improvement in model fit when threshold invariance is relaxed.

The continuous latent response variable, y_{ti}^*, at each wave, t, is expressed as the sum of a mean and error term given by

$$y_{ti}^* = \mu_{ti} + \delta_{ti}. \quad (11)$$

As before, the distribution and scale for the error at each wave, δ_{ti}, must be specified a priori by the analyst – for the purposes of this entry, the standard logistic distribution for the error terms will be used. A latent growth model is then specified for the individual μ_{ti} values in a similar way as for observed continuous repeated measures. A linear latent growth model expresses the expected value on the latent response variable for individual i at time t as a function of the intercept and growth factors values; that is,

$$\mu_{ti} = \eta_{0i} + \eta_{1i} a_t, \quad (12)$$

or, equivalently, combining Eqs. 11 and 12,

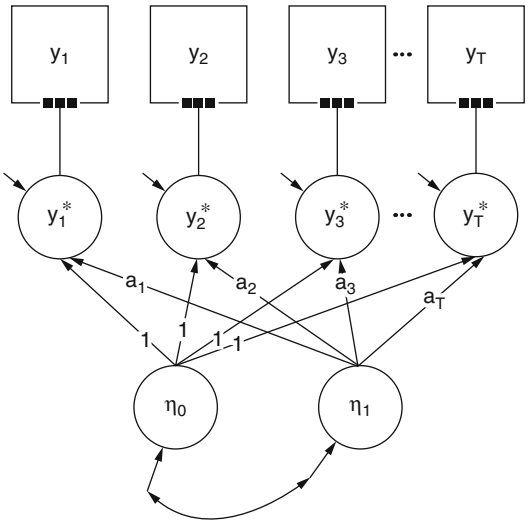
$$y_{ti}^{*} = \eta_{0i} + \eta_{1i} a_t + \delta_{ti}. \tag{13}$$

The structural portion of the latent growth model is identical to the specification for observed continuous repeated measures; that is,

$$\begin{aligned} \eta_{0i} &= \alpha_{00} + \xi_{0i}, \\ \eta_{1i} &= \alpha_{10} + \xi_{1i}, \end{aligned} \tag{14}$$

where $\xi_{\bullet i}$ s are specified to have a multivariate normal distribution. Since the location and scale of the latent response variable is indeterminate, an additional restriction must be placed, fixing $\alpha_{00} = 0$, similar to fixing $\beta_0 = 0$ for y^{*} in the cross-sectional model. The path diagram representation of an unconditional linear latent growth model for observed ordinal outcomes is depicted in Fig. 6. Although the above specification expresses the change in the latent response variable over time as a linear function of the time metric, the same approaches can be used as with observed continuous outcomes to investigate interindividual differences in curvilinear and other forms of nonlinear trajectories of change.

To gain a better understanding of what specifying a linear latent growth model for the latent response variable with longitudinal threshold invariance implies with respect to interindividual difference in intra individual change in the observed ordinal outcome, consider Fig. 7 which displays expected individual growth trajectories (dotted lines) on the latent response variable underlying an observed four-category ordinal variable for three hypothetical individuals, $i = 1$, 2, and 3, and the population overall mean growth trajectory (solid line). The time-invariant thresholds are shown by the horizontal dashed lines. Each individual in the population has their own expected y^{*} trajectory as given by Eq. 12. Each individual's cumulative response probabilities at each point in time are determined by the thresholds and the distribution of y_{ti}^{*} centered at μ_{ti}, as depicted by the separated density curves for each of the three hypothetical individuals at time points a_2, a_3, and a_4 shown in Fig. 7. Assuming that δ_{ti} are independently and



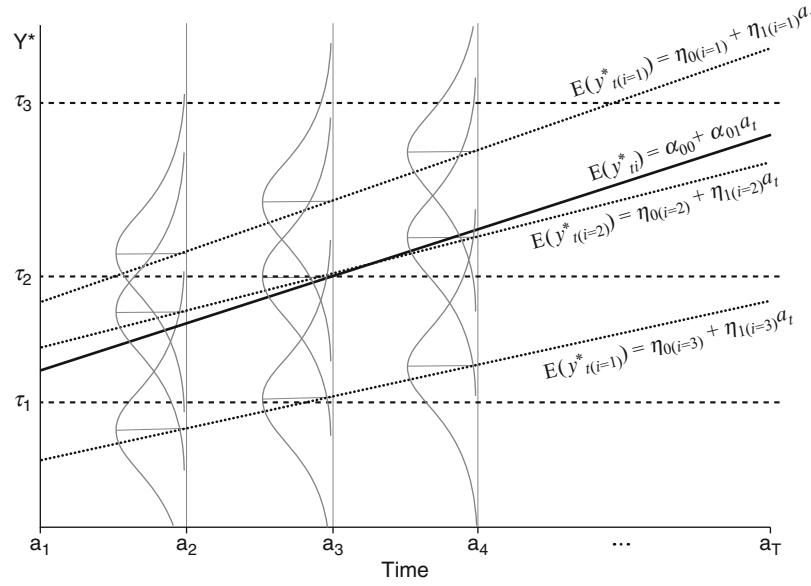
Growth Curve Models with Categorical Outcomes, Fig. 6 Path diagram for an unconditional linear latent growth model for the latent response variables underlying a set of observed longitudinal ordinal outcomes

identically distributed standard logistic, the relationship between the observed ordinal response and the growth factors is given by

$$\log\left(\frac{\Pr(y_{ti} \le j)}{\Pr(y_{ti} > j)}\right) = \tau_j - (\eta_{0i} + \eta_{1i} a_t). \tag{15}$$

Thus, $\tau_j - \eta_{0i}$ is the cumulative log odds for response category j for individual i when $a_t = 0$, and $-\eta_{1i}$ is the change in the cumulative log odds (or cumulative log odds ratio) for response category j for individual i corresponding to a one unit increase in the time metric of a_t.

It can be seen from Eq. 15 that the longitudinal threshold invariance assumption (i.e., $\tau_{jt} = \tau_j, \forall t$) implies that the difference in cumulative log odds for any two response categories will be the same at any given fixed point in time, a_t, across the entire time span for a given individual i. Assuming a linear function for the intra individual change process in the latent response variable under the threshold invariance assumption implies that the change in the cumulative log odds for a given individual and for a given response category corresponding to a one unit difference in the time metric is the same across the entire time span and across all response categories. As mentioned



Growth Curve Models with Categorical Outcomes, Fig. 7 Individual trajectories (*dotted lines*) of latent responses to repeated measure of an observed four-category ordinal outcome variable for a hypothetical random sample of three individuals ($i = 1, 2, 3$) drawn from a population with a mean growth trajectory for y^* given by the *solid line* with *dashed horizontal lines* show the time-invariant threshold values for y^* delineating the four value ranges mapping on to the four response categories of y

before, both the linearity and threshold invariance assumptions can be relaxed and tested. However, in order for the structural portion of the latent growth model to be identified, *at least one threshold* must be held invariant across time. For a binary longitudinal outcome with only one threshold at each time point, complete threshold invariance must be imposed.

It is important at this point to make the reader aware of one critical difference between the latent growth model for observed continuous outcomes and the LGM for observed ordinal outcomes. For continuous outcomes, the mean growth trajectory for the population is just a linear function of the population mean intercept factor and population mean slope factor. This is only the case at the latent response variable level of the categorical LGM – it is *not* the case for the mean population responses for the observed ordinal variable across time. In other words, it is incorrect to just plug the means of η_0 and η_1 into Eq. 15 to get the population mean cumulative response probabilities because the average of the individual cumulative response probabilities is not the same as the cumulative response probability corresponding to the mean growth trajectory for the latent response variable. That is,

$$\mathrm{E}[\Pr(y_{ti} \le j)] \neq \frac{1}{1 + \exp\left(-\tau_j + (\alpha_{00} + \alpha_{10}a_t)\right)}. \tag{16}$$

To compute the mean cumulative response probability for the population at a given point in time requires calculating and then averaging the individual cumulative response probabilities for all members of the population, that is,

$$\mathrm{E}[\Pr(y_{ti} \le j)] = \lim_{n\to\infty}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{1}{1+\exp\left(-\tau_j + (\eta_{0i} + \eta_{1i}a_t)\right)}\right)\right]. \tag{17}$$

The above expression can also be written as a double integral equation, integrating over both η_0 and η_1. Obtaining model-estimated mean cumulative response probabilities for a specific response category at a specific measurement occasion requires numeric integration based on the model-estimated distribution of the latent growth factors which is a post-estimation option in some modeling software, such as Mplus V6.12 (Muthén and Muthén 1998–2011a).

It is straightforward to extend the unconditional ordinal LGM to include time-invariant and time-varying predictors, just as is done with

observed continuous repeated measures. Time-invariant predictors can be included as predictors of the growth factors, or direct predictors of the expected latent response variable across time and time-varying predictors can be included as direct predictors of the expected latent response variable across time, as given by

$$\begin{aligned} y_{ti}^{*} &= \mu_{ti} + \delta_{ti}, \\ \mu_{ti} &= \eta_{0i} + \eta_{1i} a_t + \pi_{1t} w_{ti}, \\ \eta_{0i} &= \alpha_{00} + \alpha_{01} x_i + \xi_{0i}, \\ \eta_{1i} &= \alpha_{10} + \alpha_{11} x_i + \xi_{1i}, \end{aligned} \tag{18}$$

where δ_{ti} are assumed to be *i.i.d.* standard logistic and α_{00} is fixed at zero for identification.

The unconditional and conditional ordinal latent growth models presented in this section can all be estimated using maximum likelihood estimation. These growth models can be more computationally intensive than the cross-sectional models for observed ordinal outcomes as maximizing the likelihood function with continuous latent predictors (i.e., the latent growth factors) for the ordinal responses requires numeric integration with one dimension of integration for each growth factor. Full-information maximum likelihood (FIML) is available for these models which allows the inclusion of cases with incomplete data on the longitudinal outcomes under the missing-at-random (MAR) assumption (for more about missing data, see, e.g., Enders 2010).

Discussion

This entry has discussed the application of latent growth curve modeling to categorical outcomes by integrating aspects of the conventional latent growth model with the generalized linear model. The unconditional growth model with respect to parameterization and estimation was presented, and concise guidelines were provided for how to conduct the model building and evaluation process. It was then elaborated on how to include covariates to evaluate hypotheses about the relationship between predictors and the developmental change process.

There are several interesting augmentations of and alternatives to these models that are currently available to applied researchers. Although in Eq. 18 the change in the expected latent response outcome was expressed as a linear function of the time metric, it is possible (with an adequate number of repeated observations on each subject) to investigate interindividual differences in curvilinear and other forms of nonlinear trajectories of change. The two most common approaches are (1) to freely estimate $T - 2$ of the time scores loadings for η_1 (fixing one loading at zero to define the intercept location and fixing one loading at unity for identification and to set the slope factor metric) or (2) to use additional growth factors (beyond the intercept and slope factors) to accommodate curvilinear polynomial functions of times (e.g., adding a third, quadratic growth factor with loadings fixed at the values a_t^2). Alternative specifications of time can also be easily accommodated, including piece-wise linear growth models as well as exponential and sinusoidal models of change (see, e.g., Blozis et al. 2007; Bollen and Curran 2006).

In this entry, the application of a latent growth model to repeatedly measured categorical outcomes was discussed. In this model intra-individual change over time is estimated by person-specific growth parameters (e.g., intercept and slope), and interindividual differences are modeled by allowing for individual variation around the estimated growth factor means. Notably, this model is somewhat restrictive in that it assumes population homogeneity in the growth trajectories, i.e., that the growth factors for all persons in the sample are identically distributed. However, etiological as well as prevention and intervention evidence exists to suggest that criminal and antisocial behavior in the overall population may be better represented by a mixing of unobserved heterogeneous subgroups of individuals characterized by differently distributed developmental trajectories, differential risk factors, and differential responses to behavioral and policy interventions. Fortunately, it is

relatively straightforward to extend the categorical latent growth model to a generalized linear growth *mixture* model (Feldman et al. 2009). As is the case for continuous outcomes, different latent trajectory classes can be characterized by class-varying mean and variance structures for the growth factors. For example, the developmental change process for one latent subgroup may be perfectly captured by an intercept and a linear slope, while for another subgroup, an additional nonlinear slope is needed.

In addition to modeling nonlinear change and developmental heterogeneity, it is possible that developmental differences cannot be captured by continuous or discrete individual variability around a structured function of time (i.e., intercept, linear, and nonlinear slope). Longitudinal latent class analysis (LLCA: Vermunt et al. 2008; also known as repeated measure latent class analysis, RMLCA: Collins and Lanza 2010) can be used in such situations. LLCA is the application of latent class analysis to repeated outcomes, and unobserved heterogeneity in the developmental response profiles is captured exclusively by a categorical latent variable. In comparison to a growth model which models time-scaled change, LLCA models the longitudinal patterns of discrete states (see, e.g., Feldman et al. 2009; Liu et al. 2010; Liu et al., in press).

In the above-discussed three modeling extensions (nonlinear change, generalized linear growth mixture model, and longitudinal latent class analysis), the inclusion of antecedents and distal outcomes plays an important role. The use of such auxiliary information, potentially derived from substantive theory, is highly relevant to determine the concurrent and prognostic validity of specific growth factors and developmental trajectory profiles derived from a particular data set (Kreuter and Muthén 2008; Petras and Masyn 2010). That is to say, the inclusion of auxiliary information in these models is a necessary step in understanding as well as evaluating the fidelity and utility of the resultant trajectory profiles from a given study. In the simplest case, auxiliary information can consist of observed univariate or multivariate variables measuring predictors or distal outcomes. However, the auxiliary information could itself be a latent variable with its own measurement model and can consist of repeated measures which are observed sequentially or concurrently and modeled simultaneously with the change process of the outcome.

Clearly, these models hold great potential for aiding empirical investigations of developmental theories of normative and non-normative behaviors and risky outcomes across the lifespan. In no way is this more evident than in the marked increase in their use among applied researchers in criminology and other behavioral sciences. However, there is still much opportunity in the realm of methods development to capitalize on the potential of these models and extensions to better accommodate the complexities of developmental theories. And, as with any statistical tool, the research question, along with previous theoretical and empirical work, should guide these models' application in a particular study, with thoughtful and purposeful choices for model specification, selection, and interpretation.

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