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**DELINQUENTS AND THEIR FRIENDS:  
THE ROLE OF PEER EFFECTS AND SELF-SELECTION**

A Thesis in

Crime, Law, and Justice

by

Jeffrey M. Ackerman

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The thesis of Jeffrey M. Ackerman has been reviewed and approved\* by the following:

Richard B. Felson  
Professor of Sociology and Crime, Law, and Justice  
Thesis Advisor  
Chair of the Committee

D. Wayne Osgood  
Professor of Sociology and Crime, Law, and Justice

Michael P. Johnson  
Associate Professor of Sociology, African and African-American Studies,  
and Women's Studies

Joseph L. Schafer  
Associate Professor of Statistics

Glenn Firebaugh  
Professor of Sociology and Demography  
Head of the Department of Sociology

\* Signatures are on file in the Graduate School.

## ABSTRACT

This project examines the close behavioral similarity between adolescent friends, a finding that scholars have consistently observed in prior research. Ostensibly, the similarity suggests that friends mutually influence one another through the reinforcement of pro-delinquent values, the modeling of skills necessary to commit criminal offenses, and/or the normative conformity to behavioral expectations. An alternative interpretation, however, is that the behavioral similarity reflects the reality that adolescents prefer friendships with like-minded peers. In other words, adolescents self-select friends who already behave as they do.

Measurement artifact is another explanation of the similarity, which occurs because researchers have often obtained information about an adolescent's friends from survey respondents themselves rather than from the friends directly. Survey respondents, however, often fail to report their friends' behaviors accurately.

This project also examines the relative degree to which males and females conform to their peers, a long-standing issue in social psychology. The social psychological evidence often suggests that females are more conforming than males are; however, evidence also exists that group differences and other aspects of conformity are behavior specific. Therefore, research suggesting that females conform more to group opinion about light movement or innocuous behaviors may not generalize to delinquent outcomes.

In order to more fully examine these issues, this thesis uses data from the National Longitudinal Survey of Adolescent Health, a recently available data set based upon a large, nationally representative sample of high school students. Using these data, this project examines how closely changes in adolescent delinquency correspond to changes in the behavior of their friends. It also examines the role that delinquency plays in friendship selection and termination.

The major findings include: (a) correspondence between changes in male respondent delinquency and changes in male friend delinquency, (b) little to no evidence for the importance of delinquency for friendship termination decisions, (c) evidence of same-gender rather than opposite-gender short-term effects, and (d) a modest delinquent similarity among adolescent friends measured prior to the formation of the friendship that may be explained by similarity in characteristics associated with delinquency.

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## INTRODUCTION

A desire to increase our knowledge of the degree to which adolescents influence the delinquency of their friends underlies the four major objectives of this thesis.

The first objective involves revisiting questions pertaining to the relative importance of the adolescent friendship group in shaping the delinquency of our youth. Although a substantial literature on this topic already exists, it demands additional inquiry because prior research has often relied upon inadequate measures and cross-sectional data, which may overstate the significance of the peer group and may understate the importance of other factors associated with adolescent delinquency.

The second objective of this thesis involves the investigation of gender as a moderator of interpersonal influence. In other words, are young men influenced to a greater or lesser degree by their friends than young women are? Going beyond prior criminological research, which has rarely addressed this question, this thesis differentiates target gender (i.e., the adolescents whom we are studying) from source gender (i.e., the gender of the friendship group), in order to disentangle the effects of each.

The third objective expands discussions of peer influence by arguing that criminological research has defined social influence too narrowly by concentrating almost exclusively on two mechanisms – *socialization*, the transmission of delinquency through the alteration of attitudes, and the learning of offense-specific skills. This narrow definition of social influence has resulted in ignoring the changing nature of adolescent delinquency and whether recent behavioral changes in the friendship group correspond to changes in the adolescent's delinquency. If there were such a correspondence, then perhaps interpersonal influence mechanisms other than long-term socialization are important. In other words, if the behavior of friends is an important factor for explaining adolescent delinquency, then friends' *recent* behavior may be more important than friends' *past* behavior. The mechanisms underlying recent behavior may include, but are not limited to, what some literatures describe variously as peer pressure, situational influence, short-term influence, and audience effects.

Previously, the criminological literature largely has examined either cross-sectional data, which is unable to differentiate selective-attractive mechanisms from interpersonal

influence, or has examined the effect of *past* exposure to delinquent friends upon the *future* delinquency of adolescents. In contrast, this aspect of my thesis questions the extent to which *recent* friends affect the *recent* delinquency of adolescents, while also controlling for self-selection effects.

The fourth objective investigates the role of delinquency in friendship selection and termination. Again, scholars in other fields have examined this issue to some degree, while criminologists have largely ignored questions surrounding this topic. Adolescents may purposely select friends based upon shared delinquency, however, they may also select friends based upon more observable traits, such as race, age, or religiosity, that correlate with delinquency. Adolescents may also terminate friendships when the behavioral similarity between friends is incongruent.

Unfortunately, scholars sometimes are not as familiar as they might desire with theoretical perspectives differing from their own. Believing that familiarity and the integration of different perspectives will further our understanding of social phenomena, I review, evaluate, and incorporate the relevant literature pertaining to social influence from sociological, criminological, and social-psychological perspectives in this project in order to better incorporate the objectives mentioned above into my research.

In the first chapter, I review the criminological literature pertaining to social influence, and follow with a review of the social-psychological literature relevant to this topic in chapter two. In both chapters, I emphasize the cumulative development and elaboration of theoretical perspectives from a historical standpoint. A major purpose for these reviews is to prepare the theoretical foundation for arguing that if situational and shorter-term forms of social influence vary across time and if they are as important as the social psychological literature suggests, then exposure to the delinquency of current or recent friends may be more important than historical exposure to prior friends. Thus, the lagged regression models, which prior criminological research has emphasized, are no better than, and are likely worse than, the alternative models of change I describe in subsequent chapters.

In chapter three, I discuss theoretically important moderators of interpersonal influence, with a principle emphasis on gender. Particularly important to this chapter is a review of the persuasive communication literature as it pertains to gender. Criminologists largely are

unfamiliar with this literature, and thus have omitted these important perspectives from informing crime and deviance research.

In chapter four, I delineate five related hypotheses divided into three major categories: (a) selective attraction, (b) deselection, and (c) social influence. I argue that each mechanism provides partial explanation for the behavioral similarity we observe among adolescent friends. Collectively, these mechanisms comprise three of the four major components of adolescent behavioral similarity. Unfortunately, this thesis largely excludes an examination of the fourth major element of behavioral similarity – shared environment. While I review aspects of this fourth element, the investigation of its importance is beyond the scope of this manuscript.

In chapter five, I describe the data and methods I rely upon in this project, and outline my rationale for choosing them. These methods expand upon prior research by isolating (to the degree possible) extraneous factors that have hampered prior analyses on this topic. These extraneous factors include shared environments and the selective attraction to similarly behaving friends. Ideally, I would like to examine how changes in peer group behavior *immediately* affect changes in respondent behavior. There is only one data set, however, that approaches the requisite measures for such research, and it contains only two waves of data collected one year apart. Thus, data limitations permit an examination only of the effect of yearly change in recent peer-group behavior upon yearly change in adolescent behavior. Even so, to reiterate a point I mentioned above, change models have important benefits relative to the lagged regression and cross-sectional models that criminologists have traditionally utilized when investigating matters of interpersonal influence among adolescents. Therefore, their use is adequately justified as an important improvement over prior research designs.

## CHAPTER 1

### INTEPERSONAL INFLUENCE IN THE CRIMINOLOGICAL LITERATURE

#### **The Antecedents of Peer Influence Research: The Chicago School**

Several authors cite the early work of Shaw and McKay as an important antecedent to the study of peer influences on adolescent delinquency. Shaw and McKay were primarily interested in the study of social disorganization in Chicago neighborhoods rather than peer influence, and are best known for determining that the delinquency rates of Chicago neighborhoods during the mass immigration in the early 1900's remained stable over time regardless of which ethnic group occupied the area. Their findings were among the first to indicate that factors other than biological differences explained variation in neighborhood crime rates.

During their neighborhood disorganization research, however, Shaw and McKay found that that almost 90% of the delinquent acts brought to the Cook County Juvenile Court involved two or more participants (1929). This finding signaled some form of group or social influence process involving the *transmission* of delinquency from one individual to another.<sup>1</sup>

Shaw and McKay attempted to integrate this finding into their social disorganization research that was investigating the effects of a changes in the ethnic composition of neighborhoods. They suggested that as the ethnic group occupying a neighborhood changed, the original inhabitants of the neighborhood influenced the delinquency of the new inhabitants. They failed to elaborate, however, on the mechanism that they considered a prerequisite for the initial motivation to offend, while also failing to explain why this influence mechanism was a necessary aspect of their theory about how social disorganization explains variation in delinquency across neighborhoods. The ambiguity of their writing on this issue was evident even to their own staff (Bursik 1988; Kobrin 1971), and led Kornhauser (1978) to proclaim that Shaw and McKay's brief mention of social influence was not an integral part of their theory or

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<sup>1</sup> Authors such as Breckinridge and Abbott (1917) proclaimed the group nature of delinquency before Shaw and McKay. Shaw and McKay, however, are the most quoted (e.g., Matsueda, 1988).

research. Other criminologists have followed Kornhauser's interpretations, attributing only a social control aspect to Shaw and McKay's theory of social disorganization (Heimer and Matsueda 1994). Thus, while Shaw and McKay's mention of the group nature of delinquency helped spark later social influence research, and while their findings suggested that differences in biology did not underlie ethnic differences in delinquency rates, they remain known primarily for their work on social disorganization rather than interpersonal influence.

### **Sutherland and Differential Association**

Although the work of Shaw and McKay was a large impetus toward removing delinquency research from the realm of biology, medicine, and psychiatry, it was Edwin Sutherland who most clearly established the sociological model of crime research, largely through his theory of *differential association* (e.g., Laub and Sampson 1991). Sutherland began preliminary discussion of social influence in the second edition of his textbook (1934), but the completed version of his theory came in the 1947 edition (1947). By that time, Sutherland was aware of delinquency's group nature from the studies of Shaw and McKay and other researchers. Sutherland's emphasis on the importance of friends failed to fit the themes of Lombroso's theory of morphology and Goddard's theory of feeble-mindedness, which were the prevalent criminological perspectives of the time (Cohen, Lindesmith, and Schuessler 1956).

Sutherland proposed that individuals learn to commit crime in the same way as they learn other behavior – through social interactions, primarily those within intimate personal groups. In Sutherland's opinion, peer groups influence individuals by transmitting the motives, rationalizations, and attitudes that facilitate deviancy, as well as the explicit techniques and expertise required to commit specific offenses or avoid detection thereafter.

Sutherland believed that individuals become deviant when their accumulation of *definitions*<sup>2</sup> favorable to law violation out-weigh definitions unfavorable to violation. Social interactions expose individuals to varying degrees of pro- and anti-delinquent definitions, and provide the opportunity for delinquents to transmit their values to others. Sutherland theorized that the frequency, duration, priority, and intensity of the interactions govern the extent of their

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<sup>2</sup> Contemporary authors typically interpret this term as closely paralleling *attitudes*.

impact. Earlier exposures to pro-deviant attitudes, for example, and exposures from intimate sources, are more influential than later or less intimate exposures.

While Sutherland was far more specific about the nature of peer influence than Shaw and McKay were, like his predecessors he never paid attention to the actual mechanisms of this influence beyond brief mention that the learning of delinquent behavior involved more than imitation (Akers 1998; Sutherland 1942). Sutherland acknowledged, however, that the learning of specific offending skills was less salient than exposure to pro-delinquent attitudes and rationalizations, which allowed the *able* to become *willing* participants in deviant acts, primarily because the techniques of crime are relatively simple to learn and are often acquired by early adolescence (Jackson, Tittle, and Burke 1986). Simply knowing how to commit crime is not enough; deviancy, in Sutherland's view, required an excess of pro-delinquent versus conforming values (Akers 1998; Jackson, Tittle, and Burke 1986; Sutherland 1942).

Several early authors recognized the ambiguities in Sutherland's writings. They noted that Sutherland never formulated his hypothesis in operational terms and questioned whether any aspect of his theory lent itself to operationalization without reformulation (e.g, Short 1960). For example, how could we possibly measure the cumulated exposure to delinquent versus non-delinquent *definitions*? Understanding the state of quantitative sophistication during the mid-1900s, however, allows us to place Sutherland's lack of specificity about the actual leaning mechanism in proper perspective.

Like other social scientists of his time, *analytic induction*, an early scientific philosophy pioneered by Thomas and Znaniecki (1920), influenced Sutherland's thought. This early form of analytic reflection required its proponents to modify their tentative hypotheses if their theory fails to predict a single case and thus contrasts with the modern understanding of probability (Akers 1998; Hirschi 1996; Matsueda 1988; Schuessler 1973). Almost by definition, this perspective mandates overly-broad explanation, and led Sutherland to proclaim that, "the conditions which are said to cause crime should always be present when crime is present, and they should always be absent when crime is absent" (1955 p. 74).

For these reasons, Sutherland never explained precisely what he meant by *definitions*, nor did he explain whether the influence process was a generalized learning of delinquent attitudes or learning that was offense specific (Jackson, Tittle, and Burke 1986). He also

provided no insight into how one might empirically test his ideas. For Sutherland, individuals become deviant when their accumulated lifelong pro-delinquent influences outweigh their accumulated anti-delinquent influences – factors nearly impossible to quantify (Jackson, Tittle, and Burke 1986). Also impossible to measure is Sutherland's idea that accumulated early exposure to delinquent values continues to exert influence upon individuals until outweighed by more proximate exposure to anti-delinquent messages. In Sutherland's view, social influence is a *process* of learning that takes time; once adolescents accumulate learned pro-delinquent values, time is required to accumulate the anti-delinquent values that might counteract the negative values learned earlier. His propositions, however, are un-testable without a lifelong measure of exposure to these influences.

Although Sutherland's early attempts to understand peer influence were vague, several authors have argued that Sutherland's theory remains an important heuristic for organizing our knowledge of crime (Cressey 1960; Matsueda 1988). For this reason, later authors revised Sutherland's ideas rather than rejecting them. As Matsueda (1988) noted, the revisions endeavored: (a) to explain the origin and persistence of delinquent subcultures (Cloward and Ohlin 1960; Cohen 1955; Miller 1958), (b) to incorporate principles of symbolic interaction (Cressey 1954; Glaser 1956; Weinberg 1966), and (c) to incorporate the principles of modern social learning and behaviorist theories (Akers 1977; Burgess and Akers 1966; Jeffery 1965).

### **Countercultures and Subcultures: Miller, Cohen, Wolfgang, and Curtis**

During the 1950s, several sociologists sought to clarify Sutherland's writing by elaborating upon the origin and persistence of delinquent cultures unaddressed by Sutherland's theory. In doing so, they attempted to account for: (a) the content of what delinquents learn, (b) the source of pro-delinquent attitudes, and (c) the social-structural factors that contribute to the emergence of these attitudes (see Kitsuse and Dietrick 1959; Matsueda 1988).

Cohen, the best known of these early theorists, subscribed to Merton's (1938) notion that the etiology of lower-class culture begins with *social strain*, generally defined as a gap between a person's desire to achieve socially determined status goals and their actual means of doing so. When and where this gap exists, individuals will view alternative (but achievable) means of gaining status as advantageous relative to conventional, although unachievable, means of gaining status.

Cohen argued that perhaps the social structure of Shaw and McKay's *delinquency-areas* provided residents with few opportunities for achieving status by conventional means. Over time, these residents became increasingly frustrated by a failure to achieve middle class standards. Because younger adolescents were also *strained* by the same failure, they became particularly accepting of the delinquent values and beliefs pervasive in their communities (1955).

Through contact with parents, older peers, and other residents, adolescents living in the disorganized areas learned the norms and customs of a culture of delinquency, which stresses "an inverted moral code celebrating malicious and hostile hedonism," and considers "misdeeds praiseworthy if not good" (1955). In other words, a *counterculture* exists in high delinquency areas where residents adapt to lower-class disadvantage by actively rebelling from unachievable middle-class values. While the middle-class values emphasize ambition, cultivation of skills, postponement of gratification, control of aggression, education, employment, and adherence to the legal system, the counterculture substituted diametrically opposed values. Furthermore, Cohen argued that the stability of the structural disadvantage across time permitted a continuing cycle of socialization into the delinquent culture across generations, thus explaining the stability of these areas' high crime rates regardless of the ethnic group that inhabited the area.

Like Cohen, Walter Miller (1958) argued that an alternative system redefining the criteria of status exists among lower social class groups. Miller, however, questioned Cohen's conclusion that we should describe the alternative value system as a counterculture. Instead, Miller believed that the value system of lower class neighborhoods are *subcultural* rather than counter-cultural. The subcultural status system of the lower-class contrasts with middle class values, but the contrast is not due to active rebellion or a desire to violate middle-class norms as Cohen argued. Instead, the adherents of a delinquent culture conform to a normative system characterized by an inherently attractive set of values.

Miller described the system of lower-class values as having six important *focal concerns* that he ranked in the following order of importance: (a) *trouble*, (b) *toughness*, (c) *street-sense*, (d) *excitement*, (e) *fate* (the view that outcomes are beyond the control of the individual), and (f) *autonomy* (independence from authority and rules). Lower-class adolescents

often valued the ability to fight, for example, but typically only under conditions where one would not bring *trouble* to oneself or one's family through the unwelcomed intrusion of middle-classes agents of social control.

Later authors retained Miller's basic premise, but focused on group differences in pro-aggressive attitudes rather than delinquent attitudes in general (e.g., Curtis 1975; Silberman 1978; Wolfgang and Ferracuti 1967), or felt that fighting ability was the most valued among a range of delinquent status criteria (e.g., Kobrin, Puntil, and Peluso 1967). According to these views, members of low socio-economic groups who fail to gain self-esteem and status by following the traditions of the dominant culture create alternate status systems based upon manliness and a quick aggressive response to perceived status threats. Because aggressive reaction to perceived status threats are normative in violent subcultures, there may be social penalties for *non-violent* response – ostracism or labeling as an easy target – someone who is unwilling to fight back (Short and Strodtbeck 1965) (also see Anderson 1994; Anderson 1997; Anderson 1999).

While these early subcultural and countercultural theorists provided rich descriptions of the nature of the purported delinquent subculture, they often failed to distinguish between the emergence of the alternative culture and its maintenance – elements that do not necessarily result from the same cause. Socialization processes, for example, could maintain culture norms and values from generation to generation, even if the culture's etiology had roots in structural disadvantage that now is greatly diminished. In other words, peers may transmit delinquent culture across generations through some type of social influence process even absent the social strain originally responsible for its emergence (Kitsuse and Dietrick 1973) (also see Sampson and Wilson 1995; Wilson 1991).

### **Justifications versus Subculture: Sykes and Matza**

Unlike those advocating subcultural or countercultural explanations for delinquency, Sykes and Matza claimed that delinquents are “more or less” committed to conventional beliefs. During the 1960s, they outlined two distinct theoretical perspectives summarizing their views. First, they argued that delinquents counteract feelings of guilt by developing specific justifications (neutralizations, which precede behavior; and rationalizations, which follow it) for their actions (Cressey 1952; also see Cressey 1953; Cressey 1954; Scott and Lyman 1968;

1957). Justifications make offending possible by defining deviancy as “acceptable if not right” given the circumstances, even when individuals retain the belief that their behaviors are unjustified under different conditions.

Sykes and Matza preserved Sutherland’s major argument that individuals learn definitions favorable to violations of law in interaction with others, but emphasized that justifications are the crucial component of the learned values. Thus, differential learning of justifications rather than different subculture or countercultural values explained group differences in delinquency. Later research supported Sykes and Matza’s basic premise, through evidence indicating that virtually all groups condemn the use of force or fraud in human interaction and endorse values contrary to crime (Ball-Rokeach 1973; Cao, Adams, and Jensen 1997; Dominick and Greenberg 1972; Erlanger 1974; Heimer 1997; Kornhauser 1978; Nettler 1984; Newman 1976; Rossi, Waite, Bose, and Berk 1974; Sampson and Bartusch 1998; Shoemaker and Williams 1987; Short and Strodtbeck 1965; Suttles 1968).

Sykes and Matza’s second argument followed from the writings of Thorstein Veblen (1924). Like Veblen, Sykes and Matza argued that both delinquents and non-delinquents value thrills, excitement, and adventure, but the middle-class has the ability to express these values at the *right* time through the *proper* channels. For example, the lower-class and the middle-class both value violence, but the middle-class has the ability to express this value through magazines, television, and books (Matza and Sykes 1961).

These two theories of delinquency, particularly Sykes and Matza’s theory of neutralization, continue to influence contemporary social thought (e.g., Bersoff 1999). For example, several authors cite Sykes and Matza’s work when suggesting that subcultural theories of crime causation may still hold relevance in spite of the lack of differences in pro-delinquent values across cultures and ethnic groups. They argue that global attitudinal differences across groups that favor law-violation may not exist, but there may be localized rules among members of smaller groups specifying exceptions to generally law-abiding group expectations. In other words, there may be occasions where a greater *tolerance* for deviance exists under certain *specific* circumstances, even when the majority does not value crime as a general goal. In particular, a tolerance for certain forms of deviance is more probable in minority neighborhoods where residents have good reason to exhibit cynicism toward the legal

system due to the unresponsiveness of the criminal justice system or the inequitable application of formal social control strategies (e.g., Sampson and Bartusch 1998).

Other contemporary sociologists have elaborated upon Sykes and Matza's general theme by arguing that while most groups do not value violence or crime as primary goal, crime is nevertheless expected and tolerated as an unpleasant fact in social contexts where the expression of wider cultural values in socially appropriate ways is unviable. Anderson (1978; 1990; 1994; 1997; 1999), for example, described the inability of "decent" families to abide by their own non-violent values in neighborhoods where quick resort to violence is functional.

### **Social Learning: Burgess and Akers**

Burgess and Akers (1966) elaborated differential association theory by incorporating concepts from the behaviorist psychology of B. F. Skinner (1938; 1948), as well as modern concepts of vicarious learning associated primarily with Albert Bandura (1977; 1986; 1963).

Like behaviorist theories, the basic tenant of social learning theories is that individuals repeat rewarded behavior and cease punished behavior. Unlike behaviorist theories, social learning theory adds that individuals learn to anticipate rewards and punishments not only through direct experience as Skinner suggested, but also by observing others. Burgess and Akers applied Bandura's approach specifically to criminal behavior by arguing that like conforming behavior, individuals learn to offend by observing and communicating with others about the circumstances leading to reward and sanction. Individuals initially learn crime through direct imitation or modeling while reinforcement determines its persistence. When people perceive criminal behavior as more rewarding than non-criminal behavior, the former becomes likely. Rewards may result from the intrinsic benefits of the act itself, or from specific rewards including status and acceptance by others who value the act. Burgess and Akers thus amended Sutherland's theory by suggesting that the probability of criminal behavior is a function of the amount, frequency, and probability of its direct or vicarious reinforcement.

Although Burgess and Akers' social learning theory improved upon the specificity of Sutherland's theory of differential association, it left many questions unanswered. For example, as a solo author Akers continued to write about social learning. He noted that the balance of delinquent versus conforming learning usually "exhibits some stability over time, but it can

become unstable and change with time or circumstances” (1998:501). Akers never elaborated, however, on the factors that might cause the instability.

Although Akers emphasized one primary form of social influence – the transmission of pro-delinquent values, attitudes, or beliefs resulting in some degree of stable, internalized, cognitive change in the recipient, he also argued that attitude changes do not always accompany the behavioral changes instigated by peers (1985). Instead, imitation, modeling, or vicarious reinforcement rather than attitude transmission might be the potential mechanisms of this form of social influence. He did not specify, however, the theoretical mechanism presumably underlying the imitation. Perhaps Akers had in mind early developmental research, which suggested that individuals are socialized into patterns of spontaneous imitation when raised in environments where the imitation of others is a method of gaining social approval (Bandura and Huston 1961; Sears, Maccoby, and Levin 1957). Alternatively however, he may have been envisioning the possibility that individuals learn new reward and punishment contingencies while observing others.

### **Attitudes versus Behavior: Warr and Stafford**

Drawing upon Akers’ discussion of imitation, Warr and Stafford (1991) provided evidence to suggest that the *attitudes* of friends are not the salient influence, but rather the *behavior* of friends is the important aspect of learning. Relying on lagged regressions using three waves of the National Youth Survey (with three different outcome measures: cheating, theft, and marijuana), these authors concluded that while peers do transmit pro-delinquent attitudes to each other and these attitudes subsequently produce delinquent behavior, variation in the delinquent *behavior* of friends explains differences in adolescent delinquency better than variation in the friends’ *attitudes* does. In other words, individuals sometimes model the behavior of others without changing their attitudes about the propriety of the modeled behavior.

Like Akers, Warr and Stafford emphasized vicarious learning by arguing that an adolescent’s perceptions of reward and punishment may be altered when the adolescent observes the behavior his or her friends. In other words, individuals may learn to fear (or not fear) legal sanctions by observing the consequences of friends’ behavior. When individuals see their friends’ deviance rewarded rather than punished, they are more likely to duplicate the behavior.

### Short-term Social Influence

Recently, Warr (2002) emphasized that an adolescent's delinquency parallels the current friendship group more closely than prior friendship groups. Because the similarity between a respondent's present behavior and his or her friends' behavior at earlier ages declines rapidly as the time interval between the two increases, Warr argued that situational or short-term influences likely are more important than long-term influences.

Warr, however, was not the first to mention short-term influence in the criminological literature, a credit that probably belongs to Short and Strodtbeck (1965) and Briar and Piliavin (1965). These authors argued that adolescents who associate with deviant peers are more likely to offend regardless of the degree to which their own attitudes are altered to favor deviancy. Briar and Piliavin, for example, suggested that all boys experience short-term situational desires to portray courage and loyalty in the presence of peers.

The key distinction between short-term forms of social influence and the forms of influence that various social learning perspectives describe (including Sutherland's "differential association") is the continuation of the influence after contact with an influence source terminates. Short-term influences occur contemporaneously with or shortly after the introduction of the influence source and terminate shortly after the contact concludes. In contrast, social learning theory describes attitudinal or similar influences that continue after the influence target terminates contact with the influence source.

For example, although Sutherland argued that *associations* with deviant peers produce social influence, contemporary social learning theories argue that it is not simply associations that create change, but rather the learning that follows from such associations – and this learning takes time (Horney, Osgood, and Marshall 1995). According to social learning theory, long-term influences alter behavior only after they produce the cognitive changes, while Sutherland's differential association theory suggests that behavioral change occurs only these influences alter the balance of pro- versus anti-delinquent messages. In contrast, the desire to portray courage in front of the peer group that Briar and Piliavin described occurs only in the presence of important others whom the individual wishes to impress (more specifically, the influence may remain under conditions whereby the individual *perceives* that an important other may learn of the individual's behavior).

We might describe the theoretical mechanisms underlying short-term influence as a close parallel to social control mechanisms. Hirschi, for example, proclaimed that attachment to conventional others was one of four principle factors that constrain deviancy. Attached individuals refrain from the performance of disapproved behaviors as they are unwilling to risk losing the social rewards accompanying the attachment (1969). Hirschi did not believe that delinquents strongly attach to each other. Instead, they attach only to conforming others. Thus, he argued that attachment to others *always* constrains rather than facilitates delinquency. A delinquent could not influence another to commit acts of delinquency because delinquents are unable to form the requisite attachment. Other theorists, however, have presented evidence to the contrary (e.g., Giordano, Cernkovich, and Pugh 1986).

Using data from the Richmond Youth Study (see Hirschi 1969), Jensen (1972) provided some of the earliest quantitative evidence in the criminological literature supporting the importance of influences that do not involve attitude change. Like other criminologists of the time, he found a moderate degree of behavioral similarity among adolescent friends. Unlike others, however, the similarity he observed remained relatively constant across subgroups of respondents who had unfavorable, neutral, or favorable *definitions* toward law violation. Because controlling for attitudes did not alter behavioral similarity, Jensen argued for the importance of “group pressure, group process, and short-term situational motivations in the explanation of delinquency” (1972:573).

Other scholars have argued for the importance of short-term influence by noting that many delinquent behaviors occur in short-lived groups where members have little regard for one another (Bursik and Grasmick 1993; Gottfredson and Hirschi 1990; Short and Strodbeck 1965; Suttles 1968; Yablonsky 1970). Gold (1970), for example, described the typical group offense as analogous to a *pick-up game of basketball* where the players depend on who occupies the playground at the same time. When an opportunity for delinquency (basketball) arises, those present may choose to play, but then go their separate ways after the game concludes. In other words, if group dynamics are involved, they may be of short-term relevance and involve conformity to group norms, or the passage of information about offending opportunities, rather than longer-term changes in attitudes conducive to crime.

More recently, Horney and colleagues presented evidence of *short-term* changes in adult deviancy. Their study of newly convicted male offenders examined how month-to-month variation in attachments to institutions of social control affected offending. In particular, the offenders exhibited less offending during months they were attached to a spouse. The authors suggested that the constraining effect of the attachment may occur “either because the individuals perceive that they have more to lose, or that their sense of shame is enhanced when the reactions of a significant other person are considered” (Horney, Osgood, and Marshall 1995:670). If the mechanism of control is the latter, then perhaps the male offenders did not wish to risk losing the affection of wives who disapprove of social deviance. According to this scenario, the wives exerted social influence constraining deviant behavior through their ability to withhold approval or exert social punishments. Alternatively, if the men anticipated the inevitable physical separation from the spouse accompanying incarceration, than a different mechanism of control tied more closely to deterrence theory would be the mechanism responsible for the desistance. While we would require further research to assess if social influence or deterrence were responsible for the desistance, we can be certain that differential learning perspectives, which do not predict rapid changes in month-to-month offending measures, are not viable explanations for these findings.

Other criminologists have described similar forms of short-term social influence (often described from the social control perspective), which occur absent cognitive changes in delinquent values (e.g., Caspi, Lynam, Moffitt, and Silva 1993; Elifson, Petersen, and Hadaway 1983; Felson, Liska, South, and McNulty 1994; Simcha-Fagan and Schwartz 1986; Smith and Jarjoura 1989). The role of audiences is prominent in this literature. According to this perspective, audiences exert influence upon an individual’s behavior through a social control function that facilitates or constrains offending – particularly offending that involves aggression (Baumeister and Cairns 1992; Borden 1975; Felson 1978; Felson 1982; Felson, Liska, South, and McNulty 1994; Shotland and Goodstein 1984). Individuals, especially males (Felson 1982), may attempt to present themselves as powerful or otherwise promote their self-image in the presence of others (Felson 1978; Horowitz and Schwartz 1974; Kobrin, Puntit, and Peluso 1967; Luckenbill 1977; Toch 1969). They may also behave as the current audience

expects them to behave if they fear reprisal or being labeled an *easy target*, particularly in contexts where strong norms mandate aggression in the face of provocation.

Audience effects may be overt, as in the case of a gang requiring a new member to perform a violent act; however, less obvious forms of this influence are more likely. Institutionalized youth, for example, may amplify rule violations through laughter, while their ridicule may constrain behavior that conforms to institutional rules (Buehler, Patterson, and Furniss 1966). Some influence may be even less overt than ridicule, as teenagers typically are aware of the behaviors required to achieve group status, thus making overt pressure unnecessary (Lightfoot 1992).

In sum, these perspectives presents an alternative view of social influence. According to these views, conformity to the *current* audience occurs through informal social control mechanisms rather than through the internalization of pro-delinquent attitudes acquired through social learning.<sup>3</sup> These perspectives also differ from learning theories because the social control aspect of this form of social influence is salient only under the direct observation of audiences, or under conditions where the actor perceives that the audience subsequently might discover their behavior.

Several researchers have described this form of social influence from an *impression management* perspective – the strategic presentation of the self in an attempt to control the impressions and reactions of others (e.g., Arkin and Shepperd 1990; Felson 1978; Goffman 1959; Leary and Kowalski 1990; Lindskold and Propst 1981; Schlenker 1980; Tedeschi 1981; Tedeschi 1990; Tedeschi and Lindskold 1976; Tedeschi and Melburg 1984).<sup>4</sup> Because individuals are aware that others are categorizing them, they seek to make the categorizations favorable (also see Weinstein 1969). They act in a manner to assert or maintain social identities – particularly identities of power and the ability to physically defend themselves. Because the positive reactions of others to powerful social identities reinforces the behavior, many see this approach as an extension of social learning theory.

Other scholars have described this form of social influence as one type of *contextual effect* (Blalock 1984; Boyd and Iversen 1979; Iversen 1991; Lincoln and Zeitz 1980; Mason,

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<sup>3</sup> The individual's *perceptions* of the audience's likely response, however, may involve social learning.

<sup>4</sup> Similarly, symbolic interaction theory suggests that behavior performed in private may reflect concern for the reaction of an internalized audience (Mead, 1934).

Wong, and Entwistle 1983; Mason, Wong, and Entwistle 1983; Raudenbush and Bryk 1986; Tannenbaum and Bachman 1964).<sup>5</sup> Statistical models indicate a contextual effect when a group-level mean predicts individual behavior independent of an individual's own value on the same measure.<sup>6</sup> Felson and colleagues, for example, found that a school-level measure of violent attitudes (the school mean) affected the behavior of individual students net of the student's own attitudes toward violence (1994). This finding suggests a school-level social control mechanism – students who attend schools characterized by a large percentage of violent adolescents are more likely to resort to aggression because the aggressive student audience expects it. Non-aggressive students who attend such a school would find themselves ostracized or a target for bullies if they failed to follow their fellow students' norms while under conditions of group surveillance.

### **Social Selection versus Influence**

Many of the theoretical perspectives presented thus far are based largely upon the observed behavioral similarity among adolescent friends and assume that strong peer influence is responsible for this similarity. Researchers since the time of the 1950's, however, have offered alternative interpretations of this finding.

Sheldon and Eleanor Glueck (1950), for example, argued that the influence of delinquent friends was largely irrelevant for delinquency. Instead, they suggested that parenting, biology, and socio-cultural forces are the salient explanatory factors of adolescent delinquency. For them, the similarity between the delinquency levels of adolescent friends was indicative not of peer influence, but of social selection – the preference of adolescents to associate with like-minded peers (also see Gottfredson and Hirschi 1990; Hirschi 1969; Wilson and Herrnstein 1985).<sup>7</sup>

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<sup>5</sup> The concept of a contextual effect was initially controversial (Hauser, 1970; Liska 1990). Eventually, however, initial skepticism receded. The construct is now widely accepted by sociologists (for comment on Houser, 1970 see Farkas, 1974).

<sup>6</sup> Various scholars have defined the term “contextual effect” in other ways. Some acknowledge the definition used herein, while also using the term to indicate an interaction between aggregate characteristics and individual factors (Miethe and McDowall, 1993). Others use the term to describe any type of aggregate level relationship (e.g., Krivo and Peterson, 1996). Both treatments fail to distinguish the difference between group composition and a true contextual effect that occurs due to a social control or similar mechanism.

<sup>7</sup> Later authors have used the term “homophilic selection” rather than social selection (e.g., Cohen, 1977), based upon Lazarfeld and Merton's (1954) use of the term “homophily” to describe the similarity between friends (also

The Gluecks' arguments, along with the later research of other scholars, however, have often failed to differentiate between selection based solely on similarities in delinquency levels *per se* and selection based upon other similarities that correlate with delinquency. Many arguments have also failed to recognize the role of structural factors in limiting an individual's access to potential friends. The lack of transportation, for example, limits the friendships of an adolescent who resides in low-income neighborhood to other adolescents who live nearby.

Similarly, a few authors have found that *proximity* (propinquity) alone is the single best predictor of friendship. Homans was one of the earliest scholars to describe this phenomenon when he stated that, "if the frequency of interaction between two or more persons increases, the degree of their liking for one another will increase" (Homans 1950). Research by Festinger and colleagues (1950), as well as Deutsch and Collins (Deutsch and Collins 1951) supported Homan's statement. Newcomb formally elaborated this principle in his *proposition of propinquity*, which states, "other things equal, people are most likely to be attracted toward those in closest contact with them" (1956:575).

In Newcomb's research, male college students, who were initially strangers, agreed to live together in exchange for room and board at the University of Michigan. At the end of the year, the strength of their attraction for one another depended to a great extent on how much contact they had with one another, rather than their initial attitudes and values. Newcomb explained that it was social interaction that was ultimately responsible for the relationship between propinquity and attraction that he and the earlier scholars had observed.

Later scholar noted that ascriptive characteristics like age (Savin-Williams 1979; Weisfeld and Billings 1988) and race (Clark and Drewry 1985; Hansell 1981; Rodgers, Billy, and Udry 1984; Taylor and Rickel 1981; Tuma and Hallinan 1979) following closely behind propinquity as predictors of attraction. Furthermore, visible or ascertainable characteristics, such as developmental maturity and pubertal onset (Caspi and Moffitt 1995; Stattin and Magnusson 1990), educational aspirations (Cohen 1977; Eder 1985), sexual behavior (Rodgers, Billy, and Udry 1984), and school failure (Cairns, Cairns, and Neckerman 1989) have all been cited as more salient than subtle and hidden characteristics like delinquent behavior as factors

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see, Kandel, 1973; Matsueda, 1988). Others have used the term "selective attraction" (Jussim and Osgood, 1989) and "self-selection" (Haynie, 2001).

that substantially influence friendship selection (Laumann 1973; Rodgers, Billy, and Udry 1984; Sykes, Larntz, and Fox 1976). Other important friendship selection factors include popularity, aggression, achievement, sports participation, cheerleading, attractiveness, and leadership (Cairns and Cairns 1994; McPherson and Smith-Lovin 1987; Rubin 1973; Warr 2002), although researchers have not ascertained their rank order relative to delinquency.

The actual basis for adolescent friendship becomes important if we are interested in determining whether the similarity in delinquent behavior exhibited by individuals who later become friends is actually responsible for that selection or whether the salient selection factor is something correlated with delinquency. For example, adolescents largely choose friends from among those attending the same school (Clark 1989), and schools will exhibit substantial variation in delinquency levels. Additionally, schools often assign students with similar grade point averages to the same classes, and classmates are more likely to become friends (Berndt and Keefe 1995; Clark 1989). Therefore, because grades correlate with delinquency, self-selection may explain the similarity among adolescent friends without delinquency itself being the basis for the selection.

If individuals select their friends based primarily upon similar delinquency levels rather than other factors correlated with delinquency, the question of how adolescents know about their friends' behavior arises. Smoking and drinking, for example, are easily observable social behaviors. Thus, an adolescent might use their knowledge about their potential friends' involvement in these activities when making friendship choices (Rodgers, Billy, and Udry 1984). In contrast, serious delinquency is uncommonly perpetrated, observed, and communicated. For these behaviors, it becomes more difficult to imagine how adolescents even know about their friends' involvement in them, much less use them as a basis for friendship selection.

### **Deselection and Rejection**

The criminological literature has traditionally focused solely on self-selection and influence when explaining the delinquent similarity among friends. Criminologists, however, have typically ignored the processes of *de-selection* and *peer rejection*. In fairness, however, self-selection, deselection, and rejection are so closely related that some researchers proclaim

their differentiation unimportant (e.g., Kandel 1996). Others, however, feel that the conceptual distinction is essential even if subtle (e.g., Ennett and Bauman 1994).

De-selection occurs in one of two ways. First, friendships may terminate after adolescents realize that original levels of dissimilarity generate incompatibility. In other words, adolescents may choose friends randomly, but terminate friendships when they realize a chosen friend fails to share common interests. After several cycles of random selection followed by the de-selection of non-similar friends, only those who were initially similar by chance remain. Alternatively, adolescents may choose a friend based on shared behavior, but terminate the friendship when the friend's behavior gradually diverges from their own.

The importance of de-selection for explaining group homogeneity is particularly salient for aggressive adolescents, particularly those who direct aggression toward friends. When this occurs, the target of aggression will often avoid the source (Asher and Coie 1990; Brendgen, Vitaro, and Bukowski 1998; Cairns, Cairns, Nekerman, Gest, and Gariépy 1988; Coie 1990; Parkhurst and Asher 1992; Patterson, DeBaryshe, and Ramsey 1989). In this sense, de-selection is similar to rejection, different only in the aspect that rejection implies that the friendship never existed. Behavioral homogeneity results here not because the non-aggressive adolescents actively select each other, but because they actively reject aggressive potential friends. In turn, the rejected adolescents find their pool of potential friends restricted (Kupersmidt, Coie, and Dodge 1990), leaving them with a choice of remaining friendless or associating with other rejected adolescents.

Most studies of deselection have concluded that both possibilities either do not contribute to group homogeneity (e.g., Billy and Udry 1985b; Fisher and Bauman 1988), or contribute only minimally and conditionally (e.g., Ennett and Bauman 1994). A possible reason for these findings is that adolescents *may not* reject aggressive peers, but instead reject the *targets* of aggression (Perry, Kusel, and Perry 1988). Other research has found that aggressive adolescents are equally accepted (they have the same number of reciprocated best-friends), and have equally close and meaningful friendships and colleagues (Cairns et al. 1988; Giordano, Cernkovich, and Pugh 1986). This conclusion contrasts with arguments made by Gottfredson and Hirschi (1990) who claim that delinquent and aggressive adolescents are unlikely to have close friendships.

The conclusions of prior authors about the relative importance of de-selection and rejection, however, have been based largely upon research involving status offenses such as smoking and drinking. Potential de-selection and rejection effects involving the dissimilarity with serious delinquent outcomes remains unexamined.

### **Reciprocal Processes**

In the past, researchers were prone to accept either the social influence or the social selection interpretation while completely discounting the other possibility. Social selection and social influence, however, may not be mutually exclusive, but instead may involve reciprocal processes (Akers 1998; Cairns and Cairns 1994; Cairns et al. 1988; Elliott and Menard 1996 ; Kandel 1978; Krohn, Lizotte, Thornberry, Smith, and McDowall 1996; Paternoster and Brame 1997; Patterson and Dishion 1985; Thornberry, Lizotte, Krohn, Farnworth, and Jang 1994). Individuals may sort themselves into relevant groups based upon initial similarity, but thereafter, peer influence may further increase the group's behavioral consistency. When negative peer influence increases an adolescent's delinquency, the cycle repeats, and the subsequent selection of delinquent friends becomes more probable.

While many contemporary scholars now agree that both self-selection and influence affect the behavioral similarity among friends, several authors continue to praise the virtues of one explanation while rigorously downplaying or completely excluding the other. A minority of published articles, for example, continue to advocate the importance of social influence explanations with little or no statistical control for self-selection effects, even while other scholars have proclaimed that any debate that totally excludes either process is, "ill-stated, as most researchers expect some combination of influence and selection" (Snijders and Baerveldt 2002:6).

Gottfredson and Hirschi, for example, have argued for the social selection interpretation of peer group homogeneity to the total exclusion of peer influence (1990). In contrast, Harris has recently argued in both the academic and popular literatures that peer influence is extremely powerful. While she does not specifically mention the delinquent behavioral similarity among adolescent friends nor the term *social selection*, she does stress the power of peer influence while largely excluding the importance of other sources of influence such as

parents. In sum, her view suggests that peers exert the *only* important social influence that creates enduring changes in the lives of adolescents (1995; 1998).

Unlike these extremes, most contemporary authors take a moderate view by arguing that each process has equal importance (e.g., Thornberry 1987), or by accepting both processes while also claiming that either peer influence (e.g., Akers 1994) or social selection (e.g., Cohen 1977; Matsueda and Anderson 1998; Reed and Rose 1991) is prominent. A few have realized, however, that the relative importance of selection and influence may depend on the behavior in question (Kandel 1978).

Perhaps the existence of reciprocal processes implies that scholars should direct effort toward understanding the *relative strength* of each effect. Many discussions about the relative importance of each process, however, do not consider that the selection of each new friend is a *distinct event*, while the influence of each peer continues for the duration of the friendship, potentially increasing similarity gradually over time (e.g., Kandel 1996). Likewise, a de-selection process is also cumulative. Dissimilarity is more likely to cause friendship termination as time increases. Thus, while it may make sense to speak about the relative importance of each process for explaining group homogeneity over a specific time period, the contribution of each process to group homogeneity may change depending upon the duration of the time period considered.

### **Shared Environment**

An often overlooked explanation for group behavioral homogeneity is a shared environment among group members. Jussim and Osgood, for example, have argued that if peers share the same social environment and this environment strongly influences pro-delinquent beliefs or offending opportunities, we should expect friends to exhibit behavioral similarities regardless of their influences upon each other (1989).

Likewise, Fischer and colleagues have argued that individuals who share social settings (where friendships are likely to form) are disproportionately homogeneous *prior* to their participation in these social contexts (1977). The social structuring of the settings facilitates contact with similar individuals and constrains contact with dissimilar others. The *frequent contact* among already homogeneous individuals subsequently leads to friendships with similar

peers even though the friends did not *deliberately* choose one another based upon their similarity (Feld 1982).

For adolescents, neighborhoods and schools comprise the primary shared social settings where the majority of social activities are likely to occur. Here, they regularly contact similar others under conditions where they also find a similarity of offending opportunities.

### **The Inadequacy of Cross-sectional Data in Interpersonal Influence Research**

Because estimates of the behavioral similarity of adolescent friends obtained from cross-sectional data include a combination of both selection and influence effects, it is inadequate for disentangling social selection from social influence and properly evaluating the degree to which reciprocal processes involving both phenomenon occur.

Many scholars have long recognized this fact; however, a majority of the criminological literature on peer influence repeatedly has based arguments and theoretical propositions largely upon conclusions derived from cross-sectional data. In a review of research, Kandel estimated that cross-sectional data analysis typically indicates twice the degree of interpersonal influence as longitudinal data indicates (1996), but only recently has longitudinal research begun to illustrate the extent to which cross-sectional research confounds selective attraction and peer influence.

### **Problems Associated with Measurement Artifact**

Because improved methods of measurement often indicate that adolescent friends *may be less similar* than commonly believed *even* in cross-sectional designs, several scholars have argued that problems of measurement artifact overshadow the problems of cross-sectional research (e.g., Bauman and Fisher 1986; Haynie and Osgood 2002).

These scholars are skeptical of the common practice of asking survey respondents to estimate their friends' behavior as a substitute for directly asking the friends to report their own behavior. The skeptics argue that respondent perceptions are a misleading measure of their friends' actual behavior because adolescents grossly overestimate the behavioral similarity they share with friends (Jussim and Osgood 1989).

The phenomena that underlie these overestimation tendencies in survey research fit into two broad categories: *projection*, which occurs primarily due to psychological mechanisms,

and *response-sets*, which are largely problems of instrumentation. Alternatives to survey research, such as the analysis of court and arrest records, have their own unique problems of measurement, which I address in separate sections below.

### *Projection, Assumed Similarity, and Similar Phenomenon*

A few scholars have used the umbrella term *projection* to describe a general tendency for individuals to assume a high degree of similarity between their own beliefs and the beliefs of others (e.g., Felson 1981; Jussim and Osgood 1989). This tendency occurs for a variety of generally related psychological reasons that scholars has labeled using closely related phrases.

While there is no standardized usage, scholars who have noted the strong assumption for married adults to believe that their partners share the same beliefs they do have often labeled the phenomenon the *assumed similarity bias* (Berscheid and Walster 1969; Bryne and Blaylock 1963; Levinger and Breedlove 1966), while researchers who have noted the more general phenomenon that *everyone* shares similar beliefs, have often used the term *false consensus effect* (Katz and Allport 1931; Ross, Greene, and House 1977). Similarly, those who have examined a dissonance reduction motivation in conjunction with this effect have used the term *egocentric attribution bias* (Heider 1958; Jones and Nisbett 1972). Regardless of the term used, or the precise mechanism underlying it, the projection effect implies that when a respondent reports the behavior of a friend, their report will be biased toward the respondent's own behavior.

### *The Inaccuracy of Respondent Perceptions of Friends' Behavior*

In research which supports the importance of considering the magnitude of the projection effect, several scholars have noted less behavioral similarity between adolescent friends when they used independent peer reports in their research relative to the similarity other authors found when they computed the similarity using respondent estimates. Research comparing the results obtained when scholars used both methods with the *same* sample of respondents has strengthened these conclusions. Iannotti and Bush (1992), for example, computed a .29 correlation between the substance abuse behavior of adolescents and their peers when they used the respondents' perceptions of their friends' behaviors, but only a .12 correlation when they used independent peer measures. Similarly, Huizinga and colleagues

(1992) concluded that their initial assumption of perceptual-measure legitimacy was mistaken when a .50 correlation between respondent and friends that the researchers initially calculated based upon perceived measures of similarity for both marijuana usage and minor delinquency dropped to .15 when they measured the similarity using independent measures.

From these and similar findings, Kandel (1996) concluded that survey research that relies upon respondents' perceptions of their peers' behaviors generally indicates correlations two to three times higher than survey research based upon direct peer self-reports (also see Bauman and Fisher 1986; Berndt and Keefe 1995; Erickson, Crosnoe, and Dornbusch 2000; Wilcox and Udry 1986).

The conclusions of Haynie and Osgood agreed with Kandel's assessment. Using cross-sectional data that relied upon the independent self-reports rather than respondent perceptions, Haynie and Osgood regressed target adolescents' delinquency on the delinquency of their friendship groups (2002).

After they controlled for several factors such as age, parental attachment, and school achievement, the standardized partial regression coefficient for the group's delinquency was only .12. Consequently, they argued that increasing the reliability and validity of friend behavior produces even lower effect size estimates of peer influence in cross-sectional analyses than estimates using longitudinal analyses that rely upon indirect measures of peer behavior.

Kandel estimated that research that combines the artifact problem with cross-sectional data analysis results in a five-fold overstatement. She noted, however, that the magnitude of the problems changes with nature of the offense, as adolescents report a several peer behaviors such as the cigarette and marijuana smoking more accurately than other peer behavior such as alcohol usage and delinquency. Bauman and Fisher, for example, found that correlations for cigarette smoking based upon perceptions were .56, while those based upon friends' reports dropped only to .42 (1986).

In contrast to Kandel's point that respondent estimates may overstate peer similarity in delinquent behavior, Warr (2002:44) dismissed the possibility that the similarity between friends is due to the "idiosyncrasies of self-report data" by citing four studies that used independent assessments of peer behavior rather than relying upon respondent estimates. Upon close inspection, however, three of the four studies that Warr cited confirmed rather than

contradicted Kandel's point of overstatement. Erickson and Empey (1965) calculated a correlation of .31 using official data for *general theft*, .27 for *serious theft* (primarily theft of items over \$50, but also auto-theft and burglary), and .27 for *common delinquency*, which included drinking, skipping school, and defying adults. Hepburn (1977) reported a correlation of .32 for his delinquency measure, while Aseltine (1995) found correlations between .2 and .3 depending on the offense. As Kandel mentioned, in each of these studies, the correlations were roughly half that found using other measurement methods. Reiss and Rhodes' (1964) results were an unexplained anomaly with correlations between .45 (for driving a vehicle without permission) and .61 (for theft over \$50).

In sum, the majority of cross-sectional studies using respondent estimates report correlations between friends' behavior and respondent behavior in the range of .4 to .6 for most offenses, while independent self-reports by the peers results in correlations near .3 for minor behaviors and near .1 for serious behaviors. The conclusion of Reiss and Rhodes is the only exception. We should also note that in the studies where researchers mixed minor and serious acts, the relatively minor acts would have dominated the delinquency score because of their higher frequency, thus biasing correlations upward.

### *Perceptions versus Reality*

There is no consensus that perceptions of peer behavior, even when inaccurate, are inappropriate for investigating peer influence. Several classical perspectives, principally those based upon symbolic interaction viewpoints, disagree by arguing that perceptions are more important than reality. Mead, for example, suggested that evolutionary instincts drive individuals to maximize their self-esteem (1934). Because self-concept and self-esteem are critically related to evaluations of the self by others, individuals adjust their behavior to conform to group norms (1918). The individual's *perceptions* of these evaluations (*reflected appraisals*) rather than the *actual* appraisals of others, however, are the critical component of this self-evaluation. Similarly, Cooley's concept of the *looking-glass-self* suggests that individuals create an identity, present it to the world, and then adjust their identity in response to the perceived reactions of others (1902; 1998).

W. I. Thomas, also central to symbolic interaction theory, suggested that, “if [people] define situations real, they are real in their consequences” (1928:572). Again, this phrase suggests that individuals respond not to reality, but to their perceptions of reality.

Early quantitative research confirmed that individuals’ self-perceptions are more closely related to reflected than actual appraisals. Later research, however, questioned the causal order of this relationship (see Shrauger and Schoeneman 1979 for a review). While early research “assumed that respondents’ perceptions of each other influence their own attitudes, but that their own attitudes do not influence these perceptions” (Jussim and Osgood 1989:100), some contemporary research has indicated that changes in an individual’s values produce subsequent changes in the individual’s *perceptions* of their friends’ values without accompanying changes the *objective* values of the friends.

The research of Jussim and Osgood (1989), most clearly illustrates this pattern. Using structural equation modeling and two waves of data, Jussim and Osgood specified a reciprocal relationship between a target adolescent’s values and the target adolescent’s *perception* of their best friend’s values. They found that the standardized path coefficient from the target’s values to the *perceived* values of the friend was stronger (.73 – the projection effect) than the path coefficient in the reverse direction (.63 – the effect of reflected appraisals). The direct effect of the friend’s values on the target adolescent (mediated by the target’s subjective perceptions), however, was only .11.

Felson (1981) also used longitudinal data to ascertain that visual-film-feedback did not increase the relationship between self-evaluation of athletic performance among football players and the reflected appraisals of their coaches. He concluded that the players were basing their estimates of the coaches’ appraisals upon their own appraisals, thus *projecting* their appraisals upon the coaches.

Felson argued that the projection effect is strong under conditions where barriers constrain the accurate communication of appraisal between an individual and others. Drawing upon the work of Goffman (1955; 1956; 1967), he argued that established norms of social interaction create stringent communication barriers that prevent individuals from accurately assessing reflected appraisals (1980).

While some might note that Felson's argument conveys the communication difficulties present for the assessment of perceived *appraisals* and not perceived *behavior*, others might argue that analogous communication difficulties underlie an adolescent's projection of their own behaviors onto friends when they are unable to ascertain their friends' behaviors directly. How do adolescents know, for example, about their friend's delinquent behavior? Two possibilities are probable. Either the friend (or a witness) told the respondent about the behavior, or the respondent jointly-participated in the act. If the former occurred, the accuracy of the second-hand report is questionable as adolescents are prone to exaggeration. If the latter occurred, the respondent would simply be reporting his or her own offending (Elliott and Menard 1996; Gottfredson and Hirschi 1987).<sup>8</sup> It is also possible, but less likely, that the respondent witnessed the act without participating (Elliott and Menard 1996).

### *Response Sets*

Like projection effects, response sets are another measurement artifact that may decrease the ability of survey instruments to accurately measure the behavioral similarity between friends. This artifact is a problem of instrumentation that occurs because individuals have certain habits that come into play when responding to questions in forced-choice surveys. For example, when given the alternatives *agree*, *uncertain*, *disagree*, people who exhibit a tendency toward acquiescence are more likely to answer *agree*, while people who exhibit a tendency toward evasiveness are more likely to answer *uncertain* (Cronbach 1946; Cronbach 1950).

For interpersonal influence research, which rests upon the measurement of behavioral similarity between the respondent and his or her friends, it is reasonable to question whether a similar pattern occurs in surveys that provide one set of questions about the respondent's conduct and a similar set of questions about the friends' conduct, particularly when the survey confines each set of answers to the same ordinal or interval range. Habitual orientation to either side of the scale, regardless of the underlying mechanism or personality characteristic responsible, will bias the degree of similarity between respondent and friendship group upward.

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<sup>8</sup> Gottfredson and Hirschi (1990) largely dismissed the idea that behavioral similarity resulting from co-participation is anything other than a methodological artifact based upon the prevailing criminological view that attitude changes mediate the relationship between contact with deviant peers and offending. They did not consider, however, that co-offending may suggest forms of situational influence that are not mediated by attitude changes.

While prior research has not yet documented the magnitude of this problem in the interpersonal influence literature, Cronbach noted that across numerous instruments that he and his graduate students have examined, they have never failed to find a single instrument immune to the problem. He also noted that response sets become more problematic with item difficulty and ambiguity (1950), characteristics that likely describe a survey's request to estimate the behavior of an entire group of friends.

### *Problems Associated with Governmental Records of Offending*

Differential-detection by criminal justice officials for *group* relative to *solo* offending is a potential third problem that might bias behavioral similarity estimates upward. Several scholars have noted that this problem is likely in research that has relied upon court and arrest records. These data often indicate that a groups of adolescents rather than sole offenders commit a large number of offenses that come to the attention of the criminal justice system. Recall from the earlier discussion about Shaw and McKay's research that findings pertaining to the group nature of delinquency date to the early 1900's when researchers first noted that court records indicated that many juveniles act with accomplices.

The differential-detection hypothesis disputes the accuracy of these measures by questioning the extent to which groups are more easily apprehended. For a variety of reasons, court and arrest records, such as those used by Shaw and McKay, will overstate group- versus solitary-offending. Lone offenders, for example, may be more difficult for law-enforcement officials to detect and prosecute. The increase in detection probability occurs principally because an increase in the number of co-offenders increases the probability that one of the co-offenders will relay details of the event to others, who then may purposely or accidentally pass this information to parents or law-enforcement officials, sometimes in exchange for lenient treatment for their own offenses.

Self-report methods that indicate a higher rate of lone offending than official records do lend support to the differential-detection hypothesis. Unfortunately, the evidence here is mixed, as well as the interpretation of that evidence. Some researchers who have compared self-report methods to official records have found a significantly higher group-apprehension-risk (Erickson 1971), while others argue that the risks of group versus solo offending are equal (Hindelang 1971; Hindelang 1976).

Several researchers have pointed to the frequency of group offending without making a comparison to official arrest statistics. Gold (1970), for example, reported that 75 percent of the 2490 chargeable delinquent offenses reported by his sample of Flint youth were committed in the company of others. Less than 20 percent of respondents in Shannon's survey of Racine youth said, "that they had done what they did alone" (1991). Erickson (1971) found a group violation rate below 50 percent for only one of the 18 offenses he examined. The same was true of only 4 of 18 offenses in a later study by Erickson and Jensen (1977). Similarly, Warr (1996) noted only 2 offenses out of 12 had a group offense rate this low.

In contrast, Miller (1982) estimated that two-thirds of all collectively executed youth crimes are committed by only two individuals; Erickson and Jensen (1977) noted that assaults are generally committed by lone offenders; and Reiss (1986) found that burglaries and robberies were primarily solitary.

Scholars who have reviewed these somewhat contradictory findings have come to no consensus about their meaning. Warr (2002), argued that these statistics suggest a strong group-offense component, while Elliott and Menard (1996) reviewed similar research and argued that the group nature of offending is overstated with the exception of illegal drug use. Because Reiss found that the rates of solitary as opposed to group offending vary by age, race, and gender, the contradictory findings and opinions of these various scholars may simply reflect differences in the sample and in the offenses that these researchers chose to study (Tittle and Paternoster 2000).

#### *Problems Associated with Confounding of Offense- and Offender-level Statistics*

The final point scholars have noted regarding a potential overstatement of behavioral similarity is that the frequency of group versus solitary offending depends on whether we are considering the difference between the *proportions of offenders* who commit their crimes in groups versus alone, and the *proportion of offenses committed by lone individuals*. For example, if three co-offenders commit one burglary while a lone offender commits a second burglary, crime statistics would indicate one group and one solitary *offense* – a one-to-one ratio of group versus solo *offenses*. If we examine the *ratio of offenders*, however, we find that that three *individuals* have committed a group offense while one individual committed a solo offense – a three-to-one ratio.

In sum, if we examine crime at the offense level rather than the offender level, arrest as well as victimization statistics indicate that solo offenses are more common. About two-thirds of all crimes have a single offender according to arrest statistics, but also, about two-thirds of all offenders commit their crimes as members of groups (Reiss 1988).<sup>9</sup>

### **Disentangling Selection, Shared Environment, Influence, and Artifact**

Unfortunately, longitudinal data which also contains direct peer self-reports are uncommon. A large portion of past research in the criminological literature has analyzed data from the National Youth Survey (NYS - e.g., Elliott and Ageton 1980) or the Rochester Youth Development Study (RYDS - e.g., Thornberry et al. 1994), which are both longitudinal designs, but unfortunately, both contain perceptual measures rather than independent self-report of peer delinquency. Research based upon these data generally support the notion that both selection and influence processes are operating. Using six waves of the NYS data, Elliott and Menard (1996), described a complex series of events related to the onset of delinquency. Their findings suggested that the relationship between peer associations and delinquent behavior is dynamic: The typical progression is: (1) movement into a mildly delinquent peer group, (2) onset of minor delinquency, (3) movement into a more delinquent peer group, (4) onset of index delinquency, and (5) movement into a predominantly delinquent peer group. They concluded that the influence of friends precedes delinquency, and is more pronounced for the onset of deviancy than its intensification. After onset, the relationship between associations and behavior is reciprocal.

Thornberry and colleagues provided similar findings based upon their analyses of three waves of RYDS data. They argued that the relationship between an adolescent's own delinquency and that of their friends' was reciprocal in nature, but offered no guidance concerning the temporal priority of association with delinquent peers and delinquent behavior. Rather than addressing the issue of which precedes the other, they suggested that even asking this question detracts from the acknowledgment that human behavior is interactive.

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<sup>9</sup> Reiss used data from the Uniform Crime Reports as well as 1979 data from the Peoria, Illinois crime reduction council in compiling these statistics. In contrast, Warr (2002) emphasized that, "event- or incident-based data tend to understate group involvement, because they give equal weight to lone and group offenses."

Thornberry and colleagues' RYDS data, as well Elliott and colleagues' NYS data have the positive aspect of inquiring about a wide range of offenses. These data sets retain the problematic aspect, however, of measuring peer delinquency by asking the respondents for these estimates rather than asking the peers directly. Thus, this research is unable to rule out the artifactual interpretation discussed earlier.

In contrast to the NYS and RYDS approaches, a few scholars have collected longitudinal data that measured peer factors through independent peer self-reports, which minimizes measurement artifact. Kandel (1978) and Cohen (1977) were the first to do so. Each author examined modifications in the behavioral and attitudinal similarity among friends across two waves of data collected at the beginning and end of a school year. Kandel's research used best-friend dyads, while Cohen examined cliques containing at least four members. Kandel started by matching New York State high school students to their self-reported best friends and subsequently obtaining self-reports of behavior from each dyad member. Cohen (1977) used data previously collected by James Coleman (1961), which contained information from the entire student body of the all-white Newlawn high school in the suburbs of Chicago. The inclusion of the entire student population and a question about the names of the respondents' best friends enabled Cohen to match respondents to their self-selected friendship cliques. The results of Kandel and Cohen were similar. Adolescents who retained their friendship over time exhibited increased similarity, while those who discontinued the relationship with that friend decreased the similarity to their now ex-friend.<sup>10</sup>

In addition to the dyads that retained and discontinued their friendships over time, Kandel described a third category of friendship dyads – adolescents who were not friends during the first wave of data collection, but became friends by the second. She found that the behavioral similarity of the dyads in the process of formation also increased, although not to the degree of the stable friendship dyads. Presumably, the similarity among this category increased somewhat less than the similarity among stable friendship dyads because the friendships were of shorter duration. Both Kandel and Cohen, however, measured outcomes of minor deviancy

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<sup>10</sup> Jussim and Osgood (1989) explained that selective attraction between friends that is based upon the initial similarities of an *unstable* behavior will result in diverging rather than stable behavioral differences in the absence of strong social influence (also see Kenny, 1979). This contrasts with the arguments of Kandel and Cohen, and other researchers (e.g., Berndt and Keefe, 1995; Newcomb, 1961) who suggest that in the absence of outside influences behavioral differences between dyad members remain stable.

only. Cohen examined alcohol consumption and cigarette smoking, while Kandel examined marijuana smoking and *minor delinquency*, a scale she derived from seven separate items.<sup>11</sup>

Relatively few studies in the United States other than Kandel and Cohen's early research have used longitudinal data combined with independent peer self-reports of peer behaviors. Ennett and Bauman (1994) did so using a two-wave longitudinal design when they investigated smoking initiation. Their findings indicated that non-smokers who are in smoking cliques are more likely to start smoking at a later point than are non-smokers in non-smoking cliques.

Tremblay, Vitaro, and their associates (Tremblay, Masse, Vitaro, and Dobkin 1995; Vitaro, Brendgen, and Tremblay 2000; Vitaro, Tremblay, Kerr, Pagani, and Bukowski 1997) are currently collecting longitudinal data based on a Canadian sample using direct (peer reported) measures of peer behavior. Their published research includes information on the influence of friends on adolescents under fourteen years of age, which encompasses a wide range of behavior with items similar to that utilized by the NYS and RYDS (LeBlanc and Fréchette 1988). While their study is still ongoing, they have published a few results relevant to questions about peer influence among younger children. They found that the delinquency level of a best friend significantly predicts a respondent's own delinquency even after controlling for the respondent's prior delinquency level (Vitaro, Brendgen, and Tremblay 2000). The strength of this effect, however, depended on the value of several other variables that I discuss later in this chapter.

### Notes on Stability and Change

Researchers have sometimes classified theoretical perspectives on delinquency as either *static* or *dynamic* to reflect differing views regarding the importance of early childhood socialization relative to adolescence and adult development (Brame, Bushway, and Paternoster 1999), and to reflect differing views about the ability of situational or changing social-structural factors to affect offending trajectories. Static perspectives suggest that early childhood development determines the propensity for crime throughout the life-course. In contrast,

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<sup>11</sup> Kandel measured similarity with Kendall's Tau-b for ordinal data. Cohen used the average standard deviation across the thirty-seven groups in his study. Kandel failed to specify the actual items that comprised her *minor delinquency* scale in her 1978 and prior articles. Kandel (1973), however, included *days absent from school* among her outcomes, so this may provide a hint at the severity of delinquency measured in her scale.

dynamic theories argue that social changes occurring in the later life-course significantly affect offending outcomes.

Questions pertaining to whether social factors can affect change beyond the earliest developmental years subsume issues of peer influence; if behavior is stable beyond the earliest years, then we cannot argue for the importance of adolescent peer influences that occur after thereafter. Gottfredson and Hirschi (1990), for example, argued against the salience of change. They suggested that early developmental factors largely shape offending throughout the an individual's life; thus, social factors, including association with highly delinquent peers, are irrelevant for explaining variation in adolescent and adult offending patterns (also see, Wilson and Herrnstein 1985).

Most researchers do not take such an extreme position, but instead point to evidence of behavioral change as well as continuity. In terms of continuity, we know that past and future criminal and/or aggressive behavior are strongly correlated (Farrington 1989; Nagin and Farrington 1992a; Nagin and Farrington 1992b; Nagin and Paternoster 1991; Olweus 1979; Sampson and Laub 1993; Wolfgang, Thornberry, and Figlio 1987). Additionally, antisocial or disruptive elementary school children (and even preschool children) are at greatest risk of becoming the most delinquent adolescents and criminal adults (e.g., McCord 1979; Moffitt 1990; Pulkkinen and Tremblay 1992; Tremblay, Pihl, Vitaro, and Dobkin 1994; White, Moffitt, Earls, Robins, and Silva 1990).

Other researchers, however, have found evidence suggesting that behavioral change is far from negligible (e.g., Horney, Osgood, and Marshall 1995; Sampson and Laub 1993). Horney and colleagues, for example, suggested that fluctuation in the *local life circumstances* of serious offenders produce relatively rapid changes in their offending patterns, while Osgood and colleagues (1996) provided evidence that lifecourse changes in routine activity patterns partially explain the well-known age trend in offending.

Thus, the pertinent question involves the *relative magnitude* of stability versus change (e.g., Caspi and Moffitt 1992; Dannefer 1984; Deluty 1985; Featherman and Lerner 1985; Huesmann and Eron 1984; Nagin and Paternoster 1993; Olweus 1979), and the conditions under which we would expect change to occur (e.g., Horney, Osgood, and Marshall 1995; Sampson and Laub 1993).

Other researchers add that peer influence may be an important component of this change, and that peer effects may mediate the relationship between other key explanatory factors and offending. Several scholars, for example, have attributed the negative relationship between delinquency and social attachment (e.g., to spouse, job, or the military) to a social control process whereby the strongly attached incur a greater social cost for nonconformity (e.g., Sampson and Laub 1993; Toby 1957). An alternative view, however, is that attachment to conventional social institutions disrupts associations with delinquent peers. Therefore, the decreased contact with deviant peers, resulting from the supervisory function of spouses, employers, or the military, may be the underlying cause of desistance rather than the contemplation of offending's greater social costs among the strongly attached (Warr 1998).

Many scholars ignore the degree to which the typical adolescent changes their friends, which may be as often as every three weeks (Cairns, Leung, Buchanan, and Cairns 1995). The relative degree of this change, however, depends on its definition. Cohen (1977), for example, found that 76 percent of high school peer groups remained stable from the beginning to the end of the school year when he attributed stability to groups that retained at least 50 percent of their members. In contrast, Hallinan (1980) reported an 18 percent figure when his definition of clique stability required the retention of only three members of the group. Regardless of the precise degree of friendship stability, however, prior delinquency research has largely failed to incorporate the instability of adolescent friendships into its analyses.

### **Peer Influence and Change**

Qualitative and cross-sectional quantitative studies from several disciplines suggest that the influence of friends is an important component of the changes that occurs in the delinquency levels of individuals across time. Furthermore, this influence extends across age groups and diverse outcomes – including minor and serious delinquency. For example, as early as elementary school, young children enforce group norms by ridiculing nonconformists (Adler, Kless, and Adler 1992), while teenagers often cite the influence of friends in robbery decisions (Feeney 1999) and physical violence (Maguire and Pastore 1996). For older males, peers sometimes support and maintain misogynistic beliefs and inspire sexual aspirations that may lead to violence against women (Kanin 1967; 1993; Schwartz and DeKeseredy 1997), gang companions sometimes pressure each other to commit aggressive acts ranging from

vandalism to murder in order to demonstrate group commitment (Hogan and Jones 1983; Rosenberg 1991; Sarbin 1982; Staub 1989; Toch 1992), and delinquent peers may interfere with rehabilitation efforts in correctional settings (Buehler, Patterson, and Furniss 1966; Clemmer 1940; Sykes 1958).

## CHAPTER 2

### INTERPERSONAL INFLUENCE IN THE SOCIAL-PSYCHOLOGICAL LITERATURE

#### Introduction

Because criminology is interdisciplinary, categorizing perspectives as either criminological or social-psychological is somewhat of a false dichotomy. Criminologists, however, largely have omitted from their work a large portion of the social-psychological literature, particularly that segment most closely linked with psychology (see House 1977 for a discussion of the different faces of social-psychology).

While the criminological literature largely has emphasized a single type of interpersonal influence – the transmission of attitudes (definitions) among individuals, a large portion of the social-psychological literature has progressed beyond this focus by addressing different mechanisms through which interpersonal influence occurs. In the social psychological literature, the situation, not the person, is typically more relevant. Situational aspects of influence, often termed *public compliance*, emphasize short-term or immediate forms of interpersonal influence, which occur absent attitudinal changes.

Because my review of the criminological literature has already discussed the forms of influence that involve changes in attitude, often termed *private acceptance* in the social psychological literature, this chapter concentrates primarily on *public compliance* and similar short-term influence mechanisms. I begin this review on common ground – the social learning perspectives of Albert Bandura, whom scholars from a number of disciplines regard as vitally important to the interpersonal influence literature. Next, I turn to the early work of Muzafer Sherif and Solomon Asch, whom sociologists as well as psychologists alike regard as significant (Turner 1990). Like Bandura's work, scholars often associate Sherif's work primarily with private acceptance. A large portion of both scholars' research, however, deals with both types of influence.

### **Social Learning – Albert Bandura**

In early experimental research, Miller and Dollard (1941) demonstrated that individuals will often mimic a model's behavior if the imitator had *previously acquired* the same behavior through another mechanism (also see, Logan, Olmsted, Rosner, Schwartz, and Stevens 1955; Maccoby 1959; Maccoby and Wilson 1957). Drawing on this finding, Bandura established that individuals will also perform *novel* behavior after observing a model's example (1961). Bandura suggested that the primary mechanism for this imitation involves changes the imitator's perceptions of reward and punishment, which become altered when an individual observes the consequences a model receives following the behavior (e.g., Bandura, Ross, and Ross 1963:601). As mentioned previously, Bandura's findings extended the earlier work of behaviorist psychology by noting that behavioral changes may occur without the necessity of *direct* reward or punishment. Bandura also suggested that an individual may mimic the behavior of a model even absent anticipated reward, as imitation itself may be intrinsically rewarding. Bandura, however, never fully explained the implied mechanism for this form of imitation.

While the criminological literature on social learning does cite Bandura's work, an important aspect is missing – the distinction between an individual's *acquisition* of new behavioral patterns and their *performance*. Through observation, for example, different groups (e.g., males and females) often acquire an equal *ability* to perform novel behaviors, while the actual imitation remains *unequal* due to enduring group differences in reward and punishment expectancies (Bandura 1965). In other words, through the process of social learning, different individuals may acquire the same degree of knowledge about a behavior, while only some individuals alter their *willingness* to actually perform the behavior (also see, Mischel 1970). Young girls in Bandura's experiments, for example, initially imitated aggressive models less often than did young boys until the experimenters provided additional incentives for the girls to perform the previously observed stereotypically masculine behaviors. Under the supplementary incentive conditions the experimenters largely eliminated gender differences in performance. These findings indicated that even though individuals may learn new behaviors equally through observation, their actual performances may be unequal, if the consequences they anticipate

differ. Furthermore, variation in prior socialization or in the subsequent application of reward or punishment are likely explanations for these differences.

### **The Early Work of Sherif and Asch**

Although the social learning literature relies primarily upon the work of Bandura, the roots of social influence research in the social-psychological literature occurred earlier in the work of Muzafer Sherif (1935; 1936; 1937) and Solomon Asch (1951; 1955; 1956), whose work focused primarily on majority-produced influences. Unlike the early gang research in the criminological literature, which relied on ethnographic work, the early social-psychological research (as well as later research) relied on laboratory research.

Sherif was the first to apply laboratory experiments to the study of group norms by utilizing knowledge of the autokinetic phenomenon, where a stationary point of light observed in otherwise total darkness appears to move about in an erratic manner. His earliest experiments began by placing a lone individual into a darkened room where Sherif projected a point of light onto a wall. Sherif asked the participants to estimate (in inches) the magnitude of the light's movement. Because Sherif darkened the room, the participants had no point of reference to gauge movement. Under these conditions, each subject typically provided estimates within a relatively narrow, normally-distributed range, although the means of these estimates *across* individuals were fairly dispersed. After Sherif established each subject's mean, he placed each in group situations and repeated the procedure. In the group setting, each member orally reported an estimate for the light's movement. After a few trials, group members quickly altered their estimates toward the group members' combined average that Sherif obtained during the earlier (individual) phase of the experiment.

In a second phase of his research, Sherif studied a different sample of participants, starting them in the group situation before testing them as individuals. Participants in this manipulation quickly established a group reference for light's range of movement, and retained the reference during later sessions while alone. For Sherif, the convergence of estimates in the group situation indicated the establishment of a group norm. He argued that when an individual

identifies with a *reference group*,<sup>12</sup> the group influences the values and attitudes of the individual members.

While Sherif's research on the establishment of group norms was an early contribution to the reference group literature, earlier experiments, which involved dyads rather than groups, contributed to our knowledge on the effect of social status on influence and conformity. In these experiments, Sherif also employed the autokinetic effect, but rather than placing the subject in a group setting, he matched each subject with a prestigious confederate – a Columbia University professor. Sherif found that the prestigious confederate was easily able to influence each participant toward an agreement with the confederate's own estimates (1937). These experiments fostered later work on the effect of social status upon the ability to influence and the susceptibility toward conformity, topics that I address in subsequent sections.

While Sherif examined dyadic and group influence under ambiguous estimation conditions, Asch (1951; 1955; 1956) investigated conformity in cases where the majority opinion was clearly incorrect. In well-known and widely replicated experiments, Asch directed participants to judge which of three lines was the longest. Each subject orally reported their own estimates following the incorrect reports of several confederates. Asch found that approximately thirty percent of the participants' responses were contrary to the participants' own perceptions, but in agreement with the erroneous majority view.

Unlike Sherif's work, which spoke about the emergence of a group norm, Asch's paradigm relied upon unanimous majority opinion. When Asch broke the unanimous opinion by including additional confederates who answered accurately, the participants stopped conforming (1956).

## **Compliance, Acceptance, and Reference Groups**

### *Different Functions of Reference Groups*

The early work of Sherif and Asch stimulated deliberation about the existence of several forms of social influence. Kelley (1952) was first to make these distinctions explicit by speaking about two different functions of reference groups: (a) a normative function and (b) a comparative function. He argued that normative influence involves conformity to the

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<sup>12</sup> A designation borrowed from Hyman (1942), who was the first to use the term.

behavioral and attitudinal norms of an individual's reference group. Here, group concordance occurs because groups reward conformity, punish non-conformity, and base their status hierarchy on complying to group norms.

A different mechanism underlies the comparative function of reference groups. Here, individuals evaluate themselves relative to the standard of a reference group, and their self-appraisal depends on the group they use for the comparison. In one classic study, for example, American non-combat soldiers living overseas considered their living conditions advantageous because their standard of comparison was not the United States civilian, but combat soldiers living in relatively worse conditions than their non-combat counterparts (Merton and Kitt 1950). In comparison to the combat soldier, the non-combat soldiers were living under superior conditions. In contrast to this example, when individuals compare themselves to a more advantaged group, they likely will feel relatively deprived, a condition that contemporary scholars continue to point to as a factor explaining crime (e.g., Shihadeh and Steffensmeier 1994).

#### *Private Acceptance versus Public Conformity*

Festinger (1953) extended Kelley's work by explicitly noting that *public* behavior may differ from *private* attitudes, but only later did Deutsch and Gerard discuss this distinction in detail. Deutsch and Gerard (1955) framed their description of reference groups much like Kelley, but used the terms *normative social influence* and *informational social influence* to describe the persuasive mechanisms that enable the group to control its members. Normative influence is operative when individuals conform to group expectations for purposes of acceptance as in the Asch paradigm. In order to maintain their acceptance, individuals may say things they do not believe when interacting with the group although they retain their contrary beliefs in the absence of group scrutiny.

In contrast to normative influence, informational influence occurs when an individual accepts majority beliefs as evidence about reality, even though he or she is unmotivated to conform to group behavior per se. Deutsch and Gerard felt that the desire of individuals to have accurate beliefs, coupled with the assumption that the majority is more correct or knowledgeable than oneself, describes this second form of influence (also see Allen 1965). Experimentally, they demonstrated this distinction by exposing individuals to "Asch-type"

judgments and comparing anonymous and public responses. After exposure to group opinion, research participants often retained a confederate's erroneous judgment even during subsequent anonymous judgments. While participants providing public judgments gave a larger number of errors (agreeing with confederates) relative to the number of errors given by individuals in anonymous conditions, the anonymous participants previously exposed to the erroneous group opinions still erred to a greater degree than those unexposed to group influence. Thus, Deutsch and Gerard demonstrated the ability of the group to affect informational influence that alters judgments even when group surveillance is not at issue.

Deutsch and Gerard furthered their arguments that the motivation for accuracy underlies informational influence by experimentally manipulating motivation. When they provided a reward for the group performing the best on a task requiring accurate information in both public and anonymous situations, conformity to the confederates' erroneous judgments increased to a greater extent than found in previous experiments. Their research demonstrates that increases in a target's motivation for accurate beliefs corresponds to increases in a source's informational influence when the target presumes the source to be more knowledgeable.

Other early researchers proposed similar dichotomous models of social influence (e.g., Jackson and Saltzstein 1958; Jones and Gerard 1967; Thibaut and Strickland 1956), but Deutsch and Gerard's formulation remains the best known (Levine and Russo 1987). Several alternative models suggested that normative influence produces public behavioral compliance (*public conformity*) but not *private acceptance* (e.g., Allen 1965; Hollander and Willis 1967; Jones and Gerard 1967; Kaplan and Miller 1983; Kiesler 1969; Moscovici and Faucheux 1972; Nail 1986). Additionally, several authors surmised that *status* is an important component in public conformity. That is, when an individual attempts to establish or maintain status within the group, he or she may express normative attitudes and may behave in conforming ways while under public scrutiny hoping to achieve favorable reaction, obtain specific rewards, or avoid specific punishments. Thus, the desire to maximize status, coupled with the assumption that others respond more favorably to conformity than to deviance may underlie normative-influence (Levine 1980). Under these scenarios, some individuals may say the expected thing in all situations and please everyone out of a need for favorable responses. The individual learns to say or do the expected thing regardless of his or her private beliefs; however,

individuals affected by normative mechanisms express these behaviors or attitudes only when the influencing agent observes (or may potentially discover) the individual's behavior.

Several studies of adults (Gerard and Rotter 1961; Levine 1980) and children (Bierman, Smoot, and Aumiller 1993; Coie 1990) have indicated that the anticipation of negative evaluation from other group members following deviation from group norms is realistic, as majority members dislike and reject deviates. In a particularly dramatic example involving childrens' groups, an eleven year-old girl explained her fear of rejection to Maccoby and Martin by noting that "people wouldn't be her friends; you would be teased for months" if she violated a female norm by voluntarily sitting next to a boy in school (1987, p.245). Similarly, a study of older adolescents using experimental manipulations conducted by Solomon and Wahler (1973) found that students reduced their deviant behaviors to almost zero when classmates no longer approved the acts, but resumed disruptive behaviors when their peers revived their approval.

The control tactics that delinquent groups use to ensure conformity are sometimes obvious. Institutionalized youths, for example, will often reinforce behavior that staff members consider deviant through agreement, interest, attention, laughing, smiling, and imitating the speaker. Likewise, they will negatively reinforce or punish behaviors the staff considers advantageous by disagreeing, threatening, frowning, ignoring, and sneering (Buehler, Patterson, and Furniss 1966, p.157). Groups need not express their norms overtly, however, as individuals also conform to norms expressed non-verbally (Kiesler 1969). Mead (1934) and Hall (1959), for example, provided early theoretical rationales of the salience of non-verbal communication (Buehler, Patterson, and Furniss 1966).

Some scholars have described the motivation toward public compliance as an effort to increase self-esteem (Turner 1987), or to maintain a positive self-evaluation (Tesser 1988). Others have emphasized the motivation to ingratiate the audience (Jones 1964), or otherwise manage the audience's impression (Felson 1978; Schlenker 1980). Symbolic interaction perspectives suggests that these motivations are linked, because self-evaluation is critically affected by the appraisals of others (e.g., Blumer 1969; Kinch 1963; Mead 1934) (Cooley 1909).

In each of these dichotomous models of conformity, we can distinguish private acceptance from public conformity by noting the differences in behavior that occur when group surveillance is present versus absent. Without group scrutiny, an individual will respond only to his or her internalized values.<sup>13</sup> Under these circumstances, the influence source will affect change only if they succeed in motivating the target to reconsider their existing values. As mentioned earlier, the informational form of influence will occur more often for individuals who believe that majority values are more accurate. Because informational influence involves true cognitive changes, this form of influence produces both compliance and acceptance, whereas normative influence produces only public compliance (Allen 1965; Kaplan and Miller 1983; Kiesler 1969; Nail 1986).

Evidence in both the social-psychological literature (e.g. Festinger 1950a; Festinger 1954; Levine 1983; Levine and Moreland 1986; Suls and Miller 1977; Suls and Wills 1991; Tesser 1991; Wood 1989; Wood and Taylor 1991) and the criminological/sociological literature (e.g., Atkinson 1986; Blau and Blau 1982; Greenberg and Ruback 1992; Major, Testa, and Bylsma 1991; Merton and Rossi 1968; Ruback, Greenberg, and Westcott 1984; Shihadeh and Steffensmeier 1994; Stiles, Liu, and Kaplan 2000) supports the mechanism underlying the ability of informational influence to affect private acceptance – people evaluate the legitimacy of their beliefs (also abilities, emotions, and outcomes) through a social comparison process with significant others.

Although prior research has established the ability of groups to strongly influence their members' behaviors, the type of values and behaviors that a source is able to modify may be limited. Several scholars, for example, have suggested that informational as well as normative influences are effective only when the source's position is within a certain range of the target's *current* position. When a persuasive communication advocates a position that is not far removed from the target's view, the target will move their own position toward the position of the communication. Beyond this latitude of acceptance, however, the target will not assimilate

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<sup>13</sup> In the sociological literature Ball-Rokeach (1973) distinguishes between attitudes and values just as the majority of psychologists do. Using this distinction, attitudes are the global organization of beliefs concerning an object or situation and values are beliefs about desired end-states or modes of conduct. Following Markowitz and Felson (1998), I do not elaborate on these distinctions for the purposes of the current discussion.

the influence and may move further away (Hovland, Harvey, and Sherif 1957; Sherif and Hovland 1961).

Contemporary scholars have retained the normative and informational distinction, and have used these concepts to integrate the literature on the audience effects, which I described earlier. Audiences may act as either informational or normative influences, with the magnitude of each influence resulting largely from the degree of accountability the audience demands, as well as the target's attribution of the audience's expertise (Pennington and Schlenker 1999; Quinn and Schlenker 2002; Schlenker and Weigold 1989; Tetlock, Skitka, and Boettger 1989).

### **Criticisms of Reference Group Theory**

Hyman's concept of the reference group, which initiated the theoretical elaborations I described above, is often criticized for being unable to predict which group will exert influence and which will not. A reference group may be the current membership group, but individuals may also conform to particularly appealing *non-membership* groups to which they anticipate or desire future association (Glaser 1956; Merton and Kitt 1952). As a further complication, *negative* reference groups may exist, which motivate their members toward adopting attitudes and behaviors opposite to those of the group's majority (Newcomb 1958).

Individuals typically belong to several membership groups and are exposed to several potential reference groups. Members of multiple membership groups may choose only one reference group to whom they orient their behavior; but alternatively, individuals may compromise their behavior between the expectations of each membership group (Mann 1969). Individuals may also conform to the group that holds the greater ability to oversee their behavior at any particular point in time.

While the reference group literature fails to provide a concrete ability to predict whether a membership group or non-membership group will act as an individual's reference group, it does provide a caveat for researchers to consider when operationalizing friendship. Researchers interested in examining the influence of friends, for example, sometimes collect social network data where survey respondents nominate others as friends. In turn, those nominees may or may not reciprocate the nomination. Some scholars have suggested that we should expect non-reciprocated nominees to be less influential because they are not truly part of the respondent's membership group (e.g., Cairns, Leung, Buchanan, and Cairns 1995). In contrast, others have

argued that non-reciprocated friends may be *more* influential because individuals who aspire to more intimate levels of friendship may be particularly willing to conform to prospective associates (Aloise-Young, Graham, and Hansen 1994). In other words, non-reciprocated friends may comprise a reference group to which the respondent aspires to join.

In sum, while the reference group literature provides important distinctions for researchers to consider, it provides little guidance for predicting highly influential individuals. It also fails to describe the concrete mechanisms of influence. Elaborations of the reference group perspective, however, which describe public compliance (the normative function of groups) and private acceptance (the informational function of groups), rather than the reference group construct per se, improve upon our understanding of different influence mechanisms. As such, they are worthy of further review.

### **An Additional Mechanism of Interpersonal Influence**

Expanding on earlier two-category models of influence described by Kelley and other earlier scholars, Kelman (1958; 1961; 1971), argued for *three* distinct mechanisms that describe how an individual or group may shape the behavior of another, (a) compliance, (b) identification, and (c) internalization. Kelman defined compliance in the same manner as prior researchers. He saw private acceptance, however, as having two different aspects depending upon the motivation of the influenced individual. Private acceptance based upon identification occurs when an individual finds a relationship satisfying and wishes to meet the behavioral expectations of the source. This idea parallels the notion in the reference group literature that the attractiveness of a group inspires individuals to identify with the group's majority. Here, the individual behaves in a manner that meets the requirements of the particular relationship even when the group is unable to observe the member. Conformity occurs because the individual derives a satisfying self-definition from the relationship to the person or group – a relationship that forms a part of the person's self-image. Identification involves an attempt to be like the influencing agent – saying what the other says, doing what they do, and believing what they believe. In this way, the individual maintains the relationship and the satisfying self-definition it provides. In contrast to public compliance, identification is relatively stable, remaining salient as long as the individual retains a satisfying relationship with the influence source. Should that relationship end, the new behavior based upon identification may also terminate.

In contrast to identification, the *credibility* of the source, not their attractiveness, underlies internalization. As in other formulations of internalization, Kelman argued that internalization occurs for individuals motivated towards an understanding of reality. Because a credible source alters the individual's perception of reality, internalization is the most stable form of influence in Kelman's tripartite model. We could easily imagine, however, that these perceptions may change if the source's credibility ceases, or if the individual finds a more credible source who advocates an opposing position.

### **Raven and Colleagues' Social Influence Model**

Raven and colleagues' multi-category models of social influence subsume Kelman's tripartite model of influence (Levine and Russo 1987). French and Raven (1959), first posited five types of unilateral social influence, while Raven and Kruglanski (1970) later added a sixth designation they identified as *informational* influence. Which type of influence occurs depends on the targets' motivation to conform, and subsequently affects whether private acceptance or public compliance occurs. The six forms of influence that Raven and colleagues described as well as their motivations are:

- 1) *reward* influence – which occurs when a target desires majority rewards
- 2) *coercive* influence – which occurs when a target is motivated to avoid majority punishments
- 3) *expert* influence – which occurs when a target is motivated for knowledge and has a perception that the majority has superior wisdom
- 4) *referent* influence – which occurs when a target is motivated toward identification with an attractive majority
- 5) *legitimate* influence – which occurs with the belief that the majority has a moral right to prescribe one's behavior
- 6) *informational* influence – which occurs when a target desires accuracy and has the perception that the majority's position is congruent with one's existing belief and value system

Reward influence produces public conformity, but also tends to produce private independence, while coercive influence produces public conformity but private anti-

conformity. These two forms of influence continue only as long as the individual believes that the majority is able to observe or discover the individual's behavior. Often, however, there may be difficulty distinguishing between reward and coercive power, as the withholding of reward may be a punishment.

In contrast, expert, referent, and legitimate forms all produce both public and private conformity. In order for these forms of conformity to remain stable over time, the individual must continue to view the influencing agent as competent, attractive, or legitimate, respectively.

Finally, informational influence produces more stable changes, which persist over time in the absence of any specific perception of the influencing agent or knowledge of source surveillance.

### **Evolutionary Bases for Normative and Informational Influences**

While the work of these early theorists provided clear descriptions of several types of social influence, it did not specify its origins. For this, I turn to the work of several evolutionary theorists who suggest that the ability of groups to exert normative influence has roots in early human history where group affiliation had both survival as well as reproductive benefits (Ainsworth 1989; Axlerod and Hamilton 1981; Barchas 1986; Bowlby 1969; Buss 1990; Buss 1991; Hogan, Jones, and Cheek 1985; Moreland 1987). Over the course of evolution, the small group became the basic survival strategy that humans developed. Prehistoric humans shared labor, resources, and information, and cooperated to overcome threat. Their groups also provided a concentration of potential mates and others with whom they could form reciprocal alliances that aided in the mutually beneficial exchange of reproductive resources (Buss 1990). Thus, the likely result of evolutionary selection was a set of internal mechanisms that guide individuals into social groups and lasting relationships.<sup>14</sup>

Due to these evolutionary mechanisms, threats of exclusion or the loss of important relationships cause anxiety and negative affect (Baumeister and Leary 1995; Baumeister and Tice 1990; Craighead, Kimball, and Rehak 1979; Kurzban and Leary 2001; Leary 1990). We can observe evidence of this anxiety in adults who feel lonely when they lack important

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<sup>14</sup> Evolutionary assumptions contrast with behaviorist assumptions that view newborns as *tabula rasa* (Baumeister and Leary, 1995).

relationships (Leary and Downs 1995), and in adolescents who report that being with friends is the most important aspect of school life – something not worth risking (Corsaro and Eder 1990; Cusick 1973; Everhart 1983; Willis 1981).

Informational influence may also stem from these evolutionary roots, as accurate beliefs about reality may have significantly affected the physical survival of our ancestors.

Alternatively, behaviorists may say that punishment for an inaccurate belief or reward for an accurate one is enough to explain the motivation for this form of social influence.

## **CHAPTER 3**

### **FACTORS THAT MODERATE THE INFLUENCE OF FRIENDS**

#### **Introduction**

Although prior research may have overstated the ability of adolescent friends to influence one another, there may be conditions where interpersonal influence among adolescents is stronger. In other words, there are several potential moderators (see Baron and Kenny 1986) of social influence. Aspects of the situation, as well as individual differences, such as popularity, race, and age may be important in this regard. Parental capacity to counteract the ability of delinquent peers to negatively affect children remains a topic of particular concern.

While the role of gender as a moderator of interpersonal influence has been a long standing topic in sociology, social psychology, and criminology, conclusions regarding the role of gender as a moderator of social influence remain inconclusive. Several scholars have argued that the inconsistent findings of the past literature may be caused by researchers who have ignored key distinctions involving source and target gender. Additionally, they have argued that several inconsistent findings about the magnitude of interpersonal influence may involve the omission of the important gender interactions that I elaborate upon in the sections below.

For these reasons, the literature review in this chapter, and the research hypotheses that follow from it in the next, concentrate heavily on the role of gender as a moderator of interpersonal influence.

#### **Investigating Influence Moderators**

While theorists from a variety of disciplines have occasionally discussed potential moderators of peer influence, we find the majority of empirical research on moderating effects in the experimental literature. Survey and experimental research each have their advantages and disadvantages. Survey research has the ability to investigate naturally occurring peer groups and serious delinquency. There are difficulties, however, in using surveys to measure factors of which the respondent may not be aware (Nisbett and Wilson 1977). For example, prior research has found that the presence of others affects whether individuals will assist those in distress,

although when asked whether the others' presence affected their willingness to assist, research participants generally said that it did not (Latané and Darley 1970). We can find an important example of an influence moderator in the persuasive communication literature, which indicates that individuals vary in their desire for accuracy, a trait that affects a target's motivation to accept correct information (Allen and Wilder 1977). Similarly, less confident, relative to more confident individuals, are more susceptible to informational influence because they attribute a greater degree of knowledge to the source relative to their own degree of wisdom (Allen 1965).

The primary drawbacks to experimental research are that; (a) they largely rely upon artificially determined groups (e.g., Sherif, White, and Harvey 1955) rather than natural groups (Allen 1965), and (b) for ethical reasons, they cannot be utilized for anything other than the most trivial of deviant outcomes (e.g., Bersoff 1999). These limitations reduce our confidence that findings based upon experimental methods will generalize to delinquent outcomes because the factors that condition social influence are often behavior-specific (Back and Davis 1965; Sebald 1986), or are specific to different forms of influence (Becker 1986; Eagly and Carli 1981). For example, a factor that increases a source's ability to exert influence on educational aspirations may not increase the ability to exert influence on offending. Likewise, a factor that increases conformity in a group pressure situation may not affect persuasive communications.

Unlike the survey research, however, experimental research has differentiated the concepts of source and target characteristics better than survey research has. For example, two important source characteristics associated with influence are; (a) *expertness*, the likelihood of knowing the truth, and (b) *trustworthiness*, the likelihood of telling the truth (Hovland, Janis, and Kelley 1953). Objective levels of source expertness and trustworthiness affect the ability of the source to influence a target, while the targets' subjective perceptions of these source traits affect the targets' conformity.

With these caveats in mind, I now review the experimental as well as the survey literature that discusses several important moderators of social influence. I begin with *status*, as this factor has received a considerable degree of attention, and scholars have often concluded that this factor underlies many gender differences in influence and conformity.

## Status

We know that status hierarchies exist within adolescent friendship groups (Hartup 1983; Savin-Williams 1979; Weisfeld and Billings 1988). In other words, groups typically attribute to each member a relative standing. Group members give more weight to higher status individuals, consequently increasing an individual's ability to exert influence (e.g., Sherif 1937). We also know, however, that the target's status negatively correlates with their conformity (e.g., Hollander 1958; Hughes 1946; Ruback and Gromme 1989). Homans (1961) argued that the same mechanism explains both relationships by hypothesizing that a portion of a high-status individual's influence is due to his or her ability to deviate from group norms, which in turn allows the high-status individual to express forceful opinions that demand consideration.

Because the group understands that high status individuals are easily able to join other groups, its members are less likely to react negatively to the high-status member's deviance, fearing that the valued member may disaffiliate themselves from the group and remove whatever the high status member had of value to offer. For this reason, the group is unlikely to disregard the opinions of a high status member. Simultaneously, the high status individual understands the value of their status, which decreases their desire to conform.

Others have argued that the relationships between conformity, influence, and status are slightly more complex. Using experimental methods, Hollander (1958) found that status requires initial conformity. Individuals accumulate *idiosyncrasy* credits during the stage of initial conformity, which allows them to gain group standing and subsequently deviate from group opinion without losing accumulated status. Individuals who deviate without first conforming lose status that is difficult to regain.

Several researchers have elaborated Hollander's findings by noting that the effect of status on conformity is curvilinear (e.g., Jackson and Saltzstein 1956; Kelley and Shapiro 1954). Like high status group members, low status members of a group also are less likely than are middle status members to yield to group pressures. The attenuated conformity for high and low status members, however, occurs for different reasons. While the non-conformity of a high status member fails to decrease his or her group standing, a low status individual has little status to lose regardless of how they behave (Back and Davis 1965; Homans 1974).

Additionally, after a group member receives a low-status attribution, the group is more likely to interpret subsequent conforming acts in a different light, which leads the group to cease social reward, thus decreasing further the desire to conform (Homans 1974).

### **Status Criteria**

Recall that French and Raven (1959) suggested several different sources of power – in other words, different ways to exert influence. Although these authors did not use the term *status*, we might say that they elaborated upon the status construct by noting several of its different criteria, which depend on the type of influence a high status individual can exert. When an individual's status results from knowledge, for example, the individual is able to exert expert influence, while a popular individual's influence results from referent status.

Other theorists have taken an approach similar to French and Raven. Hughes (1945), for example, argued that individuals have multiple specific statuses but only one master status (also see Becker 1963). Although peers recognize an individual's auxiliary statuses, a single trait is often particularly salient when individuals subjectively rank order the status of group members.

Contemporary scholars have sometimes extended Hughes' differentiation of multiple status elements by distinguishing between *task-related* and *non-task-related* statuses and their interrelation. Expectation states theory, for example, emphasizes that groups often attribute high status to individuals based upon easily observable (i.e., diffuse, ascribed, or master) traits like gender, age, or race assuming (often incorrectly) that these observable traits accurately predict specific task-related ability (Berger, Conner, and Fisek 1983; Berger, Webster, Ridgeway, and Rosenholtz 1986; Berger and Zelditch 1985; Freese and Cohen 1973; Knottnerus 1988; Webster and Driskell 1978). In other words, social status often generalizes and becomes the basis for a group's status hierarchy. Alternative theories of status stress that competition and successful domination determine a group's status hierarchy rather than status generalization or the cooperative calculation of task-related ability. When domination rather than task-relevant competence determines the status hierarchy, group performance suffers. Regardless of the exact causal process leading to group status, however, all theoretical views agree that whether measured as a global attribute or a specific characteristic, the status of a

source increases their ability to influence while the status of a target decreases their conformity.<sup>15</sup>

The next sections review the literature on several potential source and target moderators of social influence that many consider specific components of a master or overall status. I also discuss several potential moderators of social influence that are *distinct* from the concept of status. As mentioned earlier, there are several criteria of status; however, this project emphasizes gender as a potential moderator of source influence and target conformity.

Prior findings are often problematic, however, when they fail to distinguish source influence and target conformity. This is particularly true in survey research, where the methodology often restricts the natural variance in source and target characteristics. For example, researchers frequently limit samples to same-sex and same-grade-level participants (Hartup 1983).

## **Gender**

### *Reviews and Meta-analyses of Gender Differences in Conformity and Influence from the Experimental Social-psychological Literature*

Several reviews and meta-analyses of gender differences in conformity have appeared in the experimental social-psychological literature. The principle types of research that appear in these reviews include: (a) group pressures investigations using *Asch* or *Sherif* type conformity situations (e.g., Asch 1951; Beloff 1958; Costanzo and Shaw 1966; Reitan and Shaw 1964; Sherif 1935; Tuddenham 1958) and (b) persuasive communication scenarios (e.g., Hovland and Janis 1959).

These reviews generally mention that the experimental social psychology literature prior to the late 1970s largely agreed that females relative to males are more susceptible to influence (Levine and Russo 1987). Many suggested that the greater level of female conformity stems from the internalization of the stereotypic submissive female gender role (e.g., Krech, Crutchfield, and Ballachey 1962; Worchel and Cooper 1976). An alternative explanation, however, is that females are concerned more than males are with maintaining group harmony and cohesiveness (Cooper 1979; Eagly 1978). Another alternative is that gender differences in

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<sup>15</sup> Recall, however, the exception of the curvilinear relationship previously mentioned.

conformity arise from cultural expectations of male independence (Eagly, Wood, and Fishbaugh 1981).

Sistrunk and McDavid (1971) conducted the first influential research to question the claims of greater female conformity to peer pressure and communications.<sup>16</sup> They began their research by examining respondents' agreement with written assertions, after pre-measuring each assertion for masculine, feminine, or neutral content according to whether males, females, or neither were more knowledgeable about and interested in each declaration. Accompanying each declaration was a statement purported to be the "majority opinion of prior respondents, representing anywhere between 51 percent to 100 percent agreement with the written statement." For example, the researchers may have presented respondents with the statement, "baseball is played on a square field," followed by the statement that 75 percent of other respondents agreed. In many of their experiments, they specified the gender of the other respondents. For example, 75 percent of the men and 40 percent of the women may have agreed with the statement.

Their results indicated that women conformed their answers to the majority's opinions more often when the items contained masculine content, while men conformed more to items containing feminine content. In other words, the respondents conformed to a greater degree on items their own gender typically knew less about or exhibited less interest in. Conformity remained equal on neutral items. Goldberg (1974; 1975), Morelock (1980), and Karabenick (1983) replicated Sistrunk and McDavid's findings.

Shortly after Sistrunk and McDavid published their findings, reviews of the experimental literature by Maccoby and Jacklin (1974) and Eagly (1978) questioned earlier suppositions regarding greater female conformity. Maccoby and Jacklin's review described 47 prior studies that reported gender differences in conformity. By simply comparing the number of studies that found gender differences with the number that failed to find these differences, they reported no overall level of greater female conformity. When they separated studies involving *face-to-face* encounters from those involving persuasive communications, however,

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<sup>16</sup> Also see Sistrunk and McDavid (1965) along with McDavid and Sistrunk (1964). While some might question whether this research is properly described as experimental rather than survey, we should keep in mind that the purpose of these authors' research was a determination of how *manipulating* the questions and accompanying information produces difference in the answers. Thus, I argue that I have properly classified these methods as experimental.

they found that women tended to conform somewhat more than men did in face-to-face situations while conforming to the same degree as men did in the communication situations. While Maccoby and Jacklin failed to provide a theoretical explanation for their results, they hinted that the work of Sistrunk and McDavid might provide a “clue.”<sup>17</sup> While Maccoby and Jacklin did not elaborate on precisely what this “clue” entailed, it is relatively obvious that they were implying that the relative degree of target conformity and source influence may depend on the behavior in question.

Eagly (1978) duplicated Maccoby and Jacklin’s simple technique of comparing the frequency of the studies that found greater male, greater female, or equal levels of conformity, but she elaborated the earlier authors’ research by further categorizing conformity research into *persuasion*, *group pressure*, and *other* conformity paradigms (primarily involving fictitious group norms). Using this strategy, Eagly found that studies indicating greater female conformity outnumbered those indicating male conformity by a ten to one margin in both persuasion and group pressure studies. She noted, however, that most studies found no gender differences. Where studies did indicate gender differences, the magnitude of these differences varied considerably across the three forms of conformity research with the *other* category dominated by studies finding no difference.<sup>18</sup> Like Maccoby and Jacklin, Eagly noted that greater female conformity occurred only in persuasion and conformity experiments where the influence source was physically present, and not in cases where the source was absent. She further suggested that most of the differences indicated by prior research may be due to the researchers’ masculine bias in task choice.

Cooper was the first to apply advanced statistical methods to improve upon the strategy of simple frequency counts that Maccoby, Jacklin, and Eagly had used. Drawing upon methodological advances described by Rosenthal (1978) and Glass (1976), Cooper (1979) performed the first well-known meta-analysis. Using Maccoby and Jacklin’s original list of references, he confirmed the prior conclusions of Eagly as well as Maccoby and Jacklin, that females are more conforming than males are in face-to-face encounters, but not in persuasion

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<sup>17</sup> My discussion of the reviews by Maccoby and Jacklin; Eagly; Eagly and Carli; and Cooper rely heavily on a thorough criticism by Becker (1986). See her work for a more detailed review.

<sup>18</sup> 6 out of 18 studies in the “other” category resulted from the work of Sistrunk and colleagues. Many of the findings contained the source-gender by masculine-content interactions discussed above; however, Eagly did not take these complexities into account.

studies. Unlike the prior findings, he *did* report greater female conformity in a pooled test that combined the results of all experiments regardless of the conformity paradigm.

Cooper, however, was mostly interested in demonstrating new meta-analysis techniques, not in the substantive issue of gender differences in conformity. For this reason, he failed to update Maccoby and Jacklin's list of articles, and specifically excluded the work of Sistrunk and McDavid, claiming that their work had a "special place in the literature." Realizing the limitations of Cooper's study, Eagly and Carli (1981) updated the list of conformity studies and performed another meta-analysis, which included the work of Sistrunk and McDavid. They concluded that their updated research found evidence for gender differences in both persuasive communication and group pressure studies (recall that Cooper found a difference only for the group pressure scenarios) because their meta-analysis used techniques more powerful than the older 1978 Eagly review, which found the gender difference only for the group pressure research.

Becker (1986) noted a problem with past meta-analyses. She argued that Cooper's work, as well as the reviews by Eagly and Carli combined research of varying methodological sophistication without controlling for the variance across analytic method. Many persuasive communication studies and some group pressure studies, for example, relied on post-test-only outcome measures for attitude changes, while other studies analyzed change with more sophisticated and appropriate methodology. When Becker replicated the earlier meta-analyses of these authors, taking the differences in methodological sophistication into account, she found that the studies using lower degrees of sophistication (primarily those involving post-test-only measures) largely found no gender difference, while the more complex studies in all experimental paradigms indicated the presence of gender disparity. Becker concluded that females *do* conform more than males do across *every* category of influence that investigators have examined in the experimental research.

She cautioned, however, that questions linked to the external validity of these early experiments are still open, which implies that we remain uncertain whether the experimental findings will generalize to the types of influence and the forms of behaviors that occur beyond the confines of the laboratory. Thus, it may be wise to weigh these experimental findings with

the conclusions of survey research to determine their congruence and their applicability to questions regarding delinquency.

### *Gender Differences in Modeling Research*

Many authors have excluded Bandura's research from their reviews and meta-analyses of gender differences in conformity and influence, presumably because they felt that modeling behavior is different from other conformity paradigms. Bandura, however, was among several early researchers to examine gender differences in conformity and influence using modeling designs.

Bandura was interested in the effect of target-gender on imitation, and the effect of same-sex models relative to cross-sex models upon imitation. He found that, "in the case of highly masculine-typed behavior such as physical aggression, there is a tendency for both male and female participants to imitate the male model to a greater degree than the female model" (1961 p.581). In the case of verbal aggression, which is less clearly sex linked, however, females as well as males are likely to imitate the same-sex model. For physical aggression, Bandura's research found that boys (relative to girls) were more imitative, although he was unable to find gender differences in verbal aggression

Although the young boys performed more aggression after viewing the models than the girls did, recall that Bandura largely eliminated gender differences in performance by providing the girls with additional incentives for replicating the novel aggressive behaviors that they just witnessed. This finding supported the assertion that gender differences in imitation are largely a function of a differential *willingness* to imitate rather than the differential *acquisition* of ability. In other words, perceptions of reward and punishment are important factors that determine whether targets will imitate observed behaviors.

Bandura argued that the female participants required the additional incentives to disinherit prior internalization of norms unfavorable to female participation in stereotypically masculine behaviors such as aggression. He did not explain, however, why his aggressive male models affected females to a greater degree than his aggressive female models did.

We should consider that proper interpretation of Bandura's findings regarding gender differences in conformity likely involves an intricate blend of issues related to the moderating effects of gender and the issue of stable versus situational influences. On one hand, the females

conformed to (imitated) the models less than males did, especially when the behavior was masculine. On the other hand, the females internalized society's norms prohibiting aggression. In this sense they exhibited greater *internalized* conformity to the majority, while the lack of conformity to the peer group reflects less *situational* conformity.

### *Findings from Survey Research*

Much like the experimental research, the prior survey research that has examined gender differences in conformity to peers remains inconclusive, particularly in regard to delinquent outcomes. The majority of evidence indicates that *females* conform to delinquent peers to a *greater* degree than do males; however, at least four survey studies have indicated a greater degree of *male* conformity. Potentially, these contradictions result from differences in methodology or from the failure to account for interactions between source-gender, target-gender, and behavior type.

The survey research has relied largely upon one of two outcome types; (a) retrospective self-reports of delinquent involvement, and (b) intentions to conform to delinquent peer pressure in hypothetical situations. A few research efforts have examined gender differences using self-reported outcomes to measure the similarity between friends' delinquency and respondent delinquency using *direct* measures from the peers (e.g., Billy and Udry 1985b; Margulies, Kessler, and Kandel 1977). Most studies, however, have not used this advantageous method (e.g., Chassin, Presson, Montello, Sherman, and McGrew 1986; Downs 1985; Erickson, Crosnoe, and Dornbusch 2000; Flay, Hu, Siddiqui, Day, Hedeker, Petraitis, Richardson, and Sussman 1994; Johnson 1979; Kaplan and Johnson 2001; Keefe 1994; Mears, Ploeger, and Warr 1998). In research using *intentions* to conform, this problem does not arise because these methods simply asks the respondents to estimate what they would do in the hypothetical scenario of their friends trying to convince them to jointly participate in illegal behavior. Criticisms of these methods, however, note that behavioral intentions are a very imperfect predictor of actual behavior (see Fishbein and Ajzen 1975 for a review).

Among the studies that used retrospective self-reports, ten have indicated greater female relative to male peer conformity. These studies have examined sexual activity (Billy and Udry 1985a), minor delinquent behaviors (Rodgers, Billy, and Udry 1984), a latent construct consisting of frequent along with rare forms of delinquency (Kaplan and Johnson 2001),

alcohol or drug use (Downs 1985; Graham, Marks, and Hansen 1991; Kandel 1974; Margulies, Kessler, and Kandel 1977),<sup>19</sup> smoking (Chassin et al. 1986; Flay et al. 1994), and non-delinquent behaviors and values such as educational aspirations (Davies and Kandel 1981). In contrast, two studies using retrospective self-report outcomes indicated higher *male* conformity when examining serious delinquency (Elliott and Voss 1974) and theft under five dollars (Mears, Ploeger, and Warr 1998). Both studies, however, noted gender differences only under certain circumstances. Elliott and Voss found significantly higher male conformity only in longitudinal models that examined the correlation between respondent behavior and the proportion of their friends who self-reported serious delinquency or had an official record of delinquency. Mears and colleagues found that males conformed to peers more than females did only among adolescents who strongly felt that the behavior was wrong. Among those who failed to attribute immorality to the behavior, they found no gender difference.

Among the studies that used behavioral intentions to conform to hypothetical delinquent peer pressures (in contrast to the previously reviewed self-report outcomes), three have indicated that *males* conform more than females do (Berndt 1979; Brown, Clasen, and Eicher 1986; Wall, Power, and Arbona 1993), while one found no gender difference (Keefe 1994).<sup>20</sup> Some of these studies, however, noted that the gender differences depended on the behavior in question. In Berndt, as well as Brown and colleagues, the authors found a higher degree of male conformity *only* for delinquent acts, while for non-delinquent acts they found either greater female conformity (Berndt) or no gender difference (Brown and colleagues). The Wall study, however, used only delinquent outcomes, so it was unable to draw any conclusion regarding which behaviors result in conformity differences across gender and which do not. One study indicated greater male conformity using *both*; (a) Berndt's hypothetical scenario methodology as well as, (b) retrospective self-reports across a wide range of offending behaviors (Erickson, Crosnoe, and Dornbusch 2000).

A study by Johnson (1979), also relied upon behavioral intentions to conform to peer pressures to participate in theft, vandalism, and assault, reported a greater degree of male

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<sup>19</sup> Graham and colleagues mentioned that in their research females conformed somewhat more than males did, but the difference was not statistically significant at traditional levels.

<sup>20</sup> Erickson and colleagues (2000) reported that studies by Bronfenbrenner and Crouter (1980), along with Elliott and colleagues (1989) and McCord (1990) found that males conform more to peers than females do. This appears to be in error; none of these authors appear to make that statement.

conformity. Johnson, however, failed to perform statistical tests on the gender differences for *susceptibility to peer influence* (standardized effect sizes of .06 for males and .00 for females) as well as *delinquent associates* (.42 for males and .38 for females).<sup>21</sup> If he had performed these tests, he would have realized that in a sample of approximately 200 individuals of each gender, there is almost no evidence that these effects differ to a degree greater than chance.

Differences in the operationalization of the peer group may explain some of these discrepancies. Berndt and Keefe (1995), for example, reviewed a limited number of these studies and noted that in most *survey studies* where females exhibited greater conformity the researchers examined the effect of a single *best-friend*, while research that examined the effect of a *group* of friends typically has found no gender differences. Therefore, small groups of friends might influence boys as much as girls, but girls may be influenced more by their *closest* friend. Clark (1989) argued that the particularly strong influence of close female friends occurs because young females choose relatively few intimate friends, and only close friends are influential. Young males, in contrast, choose a larger group of friends and interact less intimately with each.

In sum, we can draw no conclusive verdict from these studies. Most studies using self-report outcomes find greater female conformity, but research sometimes notes a greater degree of male conformity with more serious delinquency. Research relying on hypothetical scenarios often finds that males conform to peer influences to a greater degree than females do for delinquent behaviors but not neutral behaviors. These conclusions, however, rely only on research measuring behavioral intentions to hypothetical situations, which have questionable validity.

#### *Confounding Source and Target Gender in Survey and Experimental Research*

Along with methodological differences, the confounding of source and target characteristics may also explain some of the discrepancies we find in past research. Because the majority of past survey research typically contrasts female-female and male-male influences (e.g., Poulin, Dishion, and Haas 1999), or has aggregated female and male peer groups (e.g.,

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<sup>21</sup> Johnson measured *susceptibility to peer influence* by asking the respondents the degree to which they *are talked into doing things by their friends that they really did not want to do*. He measured *delinquent associates* by asking how many of the respondents' friends were delinquent.

Elliott and Voss 1974; Erickson, Crosnoe, and Dornbusch 2000), prior research may have confused the characteristics that increase source influence with the characteristics that increase target conformity (Hartup 1999).

The experimental and qualitative research that differentiates these issues generally suggests that males are more influential than females are regardless of the target's gender (e.g., Brandon 1965; Strodbeck and Mann 1956). As previously mentioned, the expectation-states literature has argued that the increased male influence stems from the traditionally higher status of males relative to females in society, followed by the generalization of this status into task-specific situations. The heightened influence may also result from gender role socialization that traditionally has viewed males over females as the appropriate leaders (Brandon 1965; Strodbeck and Mann 1956), or from attributions of *expert power* (French and Raven 1971) that males often receive.

One explanation of Sistrunk and McDavid's (1971) previously mentioned finding that females conform more than males do for masculine items but not for feminine items as Eagly suggested would be that individuals attribute to males a higher level of competence for tasks traditionally viewed as masculine. This might also explain Bandura's findings that females imitated the physically aggressive behavior of male models more so than female models, but imitated the verbally aggressive behavior of male and female models equally. There is a rarely mentioned aspect of the Sistrunk and McDavid study, however, that does not fit this interpretation. In one version of their survey instrument, Sistrunk and McDavid added the additional detail that the *majority* opinion was either male or female. Using this manipulation, they found that for the *masculine* items, the *female* respondents conformed only when the researchers labeled the majority opinion *female*. The females did not conform to a *male* majority even for masculine items. Sistrunk and McDavid noted that this result failed to support the theory that those who lack knowledge about a topic yield to the group with more assumed knowledge. As mentioned previously, similar studies on persuasive communications conducted by Morelock (1980), Goldberg (1974; 1975), and Karabenick (1983) reported the same pattern of interaction.

Later, a descriptive survey by Giordano (1978) indicated parallel findings. Giordano found that white-female-delinquent-adolescents reported that their female friends, but not their

male friends, would show approval if the respondents engaged in delinquency. In other words, there was a higher correlation between female peer approval for delinquency than male peer approval for delinquency, a stereotypically male behavior. While both the Sistrunk and McDavid research as well as the Giordano research specifically investigated statistical interactions involving source gender and target gender, only the Sistrunk and McDavid research (and its replications) specifically investigated the three-way interaction that included source gender, target gender, and behavior type, while only the Giordano research investigated delinquent outcomes (using a two-way interaction).

While neither Giordano nor Sistrunk and McDavid provided theoretical explanations for their findings, child development research may provide a clarification. First, several descriptive studies show that children tend to receive more reinforcement from same-sex rather than opposite-sex peers (Charlesworth and Hartup 1967; Jacklin and Maccoby 1978). Second, in developmental studies of preschool children experimenters labeled toys as either sex-appropriate or sex-inappropriate prior to allowing the children to play with the toys. When same-sex models played with the sex-inappropriate toy, the participants' inhibitions against playing with the toy decreased. When opposite-sex models played with the same toys, inhibition remained unaffected (Kobasigawa 1968; Masters, Ford, Arend, Grotevant, and Clark 1979). Wolf (1973; 1975) reported similar findings, adding that girls seem to disinhibit more readily following exposure to same-sex models than boys do. Thus, a same-sex model may alter a child's initial perceptions of the gender appropriateness of certain behaviors, while an opposite-sex model may reinforce the original *sex-inappropriate* attribution (Hartup 1983). While no studies have tested this account on adults, this explanation would explain Giordano's as well as Sistrunk and McDavid's results.

Unlike the developmental studies which suggest that cross-gender influences are minimal, some authors have suggested that cross-gender influence is particularly important in certain contexts. Some studies (primarily those dealing with illicit drug use) have reported that males may act as *agents of contagion* (Wister and Avison 1982:526) who exert a strong negative influence on females (Bowker 1977; Ferrence and Whitehead 1978; Freeland and Campbell 1973). A consistent finding in this research is that females who associate with males become delinquent more often than females who associate with other females do (Caspi,

Lynam, Moffitt, and Silva 1993; Steffensmeier and Allan 1996; Warr 1996). A somewhat contrasting argument is that females may have a civilizing effect on males (Courtwright 1996). These arguments are compatible if associating with friends of the opposite gender causes male adolescents to become less delinquent and female adolescents to become more delinquent. In other words, if the behavior of individuals in mixed-gendered friendships conforms to an emergent group norm that represents an average across male and female behaviors. Recall that Sherif's (1958) experiments based upon the autokinetic effect produced similar results, although Sherif did not examine the effect of gender.

Also recall, however, that the relative ability of males versus females to exert interpersonal influence may be behavior specific (Brown 1982; Clasen and Brown 1985; Sistrunk and McDavid 1971). Thus, each gender may exert greater influence for some behaviors relative to others.

In sum, we do not know whether the source-gender/target-gender interactions indicated by several experimental findings will generalize to delinquent behaviors in naturally occurring peer groups. It also remains unclear how and to what extent males affect the delinquency of females (and vice-versa), and how source gender affects influence for delinquent outcomes when unconfounded with target gender.

### **Age**

Age is another factor that researchers have examined as a potential moderator of conformity. As with gender, there are conflicting findings. Some survey research has suggested that susceptibility to peer influence increases with age (Magnusson 1987), particularly for males (Dornbusch, Laird, and Crosnoe 1999; Schlegel and Barry 1991). In contrast, other research has suggested that as adolescents age their susceptibility to peer influence declines (Janney, Mallory, Rossitto, and Simon 1969; Zani 1993).

A curvilinear age effect may explain these apparently contradictory findings. Conformity to peers may be low at young ages, increase during adolescence, and then gradually decline at some point due to changes in the relative importance of different individuals during different stages in the lifecourse (Berndt 1979; Devereux 1970; Iscoe, Williams, and Harvey 1963).

Parents, for example, typically dominate the lives of young children (Hartup 1983), while the peer group gradually increases in importance as children enter the teenage years (Warr 1993a). By the age of eleven, a substantial portion of the typical adolescent's social activity occurs with other adolescents (Rubin, Bukoski, and Parker 1998). During the middle teens, adolescents typically spend more time with peers than with parents (Csikszentmihalyi and Larson 1984; Warr 2002).<sup>22</sup> From middle to later adolescence, teenagers often report a declining importance of the peer group and an increased interest in dating, a concern that gradually becomes central (Brown, Eicher, and Petrie 1986; Coleman 1961; Coleman and Hendry 1999; Zani 1993). In early adulthood, peer influences may continue to decrease as individuals become more independent from both their families of origin and their peer groups in favor of closer ties to their family of procreation (Braithwaite 1989; Farrington and West 1995; but c.f. Fasick 1984; Sampson and Laub 1993). Some survey research that examined behavioral intentions to hypothetical situations has suggested that the peak period of conformity may occur during the years of junior high school or during the first year of high school (Wall, Power, and Arbona 1993), while other survey research on political beliefs suggested that the peak occurs during late adolescence and early adulthood (Krosnick and Alwin 1989). Some experimental research relying on persuasive arguments has suggested that the peak ranges from nine to twelve years of age (McGuire 1985). Again, these peaks may be behavior specific, depending largely on whether the conformity is due to normative or informational concerns. With normative conformity in mind, Coleman suggested that the peak is partially due to the fear of peer rejection being strongest during these times (1974; 1989).

Age interactions involving source and target may be important when younger adolescents associate with older ones. Adolescents typically associate with others of similar age (Savin-Williams 1979; Weisfeld and Billings 1988); however, those with older companions may be more susceptible to their influence (Ludeke and Hartup 1983; Wolf 1975). An older peer's ability to exert influence may be due to advanced physical maturation, because physical stature often correlates with social status among the young (Savin-Williams 1979; Weisfeld and Billings 1988). It is also possible that children and adolescents view their older companions as

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<sup>22</sup> Larson and colleagues (1996), however, note that an increase in the importance of peers does not necessarily imply a decreased importance in parents even though the time spent with parents may decrease during these years.

more competent regardless of physical maturity because younger adolescents believe that older friends better understand the potential costs and benefits of various forms of behavior.

Investigating age interactions is difficult because children and adolescents are most accessible in schools and other institutions, which are by nature age-graded. For this reason, approximately 90 percent of existing studies on peer relationships deal with relations among agetates (Hartup 1983). Therefore, we have limited information on the effect of *source* age unconfounded with *target* age with regard to variations in conformity and influence.

### **Race and Culture**

There is minimal evidence for the effects of race on either conformity or influence because researchers have conducted the majority of their investigations on whites (Dornbusch, Laird, and Crosnoe 1999). Some research supports the idea that minorities, such as African-Americans (Dornbusch, Laird, and Crosnoe 1999; Erickson, Crosnoe, and Dornbusch 2000; Flay et al. 1994; Iscoe, Williams, and Harvey 1964; Mock and Tuddenham 1971) and Asian-Americans (Dornbusch, Laird, and Crosnoe 1999), conform to peer pressures to a *lesser* degree than whites do. Fridrich and Flannery (1995), however, found evidence that Mexican-American males conform to antisocial peer pressure to a *greater* degree than do non-Hispanic males. While some research has suggested no variation in conformity across ethnic groups, these studies often have lacked sufficient statistical power to detect small to moderate differences (e.g., Janney, Mallory, Rossitto, and Simon 1969).

Researchers have provided few theoretical explanations for ethnic differences in susceptibility to peer influence within United States samples. Some have suggested that racial differences are due to the relative importance of peers and family (Krohn and Thornberry 1993; Schwendinger and Schwendinger 1985). Krohn, for example, suggested that discrimination may cause minority groups to rely heavily on their families (relative to their friends) for social support, and this reliance on the family may result in a lowered degree of peer influence.<sup>23</sup>

Cultural explanations rather than discrimination or other structural factors may be responsible for ethnic differences in peer influence. For example, Asian cultures (Cole 1992;

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<sup>23</sup> Krohn and Thornberry (1993) did not provide any qualitative or quantitative evidence to support his assertions. He cited several sources to back his contention, however, none of these sources pointed to specific evidence to back his statement (e.g., Becerra, 1988; Booth, 1990; Clark, 1989; Sanchez-Ayendez, 1988; Singleton; 1989).

Guisinger and Blatt 1994; Miller 1987; Stevenson, Chen, and Lee 1992) as well as French culture (Mussen, Conger, and Kagan 1979) emphasize the family over the individual and do not consider independence and autonomy from the family as virtues.

The amount of unsupervised time spent with peers also varies by culture. In countries such as the Soviet Union and Japan, teenagers report spending only two or three hours per week with friends compared to twenty hours among American youth (Csikszentmihalyi and Larson 1984). Other researchers have noted similar differences in Denmark (Kandel and Lesser 1972). Again, the amount of influence that friends are able to exert during this time may depend on whether the interaction is supervised by parents or other adults.

### **Parents**

As mentioned earlier, there is a clear zero-order negative relationship between parental attachment and/or supervision and delinquency. Several researchers have explained this relationship as one involving changes in the child's susceptibility to peer influence. Stated in another way, the ability of a delinquent source to influence a target adolescent may depend on the quality of the target's parental relationships. Adolescents who are emotionally close to parents are more likely to internalize their parents' moral inhibitions, thus becoming less susceptible to negative influences. Hirschi described this mechanism as the parents being *psychologically present* when their children are in the company of delinquent peers (1969 p.88.). A number of survey studies have supported this assertion – when attachment to parents is high, peer deviancy has no effect; when low, the effect of peer deviancy is significant (Berndt 1979; Hill 1980; Mason, Cauce, Gonzales, and Hiraga 1994; McCord 1990; Poole and Regoli 1979; Vitaro, Brendgen, and Tremblay 2000).

Several authors have contrasted the moderating explanation of parental influence discussed above with mediating mechanisms, which suggest that parental attachment reduces peer influence through decreasing the exposure to delinquent friends. While mediating and moderating mechanisms may occur simultaneously, one study indicated that parental effects operate *solely* through the mediating mechanism of inhibiting delinquent friendships rather than through moderating mechanisms involving a lowered susceptibility to peer influence (Warr 1993b). Because this study relied upon the National Youth Survey (Elliott, Huizinga, and Ageton 1985), which measured peer behavior using respondent estimates, these results may be

suspect for the reasons delineated previously. In other words, to the extent that respondent estimates of peer behavior reflect the projection of the respondents' own behavior, a mediation model will improperly control for the dependent variable, thus reducing the effects of the independent variables (see Haynie and Osgood 2002). In this case, the model would indicate spurious mediation.

### **Initial Delinquency Levels**

The effect of a source's influence may depend on the initial level of the target's own delinquency. The study by Vitaro and associates (2000) discussed earlier found that disruptive friends increase delinquency among children who are moderately disruptive themselves, but not among children who are either highly disruptive or never disruptive. They suggested that highly disruptive children are so involved in antisocial behavior that friends make little difference, whereas nondisruptive children are so well protected due to the internalization of norms that the behavior of their friends is irrelevant (Vitaro et al. 1997) (also see Hartup 1999; Poulin, Dishion, and Haas 1999; Schulenberg, Maggs, Dielman, Leech, Kloska, Shope, and Laetz 1999). Some of these findings, however, may be due to statistical artifact such as floor and ceiling effects; if adolescents are already highly deviant, becoming more delinquent is unlikely. In contrast to this position, Giordano, Cernkovich, and Pugh reported that delinquent youths have higher susceptibility to peer influence than do non-delinquents (1986). Unlike the study by Vitaro and colleagues, these researchers categorized their subjects based upon their frequency of delinquency, while subsequently measuring their self-reported susceptibility to influence in a manner where ceiling and floor effects would not affect their analyses.

### **Homogeneity**

Evidence first reported in the Asch experiments indicated that the presence of a social supporter (or similarly, one who breaks the homogeneity of the majority) disrupts the strength of social influence (Asch 1955) (also see Allen and Newston 1972). Other laboratory studies have suggested that supportive partners reduce a subject's fear of majority retaliation for deviance from group norms. These studies indicated that a subject who deviates from group consensus anticipates rejection, but a partner who agrees with the subject reduces this fear (Allen 1975). The decreased fear of majority reaction may occur because the subject believes

the majority will divide its hostility between the supporter and the subject, or alternatively, because the subject assumes that the presence of a supporter will decrease the possibility that the majority will attribute nonconformity to personal idiosyncrasy (Boyanowsky and Allen 1973).

Another possibility is that a social supporter may reduce the self-doubt an individual feels when confronted by several peers holding a unanimous belief that contrasts with the individual's own beliefs. When individuals are not confident of their position, they become more susceptible to informational influence (Allen 1965). A social supporter who confirms that the position is correct, however, reduces the ability of the majority to exert influence.

In the delinquency literature, scholars have rarely discussed network behavioral homogeneity – or in other words, the behavioral homogeneity of the peer group.<sup>24</sup> The maximum value of homogeneity occurs when the members of a friendship group behave identically. Theoretically, a group that is homogeneous in behavior or attitude should exert more pressure toward conformity to group norms than a non-homogeneous group; however, research conducted by Vitaro, Brendgen, and Tremblay (2000) did not support this hypothesis.

### **Popularity**

Popular adolescents may consider having a large number of friends particularly important, and thus they may conform to others' expectations due to a desire to maintain a large number of friendships (Eder 1985; Festinger 1950b; Haynie 2001). This may be particularly important for adolescent females who often believe that popularity is more important than are academic achievement and other dimensions of success (Douvan and Adelson 1966; Rosenberg and Simmons 1975; Rosenberg 1965). On the other hand, if popularity is comparable to other components of status, it should correlate negatively to conformity for the reasons mentioned above.

Once again, there are conflicting findings in prior research related to the moderating role of popularity upon target conformity. Some research has found that the number of friendship choices an individual receives positively correlates with a target's conformity to

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<sup>24</sup> The neighborhood/social-disorganization literature does, however, discuss neighborhood *ethnic* homogeneity (e.g., Warner and Pierce, 1993) and differential association theory does suggest that the ratio of delinquent versus non-delinquent exposure affects subsequent acceptance of delinquent *definitions*.

group norms (Festinger 1950b; Haynie 2001). Other research has found that popularity is unrelated to conformity (Back and Davis 1965).<sup>25</sup> Even if we accept the conclusion that popularity correlates with conformity, the causal direction remains uncertain. Popular individuals may be more susceptible to influence, but equally likely is the prospect that when people conform they become more popular (Braver, Linder, Corwin, and Cialdini 1977; Kelley and Shapiro 1954).

By definition (because popularity means that a large number of individuals consider someone a friend), popular individuals are able to exert more influence over a larger *number* of targets who identify them as friends (recall referent power French and Raven 1971), but prior research offers no discussion about the effect of popularity on the degree of influence a popular source will exert on *each* individual. Thus, questions related to the effect of popularity on influence remain unresolved.

### **Source-target Relationship**

The strength of peer influence may depend on the nature of the source-target relationship. For example, differential association theory predicts that peers who interact more frequently are more likely to influence each other (Sutherland and Cressey 1955). Other perspectives, however, argue that influence depends primarily on attachment to the influence source rather than the frequency of contact (Agnew 1991; Heider 1958; Newcomb 1953). According to these perspectives, no matter how much time a person spends with others, disliked sources will have little impact.

Suggestions by Urberg and colleagues (1997) and Newcomb and Bagwell (1995) are particularly relevant for this project. These scholars have suggested that the degree of similarity should be greater for peers chosen as *best* friends than for other friends. They argue that *best* friends relative to other friends share more intense and frequent interaction. Thus, best friends should exert more mutual influence. Similarly, a group leader may exert stronger influence than other group members (Dunphy 1963; Sherif and Sherif 1964).

Alternatively, if a similarity hierarchy exists where best friends are more similar than other friends, it may result from initial selection processes rather than a differential influence

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<sup>25</sup> Haynie had a large sample and found only a small positive relationship. Back and Davis had a small sample and found no relationship. Therefore, the difference in the findings could be due solely to statistical power.

process. In other words, adolescents may choose their closest friends from among those whose behavior is initially more similar than the behavior of their other associates.

### **Summary**

Some researchers have cast doubt on the well-accepted assumption that friends are the most important influence on adolescent delinquency. While their ascertainment of minimal interpersonal influence may be correct generally, there may be circumstances where influence (or similarity) is stronger. Prior experimental research has examined, with some success, the factors that condition a target's susceptibility to influence, as well as a source's ability to exert influence. Other research, however, has suggested that these factors are often behavior specific. Therefore, we cannot be certain that conclusions from prior experimental and field research that deal with non-criminal or minor forms of offending will generalize to more serious forms of behavior. For these reasons, we require research that examines the potential moderators of peer influence with longitudinal data that uses direct self-reports of different types of peer delinquency.

## CHAPTER 4

### RESEARCH HYPOTHESES

#### Introduction

The social-psychological and criminological literatures have indicated that the behavioral similarity between adolescent friends results from several interrelated, but distinct, phenomenon. Adolescents mutually influence each other, choose friends similar to themselves, and terminate friendships with dissimilar others (Ennett and Bauman 1994).

Mutual influence may occur from different mechanisms. Some forms of influence imply a time lag between exposure to delinquent peers and subsequent increases in delinquency (e.g., learning pro-delinquent attitudes), while other forms of influence imply contemporaneous and non-stable effects (e.g., public conformity). While we know that various forms of influence occur, the relative strengths of each remain uncertain, primarily because disentangling each is problematic. Disentangling the effect of peer influence from the effects of a shared environment, selective attraction, and method artifact is also difficult without information pertaining to friendships that develop within groups of previously *unacquainted* individuals who interact within similar environments (Jussim and Osgood 1989). Research opportunities under these conditions are rarely possible however (for exceptions see Jussim and Osgood 1989; Newcomb 1943). Consequently, most delinquency research relies on survey data and imperfect methods for separating selection from influence.

Until the time of Sampson and Laubs' work (e.g., 1992) and the research of Horney and colleagues (1995), sociological research on crime has largely ignored the changing nature of juvenile delinquency and the degree to which *current* rather than historical factors explain this change. Instead, this research has emphasized lagged statistical models, assuming that long-term social learning is the primary form of interpersonal influence. This emphasis has lead several authors to argue that criminology's neglect of mechanisms other than long-term socialization is unfortunate (Birkbeck and LaFree 1993; LaFree and Birkbeck 1991).

For these reasons, and because several theoretical perspectives within the social-psychological literature emphasize the importance of the current social context rather than the accumulated prior exposure to delinquent friends, the models of influence I am using in this

project are random effect models of within-individual change, similar to that described by Horney, Osgood, and Marshall (1995) and Brame, Bushway, and Paternoster (1999).

When applied to issues of peer influence, the theoretical foundation of these models assumes that exposure to the delinquent behaviors, attitudes, and modes of reinforcement of the *current* friendship group is at least as important for explaining delinquency as exposure to the *prior* friendship group. Chapter 5 provides more detailed discussions of these models.

This project also examines an issue pertaining to friendship selection. Specifically, while the prior literature has often assumed that *delinquency per se* is the actual basis of friendship selection when a delinquent adolescent chooses a friend who is similarly delinquent, this project examines the possibility that the actual basis for selection may be factor(s) correlated with delinquency such as age, educational achievement, religiosity, race, and socio-economic status.

Finally, this project examines the role of delinquency in the largely neglected phenomenon of friendship *de-selection* where adolescents terminate friendships with some of their friends. Here, a sparse literature suggests that although individuals may become friends due to random factors, a dyad's initial behavioral dissimilarity may result in the termination of their friendship.

The National Longitudinal Survey of Adolescent Health, which I describe in chapter 5, contains the information required for these analyses. Even these innovative data, however, contain only two survey waves, thus somewhat limiting their utility for modeling change. Despite this limitation, these data utilize independent measures of peer behavior rather than relying upon the perceptions of the respondents for peer behavioral estimates and therefore eliminate a major criticism of prior research.

### **Selective Attraction**

#### ***Hypothesis 1 – Adolescent Friendship Choice***

**Hypothesis 1 contains two closely related predictions: (a) adolescents choose friends who are similar in their levels of delinquent behavior, but (b) they base their friendship selection largely upon traits associated with delinquency rather than delinquency itself.**

The propositions of some authors who deny the importance of interpersonal influence for explaining adolescent influence have implied (but have not explicitly articulated) that because cross-sectional data indicate that adolescents share some level of behavioral similarity with their friends, the friends must have chosen each other specifically because they behaved alike (e.g., Gottfredson and Hirschi 1990). As mentioned previously, however, research typically has indicated that observable characteristics like age and race are the principal criteria of friendship selection, not subtle characteristics like delinquency (Laumann 1973; Rodgers, Billy, and Udry 1984; Sykes, Larntz, and Fox 1976). Thus, a substantial portion of friendship behavioral similarity may result not from the purposeful self-selection of other delinquents, but from self-selection based upon demographic factors that correlate with offending.

As Kandel (1978) noted, we can investigate the magnitude of this initial level of similarity (selective attraction) with two waves of longitudinal data by determining the degree of similarity between friendship dyads prior to the initiation of their friendship (i.e., by examining dyads who are not friends at time 1, but become friends at time 2). Prior research utilizing Kandel's strategy to examine this issue, however, has largely failed to include important correlates of delinquency (e.g., age and race) that may also be important criteria for friendship selection in statistical models (for an exception, see Rodgers, Billy, and Udry 1984). This limitation confounds selection based upon delinquency's correlates with selection based upon delinquency itself (Feld 1982; Rowe, Woulbroun, and Gulley 1994).

Admittedly, this confounding may be of interest to some scholars but irrelevant for others. If research only seeks to isolate the effects of peer influence from selective attraction, then it makes little difference why adolescents select their friends as long as the research design controls for the selection. If, however, there is an interest in whether delinquency itself affects friendship choice, the confounding is problematic.

Some researchers with an interest in this distinction have used samples from multiple schools but have neglected to control for between-school differences in delinquency levels. This failure confuses actual selection criteria with the structural and geographical boundaries constraining friendship choice, because adolescents rarely have friends who attend another school (Clark 1989), and schools are an important shared environment likely to affect delinquency levels. Research that acknowledges these distinctions, however, has generally

found that observable characteristics and propinquity are the most important friendship selection criteria.

For this reasons, I predict that adolescent friends share a similarity in delinquent behavior, but controlling for age, race, gender, SES, GPA, and school will explain a large portion of that similarity. Even prior to the inclusion of these controls, however, the Add Health data likely will indicate that adolescents behave less like their friends than has prior research because Add Health use independent behavioral measures from each member of the peer group, which minimize methodological artifact.

### **De-Selection**

#### ***Hypothesis 2 – Friendship Termination***

**Friendships between two delinquent adolescents and friendships between two non-delinquent adolescents will terminate less often than friendships between adolescents who do not share the same delinquency status.**

One explanation for behavioral resemblance among adolescent friends is a continuing cycle of selecting similar friends followed by subsequent de-selection of dissimilar friends (Billy and Udry 1985b). Adolescents are likely to select friends who behave like they do, thus providing opportunities for mutual reinforcement. Dissimilar friendships, where adolescents share few activities, do not provide these frequent reinforcement opportunities. Consequently, dissimilar friendship are more likely to terminate. Warr's (1993a) evidence that the behavior of adolescents at any particular point in time more closely matches the behavior of current friends than prior friends supports this hypothesis, although his findings do not isolate influence from selective attraction.

Because we know that friendship stability correlates with several demographic characteristics (e.g., Cantor 1975; Mock and Tuddenham 1971; Rowe 1983), and that cross-sex friendships are less stable than same-sex friendships are (Asher, Oden, and Gottman 1977; Clark and Ayers 1985), it is important to include these controls when testing this hypothesis. Therefore, along with delinquent similarity, I will also examine the effect of gender, religiosity, SES, GPA, age, and minority status together with differences between the friends on these factors when I examine this hypothesis.

## Influence

### *Hypothesis 3 – Friends' Influence*

**The recent delinquency of an adolescent's friendship group will affect the recent level of an adolescent's own delinquency.**

The literature on social learning and the transmission of pro-delinquent attitudes provides the theoretical foundation for the majority of interpersonal influence research in criminology. For this reason, the criminological literature largely has concentrated on the effects that exposure to delinquent peers has upon the *future* behavior of adolescents. In other words, when target adolescents contact new sources of delinquency the targets require some non-trivial period of time to learn and internalize the novel delinquent norms and attitudes to which they are exposed.

The literature on situational, shorter-term, and contemporaneous influences, together with the literature stressing the ability of time-varying factors to explain time-varying patterns of delinquency, however, suggests that the focus on long-term social learning mechanisms is too narrow. A recurring theme in the social psychological literature, for example, implies that the most relevant forms of interpersonal influence occur contemporaneously with exposure to delinquent peers and cease shortly after the exposure ends. Statistically, this literature implies that empirical research should concentrate on determining the correspondence between recent *changes* in an adolescent's behavior and the recent *changes* in the delinquent behavior of the adolescent's friendship group (Brame, Bushway, and Paternoster 1999). Changes in the group's behavior may occur for two reasons: (a) the behavior of group members changes, or (b) an adolescent decides to associate with a different group of friends.

Evidence of corresponding changes in the behavior of target adolescents and their friendship groups are discordant with so-called *static* theories of delinquency (see Brame, Bushway, and Paternoster 1999), which suggest that the propensity to commit delinquency remains stable once established in early childhood (Gottfredson and Hirschi 1990; Wilson and Herrnstein 1985). These changes are, however, concordant with *dynamic* theories of offending, which stress the salience of changes that occur over the lifecourse (e.g., Horney, Osgood, and Marshall 1995; Sampson and Laub 1993). In testing this hypothesis, I will use a random effects

model of within-individual change, which isolates the effects of within-individual changes from between-individual differences. I describe these models more fully in the next chapter.

#### ***Hypothesis 4 – Gender and Friends’ Influence***

**Adolescents will conform more to other adolescents of the same gender than to adolescents of the opposite gender.**

Prior research has often suggested that females are more conforming and males exert greater influence, although the evidence for these assertions is far from conclusive. Furthermore, this research often confounds source and target characteristics, making interpretations of the findings problematic. Most of the prior literature also fails to test for target-gender by source-gender interactions. Females may conform more, for example, when the influence source is male, and conform less when the influence source is female. The reverse is also possible.

Some theoretical perspectives suggest that female targets conform more to male sources, while other perspectives suggest that same-sex influence should be stronger. The majority of the reference group literature, for example, argues that individuals are more likely to compare themselves to, and model their behavior after, similar rather than dissimilar others (e.g., Merton and Kitt 1950). Because individuals often make comparisons between themselves and a referent based upon ascribed characteristics such as gender and race rather than behavior (Clark 1972), same gender rather than opposite gender friends should exert the most influence. Others, however, note that individuals frequently choose a referent from non-membership rather than membership groups (Allen and Wilder 1977; Festinger 1954; Glaser 1956; Suls and Miller 1977; Suls and Wills 1991; Wood 1989), a prospect that makes predictions based upon this theoretical perspective problematic.

Like the reference group literature, some developmental perspectives also suggest that females influence other females to a greater degree than males influence females. When a male model performs stereotypically male behaviors such as delinquency, the model reinforces the target’s perception that the behavior is masculine. Under this scenario the reinforcement occurs regardless of the target’s gender. In contrast, when female models perform stereotypically male

behaviors the model may reverse the female targets' initial perceptions of the inappropriateness of these behaviors for women (e.g., Hartup 1983; Wolf 1973; Wolf 1975).

Unlike the reference group and developmental perspectives, the majority of the persuasive communication literature suggests that male sources relative to female sources should always exert greater delinquent influence regardless of target gender. Evidence arising from this research tradition implies that a target will conform to a knowledgeable source, particularly when the target lacks competence in a particular area (Eagly and Carli 1981; French and Raven 1971). Simply by virtue of their experience with performing delinquent acts, males are generally more knowledgeable about the contingencies of delinquent behavior. Thus, according to this theoretical perspective, male sources should have the most influence upon a target of either gender, because males perform delinquent acts to a far greater extent than do females.

The literature related to social status also suggests that females should conform to males because males traditionally have held higher status (Brandon 1965; Strodtbeck and Mann 1956). We find this theme in expectation states theory (e.g., Berger, Cohen, and Zelditch 1966; Berger, Webster, Ridgeway, and Rosenholtz 1986; Berger and Zelditch 1985) as well as various dominance theories (e.g., Mazur, Rosa, Faupel, Heller, Leen, and Thurman 1980).

While the reference group, developmental, persuasive communications, status, and dominance perspectives provide different predictions relative to this hypothesis, the actual evidence that supports one perspective over the other is mixed and largely confined to experimental research. Often, however, the sample sizes in this literature are too small to draw definitive conclusions (e.g., Bandura, Ross, and Ross 1961).

Results also vary depending on the behavior in question. Recall that Bandura and colleagues (1961), for example, found that females imitated physically aggressive male models more than physically aggressive female models. For verbally aggressive behaviors, however, females imitated the models more often when the models were other females. Bandura and colleagues suggested that these findings resulted from the male domination of physically aggressive behaviors. In contrast, Sistrunk and McDavid (1971) and Morelock (1980) found that females conform more to the persuasive communications of other females than to males even under conditions where the males were more knowledgeable. These findings contrast with

the majority of the persuasive communication literature, although the common failure to disentangle source from target gender and a failure to consider gender interactions may underlie the disparities.

Which perspective proves correct likely depends upon the predominant nature of interpersonal influences upon delinquent behavior. Theoretical perspectives emphasizing conformity to knowledgeable sources may apply if delinquency requires a high degree of expertise. Some authors, however, suggest that crime and delinquency is easily learned and requires no special skill or knowledge (e.g., Gottfredson and Hirschi 1990). Theories of status may apply if female adolescents view male adolescents with particularly high regard. Because neither possibility appears highly likely, I base my hypotheses on the perspectives found in the developmental and reference group literatures and predict that females will influence other females to a greater extent than males will influence females. Contrary findings, however, would support the alternative perspectives in the persuasive communications and status literatures. Similarly, I predict that male friends, but not female friends will influence male adolescents. While the persuasive communications literature would not disagree with this prediction, a finding such as this would contradict the suggestion that females are a civilizing influence on males (e.g., Courtwright 1996).

Table 4.1 and its accompanying narrative illustrates these predictions. This table contains four cells labeled 1 to 4, which represent all combinations of target-gender and source-gender. Hypothesis 4 predicts that if we have an appropriate measure of interpersonal influence in each cell, the influence effect in cells 1 and 4 will be greater than the effects corresponding to cells 2 and 3.

**Table 4.1 An Illustration of Target Conformity and Source Influence**

<u>Source</u>	<u>Target</u>	
	<u>Male</u>	<u>Female</u>
Male	1	2
Female	3	4

### ***Hypothesis 5 – The Relative Strengths of Same-gender Effects***

#### **Female peers influence females to a greater extent than male peers influence males.**

The prior literature has generally suggested that females conform to peers more than males do, although as I mentioned above, the literature has often confounded target and source gender and has often failed to consider target/source gender interactions. Referring again to table 4.1, hypothesis 5 elaborates upon the prior hypothesis by specifying that cell 4 will be greater than cell 1.

A greater level of female conformity may occur due to a general female disposition to conform to peers more than males do – potentially a consequence of the stereotypically normative expectations of the submissive female role (e.g., Krech, Crutchfield, and Ballachey 1962; Worchel and Cooper 1976), or the normative expectations for females to maintain group harmony (Cooper 1979; Eagly 1978). According to the theoretical perspectives discussed in the prior hypothesis, however, we gain little by discussing the *overall* conformity of females when the source gender is unspecified, because source-gender/target-gender interactions likely exist.

Thus, I will make a hypothesis only about same-sex influences and not about an overall level of conformity exhibited by each gender. Again, because the prior research evidence largely suggests that females conform more than males do for the theoretical reasons mentioned above, I predict that this finding will generalize to delinquent behavior. Contrary findings, however, are consistent with the results noted by Bandura and colleagues (1961) where young males imitated aggressive models to a greater extent than did young females. If my analysis did find this result it may suggest that the early socialization of female adolescents into stereotypically submissive and non-aggressive gender roles will trump the later influence of delinquent peers. In other words, although females may conform more than males do, the important influence source for young women may be parents and other conventional individuals rather than the current friendship group.

## CHAPTER 5

### DATA AND METHODS

#### ***Add Health Data***

To test the hypotheses I described in chapter 4, I am relying upon data from the National Longitudinal Survey of Adolescent Health (Add Health), a recently available dataset consisting of a nationally representative sample of adolescents in grades 7 through 12 from 164 schools in the United States. Add Health had two distinct phases of data collection. During the initial *in-school* phase, 90,000 adolescents answered a paper-and-pencil survey instrument, limited to questions of minor and moderate sensitivity. During the subsequent *in-home* phase, a sub-sample of approximately 20,000 adolescents answered more sensitive questions. This project relies upon 2 waves of in-home data collected one year apart, which the principle investigators have termed wave 1 and wave 2, although the in-school phase preceded wave 1.

A key advantage to these data is their inclusion of sociometric network information, which consists of links from each respondent to their five closest friends of each gender starting with their closest male and closest female friend. Unlike most other studies where respondents *estimate* the behavior of their peers, sociometric methods allow researchers to derive the behavior of each member of the respondents' social network *directly* from each friend's self-report. Because the respondents also nominated friends during the second wave of data collection, researchers can examine of the effects of changes in the respondents' social network upon changes in the respondents' own behavior.

A second important advantage of the in-home phase of Add Health is its innovative data collection technique. For questions of a sensitive nature, the respondents typed their responses directly into laptop computers after listening to pre-recorded questions played through headphones. This method helps assure anonymity, which greatly increases data reliability and validity.

The principle investigators chose a majority of respondents for the in-home sub-sample at random, although they over-sampled some groups with characteristics desirable for specialized research, such as minorities with highly educated parents. When adolescents indicated that they had a twin during the in-school phase the investigators automatically

selected them for participation in the in-home phases. A weighting variable allows for the statistical adjustment of over-sampling, and I excluded adolescents from the biological-twin auxiliary sample, who were not chosen using known-probability sampling methods.

For the purpose of collecting longitudinal network information from the respondents, the Add Health data contain one additional departure from random sampling procedures. In 16 schools, *all* students rather than a sub-sample were interviewed, thus allowing for the collection of full network data from a *saturated* sample of students in the selected schools. Although two of the schools had more than 1000 students enrolled, the principle investigators choose the majority due to their small size (under 400 students). There were four schools from the West, five from the Midwest, four from the South, and four from the Northeast. Four of the schools were urban, seven suburban, and 5 rural. One of the large schools was located in a suburban area in the Western region of the United States, while the other was located in an rural area of the Midwest.

Although some might be concerned that the selection of these schools was not completely at random, the prior literature gives us no reason to believe that the mechanisms of peer influence are different for students who attend the saturated schools than are the mechanisms of peer influence for other students in the United States. Haynie and Osgood (2002), for example, compared findings on their peer influence analyses for the saturated schools sample with similar analyses they based on the overall sample and obtained essentially identical results.

The in-school and first in-home wave of Add Health data collection began during the 1995 school year, while the second wave began in 1996. A third wave of collection was recently concluded, but the long time lag between the second and final wave was designed to help address issues relevant to early adulthood and thus this wave is not useful to the current analyses. Because my hypotheses involve network measures of the respondents' friendships, I used only the individuals in the saturated sample in this thesis.

## ***Dependent Variables***

### *Considerations When Constructing Delinquency Scales*

The majority of my hypotheses rely on scaled measures of the respondents' delinquent involvement and the delinquency of the respondents' friends. While the initial in-school survey has questions pertaining only to minor to moderate forms of delinquency including: involvement in a serious physical fight, skipping school, drinking, getting drunk, and smoking, the subsequent in-home surveys contain questions involving more serious behaviors including: painting graffiti, vandalism, shoplifting, hurting someone during a fight, auto-theft, theft of less than \$50, theft of over \$50, burglary, robbery, pulling a weapon on someone, using a weapon, carrying a weapon, selling drugs, and participating in a group fight. For each behavior, the students reported their frequency of participation over the past 12 months on a four or five point scale ranging from *never* to *nearly every day*.

Although operationalizing a delinquency scale from these measure might seem straightforward, there are a number of problematic aspects of instrumentation and several theoretical concerns to consider. When determining a scaling strategy for delinquency outcomes, a primary consideration is that many adolescents are *non*-delinquent. Because a large proportion of adolescents do not perform seriously delinquent behaviors, traditional delinquency measures are not normally distributed. The non-normality is problematic for ordinary least squares regression analyses (OLS), because the skewed distribution violates an assumption of OLS statistical models.

We also need to consider whether to use a threshold of behavioral seriousness that we might require before including an item in the scale. If we include smoking, alcohol consumption, or other minor acts in a delinquency measure, the high frequency of these behaviors will typically dominate the resulting scale.

### *Delinquency Scales Used in Prior Research*

To minimize the problems of scaling delinquency, scholars have traditionally used one of two approaches – summing across the raw frequencies of each behavior in question (typically within ordinal response categories that contain an upper limit), or summing across dichotomized versions of each behavior (Hindelang, Hirschi, and Weis 1981). The former

strategy has the advantage of including all available information in the resulting measure, and the disadvantage of biasing the scale toward minor behaviors, because minor offenses are more frequent. In contrast, the latter strategy limits the contribution of high-frequency/minor items and reduces the skewness of the resulting scale. Unfortunately, this approach also minimizes the distinctions between individuals who commit single versus multiple acts within each offense category (Osgood, McMorris, and Potenza 2002). Several scholars have advocated the first strategy (e.g., Hindelang, Hirschi, and Weis 1981), although others have noted that strong correlates of delinquency retain similar relationships with any reasonably derived delinquency scale (Osgood, Finken, and McMorris 2002). Additionally, some have noted that OLS results are typically robust even in the presence of skewed outcome measures (Bohrnstedt and Carter 1971). Thus a failure to account for skewness may not be a serious problem, and under many conditions either strategy will suffice.

#### *Problematic Aspects of Statistical Interactions*

Although the robustness of statistical estimates in the presence of the violation of model assumptions implies that choosing between differing scaling strategies has minimal importance for many statistical models, major concerns that researchers *should not* ignore are problems that arise with the inclusion of interaction terms in statistical models that contain non-normally-distributed dependent variables. For non-normal outcomes, OLS may produce artifactually significant interaction coefficients (Haynie and Osgood 2002). Primarily for this reason, Osgood and colleagues have advocated the use of delinquency scales based upon item-response-theory (IRT), particularly when statistical interactions are a primary interest.

IRT scales are latent constructs that differ from more common latent variable techniques primarily because they relax normality assumptions about the manifest variables from which the latent construct is derived. Most structural equation applications, for example, assume that observed indicators are normally distributed. In contrast, counts of delinquency items in the Add Health Data (and most delinquency data) are skewed ordinal measures that contain a large number of zeros.

With minor modification, an analyst could specify a latent construct similar to Osgood and colleagues' IRT scale using relatively common structural equation modeling software. If a user of Prelis software, for example, were to specify a polychloric correlation between the

manifest variables where the latent construct had zero mean and unit variance, the analyst would obtain an outcome similar to the IRT values. While the distribution of the manifest variables is not assumed normal, the latent IRT construct produces a near-normal distribution where the primary departure from normality involves a truncation at the low range of the scale.

To properly model this truncation, analysts may use tobit regression analysis (Osgood, Finken, and McMorris 2002). Unfortunately, statistical software that permits tobit analyses for a random-effects model of longitudinal data is not readily available, and thus will not be used in this project. In future research, I will either attempt to add additional manifest indicators that decrease the truncation of the delinquency scale, or will determine a method to properly model the truncated outcome within a random-effects framework. Again, however, the failure to account for the outcome's precise distribution becomes problematic mostly when interactions are modeled, which is not the case in this project's analyses.

### **IRT Delinquency Scale**

Due to the considerations outlined above, I based the dependent variable I used in most analyses in this research upon Osgood and colleagues' (2002) item-response theory scales. Following the procedure outlined by Haynie and Osgood (2002), I combined the following 14 items into a single IRT delinquency scale: (1) painting graffiti, (2) vandalism, (3) shoplifting, (4) theft under \$50, (5) theft over \$50, (6) burglary, (7) unauthorized use of a car belonging to another, (8) selling drugs, (9) engaging in a serious physical fight, (10) injuring another person, (11) use or threatening to use a weapon, (12) participating in a group fight, (13) pulling a knife or gun on someone, (14) shooting or stabbing someone.

### **Friendship Termination**

One hypothesis relies upon the dichotomous outcome of friendship continuation or termination across waves. Here, the operationalization of the dependent variable is relatively straight-forward. When a respondent nominated a friend during the first survey wave but failed to nominate that friend during the second wave, I considered the friendship terminated.

## ***Independent Variables***

Time-stable covariates, such as age, race, and socio-economic-status are relatively unimportant for the random-effects models of change that I employed to test the influence hypotheses, because, by definition, a time-stable covariate cannot explain a time-varying outcome. These covariates are, however, important controls for the statistical models that test the selection and deselection hypotheses. Along with time-stable covariates, my influence models also include time-varying covariates, such as grades, religiosity, parental supervision, and parental attachment. The next sections present the operational definitions of each.

### **Age**

Some research suggested that the stability of adolescent friendships varies across age (Berndt and Hoyle 1985; Horrocks and Bucker 1951), and that age homogeneous friendships tend to be longer lived (Fischer 1982). For these reason, controlling for age is particularly important for the friendship termination hypothesis. Because delinquency levels vary across age (Hirschi and Gottfredson 1983), this control is also important for the selection hypothesis. Equally important to tests of the selection and deselection hypotheses is the finding that children prefer same-aged friendships (Clark and Drewry 1985; Hansell 1981; Taylor and Rickel 1981; Tuma and Hallinan 1979).

The age measure in the Add Health data is relatively straight-forward. The data contain the month and year of the respondent's birth, which I combined to provide a continuous measure of age. In other words, I coded an adolescent who is fifteen years and four months old as 15.3. In longitudinal analyses, age refers to the age at wave 1.

### **Race**

Race is also an important controls when examining friendship selection and deselection, as prior research suggests that children prefer same-race friendships (Clark and Drewry 1985; Hansell 1981; Taylor and Rickel 1981; Tuma and Hallinan 1979). Although participation in delinquent behavior varies across race (Hindelang, Hirschi, and Weis 1981), again, because it is time-stable, race cannot be important to an additive model of within-individual change.

Because I will examine interaction models that test whether interpersonal influence varies

across race in future analyses, I also included race as a control variable in the random-effects models of change that I describe in subsequent sections.

Add Health's range of information about ethnic background is broader than most surveys. Although several questions allowed respondents to choose multiple racial and ethnic categories, a separate question requested those who indicated more than one category to choose a *single* background descriptor that was most applicable.

For this measure I combined the appropriate questions into five mutually-exclusive racial categories: (a) White, (b) Black, (c) Asian, (d) Native-American, and (e) Other. Add Health also provides a separate indicator of Hispanic background, which I included as a separate variable in my analyses. In the small number of cases where race or Hispanic background were missing during the in-home phase, I obtained this information from the in-school phase.

### **Socio-economic Status**

Like age and race, prior research has also found variation in delinquent behavior across socio-economic status (e.g., Braithwaite 1981). For this reason, I included SES in statistical models that test all hypotheses, but again, any time-stable covariate is relatively unimportant to models of within-individual change. SES may be an important variable in tests of the selection and deselection hypotheses, because adolescents from higher SES families may have more stable relationships (Fischer 1982), although some research has not found significant differences in relational stability across social class (e.g., van Duijn, van Busschbach, and Snijders 1999; Van Tilburg 1998).

To operationalize SES, I combined the educational level of the respondents' parents, a standard occupational prestige score derived from the US census, and family income into an SES measure. I averaged the educational level and occupational prestige of the parents, so that the resulting value for a single-parent household reflects that of the lone parent. I capped income at 80,000 dollars and summed the Z-scores from these three measures into a single SES scale.

### **Religiosity**

Add Health first asks respondents to indicate if they are a member of a religious affiliation. If they are, a series of questions is asked about: (a) the frequency of religious service attendance, (b) the frequency of other church activity attendance, (c) the frequency of prayer, and (d) the how important the respondent feels that religion is to them. For my religiosity measure, I summed the Z-scores from these measures into a single scale. Although a respondent who failed to indicate a religious affiliation may arguably still exhibit some religiosity (e.g., individuals who are not affiliated with a church may still pray), Add Health does not gather information from individuals who do not indicate religious affiliation. For this reason, I coded individuals who did not indicate affiliation at the floor value of negative 2.3.

### **Parental Attachment**

Add Health asks respondents to indicate how close they feel to each of their parents and how much they believe that their parents care about them. As in other scales, I averaged the values across both parents so that single-parent households receive the value of the lone parent. I then summed the Z-scores of each measure into a single parental attachment scale.

### **Parental Supervision**

For this scale I relied upon questions which inquired about how often each parent was home when the respondent, (a) left for school, (b) came home from school, and (c) went to bed. Because each of these questions was on the same scale, I simply averaged these measures across both parents, rather than summing Z-scores.

### **Grades**

The respondents indicated the grades that they receive for Science, English, History, and Math. Like the parental supervision measure, each academic subject is on the same scale, so I simply averaged them. Where this measure was missing in the in-home phase, I obtained it from the in-school phase.

### **No Friends During Interview Wave**

Some respondent did not have friends of either or both genders during one or both waves. For these cases, I used a dichotomous indicator of *no-friends-during-wave*. Individuals

with no friends, by definition, however, did not have any value for the friendship group's delinquency. To retain these individuals in the analysis, I substituted the across-individual mean of all friendship groups for individuals with no friends. Thus, the dichotomous *no-friend* variable indicates the degree to which friendless respondents differ from respondents who have friends of average delinquency. I used a separate indicator for no-female-friends and no-male-friends. I calculated the across-individual means of the friendship groups separately for male and female friendship groups and for waves 1 and waves 2.

### **The Delinquency of the Friendship Group**

The influence hypotheses refers to an aggregate measure of the delinquency of the respondent's peer network. Here, I followed prior research (i.e., Haynie 2001; Haynie 2002; Haynie and Osgood 2002), and used the *average* delinquency level of the peer group. For analyses where the outcome is the IRT measure of delinquency that I described previously, the group's delinquency measure is simply the average of each group members IRT score.

A question arises, however, about which individuals constitute the peer group, as respondents may nominate friends who fail to reciprocate the respondent's nomination. In addressing this matter, prior research has traditionally differentiated the *send* and *receive* networks, while also noting the presence or absence of nomination reciprocity (Wasserman and Faust 1994). Because most theoretical perspectives on interpersonal influence predict that a source adolescent's influence upon a target adolescent is strongest when a target considers the source a friend and not vice-versa, for this project I have examined the send-network only.

When I used the send group rather than the receive group in preliminary analyses, I found a stronger relationships between the group's behavior and that of the respondent. The initial imputation model, which I used for the purpose of imputing missing data (described below), however, included a separate measure of the receive group's delinquency, as this variable carries considerable information about missing send-network values. Again, I calculated the delinquency of the female group and the male group separately. Because initial analyses indicated no statistically significant correlation between the delinquency level of the respondents' female friends and their male friends, I included the value for each group within the same regression equation without running into collinearity problems.

## Behavioral Dissimilarity

Hypothesis 2 involves the effect of behavioral dissimilarity upon the likelihood of friendship termination. Although prior research has often used difference scores when examining similar hypotheses, the use of difference scores in statistical models is controversial due to statistical and interpretational complications, which arise in dyad research largely because *different* patterns for the measures of each dyad member can produce the *same* difference score (Griffin, Murray, and Gonzalez 1999). For example, if salary equity between spouses correlates with women's marital satisfaction, the underlying effect may be caused by: (a) the wife's greater salary measured in *absolute* terms, (b) a greater overall household income, as salary equity positively correlates with income, or (c) the wife's salary being larger *relative* to the husband's. In other words, it is possible to confound difference scores with their constituent main effects (Edwards 1994; Johns 1981). An additional problem for difference scores arises because the reliability of the difference between two predictors decreases as the positive correlation between the predictors increases (Griffin, Murray, and Gonzalez 1999).

In the friendship termination analyses, I used three different strategies to operationalize the predictor variables. I used the first strategy for variables that I could logically separate into coherent dichotomies—for example *delinquent* versus *non-delinquent*. In this case I included two dummy variables to indicate the three possible categories: (a) the respondent and friend were both delinquent, (b) either the respondent or the friend were delinquent (but not both), or (c) both respondent and friend were non-delinquent. Therefore, categories (a) and (c) represent delinquent similarity, while category (b) represents dissimilarity. Although one could argue for a fourth category where we separate *friend-delinquent/respondent-non-delinquent* from *friend-non-delinquent/respondent-delinquent*, these categories are substantively equivalent because the designation of respondent and friend are largely arbitrary. Preliminary analyses indicated that when I separated these categories the effects of each were nearly equal. I also used this coding for *minority* versus *non-minority* status and to indicate whether the respondent and friend indicated a religious denomination or not.

I used the second strategy for indicating an age difference between the respondent and friend. Here, I coded a dichotomous indicator of *age-difference* as “1” if the respondent's age and friend's age were greater than 1.5 years apart and “0” otherwise. I also included the age of

the respondent as a additional predictor, because younger or older adolescents may be more likely to terminate friendships regardless of the age difference between dyad members.

I used a third strategy when there was no clearly defensible way to categorize the respondent/friend similarity. This occurs with SES and grade point average. Here, I simply coded SES-difference and GPA-difference indicators as the absolute difference between the respondent and friend values. In this case I again used a separate predictor for the respondent's value, because respondents with high (or low) SES or GPA may be more likely to terminate

### **Reciprocation**

As I mentioned above, adolescents may not reciprocate a respondent's friendship nomination. This prospect is particularly important, as some have argued that mutual friends relative to unreciprocated friends may exert greater influence on each other (Cairns, Leung, Buchanan, and Cairns 1995). The additional influence may occur because closer friends spend more time together, or because mutual friendships are more valuable, and thus dyad members are less inclined to discount the expectations of the other member.

In contrast, however, others have suggested that friends who *fail* to return the respondent's nomination may exert *greater* influence, because individuals who aspire to more intimate levels of friendship may be particularly willing to conform to their prospective associates (Aloise-Young, Graham, and Hansen 1994). In other words, anticipatory socialization may occur.

A factor important in the termination hypothesis is that adolescents may be more likely to terminate unreciprocated friendships (Kandel 1978). Therefore, in hypothesis 2, which involves a measure of each friend's delinquency, rather than the group average, I included a control indicating whether or not the nominee reciprocated the friendship.

When testing hypotheses 3 through 5, which involve the group mean of delinquency I calculated the percentage of the group who reciprocated the nomination and examined whether this measure interacted with the group's delinquency score in its effect upon the respondent's delinquency level. Initial analyses indicated that this interaction term was not statistically significant, therefore I excluded it from the final models.

## **Gender**

Although some research has found no gender effects on relational stability (van Duijn, van Busschbach, and Snijders 1999), many researchers have found that women and girls have more stable relationships than men do (e.g., Fischer and Oliner 1983). Thus, gender remains an important control for the termination and selection hypotheses. For this reason, I have examined the male and female respondents and their male and female friends separately when testing the termination and selection hypotheses.

Although gender is time-stable and thus cannot explain within-individual variation in an additive model of change, for the reasons I described previously regarding gender differences in influence and conformity, I have also analyzed males and females separately when testing the influence models. I have also included separate measures that represent the male and female friendship groups.

## **School Level Variation in Delinquency**

As I mentioned previously, prior studies of friendship selection have often failed to control for between-school variation in delinquency when using multi-school data. This control variable is particularly important when examining friendship selection, as adolescents typically choose friends in the same school, and schools vary in their mean delinquency levels. Conceptually, between-school variation in delinquency represents that portion of the cumulative effect of shared social and environmental influences that result from each friend attending the same school (Jussim and Osgood 1989).

For the four influence hypotheses, this control is likely unimportant, as there is no theoretical reason to suggest that in a longitudinal model, *changes* in adolescents' delinquency over time (at least across the one year periods between Add Health waves) differ between schools.

## **Analysis Methods**

### **Multilevel Models of Friendship Groups**

In this project I have used multilevel models, which are applicable when individuals are *nested* within social aggregates such as neighborhoods, schools, or friendship groups (Bryk and

Raudenbush 1992 ; Snijders, Spreen, and Zwaagstra 1995), like we find in tests of hypotheses 1 and 2. Multilevel models are also applicable when waves of data are nested within individuals, as we find in the tests of hypotheses 3 through 5.

While perhaps not immediately apparent, in the case of the first two hypotheses, adolescents are *nested* within friendship groups (Snijders, Spreen, and Zwaagstra 1995). Although using multilevel models in this manner is still uncommon, there is some precedence for method in the prior research of Kenny and colleagues, and Snijders and colleagues (see, for example, Kenny 1996a; Kenny 1996b; Kenny, Bolger, and Kashy 2001; Kenny, Kashy, and Bolger 1998; Kenny, Mannetti, Pierro, Livi, and Kashy 2002; Snijders 2001; Snijders 2003; Snijders, Spreen, and Zwaagstra 1995).

Snijders and colleagues (1995), for example, used a multilevel strategy to analyze a *snowball* sample where geographically dispersed *primary* individuals each nominated friends who were unassociated with the nominees of the other primary individuals. In this form of *egocentric* network data, each individual belongs to only one friendship group. There is a problematic aspect to using this form of model with the Add Health data, however, as the Add Health network data are *complete*, rather than *egocentric*. Complete network data reflects the social reality whereby individuals are embedded within overlapping friendship groups. In complete network data collection, respondents nominate individuals who are also survey respondents. This data structure contrasts with egocentric methods, which are constrained to include only mutually exclusive friendship groups.

In complete network data, adolescent A may nominate individuals B, C, and D as friends, but adolescent B may fail to reciprocate A's nomination and instead choose C, E, and F as friends. In this example, individual C is in two overlapping friendship groups, meaning that the data does not fit neatly into a traditional hierarchical structure. Therefore, while traditional multilevel models account for the dependence that occurs when several relationships nest within each individual, they cannot properly model the dependence that occurs due to nominees being members of multiple friendship groups.

Previously, some researchers have avoided the dependence problem of complete network data by using egocentric data, artificially confining friendship nominations to a single *best* friend, and using only reciprocated best-friendship choices in their analyses (e.g., Kandel

1978). In studying the behavior of friends, however, this strategy assumes that the effect of reciprocated best-friendships generalizes to all friendships. It also ignores within-individual variation in the delinquency level of the respondents' relationships, which occurs because the friends of one adolescent may be very much alike, while another adolescent may choose friends who vary widely in their delinquency levels. Differences in group homogeneity may be important because group homogeneity affects the ability of a group to exert influence over individuals (1955; Asch 1956).

Rodgers, Billy, and Udry (1984) questioned whether analyses using the strategy of including only mutual friendship pairs would differ from analyses where each respondent appeared in the data more than once (i.e., where each record represents a friendship dyad, and each respondent is a member of several friendship dyads). In each of their analyses, these researchers used the friend's delinquency to predict the respondent's delinquency, and compared each alternative. Both methods produced similar results for the questions they were interested in, although the former strategy greatly limited the sample size.

This project follows the lead of Rodgers and colleagues by allowing individuals to appear in the data more than once for the first two hypotheses. In hypothesis 1, which addresses selective attraction, I operationalized a friendship group as the respondent and each friend they nominated. In other words, if respondent A nominated adolescents B and C as friends, the group contained adolescents A, B, and C. If respondent B subsequently nominated adolescents A and E, a second friendship group contained adolescents B, A, and E. In contrast, the methods of Rodgers and colleagues treated this scenario as five different friendship dyads (A-B, A-C, B-C, B-E, and A-E) assuming that each friend reciprocated their nomination.

A multilevel model of friendship improves upon Rodgers and colleagues' strategy by accounting for a portion of the hierarchical nature of friendship pairs rather than treating each pair as an independent entity. A hierarchical model treats A's relationships with friends B and C as a single nested friendship group, where the friendship group is the level 2 unit of analysis, which contains respondents A, B, C at the level 1 unit of analysis.

The operationalization of the level 1 and level 2 units are somewhat different in the selection and termination models. In the termination models, the outcome measure may differ for each group member (e.g., the respondent may terminate a friendship with one nominee but

not another). Here, the respondent is the level 2 unit of analysis and the friends comprise the level 1 units. When respondent A nominates adolescent B and C, and respondent B nominates adolescent A and D, there are two level 2 units where adolescents B and C *nest* within respondent A and adolescents A and D *nest* with respondent B. This strategy allows the proper modeling of factors which determine between-individual differences in friendship stability.

As others have argued, these strategies are well justified when the outcome is a property of the dyadic relationships nested within each individual (e.g., termination of the relationship as in hypothesis 2 Snijders, Spreeen, and Zwaagstra 1995). Here, the outcome may potentially differ across each friendship dyad to which a given respondent is a member. In other words, respondent A's friendship with B may terminate, while B's friendship with C remains stable. Even though the dyad containing respondent B appears twice in the data, the outcome for each differs. Therefore, a large portion of the dependence due to the structure of complete network data is eliminated.

In contrast, when the outcome is a property of each respondent (e.g., the delinquency of the each adolescent in the group as in hypotheses 1), the strategy is *less* justified, because respondent B's delinquency remains the same regardless of which friendship dyad he or she is a member. For example, if we use friend A's behavior to predict respondent B's behavior, while also using friend C's behavior to predict respondent B's behavior, the same behavioral measure of B appears twice in the analysis.

While this aspect of dependence is unsolvable using available multilevel software, disregarding the problem will result in only a slight underestimate of the standard errors of each regression coefficient, thus providing liberal tests of statistical significance. The coefficients that we obtain after ignoring this unmodelled dependence, however, remain *unbiased*. Another consideration that justifies the use of this strategy even though it may provide improper standard errors is that the *intra-class correlation coefficient*, and not the coefficients themselves, is the primary statistic of interest as I explain in subsequent sections. Thus, the magnitude of this problem remains minimal.

In sum, although this strategy is imperfect, it improves upon the strategies used in prior research. The inability to fully control for the full extent of the unmodelled dependence, however, implies that we should interpret the results cautiously. It is my understanding that

subsequent versions of MLWin multilevel software will incorporate multiple-membership models that may address these statistical issues.

### Testing Hypothesis 1 – Friendship Selection

As I described above, hypothesis 1 examines the degree to which adolescents who share the same level of delinquency are more likely to choose each other as friends. Recall that the statistical model testing this hypotheses examines the behavioral similarity of dyad members prior to the formation of their friendship. In other words, the models investigate the time-one similarity for *future* friendships that are formed at time-two, but do not yet exist at time-one.

While prior research has addressed the important of delinquency to friendship choice to a small degree, the extant literature largely has failed to differentiate friendship choice based upon delinquency per se and friendship choice based upon third factors that correlate with delinquency (for exceptions, see Laumann 1973; Rodgers, Billy, and Udry 1984; Sykes, Larntz, and Fox 1976). Again, this differentiation may be unimportant to those interested only in the *full extent* of peer group homophily regardless of its component causes. The analyses in chapter 7 report both the full extent of homophily and the conditional homophily after adding controls for common factors that are correlated with delinquency and important in friendship selection.

Using the multilevel model I described above, chapter 7's analyses began by examining the intraclass-correlation coefficient (ICC) where the delinquency of friend *i* in friendship group *t* was the dependent variable ( $Y_{it}$ ). In a multilevel model, the ICC represents the proportion of variance between macro-units relative to the total-variance. In other words:

$$ICC = \tau^2 / (\tau^2 + \sigma^2)$$

where:

$$\begin{aligned} \tau^2 &= \text{the variance between friendship groups} \\ \sigma^2 &= \text{the variance within friendship groups} \\ \tau^2 + \sigma^2 &= \text{the total variance} \end{aligned}$$

In this type of research where individuals are nested within groups, the ICC represents the degree to which the individuals within each group are more similar (or potentially less

similar)<sup>26</sup> to each other than they are to individuals in different groups (Kenny, Kashy, and Bolger 1998; Kenny et al. 2002). In other words, an ICC of .25 means that the correlation between dyads in the same group is .25. The ICC of a *null* or *unconditional-model* indicates the full extent of homophily. This model is equivalent to a one-way ANOVA, and does not differ remarkably from the OLS model Rodgers and colleagues used. The primary purpose of this project, however, is to go beyond the unconditional model by adding additional factors that help explain the nature of the homophily.

Although we may find that friends are equally delinquent (or equally non-delinquent), as mentioned previously, the cause of this homogeneity among friends may reflect the effects of homogeneity among *third* variables correlated with delinquency. For example, if race and social class correlate with delinquency, delinquent homophily in an all-white, middle-class friendship group will occur even if the friends were unaware of the behavior of each other when they made their friendship decisions.

An equivalent effect occurs because school and neighborhood boundaries largely constrain adolescent friendships to others who share these boundaries (Zipf 1965). Thus, adolescent friends likely are exposed to (or isolation from) a variety of criminogenic factors, some of which are immeasurable. In this case, the behavioral similarity among adolescent friends may represent only the degree to which *birds of a feather are forced together*. When examining the selective-attraction hypotheses, a failure to control for which school the adolescent attended would risk artifactually-high estimates of similarity between friends that might represent only between-school differences in criminogenic exposure. For this reason, I added dummy variables that represent which of the 16 schools the respondent attended.

It is correct that a typical hierarchical model acknowledges that students are nested within schools, thus implying a third analysis level rather than the use of dummy categories. In this particular case, however, a third level is not appropriate, as the intended purpose for considering schools effects is solely to control for the fixed-effect of between-school variance in mean delinquency levels. In this analysis, the appropriate control is simply dummy

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<sup>26</sup> Individuals within the same group can be less similar to each other than to individuals from other groups when one individual influences others to be different than they are, or there is a fixed proportion of some factor within each group Kenny, David A., Lucia Mannetti, Antonio Pierro, Stefano Livi, and Deborah Kashy. 2002. "The statistical analysis of data from small groups." *Journal of Personality and Social Psychology* 83:126-137..

indicators that account for the school-level variance of the level-one *outcome*, rather than the school-level variance of a level-one *predictor* as typically used in traditional multilevel models. Adding a third (school) level would eliminate any variance of the outcome at the school level, thus rendering the parameter estimates for this level meaningless. Therefore, the inclusion of 15 dummy variables to represent potential differences among the 16 schools of the saturated sample is the most appropriate method to acknowledge school differences when testing these hypotheses.

For the reasons mentioned earlier regarding the question of whether delinquency itself or the covariates of delinquency underlie friendship choice, I added additional controls to the null-model that prior research has identified as both: (a) correlated to delinquency, and (b) important determinants of friendship choice. Recall that prior research suggests that friendship group homophily results primarily from similarity on obvious (and non-malleable) characteristics like race, age, and SES, rather than behavioral similarity on seldom observed delinquent acts.

Grade-point-average (GPA) may be a particularly important control, because prior research has suggested that simple propinquity is a major selection factor (Deutsch and Collins 1951; Festinger, Schachter, and Back 1950; Hallinan and Smith 1985; McPherson, Smith-Lovin, and Cook 2001; Newcomb 1956), and schools often sort students into classrooms according to academic performance (Epstein 1983; Hallinan 1982; Hallinan and Smith 1985). GPA may also be an important control simply because adolescents may choose each other who share the same interest in academic achievement or aspirations (Almack 1922; Richardson 1940). Likewise, I included religiosity, as this is also a likely factor which accounts for friendship selection (Kalmijn 1998; Laumann 1973; Louch 2000) as does age (Fischer 1982; Marsden 1988) and SES (Verbrugge 1977). The criminology literature, of course, has repeatedly identified all of these factors as correlated with crime and delinquency (e.g., Bainbridge 1989; Braithwaite 1981; Cernkovich and Giordano 1992; Hirschi and Gottfredson 1983; Smith, Lizotte, Thornberry, and Krohn 1995).

To investigate how much of the homophily results from choices based upon these factors, I included these variables as level-one predictors of each group member's delinquency. Conceptually, differences in the race, SES, and age of group members account for a portion of

the within-group variance in delinquency, while a portion of the between-group variance in delinquency is due to differences in the predominant race, SES, and age of the group. When the added covariate explained a portion of the within-group differences in delinquency, it reduced the within-group error variance and subsequently *increased* the ICC. When the added covariate explained between-group differences in delinquency, it reduced the between-group error variance and subsequently *reduced* the ICC.<sup>27</sup> After adding these controls, the ICC represents the degree of delinquency similarity we would expect to see among friendship groups that are homogeneous on race, SES, religiosity, GPA, and age. Because most friendship groups are relatively homogeneous on these factors, the net result of including the covariates in the models I present in chapter 7 was a reduction of the ICC relative to the ICC in the null model. In other words, the controls primarily explained between-group rather than within-group differences.

If delinquency is the only factor beyond race, age, SES, GPA, and religiosity that affects adolescent friendship selection, then the ICC in the full model that included all covariates would closely estimate the importance of delinquent similarity for friendship choice. To the extent that adolescents base their friendship choices upon excluded covariates that are correlated with delinquency, the ICC closely represents the summative importance of delinquency and the excluded factor(s) combined.

A complication arises, however, because I cannot distinguish between instances where adolescents choose *similarly delinquent* friends from occasions where adolescents choose friends based upon the characteristics I have described above. Therefore, in models where I have included covariates, the ICC will accurately reflect the relative importance of delinquency for friendship selection to the extent that covariates *fully* constrain friendship choice.

For example, in a rural area where schools are located miles apart, we could reasonably assume that adolescent friendship choices are *completely* constrained to others who attend the same school (e.g., Zipf 1965). In these areas, the proximity of schools may be further than the threshold distance that permits contact between adolescents who attend different schools. Therefore, we can be reasonably certain that the ICC of a multilevel model where the outcome is delinquency and the predictors are school dummy variables accurately assesses the importance of delinquency for adolescent friendship choice. In suburban and urban areas,

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<sup>27</sup> Kenny Ibid. uses the term *partial ICC* when control variables are included in a multilevel model.

however, school boundaries may not fully constrain friendship choice, although in these areas contact between adolescents who attend different schools is still quite infrequent. In this case, the ICC may provide a *relatively* good approximation of the importance of delinquency that is subject to a modest degree of error.

The degree to which the ICC accurately represents the importance of delinquency to friendship selection may decrease in models containing many covariates. In other words, the assumption that some covariates fully constrain friendship choice is less tenable for some factors than it is for others, and will likely be at least one of these covariates present in models that contain many controls.

For this reason, I included the covariates to the model one at a time starting with the school dummy indicators. As I mentioned previously, I will begin by including the school level controls first, followed by age, race, SES, grade point average, and religiosity. As the number of variables increases, the assumption that these factors and not delinquency itself is the reason underlying friendship choice becomes less plausible.

Because the most likely scenario is that individuals make friendship decisions based upon *collective* similarity across several traits (Fischer 1982; McPherson, Smith-Lovin, and Cook 2001), rather than prioritizing one trait above all others, the best interpretation of the *unconditional-model* ICC (the null-model) is a ceiling value for the importance of delinquency in friendship selection while the ICC we obtain after including all of the controls represents a corresponding floor value of this importance.

### **Testing Hypothesis 2 – Friendship Termination**

As in the first two hypotheses, the statistical models in the analysis testing the friendship termination hypothesis recognizes the fact that respondents have *nested* peer relationships. Here, the dependent variable is whether each relationship continues or terminates across the one year time span between survey waves. Recall that the primary predictors of interest are two categorical variables that indicate whether: (a) the respondent and friend are both delinquent, (b) the respondent and friend are both non-delinquent. The reference category indicates that either the respondent or friend is delinquent while the other is not delinquent.

As mentioned earlier, the unmodelled dependence that results from having respondents appear in the data more than once due to their membership in multiple friendship groups is less

problematic here than the first hypothesis because in this analysis the outcome more closely resembles a property of the dyadic relationships nested within each individual (i.e., whether the friendship terminates differs for each of the respondent's relationships), rather than a property of each nominee (i.e., a given respondent's delinquency remains the same regardless of which of their nested friendship dyads we choose to examine). For this hypothesis, a multilevel model accounts for the between-individual differences in the odds that the individual will terminate a friendship with *anyone*. For the reasons that I discussed earlier, I added controls for age, race, religiosity, GPA, SES, and gender along with their differences between the respondent and each friend as well as controls for reciprocity.

### **Testing Hypotheses 3 through 5 – Interpersonal Influence**

Some research has pointed out that crime and delinquency is unstable across time (Horney, Osgood, and Marshall 1995; Sampson and Laub 1990; Sampson and Laub 1993) while other research has noted that the delinquency level of current friends may explain some of this instability (Brame, Bushway, and Paternoster 1999). To test the set of hypotheses that involve short-term peer effects, I am using longitudinal models that isolate: (a) short-term peer effects that occur during the period of a year, and (b) between-individual differences, which are due to the combined effects of selective attraction and longer-term socialization. Recall that each of the four influence hypotheses are similar, as each tests the effect of *changes* in peer behavior upon *changes* in respondent behavior. The hypotheses differ, however, in slight variations surrounding the strength of peer effects across respondent and friend gender.

For these analyses, I am using a random-effects model of change, a type of multilevel model where waves of data collection are nested within individuals. Random-effects models are an elaboration of traditional regressor-variable, change-score, and fixed-effects models, but unlike these alternatives, random-effects analysis permits the simultaneous investigation of: (a) time-varying covariates, which potentially explain within-individual variation in delinquency across survey waves, and (b) time-stable covariates, which explain between-individual differences in the propensity to perform delinquent behavior. Because random-effects models are still relatively uncommon in criminological research, I will briefly review some background information necessary for an understanding of their logic.

### *Regressor-variable and Change Score Models*

Theories of socialization either; (a) fail to address the stability of delinquency across time (i.e., how it takes for exposure to delinquent influences to produce changes in delinquency and how long non-delinquent influences may take to counteract the negative influence), or (b) argue that *only* early socialization during childhood is important (e.g., Gottfredson and Hirschi 1990; Wilson and Herrnstein 1985). Life-course (e.g., Sampson and Laub 1992) and other *dynamic* perspectives (e.g., Brame, Bushway, and Paternoster 1999; Horney, Osgood, and Marshall 1995), however, suggest that behavioral changes during adolescence and adulthood are relatively common. Sutherland's early socialization perspective, for example, *explicitly* assumed that prior exposure to delinquent peers increases future delinquency and *implicitly* assumed that the influence remains stable until counteracted by an equal degree of exposure to non-delinquent messages.

These assumptions suggest one of two closely related regression methods when only two-waves of data are available. Scholars have traditionally called the first method the *regressor-variable* method and the second the *change-score* method (Allison 1990). To apply the regressor-variable method to questions about the influence of friends, we would regress respondents' time-two behavior on the friends' time-one behavior, controlling for the respondents' time-one behavior using the equation

$$5.1 \quad RD_{i2} = B_0 + B_1(FD_{i1}) + B_2(RD_{i1}) + r,$$

where

$$\begin{aligned} RD_{i2} &= \text{respondent's time 2 delinquency,} \\ FD_{i1} &= \text{friends' time 1 delinquency,} \\ RD_{i1} &= \text{respondent's time 1 delinquency,} \\ r &= \text{error.} \end{aligned}$$

In the alternative change-score method, an analyst would regress the differences between the respondents' time-two scores minus the respondents' time-one scores upon the friends' time-one score using the equation

$$5.2 \quad \Delta RD_{i2-1} = B_0 + B_1(FD_{i1}) + r_i,$$

where

$$\begin{aligned}\Delta RD_{t2-t1} &= \text{change in the respondent's delinquency from time 1 to time 2,} \\ FD_{t1} &= \text{friends' time 1 delinquency,} \\ r_i &= \text{error.}\end{aligned}$$

Several early authors have questioned whether the regressor variable or the change score method produces less biased parameter estimates (e.g., Bereiter 1963; Lord 1963). Many of these early authors claimed that the regressor variable method is superior, purportedly because change-scores are inherently unreliable. Later authors, however, have clarified that neither is inherently more reliable than the other, while also pointing out that both are algebraically equivalent if we constrain the value of the coefficient for the time-one control in the regressor variable method to unity (Allison 1990; Allison 1994).

Rogosa (1982) later argued that the main obstacle to obtaining reliable, unbiased, and efficient parameter estimates in change models is not highly determined by a choice of one of these methods over the other, as both are often inadequate for the study of individual growth (also see, Bryk and Raudenbush 1987; Bryk and Weisberg 1977). Instead, Rogosa suggested that the larger problem lies in the data limitations inherent in two-wave (versus multiwave) panels. A researcher who desires the most accurate understanding of change, he argued, requires more than two waves of data. Rogosa further noted, however, that in cases where only two waves are available, researchers should not “throw out the baby with the bathwater,” by disregarding the logic of either strategy. Instead, analysts should simply understand the deficiencies of both, and the fact that under many conditions *either* model may provide useful and relatively reliable information.

In situations where the outcome is expected to regress toward a mean across time, the regressor-variable method may be marginally preferable to the change-score method, although Allison (1990) noted that the choice between methods is not automatic, nor clear-cut. In ambiguous cases, Allison recommended using both and comparing the results.

While multiwave data is preferable for testing the hypotheses in this project, Add Health contains only two survey waves that measure serious delinquency, and only three waves that measure minor delinquency (the two in-home waves, and the in-school wave). It is the only available data set, however, appropriate for answering the questions posed in this thesis.

### *Fixed-effects Models*

The change score method in equation 5.2 is one version of a fixed-effects model (Allison Forthcoming), although authors more commonly reserve the term *fixed-effects* for multiwave analyses. Another version of a fixed-effects model uses dummy variables to represent each respondent ( $N-1$  dummies for  $N$  respondents). As Allison (Forthcoming) explains, however, both versions are algebraically equivalent for two-wave analyses with normally-distributed outcomes.

The logic of a multiwave fixed-effect model is most easily understood by first examining a two-wave example. The least complex model based upon change scores for both the respondent's delinquency and the friendship group's delinquency is

$$5.3 \quad \Delta RD_{i2-t1} = B_0 + B_1 \Delta FD_{i2-t1} + r_i,$$

where

$$\begin{aligned} \Delta RD_{i2-t1} &= \text{change in the respondent's delinquency from time 1 to time 2,} \\ \Delta FD_{i1} &= \text{change in the friends' delinquency from time 1 to time 2,} \\ r_i &= \text{error.} \end{aligned}$$

This model differs from equation 5.2 only in its use of the time-two minus time-one predictor for friend delinquency rather than equation 5.2's use of the lagged time-one measure for the friend.

### *Applying Fixed-effects Models to Multiwave Data*

Although equation 5.3 is conceptually and algebraically equivalent to the change score model in equation 5.2 with the exception of the added complexity of incorporating change in *both* the dependent and independent variable(s), this equation has the added advantage of being easily adaptable to multiwave data. In contrast, the regressor-variable and original change score models in equation 5.2 are limited to two-waves of measurement.

In multiwave designs, fixed effect models either: (a) examine the independent variable(s) as a deviation from an across-wave individual mean or, (b) use dummy variables to represent each respondent in a data set where each record represents a respondent's values during each individual wave. In other words, when there are  $N$  respondents measured on  $T$

occasions, the dataset in case (b) contains  $N \times T$  records. Both strategies are algebraically equivalent (Allison Forthcoming), and control for stable (but unmodeled) individual differences that might otherwise produce inaccurate results in OLS statistical models. In this way, fixed effects methods analyze change where each individual acts as *his or her own control*.

### *Random-effects Models*

While fixed-effects models examine within-individual changes across time by removing *all* stable between-individual differences, *random-effects* methods examine changes by modeling across-individual variance as a normally distributed error term that results from covariates excluded from the analysis (Horney, Osgood, and Marshall 1995). Applied to my discussion of interpersonal influence, the basic random-effects equation is

$$5.4 \quad RD_{it} = B_0 + B_1(FD_{it}) + r_{it} + u_i,$$

where

$$\begin{aligned} RD_{it} &= \text{respondent } i\text{'s time } t \text{ delinquency,} \\ FD_{it} &= \text{friends' (of respondent } i) \text{ time } t \text{ delinquency,} \\ r_{it} &= \text{time specific error for respondent } i \text{ at time } t, \\ u_i &= \text{error specific to respondent } i \text{ across all time points.} \end{aligned}$$

An advantage to random-effects models is their ability to explicitly estimate the effects of time-stable between-individual differences like gender and race. In contrast, fixed effects models simply eliminate these differences and concentrate only on within-individual changes. Random-effects methods typically have less sampling variability than fixed effects methods do, thus providing more efficient parameter estimates. Traditional random-effects models, however, assume that all unmeasured variables represented by the  $u_i$  error term are uncorrelated with the measured variables in the model.

Recent advances in these methods have shown us how to combine the positive aspects of the traditional random-effects model, illustrated by equation 5.4, with the ability to produce the unbiased parameter estimates of fixed-effects methods. We now know that analyses may combine the positive features of random and fixed effects models using one of two methods: (a) by *group-mean-centering* the independent variable, or (b) by using the original (uncentered)

version of the independent variable and controlling for its across-wave mean (Raudenbush and Bryk 2002).

In version (a), the analyst first calculates the across-wave mean of the independent variable and then calculates separate time-specific values of this variable that represent the difference between the across-wave mean and the variable's within-wave value. Some refer to this difference as a *deviation score* (e.g., Brame, Bushway, and Paternoster 1999; Horney, Osgood, and Marshall 1995), while others refer to this as *group-mean-centering* (e.g., Raudenbush and Bryk 2002). Equation 5.5 presents this form of random-effects model. Here, the deviation score represents within-individual variation across time disentangled from between-individual-differences, which are captured and removed by subtracting the mean. Because the centered variable is orthogonal to its mean and because the mean represents all between-individual difference on this factor, this strategy produces nearly identical parameter estimates to a fixed-effects model (Allison Forthcoming).

If one is interested only in the within-individual relationships, then including the across-wave mean is largely optional in linear equations such as 5.5 due to its orthogonal relationship to the deviation score, although pioneers of the sociological application of these methods initially implied that the addition is required (e.g., Allison Forthcoming; Horney, Osgood, and Marshall 1995). Without the inclusion, however, the interpretation of the intercept changes, the effects of the *time-varying* predictors are not properly partialled from the effects of *the time-stable predictors*, and there is no calculation of the between-individual effects. Raudenbush and Bryk (2002) also explained that including the across-wave mean allows for the proper calculation of explained-variance statistics, particularly in more complex models where the slopes as well as the intercepts are considered random. In this model, the coefficient associated with the across-individual mean is simply the sum of the within- and between-individual relationships. Thus, the between-individual relationship can be calculated by simple subtraction.

Because group-mean-centering controls for all between-individual differences, Allison calls equation 5.5 a fixed-effect approach, although he notes that the literature has not generally made the connection (Forthcoming). Supporting Allison's terminology, if we *exclude* the  $u_i$

between-individual error term from such a model it becomes algebraically equivalent to a fixed-effects equation (Brame, Bushway, and Paternoster 1999).

The notation for version (a) of the random effects equation is

$$5.5 \quad RD_{it} = B_0 + B_1(\overline{FD}_{\cdot i}) + B_2(FD_{it} - \overline{FD}_{\cdot i}) + r_{it} + u_i,$$

where

$$\begin{aligned} RD_{it} &= \text{respondent } i\text{'s time } t \text{ delinquency,} \\ \overline{FD}_{\cdot i} &= \text{across-wave mean of friends' (of respondent } i) \text{ delinquency,} \\ FD_{it} &= \text{friends' (of respondent } i) \text{ time } t \text{ delinquency,} \\ r_{it} &= \text{time } t \text{ specific error for respondent } i, \\ u_i &= \text{error term specific to respondent } i \text{ across all time points.} \end{aligned}$$

The second variation of a random-effects model, which I noted as variation (b) in the discussion above and as equation 5.6 below, accomplishes a nearly identical goal to the group-mean-centering technique of equation 5.5. In this version, the analyst again includes the across-wave-mean, but rather than group-mean-centering each independent variable, the analyst includes its original *uncentered* version.<sup>28</sup> Unlike the former version of random-effects, here, the across-wave-mean no longer is orthogonal to its time-varying counterpart and thus its interpretation changes. Because this coefficient now represents the effect of the predictor variable *after* we control for its wave-specific value, the coefficient represents *only* between-individual differences. In other words, in longitudinal models the coefficient represents the between-individual relationship, rather than the combined between- plus within-relationship as in equation 5.5. This total can be calculated with simple addition, however.

In cross-sectional models where we find individuals nested within social aggregates such as neighborhoods or other social contexts rather than waves of data nested within individuals as I have been discussing here, the between-individual coefficient represents the *contextual effect*, which is often interpreted as the consequences of exposure to the different social forces we might find across social contexts after we control for variation in each

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<sup>28</sup> In practice, there are several reasons to center the variable around a theoretically relevant constant – typically the grand-mean of the sample Raudenbush, Stephen W. and Anthony S. Bryk. 2002. *Hierarchical Linear Models*. Thousand Oaks, CA: Sage..

contexts' compositional difference. It may also represent the effects of excluded covariates which explain between-group differences (Raudenbush and Bryk 2002).

This version of the random effects equation is

$$5.6 \quad RD_{it} = B_0 + B_1(\overline{FD}_{\cdot i}) + B_2(FD_{it}) + r_{it} + u_i,$$

where

- $RD_{it}$  = delinquency at time t of respondent i,
- $\overline{FD}_{\cdot i}$  = across-wave mean of friends' (of respondent i) delinquency,
- $FD_{it}$  = friends' (of respondent i) time t delinquency,
- $r_{it}$  = time t specific error for respondent i,
- $u_i$  = error term specific to respondent i across all time points.

Again however, if we subtract the coefficient associated with the deviation score we obtained in equation 5.5 from the coefficient associated with the across-wave mean in equation 5.5, the result equals the across-wave mean coefficient in equation 5.6.

#### *Advantages of Random-effects Models*

As mentioned previously, random-effects models using either the group-centering technique of equation 5.5 or the alternative technique of equation 5.6 combine the ability of fixed-effects models to account for between-individual differences, while simultaneously allowing the analyst to model time-stable covariates. Because random-effects procedures model between-individual differences by including a between-individual error variance instead of eliminating these differences as fixed-effects models do, random-effects models allow for more efficient parameter estimation. Modeling between-individual differences as a normally-distributed random effect may also allow for the more appropriate generalization of the parameter estimates beyond the sample, although this point is not universally accepted (Allison Forthcoming).

An additional advantage to random effects models over change-scores models is the retention of the outcome's distribution. When a change-score model subtracts a wave 1 value from a wave 2 value, it alters the outcome's distribution, which often produces negative values that are problematic when the outcome is a count. This prohibits the use of appropriate count

models such as poisson and negative binomial (this problem does not occur with the dummy variable version of a fixed-effects equation). For these reasons, in my tests of hypotheses 3 through 5, I used a random effects model similar to equation 5.6.

#### *Applying a Random-effects Model to Research on Interpersonal Influence*

As mentioned earlier in this chapter and in chapter 4's introduction, early criminological research largely has ignored the changing nature of adolescent delinquency. While many theoretical perspectives assume that the propensity to commit crime remains relatively stable beyond the childhood years (e.g., Gottfredson and Hirschi 1990), adolescents often perform deviant acts with great frequency across one time span while abstaining across others. My preliminary analysis of the Add Health data, for example, indicated that the across-wave correlation of a scaled delinquency measure is .5, a figure which demonstrates patterns of both behavioral change and behavioral stability.

Using this model of change, I chapter 9 examined whether changing exposure to delinquent peers explains this year-to-year variability. In other words, do changes in adolescent behavior correspond to shifts in their friends' behavior.

While I argue that this correspondence largely reflects forms of interpersonal influence that the criminological literature has previously neglected, we should also keep in mind that *some* socialization perspectives we find in the criminological literature *may* be compatible with a correspondence between changes in adolescent delinquency and changes in their friends' delinquency. Most of these theories, however, contain one or more propositions that *are not* compatible with this correspondence.

Sutherland's theory of differential association, a theory which continues to influence crime and delinquency research, suggests that increased exposure to delinquent peers across several months should produce an eventual increase in adolescent delinquency. This theory also predicts, however, that early influences are more important than more recent ones, a statement that precludes large effects of recent exposure to peer delinquency during adolescence.

Differential association perspectives are also unclear about why adolescent delinquency would *decrease* during periods when friends' delinquency changes from high to low. For example, while it is not hard to imagine that recent exposure to a highly delinquent group of friends might double an adolescent's lifetime accumulated exposure to delinquency, it is

difficult to imagine that exposure to non-delinquent friends for one year would produce anywhere near a substantial alteration of the adolescent's accumulated exposure to non-delinquent behavior and thus tip the balance of accumulated pro- versus anti-delinquent *definitions*.

More contemporary socialization perspectives such as social learning *might* be more compatible with year-to-year variation, however, these perspectives are largely silent on this issue. Thus, it remains hard to imagine that the views of Sutherland or his contemporaries intended their socialization perspectives to explain year-to-year variation in offending behavior, particularly when adjacent behavioral measures separated by a one year period correlate at only .5. While it is certainly true that measurement error and opportunity might produce less than perfect stability across-time, these explanations are incongruent with any analysis that finds significant predictors of this change.

If we follow prior practice and use the *past* behavior of an adolescent's friends to predict the *current* level of adolescent delinquency, by definition we have removed any meaningful contemporaneous or situational mechanisms of interpersonal influence. In contrast, the behavioral similarity between an adolescent's *recent* or current behavior and the *recent* or current behavior of their friends is relatively sensitive to more contemporaneous forms of interpersonal influence.

These contemporaneous influence mechanisms may include, but are not limited to: attempts to present a favorable impression to the *current* friendship group (e.g., Felson, Liska, South, and McNulty 1994; Goffman 1959), conformity to the current group's behavioral expectations (e.g., Levine and Russo 1987), the anticipation of rewards from the current group for participating in what adolescents often consider to be exciting behavior (Haynie and Osgood 2002; Katz 1988), or the type of socialization that might occur across the relatively short period of a year. Again, however, while this statistical model is able to isolate within- from between-individual variation in exposure to friends' delinquency, it is unable to isolate each of these mechanisms from the others.

Thus, the deviation score in equation 5.5 (or coefficient in the alternative model in equation 5.6), which represents within-individual change, indicates the degree to which the patterns of change in adolescent delinquency correspond to the changing patterns of friend

delinquency. In other words, because we have removed the between-individual differences in peer exposure, in the Add Health data, where survey waves are one year apart, the deviation score represents the year-to-year shifts in respondent delinquency which systematically follow yearly changes in exposure to delinquent friends.

While we can interpret the within-individual changes in this relatively straightforward manner, the interpretation of the between-individual differences in exposure to peer delinquency is less precise. These differences result largely from the tendency of adolescents to select similar friends, but they may also reflect shared environmental influences, the *accumulated* exposure to the delinquency of past friends, and similar mechanisms that simultaneously affect the adolescent and his or her friendship network. Because my primary interest is the examination of within-individual change, differentiating the various mechanisms associated with the between-individual differences in exposure to delinquent peers is largely unimportant.

A final interpretational caveat is that a correspondence between changes in respondent delinquency and changes in friend delinquency does not positively rule out types of selection effects similar to those described by Gold (1970). For example, if an adolescent becomes more delinquent across time, he or she might select new friends who are also more delinquent. Because the results in chapters 7 and 8 indicate that delinquent similarity is a relatively small factor in friendship selection and termination, while also indicating a large within-group variation in delinquency, however, this possibility does not seem particularly probable.

### **Multiple Imputation for Missing Data Problems**

One final issue that is important to any social network analysis is the problem of missing data. In this project, missing data results from four sources. First, 971 respondents in the saturated-schools sample participated in the wave 1 in-home survey, but dropped out prior to wave 2 (*attrition*). The second source of missing data is closely related – each respondent nominated his or her friends (who are also respondents), and these nominees also may have participated in the initial survey but dropped out prior to wave 2. In addition, the nominees may have refused even initial participation so that data for all waves is missing (*unit nonresponse of the nominees*). The third source occurs when respondents nominated friends who were never intended to participate in the survey because they did not attend the same school that the

respondent attended nor its sister/feeder school. Finally, a smaller source of missing data results from respondents who failed to answer one or more questions on the survey (*item nonresponse*).

To address problems of missing data, I am using multiple imputation (MI), which reduces parameter bias and provides proper standard errors under many situations we commonly encounter in survey data analysis (Allison 2002; Rubin 1976; Schafer 1997a; Schafer 1999a). MI provides plausible values for missing data by using Markov Chain Monte Carlo techniques (Gilks, Richardson, and Spiegelhalter 1996) that replace missing data by  $m > 1$  simulated values, where  $m$  is typically in the range of 3 to 10 (Schafer 1999a). MI software chooses the replacement values based upon a plausible prediction of the missing values given the interrelationships among the variables in the data.

While those who are new to MI sometimes view these procedures as a “statistical alchemy in which information is somehow invented or created out of nothing,” Schafer explains that MI is “nothing more than a device for representing missing-data uncertainty,” and “is similar to other well-accepted likelihood methods, which average over a predictive distribution of the missing data by numerical techniques rather than by simulation” (1999a p.8).

Under certain conditions, MI may increase the efficiency of parameter estimation relative to likelihood based methods, thus producing smaller (but accurate) standard errors (Rubin 1996). Under most conditions, however, proper MI analyses increase the reported standard errors of the parameter estimates to account for the uncertainty in the missing data estimation.

Schafer (1999a) used the term *principled* to describe statistical methods such as MI whose assumptions are clearly stated and provide correct inferences when the assumptions are satisfied. Listwise deletion of respondents who drop out of longitudinal surveys, for example, is an *unprincipled* method because it assumes that the dropouts are identical to those who participate fully, while imputation techniques that retain the dropouts, estimate their data values during missing waves, and adjust standard errors to account for uncertainty in the estimated values are *principled*. Thus, MI provides results that are more accurate than traditional methods of dealing with missing data because MI deals with missing data problems using precise

statistical principles rather than ad hoc procedures such as case deletion, mean substitution, and single imputation.

The algorithms on which common MI techniques are based rely upon the assumption that the incomplete data are *missing at random* (MAR) (Little and Rubin 1987; Rubin 1976). In other words, they assume that the probability of missingness depends completely on observed data values, but not on values that are missing (Schafer 1997b). As Schafer and colleagues explain, however, the MAR assumption is “a mathematical convenience” (1999a p.8), and “in many realistic cases, an erroneous assumptions of MAR . . . may often have only a minor impact on estimates and standard errors” (Schafer and Graham 2002 p. 152) (also see Collins, Schafer, and Kam 2001). Therefore, although the assumption of MAR generally cannot be tested from the data in hand (Schafer 1997b), and may often be violated, in the vast majority of studies a statistical analysis that uses MI techniques where the MAR assumption is not strictly plausible still provides less biased parameter estimates and more realistic standard errors than do alternative techniques such as case deletion, mean substitution, and single imputation (Schafer 1997a), which have been frequently used in tradition statistical analyses. Although most applications of MI also assume that the data conform to a multivariate normal distribution, like violations of the MAR assumption, simulation studies have indicated that MI is robust to violations of this assumption also (Ezzati-Rice, Johnson, Khare, Little, Rubin, and Schafer 1995; Graham and Schafer 1999; Schafer 1997b).

MI is not the only principled method for handling missing data problems – well-established statistical software such as HLM uses alternatives, such as likelihood methods based upon the EM algorithm (Dempster, Laird, and Rubin 1977), which calculate similarly accurate parameter estimates and standard errors under missing at random conditions (Schafer 1999a).

A key advantage to MI over alternative techniques is MI’s ability to allow the analyst to use almost any common statistical analysis software after the imputation is completed. Another advantage to MI is the ability to define separate *imputation* and *analysis models*. For the imputation model, analysts may incorporate variables that carry information about the missing data without including these variables in a final analysis model. Using a different subset of variable in the analysis model is beneficial when the variables that contain information about

missing data are highly collinear, or their inclusion in a final analysis model would otherwise change the model's meaning, interpretation, or parsimony. Including extra variables in the imputation phase cannot bias the results, and is preferable when the analyst anticipates a variety of post-imputation analyses (Schafer 1997b).

In this project, for example, I incorporated into an imputation model several measures of minor delinquency collected during the in-school phase of data collection, which help provide more accurate simulated values for missing information about serious forms of delinquency collected only during the in-home waves. Because we know that delinquency is typically generalized across a variety of behaviors (Osgood, Johnston, O'Malley, and Bachman 1988), and somewhat stable across time (Sampson and Laub 1993), the inclusion of these measures will certainly provide important information about the data that is missing due to unit- or item-nonresponse in the follow-up surveys. I do not include the minor delinquency items in the final analysis models, however, because they are highly collinear with other delinquency measures, and thus would alter the analysis model's interpretation.

In this thesis, I am using MI when analyzing models of interpersonal influence primarily to impute a plausible range of values for the respondents' peer group behavior. Respondents frequently have nominated some friends who are present in the survey while other nominated friends are absent. When the survey excluded all nominated friends, no calculation of the peer groups' behavior is possible using the original data, even though we know a peer group exists. In this case, I use MI techniques to impute the missing value of the friendship group. Recall from my earlier discussion that if the respondent did not nominate any friends during a data collection wave, then I substitute the across-respondent-peer-group mean, and include a dichotomous indicator for no-friends-during-wave.

Often, the peer group contained missing as well as non-missing friends. In this situation, I calculated the group's behavior based upon the non-missing friends realizing that the extent to which the behavior of the nominated friends is missing may affect the accuracy of the behavioral average of the friendship network. To address this issue, it is important to note that the reason for the missing friends may be due either to a respondent nominating a friend who does not attend a participating school, or to a respondent nominating a friend who was chosen for inclusion but refused or otherwise was unable to participate in the survey. When the

respondent nominated a friend for whom we have no information, even multiple imputation techniques will be of little assistance. Add Health has, however, incorporated a coding scheme that indicates the reason that the nominated friend was not included in the survey: (a) the friend did not attend the school or the sister/feeder school, (b) the friend did attend the school or sister/feeder school, but was not properly listed the interview roster, and (c) the friend was nominated as a romantic partner. In the latter case, the identification of the friend is not revealed in the regular Add Health data due to issues of confidentiality, but a more restricted version of these data that do contain romantic partner information will become available at a later time.

The Add Health coding scheme for the missing friends allowed me to tabulate the number of friends within each respondent's friendship group who, (a) were within the intended sample but had no data during one or more waves, and (b) were outside of the intended sample and thus had no data during *any* wave. From these figures, I calculated the proportion of the group who had missing values for each of these reasons and examined the interaction of these proportions with the group's delinquency value upon the respondent's delinquency. These analyses indicated that both interaction terms were not statistically significant at traditional probability levels. For this reason, I can conclude with some confidence that the *known friends* are similarly influential upon the respondent's delinquency relative to the entire, but partially-unknown, friendship group. Although these interaction terms were non-significant, I still included them in the MI imputation models, as their signs were positive, which indicates a small degree of evidence that we may best predict the behavior of respondents from the behavior of friendship groups that contain less missing friendship information.

MI software (PAN) that accounts for the clustering of friends within friendship groups, which is currently being developed by Schafer (2001) for stand-alone computer applications, will assist in future analyses which deal with problems of missing data caused by the attrition from the survey of some of the nominated friends. In other words, it is possible to impute a missing friend's behavior when the friend is missing from a single wave if the friend participated in a prior wave. Unfortunately, there is currently no solution to the problem of missing data for friends for whom we have no information such as those who attended non-participating schools.

MI procedures applicable to the majority of the missing data problems present in the influence models of this project are currently available in SAS version > 8.2 (Proc MI and Proc MIAnalyze), NORM MI software (Schafer 1999b), SOLIS MI software (but see Allison 2000), and macros or functions that work under SAS, S-Plus, and STATA statistical analysis software. My preliminary experimentation, however, has determined that SAS Proc MI often freezes when the number of variables in the imputation model is large. NORM software, however, consistently provided imputed data sets with numerous variables. For this reason, I am using NORM MI software for this project.

For the selection and de-selection hypotheses, which require analysis of the behavior of *each friend* rather than an *averaged friendship group*, existing stand-alone MI computer software is inadequate because it fails to account for the clustering of friends within friendship groups. For these hypotheses, I have used case deletion when encountering missing values for a nominated friend. Again, PAN MI software, currently under development, will assist with missing data problems of this nature in future analyses.

### **Combining Multiple Imputation Analyses**

Rubin (1987) defined the statistical rules for analysts to follow when combining the results from several separate analyses based upon multiple imputed data sets. He has shown that the overall point estimate for coefficients obtained from multiple data sets is simply their across-dataset average, while the variance of the coefficients is calculated from the formula

$$T = (1 + m^{-1})B + U,$$

where

- $T$  = total variance,
- $B$  = between-imputation variance,
- $U$  = within-imputation variance,
- $m$  = number of imputations.

SAS Proc MIAnalyze and NORM provide automated calculation of these statistics.

## CHAPTER 6

### DESCRIPTIVE ANALYSES

#### *Individual Descriptives*

Table 6.1 provides the means, standard deviations, and ranges for the characteristics of the 1880 male and 1792 female adolescents who comprise the sample that I used for most analyses in this project. Recall from earlier discussion that in these analyses the sample of interest is the *saturated schools sample*, from which complete social network data is available from all participating students enrolled in 16 schools.

This table indicates a mean respondent age near 17. In term of race and ethnicity, 20 percent of the respondents self-reported a Hispanic background, of which 8 percent also reported being White, .5 percent reported being Black, and 10 percent reported their race as Other-Hispanic (not indicated in the table). Whites comprise the majority of the sample at approximately 56 percent for the male respondents and 57 percent for the female respondents. Blacks are slightly over-represented in the sample relative to the United States population (15-16 percent versus 13 percent), as were Asians (15-16 percent versus 4 percent). As indicated in the methods section, a sampling weight adjusts for this over-representation.

89 percent of the respondents identified a specific religious denomination. Recall from earlier discussion that respondents who indicated no denomination were not questioned about religiosity. Therefore, 11 percent received the floor value of negative 2.12 on this measure.

Males are slightly lower on the religiosity scale than females are (-.22 versus -.06), however, males and females are approximately equal on both the parental attachment and parental supervision scales. Females in the sample have slightly higher grades than the males do (2.81 versus 2.60). As expected, the socio-economic-status index is approximately equal across gender.

Some students refused participation in the survey. For this reason, the sampling-weight variable also reflects corrections for student non-response, while also reflecting corrections for school-level non-response when school administrators refused to allow the entire school to participate. The weights also reflect corrections for the schools' selection probability and a post-stratification adjustment provides conformity to population estimates based upon 1995

Current Population Survey figures. For these reasons, the sampling weights differ within- and between-schools even in the saturated schools sample where otherwise the intended probability for inclusion is 1. For further information about the Add Health weighting procedures, see Tourangeau and Shin (1998).

The last four rows of table 6.1 provide information about the number of in-sample and out-of-sample friends that each respondent nominated. Recall that interviewers asked each respondent to nominate up to five male and five female friends. As expected, respondents nominated more same-gender than cross-gender friends. Confirming prior research (e.g., Clark 1989), males nominated slightly more same-gender friends than the female respondents did (3.15 versus 2.98), although when friends of *both* genders were summed, it was the females who nominated marginally more (5.5 versus 5.41).

In table 6.1, the male friends total and female friends total include both within-sample and out-of-sample nominations. These figures indicate that we have data for less than 50 percent of the nominated friends. 80 percent of the missing friend data occurred when the respondents nominated adolescents who did not attend their school (or the feeder/sister school). 15 percent of the missing friend data occurred when respondents nominated friends who refused participation in any aspect of the survey (even the in-school survey). 5 percent of the missing friend data occurred because the nominated friend was also a romantic partner. The romantic partner data is unavailable at present, but will become available in the future.

**Table 6.1 Individual Descriptives\***

	Males <i>N</i> = 1880			Females <i>N</i> = 1792		
	Mean	SD	Range	Mean	SD	Range
Age	17.19	1.53	13 – 21	16.94	1.57	13 – 21
Race/Ethnicity						
Hispanic**	.20		0 – 1	.21		0 – 1
White	.56		0 – 1	.57		0 – 1
Black	.15		0 – 1	.16		0 – 1
Asian	.16		0 – 1	.15		0 – 1
Native American	.01		0 – 1	.01		0 – 1
Other	.11		0 – 1	.11		0 – 1
Member of Organized Religion	.89		0 – 1	.91		0 – 1
Religiosity	-.22	.97	-2.12 – 1.02	-.06	.94	-2.12 – 1.02
Attachment to Parents	4.64	.53	1.00 – 5.00	4.50	.62	1.50 – 5.00
Parental Supervision	3.21	1.09	0 – 5.50	3.22	1.12	0 – 5.67
Grade Point Average	2.60	.79	1 – 4	2.81	.78	1 – 4
SES	.02	.77	-1.74 – 6.65	.00	.74	-1.74 – 6.65
Friends						
Male Friends - Total	3.15	1.66	0 – 5	2.52	1.72	0 – 5
Female Friends - Total	2.26	1.67	0 – 5	2.98	1.63	0 – 5
% Out-of-Sample Male Friends***	42	39	0 – 100	59	38	0 – 100
% Out-of-Sample Female Friends***	52	39	0 – 100	36	39	0 – 100
Sample-Weight	658	1009	17 – 6641	758	1077	16 – 6649

\* Wave 1

\*\* Non-exclusive Hispanic indicator. All other categories are mutually exclusive.

\*\*\* Corrected for a coding mistake in the original data

### *School Descriptives*

Table 6.2 provides details for the 16 schools contained within the saturated schools sample. The smallest school has only 20 participating students, while the largest has 1,704. The average school population is 164. The mean age range of 14 to 18 is indicative of the fact that some of the schools are high schools, while others are their feeder schools, which contain younger students. The proportion of males to females varies somewhat across the schools from a low of 34 percent male to a high of 59 percent male with a standard deviation of 6 percent.

The racial composition across the schools varies considerably. In one or more of the 16 schools, one of racial categories is not represented. One school is completely White, another is completely Black, and another is 33 percent Asian.

Membership in an organized religion ranges between 56 percent to 100 percent across the schools. The religiosity index has the highest variance across schools of all measures. Its standard deviation of .63 is almost 6 times that of religious membership.

Parental supervision across the schools varies more than parental attachment does. The standard deviation for supervision is .33, while the standard deviation for attachment is .13. The mean grade point average in the schools is 2.97. There is also substantial variance in the socioeconomic-status index – the standard deviation of this measure is .26.

**Table 6.2 School Descriptives\***

	<u>Mean</u>	<u>SD</u>	<u>Range</u>
Number of Students per School	230	437	20 – 1704
Age	15.76	1.19	14 – 18
Gender	.48	.06	.34 – .59
Race/Ethnicity			
Hispanic**	.09	.13	0 – .39
White	.78	.32	0 – 1.00
Black	.13	.26	0 – 1.00
Asian	.03	.08	0 – .33
Native	.01	.01	0 – .03
Other	.05	.09	0 – .29
Member of Organized Religion	.91	.12	.56 – 1.00
Religiosity	-.02	.63	-1.41 – .84
Attachment to Parents	4.68	.13	4.46 – 4.87
Parental Supervision	3.33	.33	2.98 – 3.95
Grade Point Average	2.97	.27	2.51 – 3.48
SES	.04	.26	-.35 – .52

\* Wave 1,  $N = 16$

\*\* Non-exclusive Hispanic indicator. All other categories are mutually exclusive.

Both male and female prevalence rates varied substantially by school. The prevalence of drinking, for example, was near zero for both males and females in some schools, while performed by the majority of students in other schools.

These tables also indicate that the rank ordering of behavior prevalence across gender is quite similar with the exception of behaviors related to physical violence. Males, for example, were more likely to affirmatively answer the question about *involvement in a serious physical*

*fight* than the question about smoking. Females, however, were more likely to smoke than fight. Likewise, males were slightly more likely to have *hurt someone by fighting*, than they were to have *stolen less than 5 dollars*, while females were more likely to have committed minor theft than they were to have hurt someone in a fight.

**Table 6.3 Overall Prevalence Rates and School Variation in Prevalence Rates for Male Adolescents\***

<u>Delinquent Behavior</u>	<u>Overall</u>	<u>Lowest School</u>	<u>Highest School</u>
Drinking	.50	0.04	.69
Skipping School	.44	0.00	.59
Involvement in Serious Physical Fight	.39	0.13	.61
Getting Drunk	.34	0.00	.53
Smoking	.30	0.04	.47
Shoplifting	.28	0.04	.46
Hurting Someone by Fighting	.28	0.04	.34
Theft under \$5	.26	0.00	.39
Involvement in Gang Fight	.25	0.06	.34
Vandalism	.24	0.04	.35
Driving Vehicle without Permission	.15	0.00	.20
Graffiti	.13	0.00	.24
Marijuana Use	.12	0.00	.16
Theft over \$50	.09	0.00	.11
Burglary	.09	0.00	.12
Carrying Weapon to School	.08	0.00	.15
Pulling a Weapon on Someone	.07	0.00	.12
Robbery	.06	0.00	.12
Using a Weapon on Someone	.03	0.00	.08

\* Wave 1,  $N = 1792$

**Table 6.4 Overall Prevalence Rates and School Variation in Prevalence Rates for Female Adolescents\***

<u>Delinquent Behavior</u>	<u>Overall</u>	<u>Lowest School</u>	<u>Highest School</u>
Drinking	.48	0.11	.65
Skipping School	.38	0.00	.55
Involvement in Serious Physical Fight	.22	0.03	.50
Getting Drunk	.27	0.00	.46
Smoking	.26	0.00	.51
Shoplifting	.23	0.00	.36
Hurting Someone by Fighting	.11	0.00	.20
Theft under \$5	.18	0.00	.30
Involvement in Gang Fight	.15	0.03	.52
Vandalism	.12	0.00	.27
Driving Vehicle without Permission	.11	0.00	.18
Graffiti	.06	0.00	.19
Marijuana Use	.05	0.00	.08
Theft over \$50	.04	0.00	.11
Burglary	.04	0.00	.11
Carrying Weapon to School	.02	0.00	.06
Pulling a Weapon on Someone	.02	0.00	.07
Robbery	.02	0.00	.07
Using a Weapon on Someone	.01	0.00	.06

\* Wave 1,  $N = 1792$

**Table 6.5 The Correlation between Male Adolescents and their Male and Female Friends by Nomination Order \***

<u>Delinquent Behavior</u>	<u>Nomination Order of Male Friends</u>					<u>Nomination Order of Female Friends</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Drinking **	.35	.31	.37	.21	.19	.38	.36	.39	.33	.39
Smoking **	.57	.50	.54	.42	.46	.48	.50	.52	.47	.39
Getting Drunk **	.45	.39	.39	.31	.43	.37	.39	.29	.38	.
Skipping School **	.46	.45	.46	.38	.39	.31	.30	.35	.33	.36
Fighting **	.20	.	.22	.24	.17	.26	.11	.	.	.46
Vandalism ***	.14	.13	.17	.31	.12	.36	.	.20	.36	.
Theft over \$50 ***	.31	.	.20	.34	.17	.	.27	.	.	.
Burglary ***	.13	.17	.	.	.	.	.33	.22	.	.
IRT Scale ****	.17	.18	.18	.16	.	.16	.12	.19	.	.18

\* Wave 1,  $N = 1880$ 

\*\* Polychoric correlation

\*\*\* Tetrachoric correlation

\*\*\*\* Pearson correlation

. indicates that there is insufficient information for a calculation of this statistic due to small cell size

**Table 6.6 The Correlation between Female Adolescents and their Male and Female Friends by Nomination Order \***

<u>Delinquent Behavior</u>	<u>Nomination Order of Male Friends</u>					<u>Nomination Order of Female Friends</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Drinking **	.24	.30	.16	.28	.34	.52	.34	.38	.29	.33
Smoking **	.48	.50	.52	.47	.39	.67	.57	.45	.55	.49
Getting Drunk **	.32	.37	.31	.30	.44	.51	.39	.41	.43	.37
Skipping School **	.45	.38	.28	.39	.39	.57	.30	.41	.42	.35
Fighting **	.	.22	.23	.30	.26	.30	.23	.24	.22	.
Vandalism ***	.21	.19	.	.31	.	.32	.31	.	.37	.28
Theft over \$50 ***	.	.	.	.49	.	.	.	.32	.	.
Burglary ***	.	.23	.35	.35	.	.42	.	.	.38	.
IRT Scale ****	.	.29	.21	.18	.	.23	.24	.16	.12	.12

\* Wave 1,  $N = 1792$ 

\*\* Polychoric correlation

\*\*\* Tetrachoric correlation

\*\*\*\* Pearson correlation

. indicates that there is insufficient information for a calculation of this statistic due to small cell size

*The Correlation between Respondent and Friends Across Nomination Order*

Tables 6.5 and 6.6 indicate the correlation between male and female adolescents and their friends for selected behaviors. Recall from earlier discussion that some researchers have suggested that best friends may exert stronger mutual influences upon each other than other friends or acquaintances do (Newcomb and Bagwell 1995; Vitaro, Brendgen, and Tremblay 2000) (Urberg, Degirmencioglu, and Pilgrim 1997).

If best friends do exert more influence than other friends exert, then averaging the behavior of the friendship group for the purpose of investigating the similarity between adolescent and friend behavior is less justified than examining the similarity between the adolescent and each friend individually. Because prior research has suggested that the association between friends of the same gender and friends of the opposite gender will likely differ, I have examined each combination of respondent-gender and friend-gender separately.

Due to the non-normal and highly skewed distributions of these behaviors, I coded *smoking*, *getting drunk*, *skipping school*, and *involvement in a serious physical fight* as three-category ordinal measures of (a) no involvement, (b) some involvement, and (c) involvement almost everyday. As such, if we assume that a normally distributed latent trait underlies the observed ordinal distribution of each variable, the best measure of similarity between respondent and friend for each behavior is a polychoric correlation coefficient (Neale and Cardon 1992).

Because *vandalism*, *theft over \$50*, and *burglary* were even more skewed and had a very low base-rate, I coded these behaviors as dichotomies and examined tetrachoric correlations to indicate the degree of similarity between the respondent and each friend. Tetrachoric correlations are the best measure of similarity when each variable is a dichotomy, again, assuming that a normally distributed latent trait underlies the observed categorical distribution (Neale and Cardon 1992).

The last measure in these tables is an IRT delinquency scale. As discussed previously, the IRT measure combines 14 different behaviors into a single scale that departs from normality only in regard to its left-truncated distribution. For the present purposes, I have ignored the truncation and have used a standard Pearson correlation to examine the similarity across the ordering of the friendships.

When examining these tables, we should interpret the cross-gender correlations differently from the same-gender correlations. Obviously, a high correlation between male respondents and their male friends or between female respondents and their female friends indicates very similar behavior. Perhaps it is less obvious, however, that because female delinquency is far lower on average than male delinquency is, a high *cross-gender* correlation does not necessarily indicate that males and females behave alike. Instead, a high cross-gender correlation indicates that highly delinquent males associate with female friends who are highly delinquent *relative to other females*, but not necessarily females who are highly delinquent relative to males.

Tables 6.5 and 6.6 provide no evidence that the nomination order of the friends alters the similarity between respondent and friend for either male nor female adolescents for any of the individual behaviors nor the IRT behavioral scale. These findings justify the averaging of the friends' behavior in chapter 9 where I test the influence hypotheses.

#### *The Overall Similarity between Adolescents and Their Friends*

Tables 6.7 and 6.8 are comparable to the two preceding tables but aggregate the friends across nomination order. In these tables we more clearly can see that the correspondence between respondent and friend behavior depends on behavior type. Minor behaviors, such as drinking, smoking, getting drunk, and skipping school, have much higher correlations between respondent and friends than more serious behaviors such as burglary and theft have. The higher correlation for the minor behaviors holds for both male and female adolescents and their same-gender and opposite-gender friends.

The higher correlations could indicate that friends exert more influence upon one another for behaviors within an internalized normative boundary that many adolescents will not cross. In other words, adolescents may be influenced by others to break minor rules, but not major rules that they have internalized. The higher correlation for the minor behaviors may also indicate that similarity in frequently performed relative to rarely performed behaviors is more important when choosing friends.

Another possibility is reliability differences in measurement. All else equal, a less reliable measure will produce a lower correlation than a more reliable measure will. In tables 6.7 and 6.7, however, the IRT delinquency scale, which intrinsically is more reliable than

single item measures are, produces a lower correlation than the minor behaviors do. Thus, reliability differences alone cannot explain the range of relationship strength across the different behaviors.

**Table 6.7 The Overall Correlation between Male Adolescents and their Male and Female Friends \***

<u>Delinquent Behavior</u>	<u>Male Friends</u>	<u>Female Friends</u>
Drinking **	.31	.38
Smoking **	.52	.42
Getting Drunk **	.40	.35
Skipping School **	.44	.32
Fighting **	.18	.18
Vandalism ***	.19	.19
Theft over \$50 ***	.23	.16
Burglary ***	.10	.18
IRT Scale ****	.16	.14

\* Wave 1,  $N = 1880$

\*\* Polychoric correlation

\*\*\* Tetrachoric correlation

\*\*\*\* Pearson correlation

**Table 6.8 The Overall Correlation between Female Adolescents and their Male and Female Friends \***

<u>Delinquent Behavior</u>	<u>Male Friends</u>	<u>Female Friends</u>
Drinking **	.26	.40
Smoking **	.49	.57
Getting Drunk **	.35	.43
Skipping School **	.38	.43
Fighting **	.22	.23
Vandalism ***	.18	.25
Theft over \$50 ***	.03	.03
Burglary ***	.22	.24
IRT Scale ****	.19	.19

\* Wave 1,  $N = 1880$

\*\* Polychoric correlation

\*\*\* Tetrachoric correlation

\*\*\*\* Pearson correlation

*Do Frequency Differences Explain Correlation Differences Across Behavior Type?*

Comparing tables 6.7 and 6.8 to table 6.9 provides information about whether high frequency behaviors also produce high correlations between the behaviors of respondents and their friends. Unfortunately, the Add Health survey was not designed to measure precise behavioral frequencies. Thus, these data can provide only a moderate degree of information that we should interpret cautiously. For example, the Add Health survey response categories for burglary were: (a) *never*, (b) *once or twice* in the last month, (c) *three or four times* in the last month, and (d) *five times or more* in the last month. For skipping school, the survey asked respondents to report how often they have performed this behavior during the preceding school year (most interviews took place during the summer). When the respondent specified a response category that had a range, I considered the value to be the middle of the range. When the respondents' answer was the maximum category, I used one plus the maximum. For skipping school, I divided the number of times per school year by eight months.

**Table 6.9 Average Frequency per Month of Selected Behaviors\***

<u>Delinquent Behavior</u>	<u>Males</u>	<u>Females</u>
Drinking	3.5	2.2
Smoking	16.8	16.9
Getting Drunk	3.5	2.4
Skipping School	1.1	1.1
Fighting	2.5	2.3
Vandalism	2.5	1.9
Theft over \$50	2.5	2.3
Burglary	2.3	2.2

\* Among those reporting at least 1 incident at wave 1

These tables indicate that although smoking had the highest frequency and also the highest correlation among both the male and female adolescents and their friends, skipping school also had a relatively high correlation while having a relatively low frequency. Thus, the available evidence does not suggest that frequency alone is the sole explanation for higher correlations among the minor offenses. Again, however, because the Add Health data does not

allow for more precise distinctions among behavioral frequencies, we should consider this conclusion preliminary and in need of further research.

**Table 6.10 Cross-tabulation of Friendship Termination and Friendship Reciprocation**

<b>Friendship Stability Across Waves**</b>	<b>Reciprocity*</b>		<b>Total</b>
	<b>Non-Reciprocated</b>	<b>Reciprocated</b>	
<u>Stable</u>	1429 (57.6%)	1052 (42.4%)	2841 (28.5%)
<u>Terminated</u>	4740 (76.1%)	1492 (23.9%)	6232 (71.5%)
<u>Total</u>	6169 (70.8%)	2544 (29.2%)	8713 (100%)

\* At wave 1

\*\* From wave 1 to wave 2

### *Friendship Termination and Reciprocity*

Chapter 8 will indicate that the reciprocation of friendship nominations is the most important predictor of friendship stability across time. For this reason, table 6.10 indicates the percentage of wave 1 friendships that terminated prior to wave 2, the percentage that are reciprocated at wave 1, and the cross-tabulation of these variables. This table shows that 71.5 percent of all adolescent friendships terminated across a period of one year and that 28.5 percent of the respondents' friends reciprocated their friendship nomination. The table also shows that reciprocated friendships were less likely to terminate. Only 23.9 percent of reciprocated friendships terminated prior to wave 2, while 76.1 percent of non-reciprocated terminated during the same period.

The high rate of termination and low rate of reciprocation may be due to the passive nature of the data collection. For example, if a respondent nominated adolescent *B* at time 1 but failed to nominate adolescent *B* at time 2, the interviewers did not prompt the respondent to indicate whether or not he or she still considered adolescent *B* a friend during the second interview wave. Likewise, if respondent *B* nominated adolescent *C*, but *C* did not reciprocate, the interviewers did not ask adolescent *C* if he or she considered *B* a friend. More active

**Table 6.11 The Extent of Missing Data in the Influence Models**

<u>Time-varying variables</u>	<u>Wave 1</u>	<u>Wave 2</u>
IRT Delinquency	27.1	27.1
Male Friendship Group IRT Delinquency *	44.4	54.0
Female Friendship Group IRT Delinquency *	38.2	52.9
Smoking	.2	26.6
Drinking	.1	26.7
Parental Attachment	1.7	29.6
Parental Supervision	.1	26.5
Grades	1.7	34.6
Religiosity	1.4	27.4
<u>Non-time-varying variables</u>		
SES	0	N/A
Hispanic Indicator	.2	N/A
Race	.3	N/A

\* Send Network Only

questioning where interviewers specifically inquire whether a wave 1 friend is still a friend at wave 2 certainly would produce far less termination.

### *The Extent of Missing Data*

Table 6.11 indicates the percentage of missing data contained within each of Add Health's survey waves. Because a minimum of one indicator of SES was present for at least one parent of each respondent, SES has no missing values. The Hispanic indicator and the race variables also had low amounts of missingness, although recall that the ability to substitute answers from the in-school survey when respondents failed to provide answers on the follow-up survey is somewhat responsible for this low rate of missingness. Because SES and race/ethnicity are non-time-varying (but see Harris and Sim 2002), there are no corresponding wave 2 values.

Recall that I based the IRT delinquency scales on values calculated by Haynie and Osgood (2002). This scale contains a high degree of missing data because these authors defined the scale values as *undetermined* when respondents failed to answer four or more of the scale's items. For the respondents, the percentage of missing IRT scale values is equal for both waves because the values were determined by pooling both waves and deleting individuals who did not participate in wave 2. Because I included the in-school values of minor delinquency plus

several measures of the constituent items of the IRT scale from both waves in a multiple imputation model, I am able to simulate these missing IRT measures for the purposes of this project to a relatively high degree of accuracy. A future recalculation of the wave 1 values for respondents who were excluded from wave 2 will reduce the scale's level of missingness.

The rates of missingness for the male and female friendship groups are higher than the missingness rate for the respondents are. The increase results from the problem I discussed previously – respondents occasionally nominated friends for whom we have no behavioral data. Again, these high missingness rates indicate a condition where multiple imputation techniques become a useful tool for the calculation of relatively unbiased coefficients and standard errors that reflect the uncertainty of the missing data.

The smoking and drinking values reflected in table 6.10 have low rates of missingness, presumably because the questions are far less sensitive; and thus, adolescents are less reluctant to report them. The increased rate of missingness during wave 2 for smoking and drinking, as well as that of the other time-varying variables in this table reflects the attrition of 971 respondents from wave-2 participation.

## CHAPTER 7

### THE ROLE OF DELINQUENCY IN FRIENDSHIP SELECTION

If delinquent adolescents befriend one another, they may have based their friendship decisions on the dyad's shared level of delinquent behavior. For example, some adolescents may anticipate mutual reinforcement for joint-participation in deviant behavior with their soon-to-be friends. Delinquent adolescents may also befriend other delinquents because they anticipate that non-delinquents will criticize the adolescents' deviant behavior. To the extent that this selective attraction occurs, we will observe behavioral similarity among friends that does not result from interpersonal influences.

We would see the same behavioral similarity, however, if adolescents choose friends who are similar on factors *correlated* with delinquency. In other words, adolescents may choose new companions because each friend shares the same race, age, socio-economic-status, or other characteristic associated with delinquent behavior. Asian adolescents, for example, may find that their values, beliefs, or attitudes more closely match other Asian adolescents than they match adolescents from non-Asian backgrounds. In the same way, wealthy adolescents may find little in common with adolescents from economically deprived backgrounds. Because delinquent behavior correlates with both socio-economic-status and race, friendship decisions based upon either results in an equivalent behavioral resemblance among friends as we would see if adolescents based their friendships specifically on shared delinquency levels.

We also know that the majority of adolescent friendships occur among those who attend the same schools. Within schools, assignment to the same classrooms is a major factor that increases the probability of friendship (McPherson, Smith-Lovin, and Cook 2001). Because the school social context represents a substantial aspect of the shared environment to which all of its students are exposed, and because schools vary in their average levels of delinquent involvement, we might expect the delinquent similarity of within-school friendships to reflect the effects of the shared school environment.

For these reasons, we would observe delinquent similarity in new adolescent friendships regardless of whether adolescents: (a) base friendship decisions on a purposeful desire to associate with other delinquents, (b) base friendship decisions primarily on characteristics that

correlate with delinquency such as race, age, religiosity, GPA, or SES, or (c) have their friendship decisions largely confined by the physical boundaries of the schools they attend or the neighborhoods in which they live.

There are other important issues to consider when investigating friendship selection. As discussed previously, disentangling the relative degree to which interpersonal influence, selective attraction, and shared environment contribute to the behavioral similarity among friends is difficult. Recall that Kandel (1978) proposed that we may gain insight into the magnitude of the selection effect by determining the similarity among adolescent dyads who are *not* friends during the first wave of a longitudinal data collection effort but become friends by the second – in other words, by examining the similarity of *future friends*. Her reasoning implied that adolescents who are not yet friends are unlikely to exert mutual influence. For this reason, the similarity among future friends is a product of selective attraction isolated from the effects of interpersonal influence.

Because non-friends may still influence each other, however, Kandel's implication may be wrong. The concept of *anticipatory socialization* in the reference group literature, for example, suggests that individuals sometimes adapt their behavior toward non-membership groups to which they desire association.

With this caveat in mind, however, Kandel's strategy is intriguing and worthy of further investigation. Although non-friends *may* influence one another, thus overstating the similarity among future-friend dyads that we should attribute to selective attraction rather than interpersonal influence, the tables presented in this chapter already indicate a relatively low-level of similarity among friends. Therefore, if non-friends substantially influence one another it simply implies that the similarity among the future friends is even less than the already low figures that this chapter indicates.

### **Within- and Between-group Variance in Multilevel Models of Friendship Similarity**

While prior studies that relied upon strategies like Kandel's have typically investigated only best friend *dyads*, recall from chapter 5 that when investigating friendship selection, I am using multilevel models to examine behavioral similarity among the *entire friendship group*. By isolating within-group from between-group differences, which together comprise the two

components of similarity, multilevel models provide more information than OLS regression models do.

Prior research, for example, has often measured the resemblance between an adolescent and his or her *best* friend (e.g., Kandel 1978), a strategy that chapter 6 suggests will produce an accurate estimate of the *average* level of similarity between friendship dyads. A conventional regression analysis, however, will provide *only* this average without indicating the extent to which the similarity of each dyad varies around the average.

Prior research has also used the alternative of examining the behavioral similarity between respondents and *each* of their friends, but has ignored the fact that the dyadic friendships are nested within the same adolescent (e.g., Rodgers, Billy, and Udry 1984). Again, this strategy will estimate the average level of similarity without estimating the behavioral variance within the friendship group.

As I discussed in chapter 4, in a multi-level analysis of friendship groups, the intra-class correlation (ICC) describes the similarity in the outcome measure that exists between individuals who are a member of the same group (Kenny, Kashy, and Bolger 1998). Here, the ICC is simply the between-group variance in delinquency divided by its total variance (between- plus within-group).

Kenny and colleagues (2002) noted that the ICC will equal 1 when all of the within-group scores are equal while the across-group means of the scores differ – in other words, when the between-group mean-squared-error *is greater than 0* and the within-group mean-squared-error *equals 0*. In contrast, the ICC is minimized when the group means are equal, but the scores of one or more groups vary – in other words, when the within-group mean-squared-error is greater than 0 and the between-group mean-squared-error equals 0. An ICC is generally between 0 and 1, but a negative ICC is possible – for example, in a dyad where one member talks excessively, others members, almost by definition, talk less (Kenny et al. 2002).

### **Adding Covariates to Multilevel Models**

Multilevel models also allow an analyst to include covariates that *may* explain *why* the members of a friendship group exhibit behavioral similarity. In other words, these models provide insight into whether we should characterize delinquent similarity among group

members as the purposeful selection of other delinquents or whether adolescents may prioritize more observable and salient characteristics when making friendship choices.

While the ICC of the null (or *unconditional*) multilevel model provides the full extent of friendship similarity, the ICC we obtain from models that include covariates indicates the *unexplained* likeness after we isolate the effects of similarity (or dissimilarity) resulting from the group's resemblance on the values of each covariate. Because the inclusion of covariates into what is now a *conditional* model means that new ICC represents *unexplained* similarity, Kenny and colleagues have noted that the best designation for this statistic is the *partial ICC* (2002).

In the present analysis, the ICC of the unconditional model represents the full extent of group homophily on delinquent behavior, while the ICC after the cumulative inclusion of covariates represents the degree to which the similarity among group member remains *unrelated* to their common values on the added explanatory factors. By definition, covariates that correspond to individual characteristics may explain variation at either the group or individual level while group characteristics provide explanation only at the between-group level.

When a covariate explains within-group differences, the within-group variance decreases relative to the between-group (or total) variance. Consequently, the ICC *increases*. When a covariate explains between-group differences, the ICC falls. In the present analyses, the members of the adolescent friendship groups are relatively homogeneous on most demographic characteristics. Therefore, the inclusion of individual-level characteristics generally explains more between-group variation than within-group variation, thus decreasing the ICC. In cases where minimal between-group differences on the covariate exist, however, its inclusion will increase rather than decrease the ICC. We see this pattern, for example, when I add a gender control to a group analysis where the groups were comprised of a nearly equal number of men and women.

## **Multilevel Analysis Results**

### *Male Adolescents – Future Male Friends*

Table 7.1 presents the results of a multilevel analysis on the behavioral similarity for male adolescents and their future male and female friends where the outcome was Osgood and

colleagues' (2002) delinquency scale, a measure based on item response theory scaling (IRT). I conducted the analyses for friends of each gender separately because delinquent similarity may be more important when male adolescents choose their male friends relative to when male adolescents choose their female friends. For male adolescents and their future male friends, the unconditional model ICC of .165 indicates a moderately low level of similarity. Recall that even this modest level of behavioral congruence within friendship groups *overstates* the importance of delinquency in friendship choice to the degree that adolescents choose friends because they resemble each other on factors associated with delinquency rather than delinquency itself, and to the degree that mutual influence exists prior to friendship initiation.

In the next model, I added dummy variables that indicate which school each friend attended. By design, the vast majority of friends within each group attended the same school, although this analysis did include a number of cases where group members attended a sister/feeder school. Because group members are largely homogeneous on the school attended and the schools varied in their mean-delinquency levels, the inclusion of the school dummies explains a sizeable portion of between-group differences while explaining essentially no within-group variation. The decrease of the unconditional-model ICC from .165 to the .128 value in the model conditioned on the school dummies indicates that attending the same school accounts for 23 percent of the behavioral similarity among friends.

The next model adds age to the school dummy variables. Here we see that age differences explain no meaningful variation in either within- nor between-group differences in delinquent behavior net of the explanation provided by attending the same schools. In these data, this result is not unexpected because the friendship groups are largely age homogeneous and the entire sample consists solely of adolescents.

Including race and ethnicity dummy variables again lowers the ICC 30 percent (from .130 to .099) by explaining a substantial portion of the between-group differences in delinquency. Because friendship groups are largely homogeneous on race, however, these covariates fail to explain any meaningful within-group variance.

Including SES does not further decrease the ICC to any meaningful degree. As the next chapter indicates, in these data SES is not a statistically significant predictor of delinquency as

it is measured in this analysis. For this reason, we would expect it to explain little to no between- or within-group variance.

The addition of academic grade point average (GPA) to the model had an explanatory effect on the ICC that was even larger than the school dummy variables. As with the previously included covariates, its explanatory effect is confined to between- rather than within-group differences, a finding that is once again indicative of the reality that adolescents choose friends among others who share comparable levels in scholastic aptitude. Because students are often divided into classrooms according to achievement (Hallinan 1982; Hallinan and Tuma 1978), and because prior research suggests propinquity to be major determinate of friendship (Newcomb 1956), we should not be surprised by this finding.

The last covariate I included was religiosity, which further decreased the ICC from .061 to .054, a modest 12 percent drop. The .054 ICC of the final model thus indicates that after controlling for group differences in school, age, race, SES, grades, and religiosity, there is very little delinquent similarity left that we can attribute to selection on delinquency alone. Recall, however, that the ICC of the model conditioned on the covariates is attenuated to the degree that male adolescents choose their male friends based upon similarity in delinquency rather than similarity in these covariates.

A reasonable question is whether I have included the covariates into the model in a meaningful order. Prior research does provide some guidance on this issue as a few authors have suggested that individuals base friendship selection primarily on race/ethnicity similarity, and secondarily on age, religion, and education in that order (McPherson, Smith-Lovin, and Cook 2001). Additionally, others have noted that attendance in the same school is a necessary condition for friendship (Hallinan 1982; Hallinan and Smith 1985; Hallinan and Tuma 1978).

Including the school dummy variables first is clearly justified for the analyses of these data, because the survey design does not allow friendship selection beyond the respondent's own school or its sister school. The guidance from the prior research concerning the other factors, however, may be inapplicable, as each factor may have a different association with the other covariates and the outcome. For example, if SES and GPA are highly correlated with each other while also highly correlated with delinquency, including SES in the model before GPA will indicate a large ICC decrease associated with SES, but a minimal decrease associated

with GPA, while reversing the order of inclusion will attribute the ICC decrease to the opposite factor. Although this is certainly a consideration in this model, my preliminary analyses indicated that if we include the gender control and school dummy variables first, the inclusion order of the other variables does not substantively change the degree to which the ICC decreases when I add any of these covariates. This occurs because the covariates and the outcome are not highly intercorrelated.

A more important question than the order in which I add covariates involves the priority of each covariate relative to the delinquent outcome in terms of its importance to friendship decision choice. For example, although the majority of the prior research suggests that adolescents largely constrain their friendships to others who attend the same schools, it is certainly possible that shared delinquency and not shared school is the factor primarily underlying friendship selection. To the extent that delinquency rather than the covariate is the factor most important to adolescents when choosing their friends, the model is misleading when the covariate is also highly correlated with delinquency.

Although it seems unlikely that the prior research has proclaimed incorrectly that schools boundaries largely constrain friendship choice, perhaps we would not wish to make such a strong assumption about religiosity, because it is a bit more likely that adolescents prioritize factors other than religious similarity when choosing friends (McPherson, Smith-Lovin, and Cook 2001). While the structural constraints of high school location and attendance requirements make opportunities for the initiation of friendships difficult if the adolescents do not attend the same schools, we cannot say the same for religiosity, particularly in high schools and neighborhoods characterized by religious heterogeneity.

Although I added each covariate to the model in the order to which prior research claims they are important, the order is still highly arbitrary, as we simply cannot be certain whether adolescents choose friends because they are similar on delinquency or similar on the values of these covariates. For this reason, we should interpret these results as implying that the importance of shared delinquent behavior for male respondents who choose male friends is represented by an ICC with a value somewhere between the unconstrained model's .165 and the fully conditional model's .054. Again, however, while the .165 is a true ceiling value that

only data unreliability restricts, it is possible that these models exclude important covariates that would further reduce the ICC.

#### *Male Adolescents – Future Female Friends*

Table 7.1 also indicates corresponding ICC measures of similarity among the male adolescents and their future female friends. In these models, we see that the ICC of the null model indicates approximately one-half of the similarity between male adolescents and their female friends as we observed between the males and their male friends. While this decrease is certainly expected given typical differences between male and female participation rates in delinquency, what is unexpected is the failure of the gender control in the next model to increase the ICC. While we would not expect gender to account for between-group differences in this model because each group contains exactly one male and a maximum of five females, unexpectedly, the gender differences among the friends explains minimal within-group variation. Because the amount of within-variation explained is so small, the small decrease in unexplained between-group variance decreases the ICC by a trivial amount, rather than increasing it as one might expect.

The implication is that male adolescents consider as their friends only those females who perform delinquent behaviors to the same degree that the males do. Recall, however, that these data do not include romantic partners. Future analyses that are able to include the partners may produce different results, particularly if the non-romantic friends in the present analysis are not representative of the excluded partners.

Like the results we observed for the male adolescents' male friends, the school dummy variables and GPA were the major covariates that caused the ICC to decrease. Again this occurred because the covariates explained a portion of the between-group rather than the within-group variance. The effect of adding GPA was particularly noteworthy, because its inclusion decreased the already low .06 ICC in the previous model to near zero, thus indicating that GPA (or alternatively, a correlate of GPA) is important to cross-gender friendship selection and that GPA strongly correlates to delinquency. In the final model, the ICC of .005 indicates that the inclusion of the covariates explains all meaningful delinquent similarity among the male adolescents and their female friends.

**Table 7.1 The Similarity in IRT Delinquency between Male Adolescents and their Future Friends**

	<u>Male Friends</u>			<u>Female Friends</u>		
	<u>Within</u>	<u>Between</u>	<u>ICC**</u>	<u>Within</u>	<u>Between</u>	<u>ICC**</u>
Null Model	.651	.128	.165	.644	.057	.081
+ Gender*				.623	.055	.080
+ School	.657	.096	.128	.629	.031	.047
+ Age	.653	.097	.130	.626	.032	.049
+ Race	.660	.072	.099	.625	.025	.038
+ SES	.646	.072	.100	.623	.026	.041
+ Grade Point Average	.643	.041	.061	.610	.004	.006
+ Religiosity	.646	.037	.054	.612	.003	.005

\* In same-gendered groups controlling for gender is redundant

\*\* Intra-class correlation coefficient – defined as the between-group variance divided by the total variance

**Table 7.2 The Similarity in IRT Delinquency between Female Adolescents and their Future Friends**

	<u>Male Friends</u>			<u>Female Friends</u>		
	<u>Within</u>	<u>Between</u>	<u>ICC**</u>	<u>Within</u>	<u>Between</u>	<u>ICC**</u>
Null Model	.545	.064	.105	.415	.104	.200
+ Gender*	.531	.069	.115			
+ School	.535	.045	.078	.422	.073	.147
+ Age	.532	.045	.078	.420	.072	.146
+ Race	.533	.043	.074	.424	.067	.136
+ SES	.532	.043	.075	.424	.067	.136
+ Grade Point Average	.520	.031	.057	.430	.035	.069
+ Religiosity	.518	.026	.048	.427	.030	.066

\* In same-gendered groups controlling for gender is redundant

\*\* Intra-class correlation coefficient – defined as the between-group variance divided by the total variance

### *Female Adolescents – Future Male Friends*

Table 7.2 presents the results for female respondents and the male and female adolescents they consider friends. Because the analyses of female adolescents and their male

friends presented in this table and the analyses of male adolescents and their female friends in the preceding table both represent mixed-gendered friendship groups, an explanation of their differences is in order.

Recall that I have based these analyses on the *send* friendship network. Therefore, to the degree that the *meaning of friendship* differs across gender, these analyses will contain a different set of adolescents. Eder and Hallinan (1978), for example, suggested that females tend to consider a smaller, more intimate group of adolescents as their friends.

Although male and female adolescents may define friendship differently, the null models of the mixed gendered groups as defined separately by the male and female adolescents are not highly dissimilar (.105 versus .081). Unlike the mixed-gendered group analysis in the prior table, however, the inclusion of the gender covariate to the null-model analysis in table 7.2 increases the ICC as we might expect. The 10 percent increase, however, is quite modest.

In table 7.2's subsequent models where additional covariates are present, we see similar patterns for the explanatory ability of certain covariates to account for between- rather than within-group variation in delinquency as we saw in table 7.1. The addition of the school dummies explains about 30 percent of ICC similarity, while the addition of GPA explains an additional modest amount. Differences in religiosity, however, explain a small degree of the between-group differences in delinquency, while age, race, and SES explain minimal to no variance.

#### *Female Adolescents – Future Female Friends*

The last three columns of table 7.2 indicate that delinquent similarity is a more important factor when females choose their female friends relative to when they choose their male friends. The ICC similarity of the null model in the female-adolescent/female-friends analyses is .200, which is almost twice the .105 indicated by the corresponding female-adolescent/female-friends model in the first 3 columns of this table. It is also almost twice the ICC value of .115 we find in the analysis after controlling for within-group gender differences.

A comparison of the female-adolescent/female-friend results from the null models in this table (i.e., all female friendship group) and the male-adolescent/male-friend results from the null model in table 7.1 (all male friendship group) indicates a stronger similarity of delinquent behavior among the female friends than among the male friends (ICC of .200 versus

.165). The stronger similarity between the female friends persists even after the inclusion of the covariates (.066 versus .054), which is certainly the best comparison. These findings indicate that the purposeful selection of friends who behave to an equivalent level of delinquency is more important to female than to males adolescents.

**Table 7.3 The Similarity in IRT Delinquency between Male Adolescents and their Current Friends**

	<u>Male Friends</u>			<u>Female Friends</u>		
	<u>Within</u>	<u>Between</u>	<u>ICC**</u>	<u>Within</u>	<u>Between</u>	<u>ICC**</u>
Null Model	.667	.098	.128	.561	.091	.140
+ Gender*				.538	.098	.154
+ School	.665	.080	.108	.545	.068	.110
+ Age	.666	.080	.108	.539	.069	.114
+ Race	.662	.075	.102	.538	.063	.105
+ SES	.658	.076	.104	.538	.063	.104
+ Grade Point Average	.633	.045	.067	.535	.040	.069
+ Religiosity	.634	.045	.066	.534	.040	.069

\* In same-gendered groups controlling for gender is redundant

\*\* Intra-class correlation coefficient – defined as the between-group variance divided by the total variance

### *Current versus Future Friends*

The modest degree of delinquent similarity among the different gender combinations of future friends that tables 7.1 and 7.2 indicate may be compatible with the assumption that adolescent friends strongly influence one another. As Kandel (1978) previously noted, if individuals are dissimilar before they become friends and begin acting alike after the initiation of the friendship, we should likely conclude that mutual influence is responsible for the increased similarity. Jussim and Osgood (1989) explained, however, that a positive correlation between two measures at an early time point will diverge across time rather than remain stable when the measures are temporally instable unless an outside influence affects the correlation. In other words, if selective attraction produces an initial positive correlation at time 1, and delinquency is unstable across time, the correlation between respondent and friend delinquency

will decrease rather than remain stable in the absence of interpersonal influence. While this may not seem intuitive, the phenomenon is easily visualized in the following simple example.

If a group of individuals who meet one another for the first time purposely sort themselves into dyads based upon shirt color similarity, then absent communication between the dyad members about the color each should wear the next day, we would expect the color-similarity between the dyad members to diverge rather than remain stable. This would occur unless each dyad member always wore the same shirt color. Relative to the full color spectrum, we would likely see some continuing similarity in color because each group member is likely to possess some stability in color preference. The instability of color choice across time, however, results in decreasing similarity, unless the similarity was initially zero (i.e., the dyad members were chosen at random). In that case, the similarity across time absent an outside influence remains zero. If the individuals were sorted based upon color dissimilarity, we would expect a convergence.

Although Kandel's strategy is unable to provide an accurate indicator of influence, comparing the results of tables 7.1 and 7.2 related to future friends with equivalent results obtained from *current* friends still remains instructive. Mutual influence, for example, is indicated if we find that adolescents behave more like each other after they have become friends than before they have become friends. Thus, for the purposes of comparison, tables 7.3 and 7.4 present equivalent models for the adolescents' current friendship groups, again, measured during the same survey wave (wave 1) as the future friends were measured. To reiterate the prior point, while a significant increase in delinquent similarity among adolescents friends would indicate interpersonal influence, its absence does not indicate that interpersonal influences important to delinquent involvement are non-existent.

Table 7.3 presents the results for male adolescents and their current friends. Comparing this table with table 7.1, we see minimal to no evidence of mutual influences among the male-adolescent/male-friendship group. The ICC for the null model of the future friends is actually higher than the null model of the current friends (.165 versus .128). When comparing the ICCs in the fully conditional models of each table (which are likely the best comparison), however, we see that the current friends in table 7.3 are marginally more similar than the future friends in table 7.1 (.054 versus .066). The trivial degree of difference between these figures and their very low absolute magnitudes, however, present us no way to reach any conclusions about the presence of mutual influences toward delinquency among the all-male friendship groups.

The corresponding analyses of the mixed male and female groups in the last three columns of each table present slightly more evidence of the importance of social influences upon delinquent involvement. Here, we see greater similarity after the friendship formation than we see before the friendship formation in both the null models (.081 versus .140) as well as the conditional models (.005 versus .069).

**Table 7.4 The Similarity in IRT Delinquency between Female Adolescents and their Current Friends**

	<u>Male Friends</u>			<u>Female Friends</u>		
	<u>Within</u>	<u>Between</u>	<u>ICC**</u>	<u>Within</u>	<u>Between</u>	<u>ICC**</u>
Null Model	.628	.110	.149	.431	.094	.178
+ Gender*	.596	.113	.159			
+ School	.595	.086	.126	.431	.078	.154
+ Age	.595	.087	.127	.428	.071	.142
+ Race	.598	.080	.118	.428	.067	.135
+ SES	.596	.082	.121	.429	.065	.132
+ Grade Point Average	.576	.069	.107	.419	.047	.101
+ Religiosity	.571	.068	.106	.414	.049	.107

\* In same-gendered groups controlling for gender is redundant

\*\* Intra-class correlation coefficient – defined as the between-group variance divided by the total variance

In turning to a comparison of tables 7.4 and 7.2, which represent all-female friendship groups and the mixed-male-and-female groups as defined by the female adolescents, we again see some evidence of mutual influence. In the mixed groups, both the null-model ICC as well as the conditional ICC have increased in the current friends specification relative to the future friends specification (.105 versus .149 and .048 versus .105).

In the all-female groups we see a similar increase in the conditional models (.066 versus .107) although the null-models show a marginal decrease (.200 versus .178). Again, however, the conditional models are likely the best comparison.

In sum, the analyses in this chapter indicate that the delinquent similarity we see among adolescent friends certainly results from their similarity among a number of factors that often correlate with delinquency. While selection based on delinquent similarity alone may occur to a marginal extent, we should not overemphasize its importance as a salient selection factor.

The analyses also confirm the arguments of Kandel (1996), and the prior research of Haynie and Osgood (2002), and Huizinga, Weiber, and Esbensen (1992) – independent delinquency measures as we find in the Add Health data produce substantially lower estimates of delinquent similarity across adolescent friends in cross-sectional or within-time calculations relative to respondent estimates of the friends' delinquent behavior as we find in most prior research.

Although prior research may have overstated the behavioral similarity among friends, the finding that adolescents behave more like each other after they have become friends than before they have become friends supports the idea that friends influence each other's delinquent behavior.

## CHAPTER 8

### THE ROLE OF DELINQUENCY IN FRIENDSHIP TERMINATION

The role that friendship termination (or *deselection*) plays in explanations of the behavioral similarity between adolescent friends has received little attention in prior research (for exceptions, see Billy and Udry 1985b; Ennett and Bauman 1994; Fisher and Bauman 1988), perhaps because some authors have suggested that the concept of deselection is subsumed under selective attraction (e.g., Kandel 1996). Others, however, have suggested that the deselection mechanism is vitally important for our understanding of interpersonal influence, and thus it deserves a unique designation and research emphasis (e.g., Ennett and Bauman 1994).

In this chapter, I have followed the call for emphasizing the deselection process by examining whether the delinquent similarity of adolescent friends predicts friendship termination across the one-year period between Add Health survey waves. As in chapter 7, I am using multilevel random-intercept models in my analyses. The multilevel model that I am using in this chapter resembles the model in chapter 7 in the sense that I consider several adolescents as members of the same friendship group. Unlike the prior analysis, however, respondents in this chapter's statistical models appear on a different analysis level than their friends and represent what Bryk and Raudenbush (1992) have called *level 2 units of analysis*. In other words, in this model each nominated friend represents a level 1 record *nested* within the respondent adolescent who appears as a level 2 analysis unit.

For example, if a respondent nominated two friends, the data contain two records at level 1 nested within a single level 2 unit associated with the respondent. The characteristics of each friend appear on the corresponding level 1 records, while the characteristics of the respondent appear at level 2. Thus, the nominated friends share variables that correspond to the common respondent, although each friend has unique characteristics corresponding only to themselves. The outcome in these analyses represents a dichotomous indicator of whether the respondent repeats their friendship nomination at wave 2, while the predictors correspond to differences between respondent and friend characteristics measured at wave 1.

In order to properly model the binomial distribution of the outcome and the nested structure of the data, I am using a random-effects logistic regression model that I calculated using Proc NLMixed in SAS. This multilevel model is nearly identical to equation 5.6, which I described previously. The principle difference between this chapter's analyses and the one I described in equation 5.6 is simply that in these analyses several friends nest with a single respondent, while in equation 5.6, waves of data nest within individuals. If the present analyses were linear, they would be mathematically identical to equation 5.6. In the logistic model, however, there is no level 1 error term, as the nature of the logistic analysis is already probabilistic.

Recall from my discussion in chapter 5 that the random-intercept model in this analysis accounts for the nested data structure by using a level 2 (respondent-specific) random error term. Although it is correct that this model does not account for the statistical dependence caused by an adolescent appearing in the data several times because several respondents nominated the same friend, Snijders and colleagues have noted that this dependence is inconsequential when the outcome is a property of the dyadic relationships rather than a property corresponding to an individual (1995). In the present analyses, the termination outcome differs across each of the respondents' friendships. In other words, respondent A's friendship with B may terminate, while B's friendship with C remains stable. Although the dyad containing respondent B appears twice in the data, the outcome for each is not the same. Therefore, a large portion of the dependence resulting from the data structure becomes irrelevant because the friendship dyad and not the individual is the proper level 1 unit of analysis.

Recall from chapter 5 that for the termination analyses in this chapter I used three different strategies to operationalize the predictor variables. I used the first strategy for variables that I could logically separate into coherent dichotomies – for example *delinquent* versus *non-delinquent*. In this case I included two dummy variables to indicate the three possible categories: (a) the respondent and friend were both delinquent, (b) either the respondent or the friend were delinquent (but not both), or (c) both respondent and friend were non-delinquent. Therefore, categories (a) and (c) represent delinquent similarity, while category (b) represents dissimilarity. Although one could argue for a fourth category where we separate

*friend-delinquent/respondent-non-delinquent* from *friend-non-delinquent/respondent-delinquent*, these categories are substantively equivalent because the designation of respondent and friend are largely arbitrary. Preliminary analyses indicated that when I separated these categories the effects of each were nearly equal, and thus they could be combined. I also used this coding for *minority* versus *non-minority* status and to indicate whether the respondent and friend indicated a religious denomination or not.

I used the second strategy for indicating an age difference between the respondent and friend. Here, I coded a dichotomous indicator of *age-difference* as “1” if the respondent’s age and friend’s age were greater than 1.5 years apart and “0” otherwise. I also included the age of the respondent as an additional predictor, because younger or older adolescents may be more likely to terminate friendships regardless of age differences between dyad members.

I used a third strategy when there was no clearly defensible way to categorize the respondent/friend similarity. This occurs with SES and grade point average. Here, I coded SES-difference and GPA-difference indicators as the absolute difference between the respondent and friend values. In this case I again used a separate predictor for the respondent’s value, as respondents with high (or low) SES or GPA may be more likely to terminate friendships regardless of the differences between themselves and their friends on these factors.

In order to allow easy interpretation of the intercept, I centered the predictors around their means. Therefore, we can interpret the intercept as the log-odds of termination for non-reciprocated friendships for respondents of average SES, GPA, and age where the value of the categorical variables I noted above are all zero. Because preliminary analyses indicated differences for male and female friendship patterns, I present the results separately by friend and respondent gender.

**Table 8.1 Determinants of Friendship Termination  
Male Respondents**

<u>Friend and Respondent**</u>	<u>Male Friends</u>		<u>Female Friends</u>	
	<u>b</u>	<u>Std. Err.</u>	<u>b</u>	<u>Std. Err.</u>
Both Delinquent	.25	.16	.11	.29
Both Non-Delinquent	.75*	.21	.26	.32
Both Minority	1.21*	.39	1.24	.66
Both Non-Minority	.31	.34	.46	.56
Both Religious	-.35	.21	1.05*	.31
Both Non-Religious	.11	.50	.38	.66
Age	.11	.06	-.09	.10
Age Difference***	.57*	.28	1.53*	.50
SES	.41*	.17	.35	.33
SES Difference****	-.24	.15	.71*	.32
Grade Point Average (GPA)	-.15	.13	-.34	.23
GPA Difference****	-.03	.14	.01	.23
Reciprocation	-1.27*	.15	-.61*	.27
Intercept	1.01*	.40	.59	.63

\*  $p < .05$

\*\* The reference categories represent dissimilarity between friend and respondent

\*\*\* The respondent and friend ages were greater than 1.5 years apart

\*\*\*\* Absolute difference between the respondent and friend values

### *Male Adolescents*

Table 8.1 presents results for male respondents and their male and female friends. Contrary to hypothesis 2, adolescents who share the same delinquency status are more likely rather than less likely to terminate their friendships. Controlling for the other variables in the model, friendships where the dyad members share non-delinquent status are 111 percent more likely to terminate than are friendships where one member is delinquent and the other is non-delinquent ( $\exp.75 = 2.11, p < .001$ ). The effect when both dyad members are delinquent is also positive, although it does not reach traditional  $\alpha = .05$  levels. In separate analyses where I altered the reference category, however, both-delinquent and both-non-delinquent coefficients were significantly different from one another. For this reason, the findings on delinquent similarity for male respondents and their male friends indicate that in friendships where either

(or both) dyad member(s) are delinquent, the friendship is *less* likely to terminate than friendships where both members are non-delinquent.

We find a similar pattern for minority status that also fail to support the speculation that similarity results in more stable friendships. Where both dyad members are minorities, the friendship is 235 percent more likely to terminate than dissimilar friendships where one member but not the other is a minority (exp.  $1.21 = 3.35$ ,  $p < .002$ ). Although the point estimate for similarity when both dyad members are non-minority is positive, it is not statistically significant.

The effect of age differences is in the predicted direction. When male respondents are a year and a half or more older than their friends (or vice-versa), the friendship is 77 percent more likely to terminate than relationships where each friend shares a similar age (exp.  $.57 = 1.77$ ,  $p = .03$ ).

When examining the control variables that indicate whether the respondents' characteristics predict friendship stability rather than the difference between a respondent's and friend's characteristics as the prior measures do, we find that among male friendships, only SES is a statistically significant predictor. The SES variable indicates that boys with high backgrounds are more likely to terminate friendships with other males than lower SES males are. Age and GPA, however, failed to predict termination at traditional  $\alpha = .05$  levels.

Like minority-status-similarity, reciprocation is among the most important predictors of friendship stability. When male friends reciprocate their friendship nominations, the friendships are 72 percent less likely to terminate than unreciprocated friendships are (exp.  $-1.27 = .28$ ,  $p < .01$ ).

When male respondents nominate *female* friends, we see similar patterns as we observed for the male friends. As in the prior analysis, the male-respondent/female-friend analysis does not support hypothesis 2, which predicts greater friendship stability in similarly-delinquent friendship dyads. Again, the estimate for non-delinquent similarity is positive, although not statistically significant.

The effect of religious similarity for the male-female friendships is different than it is for the male-male friendships. Here we see that when both dyad members are religious the

friendship is 186 percent more likely to terminate than friendships where both dyad members are non-religious or where only one member is religious ( $\text{exp. } 1.05 = 2.86, p < .01$ ).

The age-difference effect is much stronger in this analysis than the prior analysis. When male respondents and their female friends differ in age by more than 1.5 years, they are over 300 percent more likely to terminate their friendship ( $\text{exp. } 1.53 = 4.62, p < .01$ ). We also see that an SES difference predicts an increased odds of friendship termination.

The additional controls that represent respondent characteristics follow equivalent patterns as in the male-male dyad analysis. Again, GPA is not a significant predictor. While reciprocation remains a strong predictor, the effect size is half that of the male-male analysis.

Because I centered the age, SES, and GPA variables around the sample mean, the intercept provides information about the stability of non-reciprocated adolescent friendships for respondents of average age, average SES, and average GPA, where one of the dyad members (but not both) are delinquent, minority, and religious (in other words, when the dummy variables are all zero). For male-respondents and their male-friends, the intercept indicates that 73.2 percent of friendships fitting this description terminate prior to wave 2 ( $\text{exp. } 1.01 = 2.75$ ).<sup>29</sup> For friendships involving male-respondents and their female friends, the probability of friendship termination is 64.4 percent. The difference between these probabilities, however, is not statistically significant.

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<sup>29</sup> probability = odds/(1+odds) = 6/7 = .857

**Table 8.2 Determinants of Friendship Termination  
Female Respondents**

<u>Friend and Respondent**</u>	<u>Male Friends</u>		<u>Female Friends</u>	
	<u>b</u>	<u>Std. Err.</u>	<u>b</u>	<u>Std. Err.</u>
Both Delinquent	-.07	.30	-.45*	.16
Both Non-Delinquent	-.45	.26	.12	.16
Both Minority	-.21	.58	-.31	.34
Both Non-Minority	-.58	.46	-.88*	.30
Both Religious	-.47	.34	-.35*	.18
Both Non-Religious	-.03	.64	.50	.41
Age	.16	.10	-.05	.06
Age Difference***	-.34	.31	.67*	.27
SES	-.17	.27	.15	.16
SES Difference****	-.41	.23	.12	.11
Grade Point Average (GPA)	-.11	.23	-.18	.13
GPA Difference****	.17	.19	.07	.13
Reciprocation	-.55*	.23	-.73*	.13
Intercept	3.57*	.62	2.04*	.37

\*  $p < .05$

\*\* The reference categories represent dissimilarity between friend and respondent

\*\*\* The respondent and friend ages were greater than 1.5 years apart

\*\*\*\* Absolute difference between the respondent and friend values

### *Female Adolescents*

Table 8.2 presents the results for female adolescents and their male and female friends. As I mentioned in chapter 7, the cross-gender friendships in tables 8.1 and 8.2 may seem conceptually alike, however, they are different in the sense that table 8.2 presents an operationalization of friendship from the female adolescents', rather than the male adolescents' subjective perspective. For this reason, the cross-gender results in these tables differ.

Unlike the male respondent analysis, the female respondent analysis provides a small degree of evidence in support of the hypothesis that delinquent behavior dissimilarity results in increased friendship termination. The evidence in support of this hypothesis for females, however, is far from conclusive. It is also not robust across friendship gender and the two different categories of delinquent similarity (similarly delinquent and similarly non-delinquent).

In table 8.2, the coefficients for similarity in delinquency, minority status, and religious affiliation for both the male and female friends are all negative with the exception of both-non-delinquent female friends and both-non-religious female friends. Neither of these positive coefficients, however, are statistically significant at traditional  $\alpha = .05$  levels.

When two female friends are both delinquent they are 36 percent less likely to end their friendships within a year relative to friendships where only one of the dyad members is delinquent (exp.  $-.45 = .64$ ). When the female friends are both non-minority they are 59 percent less likely to terminate (exp.  $-.88 = .41$ ). When they are both religious, they are 30 percent less likely to terminate (exp.  $-.35 = .70$ ).

The effect of an age difference for the female respondents and their female friends is also positively associated with termination. For the both the male and female friends of the female respondents we see no statistically significant effect of either respondent SES, respondent GPA, or differences between friend and respondent in either factor upon friendship stability. Like the male respondent analysis, reciprocation remained a strong predictor of termination.

One of the largest differences between the male and female respondents was the base-rate of friendship termination. In table 8.2, we see that females are much more likely to terminate friendships with friends of both genders than males are. The intercept of 3.57 indicates that the female respondents considered 97.3 percent of their non-reciprocated male friendships terminated when the respondent was of average age, SES, and GPA, where the friendships also scored zero on the similarity factors (exp.  $3.57 = 35.5$ ).<sup>30</sup> Although the termination rate of the female friends is also relatively high at 88.5 percent (exp.  $2.04 = 7.69$ ), it is somewhat closer to the base-rates that the male respondents reported in table 8.1.

In sum, the results of this chapter's analyses provide a small bit of evidence that females are less likely to terminate friendships across time when the respondent and their friend are both similar in delinquency or other characteristics. This finding is not robust for different operationalizations of behavioral similarity across friends of different genders, however, and the results for males generally indicate the opposite conclusion – that similarly non-delinquent

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<sup>30</sup> probability = odds/(1+odds) = 73.7/74.7 = .987

friendship dyads, particularly those between two males, are more likely to terminate than are friendships where one dyad member is delinquent and the other is non-delinquent.

## CHAPTER 9

### INTERPERSONAL INFLUENCE

In chapter 4, I hypothesized that we should see a correspondence between the recent changes in friends' behavior and recent changes in respondent behavior. I also hypothesized that same-gender delinquent influences would be stronger than opposite gender influences are. Tables 9.1 and 9.2 presents tests of these hypotheses for males and females respectively.

Recall that I based the analyses in this chapter on the random-effects model of change I described in equation 5.6. There, I noted that each time-varying covariate appears in the model as both: (a) an across-wave-mean, which corresponds to the last three columns in tables 9.1 and 9.2 under the heading *between-respondent differences*, and (b) a wave-specific value, which corresponds to the three columns on the left-hand side of the table entitled *within-respondent change*. The within-respondent coefficients represent the degree to which changes in the friends' delinquency across time correspond to changes in the respondents' delinquency. As I explained in chapter 4, the within-individual coefficients obtained using this method are identical to those in equation 5.5, which use *group-mean centering* methods (Raudenbush and Bryk 2002).

In chapter 5, I argued that we should interpret the within-respondent friends' coefficients as largely reflecting the forms of interpersonal influence we would expect to occur within a year's time, although this effect may also contain some forms of selective attraction that also occur during this same year-long period. I also noted that although we have isolated the year-to-year effects from the longer-term effects of delinquent friend association, the between-respondent coefficients associated with the friends' delinquency still reflect the mixed effects of selective attraction, shared environment, and the accumulated effects of longer-term socialization. Because this analysis is primarily interested in the within-individual change coefficients, precisely differentiating the mechanisms that contribute to the between-respondent effects is of little consequence. Also recall from chapter 5 that by group-mean-centering or by using the alternative in equation 5.6 we can isolate the within- and between-individual differences in a manner that provides within-individual estimates nearly identical to those of a

fixed-effect model, while also allowing an analysis of time-stable covariates and between-individual effects.

I performed this chapter's analyses on six multiply-imputed data sets as described in chapter 5 and subsequently used NORM software to combine the coefficients and standard errors using Rubin's rules. Although I included dummy variables that represented which school the respondent attended in these analyses, I did not present the coefficients for these controls in tables 9.1 and 9.2 in order to increase readability.

### *Male Respondents*

As hypothesized, table 9.1 indicates that changes in male respondents' behavior accompany changes in male friends' behavior. The within-individual coefficient of .10 for the male friends indicates that when the averaged IRT delinquency measure of the male friends increases by 1-unit across time, the expected value of the respondents' delinquency increases by .1. The unit change in friend delinquency would occur, for example, if a respondent's male friends each increased their delinquency by one-unit from wave 1 to wave 2. The increase could occur if either (a) a stable friendship group became more delinquent, or (b) the respondent began associating with more delinquent friends.

**Table 9.1 Determinates of Within- and Between-Respondent Variation in Delinquency (Males)**

<u>Time-Varying Covariates</u>	<u>Within-Respondent Change**</u>			<u>Between-Respondent Differences***</u>		
	<u>b</u>	<u>Std. Error</u>	<u>B</u>	<u>b</u>	<u>Std. Error</u>	<u>B</u>
Male Friends' Delinquency	.10*	.03	.08	.03	.05	.02
No Male Friends	-.38*	.10	-.09	.20	.20	.04
Female Friends' Delinquency	-.03	.04	-.02	.26*	.08	.13
No Female Friends	.02	.05	.01	-.32*	.09	-.11
Parental Attachment	-.02	.04	-.01	-.18*	.06	-.10
Parental Supervision	.01	.02	.01	-.06*	.03	-.07
Religiosity	-.01	.04	-.01	-.03	.05	-.04
Grade Point Average	-.01	.03	-.01	-.17*	.05	-.14
Survey Wave	-.15*	.03	-.09			
<u>Time-Stable Covariates</u>						
Age ****				-.04*	.02	-.07
SES				.04	.03	.04
Hispanic				.28*	.10	.14
Black				.16	.10	.07
Asian				.13	.10	.06
Native				.22	.21	.03
Other				.05	.10	.02
Intercept				2.46*	.40	

\* p &lt; .05

\*\* Wave specific value

\*\*\* Across-wave mean

\*\*\*\* Wave 1

Although we see a correspondence between changes in male adolescent delinquency and changes in male friend delinquency, the respondents' changes remain *uncorrelated* with changes in their female friends' behavior. This result supports hypothesis 4 – that same-gender effects are more important than cross-gender effects.

The results also indicate the average between-individual similarity in delinquency for the respondents and their male and female friends. The positive coefficients for the female friends indicates that the more delinquent a male adolescent's female friends are the more delinquent the respondent is, even after controlling for the friends' time-specific delinquency

values. The between-respondent coefficient for the male friends is slightly positive but is not statistically significant at traditional levels.

Recall from chapter 5, that in this analysis, the between-respondent coefficients are the equivalent of a *contextual effect*, the isolation of between-respondent differences after controlling for within-respondent change across time. Again, however, there is more than one mechanism which may underlie this statistic. It may be due to longer-term socialization processes, but may also include the effects of time-stable preferences whereby more delinquent adolescents prefer to associate with more delinquent friends.

Chapter 5 also noted that if we sum the between- and within-effects for the male friends' delinquency, we obtain a result equivalent to what we would expect from a cross-sectional analysis where two measures of friend delinquency are averaged in order to increase reliability. Here, the summation of the short- and long-term effects is .13 (.10 + .03). For example, the combined between- and within-respondent male friends' effect indicates that if we compare male respondents of average delinquency (relative to other males) to male respondents one scaled-delinquency-unit above average (i.e., if we compare *more-delinquent* to *less-delinquent* males) we would expect to find the across-time-average delinquency of the more-delinquent adolescent's male friends .13 units higher than the less-delinquent males' male friends.

The fact that the statistically significant within-respondent coefficient is three times larger than the non-significant between-respondent coefficient ( $p = .61$ ), however, is revealing. These differences indicate that a large portion of the delinquent similarity between male adolescent friends we find in typical cross-sectional analyses likely results primarily from mechanisms we can attribute to short-term effects, rather than longer-term selective-attraction or socialization mechanisms. In other words, not only is the behavioral similarity among males friends stronger at one a single point in time than it is at different time points, but isolating the variance due to the within-individual changes results in little to no between-individual similarity remaining. Again, this finding is consistent with arguments stressing the importance of shorter-term influence mechanisms. Admittedly, however, this may also indicate that adolescents continuously adjust their friendship group so the groups' behavior is more concordant with the adolescents'.

This pattern is reversed for the male adolescents' female friends. Here, the between-respondent effect is much larger for the female friends than it is for the male friends (.26 versus .03). Recall from chapter 6, however, female delinquency is far lower on average than male delinquency is. For this reason, the positive coefficient corresponding to the female friends indicates the degree to which delinquent males associate with females who are highly delinquent *relative to other females*, but not females who are more delinquent than the male friends are.

For example, if we compare male respondents of average delinquency and male respondents who are one scaled-delinquency-unit above the male delinquency average we would expect to find that the across-time-average delinquency of the more-delinquent adolescent's female friends is .29 units higher than the less delinquent adolescent's female friends. As I mentioned earlier, however, the interpretation of the between-respondent coefficients are unclear. The result likely indicates that the selective attraction process is more important when male adolescents choose female friends relative to when male adolescents choose male friends, however, it could also indicate that females friends are more important to longer-term influence effects. Given the absence of within-individual effects for the female friends, however, this alternative interpretation seems unlikely.

The effect of having no male friends during an interview wave is particularly interesting. Recall that when respondents had no friends during an interview wave, I coded their *no-friends* value "1" (and "0" otherwise) and substituted the behavioral average of the male-friendship-groups across all respondents for the groups' behavioral value. Using this coding, the within-individual coefficient for no-male-friends indicates that during times when male respondents have no male friends, their expected delinquency decreases by .38 units relative to male respondents who have friendship groups of average delinquency. We do not see a statistically significant corresponding effect for the female friendship group, however.

Perhaps this finding indicates that all male adolescents are motivated toward delinquency to some extent and when opportunities to *hang-out* with friends exist they are more likely to offend. These findings are largely consistent with Osgood and colleagues' (1989) assertion that unstructured hanging-out with friends creates opportunities and peer-reinforcement potentials which drive offending, because a logical extension of their argument

is that friendless adolescents remain unexposed to these opportunities and social rewards. In other words, the absence of an appreciative audience may decrease male delinquency.

Again, however, the findings are open to the alternative interpretation that male adolescents who become less delinquent during a particular time period may decide that they have no need to associate with other males. This alternative seems unlikely, however, as a large number of non-delinquents still associate with other males, and there is little theoretical reason suggesting that a male whose behavior becomes less delinquent across time will tend to dissociate himself from his non-delinquent (as well as delinquent) friends.

The results extend prior research by specifying that for male adolescents, associating with male friends, but not female friends, may create a social context conducive to delinquency. The finding that the female group does not contribute to this effect may imply that females do not appreciate nor reward the delinquency of their male companions.

Although the unstandardized coefficient representing *no-friends-during-wave* appears somewhat large because it is a dichotomy, as with the other effects indicated in this model, the standardized effect of having no friends during the interview wave is quite modest. If we compare the standardized value of the no-friends covariate to the standardized values of the other coefficients in the model we can see that the very modest effect of having no friends during the wave is comparable to the effect of changes in the male friends' behavior and is not appreciably different from the between-respondent differences in parental supervision, parental attachment, and grade-point-average.

None of the results in this analysis provide evidence that females are a civilizing influence upon males (e.g., Courtwright 1996). Although prior literature has not specified whether the civilizing mechanism is a consequence of associating with *non-delinquent* females or from associating with *any* females, the present results provide no evidence for either possibility. Here, the within-individual effect of having no female friends, as well as the effect of changes in female friends' delinquency have no statistically significant effect on male delinquency.

If these results indicate *anything* about the civilizing thesis, the between-individual coefficient for no-female friends contradicts it, because the coefficient for this measure indicates that males who did not have any female friends across both waves had .29 units less

delinquency than males who have female friends of average delinquency. Again, however, the within-individual coefficient indicates that during times when males have no female friends they do not exhibit appreciably different delinquency from males with female friends of average delinquency.

Table 9.1 also provides statistics associated with the control variables, which are largely consistent with prior research. Between-individual differences in parental attachment predict lower delinquency than parental supervision does, although there is no evidence that *changes* in either affect changes in delinquency. As expected, high grades correlate negatively with between-respondent delinquency differences.

While the standardized coefficient for grade-point-average is the largest predictor in the model, again, the results provide no evident that within-individual grade changes correlate with changes in adolescent male delinquency. Finally, neither within- nor between-individual differences in religiosity correlate with male delinquency levels.

**Table 9.2 Determinates of Within- and Between-Respondent Variation in Delinquency (Females)**

<u>Time-Varying Covariates</u>	<u>Within-Respondent Change**</u>			<u>Between-Respondent Differences***</u>		
	<u>b</u>	<u>Std. Error</u>	<u>B</u>	<u>b</u>	<u>Std. Error</u>	<u>B</u>
Male Friends' Delinquency	-.01	.03	-.01	.11*	.04	.09
No Male Friends	.02	.06	.01	-.17	.11	-.06
Female Friends' Delinquency	.07	.04	.05	.16*	.06	.10
No Female Friends	-.02	.08	-.01	-.17	.17	-.04
Parental Attachment	-.05	.03	-.04	-.19*	.04	-.15
Parental Supervision	-.03	.03	-.06	-.01	.03	-.01
Religiosity	-.02	.03	-.01	-.03	.02	-.04
Grade Point Average	-.09*	.03	-.10	-.05*	.04	-.05
Survey Wave	-.12*	.03	-.09			
<u>Time-Stable Covariates</u>						
Age ****				-.06*	.01	-.14
SES				.01	.03	.01
Hispanic				.16*	.08	.09
Black				.13	.08	.07
Asian				.23*	.09	.11
Native				-.09	.20	-.01
Other				.08	.10	.03
Intercept				2.75*	.33	

\*  $p < .05$ 

\*\* Wave specific value

\*\*\* Across-wave mean

\*\*\*\* Wave 1

*Female Respondents*

Table 9.2 indicates the results for female respondents. Here we see similar patterns of same-gender rather than cross-gender short-term effects as we saw for the males. The point estimate for the short-term effect of female friends on the female adolescents, however, is 30 percent lower than the same-gender effect we saw for male-adolescent/male-friends in table 9.1 (.1 versus .07) and the effect of the female friends is not statistically significant at traditional .05 probability levels ( $p = .12$ ). A test for difference between the male and female effects (see Brame, Paternoster, Mazerolle, and Piquero 1998; Paternoster, Brame, Mazerolle, and Piquero

1998), however, indicates that the evidence against the possibility that these differences may be due to chance alone is not strong ( $z = 1.39, p = .16$ ).

While table 9.1 indicates that within-individual changes in the existence of same-gender friends within a particular wave predicts changes in male delinquency, there is no evidence for corresponding same-gender effects for females in table 9.2. According to these results, changes in female delinquency remain unassociated with changes in the existence of a female friend. As expected, the between-respondent effects indicate stronger female-friend relative to male-friend long-term effects (.16 versus .11), although again, this difference is not statistically significant ( $z = .92, p = .36$ ).

These results from the female adolescent analysis largely contradict hypothesis 5, which predicted that same-gender influences for female adolescents would be greater than the same-gender influences for male adolescents. In contrast to this hypothesis, the within-individual effects, which are the most sensitive to short-term influence mechanisms, are not greater than the corresponding same-gender effects we see for the male adolescents. The difference in the between-respondent effects for same-gender friends for the females in table 9.2 and the males in table 9.1 also do not reach traditional  $\alpha = .05$  levels probability levels ( $z = 1.32, p = .16$ ).

The effects of the control variables upon female delinquency are similar to that of the males. Again, the within-individual coefficients indicate that variation in parental supervision and attachment do not predict changes in adolescent delinquency. Consistent with prior research, however, the between-individual coefficients indicate that females who are more attached to, and are more supervised by, their parents are less likely to engage in delinquent behavior than are unattached and unsupervised females. As with the males, these results indicate that parental attachment predicts between-individual differences in female delinquency much more than parental supervision does. The results also indicate that within- as well as between-individual differences in religiosity do not predict delinquent outcomes.

In sum, these analyses provide some support for hypotheses 3 and 4, but do not support hypothesis 5. Changes in male delinquency across time are associated with changes in their male friends' delinquency but not in their female friends' delinquency. Additionally, when a male adolescent is friendless during a particular wave, his delinquency decreases relative to his delinquency during times when he has other males with whom to associate. I am unable to say

the same for females. Although the coefficient for within-individual changes in the same-gender friends is higher than the coefficient representing the cross-gender friends, the effect size is smaller than the corresponding same-gender effect for the males, and its significance level does not reach traditional  $\alpha = .05$  levels.

## CHAPTER 10

### CONCLUSIONS

#### Summary of Major Findings

This project revisited a long-standing topic in sociological criminology – whether associating with delinquent friends causes adolescent delinquency. While prior research has consistently indicated that adolescent friends behave similarly to one another, the extent to which this similarity is indicative of interpersonal influence, shared environmental factors, and adolescents' selective attraction to others who already behave as they do is still unsettled. Unfortunately, this project adds only a small increment to existing knowledge and cannot settle the debate. This project was able to examine, however, a few hypotheses related to the various mechanisms that may directly and indirectly sustain the behavioral similarity.

#### *Similarity Across Nomination Order*

The descriptive analyses in chapter 6 found no evidence that the behavioral similarity between friends depends on whether the adolescents considered the friend a *best-friend* or a friend who the adolescent nominated further down the nomination order. This finding contrasts with speculations in the prior literature that the similarity across nomination order may be different and may result from best-friends having a greater mutual influence than other-friends have. Recall, however, that the prior literature has only *speculated* that nomination order may be important; no prior quantitative evidence has indicated the importance of nomination order on behavior similarity.

Although this finding justifies the use of the behavioral average of the friendship group in subsequent analyses, we must also interpret these results cautiously in regard to opposite-gender friendships because these data contain no information about romantic partners. I will address this issue further when the romantic partner data become available.

In some ways, we might interpret the lack of nomination order importance as contradictory to the interpersonal influence literature, which often suggests that close friends relative to other friends should exert more influence. We should remember, however, that the descriptive analyses in chapter 6 were quite preliminary, and contained no measures of the time

spent with each friend or how much the respondent valued the opinion of each friend. Therefore, I hesitate to interpret this finding further until additional research may be completed.

Further research is also required to determine how these results relate to the findings of Haynie (2001), who noted that adolescents located within more central locations of their peer network have a higher degree of delinquent similarity with their friends than those located in non-central locations of the network. Although nomination order and centrality are distinct concepts, there is some overlap that deserves further investigation.

### *Similarity Across Behavior Type*

Chapter 6 indicated that adolescents and their friends are more similar for some behaviors than they are for other behaviors. The similarity is particularly strong for minor behaviors like smoking, drinking, getting drunk, and skipping school. With one exception, the correlations between male and female respondents and their friends are above .30 for all of these minor behaviors, while the correlations for the other behaviors and the IRT behavioral scale are all below .25. The correlation between respondents and friends is highest for smoking, where the coefficients were near or above .5.

Chapter 6 also indicated that the frequency of minor behaviors is not solely responsible for the high behavioral similarity between the respondents and their friends. Although the average frequency to which respondents skipped school was lower than the average frequency respondents committed other behaviors, the correlation between respondents and their friends for this form of minor delinquency is higher than the correlation for more serious behaviors. The limitations of the Add Health data, however, prevented a more detailed investigation of this issue.

The findings of a higher correlation among minor behaviors is consistent with the literature on the normative boundaries of acceptance and may elaborate upon the literature that discusses techniques of justification and neutralization. For example, the stronger behavioral similarity for minor deviancy may reflect the effects of stronger mutual influence for common behaviors that adolescents can easily justify to themselves or others. When an instigator attempts to persuade a friend to co-participate in a delinquent act, the influence source may be more likely to succeed if the target perceives the act as mildly rather than strongly deviant, or if the target feels that he or she would be successful in persuading others of this interpretation.

Alternatively, the strong similarity in minor behaviors may instead reflect the importance of these behaviors in friendship selection among adolescents. For example, perhaps adolescents are more likely to choose friends who perform minor acts of delinquency to the same degree that they do, while they are unconcerned about similarity for more serious acts of delinquency that are rare and unlikely observed. Because of the complexity of this issue and the problematic aspect that measurement reliability may underlie some of these differences, I will save further exploration of this issue for future research.

### *Selective Attraction*

Chapter 7's multilevel analyses presented evidence that adolescent friends behave alike even *before* they initiate their friendships, a finding related to the importance of selective attraction mechanisms. The findings from this chapter also indicate that similarity resulting from selective attraction is stronger for female adolescents and their female friends than for male adolescents and their male friends.

The analyses in chapter 7 indicated that friends are similar across dimensions other than delinquency including: race, age, religiosity, socio-economic-status, and grade-point-average and that these resemblances may explain a large portion of the delinquent similarity we observe between the adolescent and their future friends. More specifically, in multilevel models of friendship groups, I reduced a modest intra-class-correlation coefficient (ICC) by adding covariates that greatly reduced the *unexplained* delinquent similarity among friends within the same group. Although the ICC reduction implies that similarity on the covariates *may* explain a substantial portion of the delinquent similarity we find among soon-to-be friends, it is impossible for this type of analysis to positively determine whether adolescents choose one another because of their likeness on the covariates or their likeness on delinquent behavior. For this reason, and because prior research suggests that adolescents likely choose friends who share a wide range of behaviors and characteristics, the present analyses can only approximate how important shared delinquent behaviors are for friendship selection.

### *Friendship Termination*

Chapter 8 examined whether behavioral similarity among adolescent friends during the first wave of Add Health data collection would predict friendship termination one year later. I

based these analyses on speculations in the friendship formation literature that friends who are either similarly delinquent or similarly non-delinquent are more likely to continue their friendships across time than are friends who commit different levels of delinquent behavior.

My analyses largely contradicted these speculations for the male respondents. In contrast to hypothesis 2, the same-gender friendships of male respondents are significantly more likely to terminate when both friends are non-delinquent than they are when one member is delinquent and the other is non-delinquent. In addition, the estimates for termination when two male friends are delinquent as well as the estimate indicating shared non-delinquency among male respondents and their female friends also indicated greater rather than less termination although these estimates were not statistically significant at traditional  $\alpha = .05$  levels. Although there was a small amount of support among the female respondents for the hypothesis that friends who perform delinquent behaviors to a similar degree will be less likely to end their friendships, the available evidence is weak and was observed only when the females rather than the males defined friendship.

It is difficult to speculate why friendships among males terminate more often when both dyad members are non-delinquent relative to when one member but not both are delinquent. If male delinquents are less likely to behave in a manner that maintains friendships, friendships where both members are delinquent should terminate more often than friendships where only one member is delinquent. In these data, however, when both dyads members are delinquent, the friendship is less likely to terminate than cases where only one dyad member is delinquent.

One possible explanation is that friendship choices among male delinquents are more constrained than among non-delinquents. While non-delinquent males are able to choose from among a large range of potential friends, perhaps delinquent males have a more limited friendship choice which requires them to maintain the same set of friends across time. While some of the peer-rejection literature suggests this possibility, other literature suggests that this is unlikely. Additionally, the existing literature provides no reason why the opposite should be true for females as the present analyses indicate.

Another possibility is that the simple analyses performed in chapter 7 mask important group- or school-level differences in friendship termination, which in turn alter or suppress

important determinants of friendship stability. Additionally, the data collection methods used in the Add Health Survey may be unable to provide valid measures of adolescent friendship, and are thus providing inaccurate results. Recall that in chapter 6, for example, I mentioned that the friendship nomination procedures are *passive*. If a respondent nominates a friend in survey wave 1 but fails to nominate the same friend in survey wave 2, the interviewers do not prompt the respondent to explain whether he or she truly has terminated their friendship with the wave 1 nominee. In other words, some of changes in friendship choice may reflect the measurement error that occurs when respondents forget to mention a friend. This measurement error may also explain the high rate of friendship termination indicated by chapters 6 and 8.

Because this chapter has found little to no effects of delinquent status upon friendship termination rates, particularly among the male adolescents, it adds to our knowledge on the group nature of delinquency. Although delinquency may be a social behavior, these analyses suggest that delinquent adolescents generally are able to retain their friendships with both non-delinquents and other delinquents, while the chapter on selective attraction suggests that delinquents initiate friendships among a range of delinquent and non-delinquent peers.

### *Interpersonal Influence*

In chapter 7, we initially saw a small degree of evidence that friends influence the delinquency of each other. Using methods that Denise Kandel (1978) and Jere Cohen (1977) originally described, I compared the similarity among future friends to the similarity of current friends. Mutual influence is a likely explanation for the finding that current friends are slightly more similar than future friends are for some respondent-gender/friend-gender combinations. These differences were quite modest and were consistent only in models where I included covariates.

Unfortunately, however, there are two reasons why the methods used in chapter 7 cannot reveal the strength of the influence effect. First, anticipatory socialization would increase the similarity among the future friends, thus attenuating the difference between the future and current friends. The second reason why this method attenuates the effect is somewhat difficult to visualize. The phenomenon occurs because absent outside influences, the correlation between two variables decreases across time (unless the initial correlation is less than or equal to zero) rather than remaining equal, if the temporal stability of the variables is

imperfect (Jussim and Osgood 1989). This means that an initial association between the behavior of an adolescent and his or her friends due to selective attraction will decrease across time in the absence of mutual influence unless the measured behavior is time-stable. Because my analyses did not find such a decrease, but rather found an increase for several groups, chapter 7 provided some support for modest interpersonal influence among the friends.

Although chapter 7 presented some information about interpersonal influence, I intended the analyses in chapter 9 to provide my primary examination of this issue. Rather than examining the association between the behavior of *past* friends and the respondents' *current* behavior as the majority of prior research has done, chapter 9 examined the association between the behavior of recent friends and the respondents' recent behavior by using a random-effects model of change. This model examined how closely year-to-year changes in the friends' behavior corresponded to changes in adolescent delinquency.

These analyses indicated that changes in male adolescent delinquency significantly correlated with changes in their male friends' delinquency, but not changes in their female friends' delinquency. This correspondence supports predictions found in reference group theory, but provides no support to the assertion that females are a civilizing influence on males.

In my analysis of female adolescents, I also found a pattern consistent with stronger effects for same-gender rather than opposite-gender friends. The effect of the female friends on the female adolescents, however, was 30 percent less than the corresponding same-gender effect for males and its value was not statistically significant at traditional probability levels ( $p = .12$ ).

These findings supported hypotheses 3 and 4, which argued for stronger same-gender versus opposite-gender influences among adolescents, but did not support hypothesis 5, which suggested that female adolescents are influenced more by their female friends than male adolescents are influenced by their male friends.

There was somewhat of a discrepancy between the cross-gender similarities in chapter 9 and chapter 7, however. While the analyses in chapter 7 found less similarity for cross-gender relative to same-gender friendships in an analysis designed to be sensitive to selective-attraction mechanisms, the between-respondent coefficient indicating similarity between the male respondents and their female friends was higher than the between-respondent coefficient

for the male respondents and their male friends. We should keep in mind that differences in the analyses models and the methods of comparison across these chapters may be responsible for these somewhat contradictory findings.

The analyses also found that during times when male adolescents had no male friends, their delinquency decreased. This finding is not unlike the findings of Osgood and colleagues (1996), who noted that unstructured socializing with peers is associated with delinquency. In the present analysis, when males had no male friends during a particular wave, they were less likely to engage in deviant behavior than during waves when they had friends. This finding suggests that the existence of friends facilitates delinquency. Perhaps this occurs because friends provide an appreciative audience that reinforces delinquent behavior. In other words, regardless of their motivation to commit delinquency when alone, if a group of young males are together, they are more likely to be delinquent. Alternatively, friends may facilitate delinquency by communicating deviant opportunities.

In sum, the available evidence suggests that adolescents *are* influenced by their friends, although the influence is likely much weaker than many prior studies have implied. Short-term forms of influence may also be much more important than prior research has suggested, particularly for male adolescents, although year-to-year friendship selection mechanisms may have also produced the results in the present analyses.

### **Caveats**

Jussim and Osgood (1989) have previously noted that a more precise examination of interpersonal influence may require experimental methods where friendships between research participants develop within groups of previously *unacquainted* individuals who interact within similar environments. Research opportunities under these conditions, however, are rarely possible, and there is reason to believe that the findings of experimental methods that use non-deviant or mildly-deviant behaviors may not generalize to more serious criminal offenses.

Using survey methods to disentangle the effect of peer influence from the effects of a shared environment, selective attraction, and method artifact is imprecise, and the results of statistical analyses based upon these methods are open to alternative interpretations. When examining friendship selection, it is impossible to determine whether shared delinquency is

truly important to adolescent friendship decisions or whether adolescents are more concerned with similarity among other characteristics that correlate with delinquency.

As noted earlier, the methods first suggested by Kandel and Cohen underlying the analyses in chapter 7 cannot isolate the effects of anticipatory socialization from selective attraction. These methods are also unable to properly isolate the effects of mutual influence from a statistical artifact equivalent to regression-toward-the-mean.

Although a statistical model that examines the effect of recent changes in peer behavior to predict recent changes in adolescent behavior is more sensitive to situational and short-term interpersonal forms of influence, the change models on which chapter 9 relied cannot actually isolate stable attitude changes from situational forms of influence using data collected an entire year apart. In order to better accomplish this separation, we require data collected across several waves spaced much closer in time. To properly examine situational influences, the time between waves would have to be very short.

Even with such data, however, a change model cannot positively identify the causal order of the association between changes in respondent behavior and changes in friend behavior. For example, not unlike Gold's (1970) analogy of the pickup basketball game, adolescents equally motivated toward delinquency may befriend one another after specifically anticipating joint participation in delinquent activity. Similarly, adolescents who become less delinquent across time due to an unknown or unmeasured factor may terminate friendships with delinquent peers in favor of friendships with non-delinquent peers. An increase in parental supervision, for example, may decrease delinquency at the same time it decreases the ability of an adolescent to associate with delinquent friends. Although I controlled for changes in parental supervision and thus decreased this factor as a possible explanation, it is certainly possible that excluded time-varying factors may have produced the correspondence between changes in adolescent behavior and changes in friend behavior as I found in these analyses.

The gender differences in interpersonal influence that I found in chapter 9 appear valid, although it is possible that these differences reflect gender differences in selective attraction and de-selection processes instead of interpersonal influence. In addition, the inability to account for the truncated outcome distribution or differences in the reliability of outcome measures across gender may have produced a misleading group difference.

Finally, the small interpersonal influence effects indicated by these analyses may result from an inability to capture the cumulative exposure to delinquent peers that occurred before the initiation of the survey. To the extent that cumulative exposure to delinquent peers is important (as classical theoretical perspectives have suggested), a model of change is misspecified. As I argued earlier, however, one might legitimately question the importance of the cumulative exposure to delinquent values relative to the importance of more proximal exposure to delinquent influence sources.

### **Theoretical Implications**

The criminological literature has typically ignored the changing nature of crime and delinquency, implicitly assuming that behavioral changes across time result only from measurement error or changes in opportunity. In contrast, a few authors have noted that offending behavior changes substantially across time, and have attempted to explain these changes. This project found some correspondence between changes in male adolescent delinquency and changes in male friends' delinquency across a one year measurement period. Although the strength of this correspondence was modest, the finding suggested that the young males in the sample either: (a) adjusted their friendships across the one-year period by terminating friendships characterized by behavioral differences, while simultaneously developing new friendships with those who behaved more like they did, or (b) mutually influenced others within their friendship group.

The evidence on friendship termination provided little if any support for the first possibility – differences in delinquency did not predict friendship termination among males, which is precisely the group where I found the strongest short-term effect of friends in chapter 9. The evidence in support of a one-year adjustment of the friendship group was also somewhat weak in the analyses in chapter 7, which examined the strength of the selective attraction mechanism. Here, the covariates explained a large portion of the similarity in the future friends and we saw a slight increase in the delinquent similarity when I examined current friends instead of future friends.

In sum, although my overall impression is that short-term and situational forms of influence may be more important than socialization mechanisms are, we still require more research to more definitely answer questions related to the relative importance of the short-term

and long-term effects of associating with delinquent friends. While the prior research has often simplified the concepts of influence and selection, this research has noted that these mechanisms are far more complex than a majority of the prior research has acknowledged. Delinquent adolescents do not simply choose other delinquents as friends; they choose a wide range of non-delinquent as well as delinquent friends, although the probability of a delinquent choosing another delinquent is somewhat higher than the probability of a delinquent choosing a non-delinquent. The reasons for these choices, however, are also not as simple as the prior research often implies. Although delinquents may be more likely to associate with other delinquents, they are also more likely to associate with others who share similarity across a wide range of behaviors and individual characteristics.

### **Policy Implications**

The study of interpersonal influences on crime and delinquency is particularly relevant to educators and parents who make decisions about which freedoms and constraints they should impose upon the students and children for whom they are responsible. A frequent concern of guardians involves decisions about with whom they allow adolescents to associate. When a parent or guardian prohibits friendships with certain adolescents, they likely are assuming the prohibited association may produce a context conducive to deviant behavior. The popular and academic writings of Harris (1995; 1998), for example, suggested that because peers exert tremendous influence on adolescents, parental supervision should strongly focus on insulating youth from delinquent peers.

Haynie and Osgood (2002), however, have suggested that interpersonal influences on adolescent delinquency may be much less important than some researchers have previously assumed. Although not explicitly stated by these researchers, perhaps their findings suggest that parents and educators should be concerned with factors other than an adolescent's friendships if they are interested in reducing delinquency.

This possibility may be particularly relevant after we consider its joint implications with research that has noted the importance of parental attachment, and research that suggests parental attachment is more strongly related to lower delinquency than parental supervision is (e.g., Erickson, Crosnoe, and Dornbusch 2000; Rankin and Kern 1994; Savin-Williams and Berndt 1990; Whitbeck, Conger, and Kao 1993). An often cited example in popular culture, for

example, is the adolescent who rebels against a parent who refuses to allow their child to associate with friends whom the parent believes are negative influences. Although this refusal initially may reduce association with delinquent peers, it may also produce the unanticipated consequence of reduced parental attachment that may be detrimental in the long-term.

Another policy question is whether we should concentrate our collective efforts on school based programs designed (in part) to reduce conformity to peer pressures toward deviancy. If peer pressures are not as salient as some believe, perhaps we should redirect our limited financial resources toward alternative delinquency prevention programs with proven potential. Minimally, however, if programs designed to reduce conformity to peer pressures continue, we should tailor them toward individuals or groups particularly susceptible to negative interpersonal influences.

## **Future Research**

### *Dealing with Missing Data Issues*

As I discussed earlier, the version of the Add Health data to which I had access (the restricted/contractual data) did not have friendship nomination links between romantic partners because the principle investigators and/or IRB board at the University of North Carolina initially felt that this information was too sensitive for general release even under contractual data security guidelines. For this reason, there are high rates of missing data for cross-gender friendships. Although access to the romantic partner links was highly restricted and available for use only at the University of North Carolina until recently, during the writing of this project they became available to researchers at remote locations who adhere to extra security measures. Thus, the first step in my future research includes new analyses that include romantic partners. These data will likely provide the information I need for a more conclusive test of my hypotheses, particularly those related to cross-gender friendships.

I also mentioned that there has been recent additional work on Rausch and IRT scaling measures for use in delinquency research. I am planning to further examine this research and determine whether I can improve the delinquency scale this project in order to provide more information on the relatively high number of adolescents who appeared as completely non-delinquent in these analyses. Additionally, a number of respondents had missing IRT

delinquency scale values because I relied upon procedures from other researchers who were not using multiple imputation techniques. Recalculating these values for the entire sample will increase the efficiency of the parameter estimates.

### *Interpreting the Within-individual Effects*

I will also attempt to gain greater understanding about the interpretation of the within-individual effects in the influence models by examining the percentage of the friendship group that changes across time. As I mentioned previously, it is possible that the correspondence between changes in the male respondents and changes in their male friends resulted not from interpersonal influence, but from a year-to-year self-selection mechanism. In other words, the causal order between changes in respondent behavior and changes in friend behavior remains unclear in the present analyses. Adolescents who changed from a non-delinquent status at wave 1 to a delinquent status at wave 2 for reasons unrelated to peer influence may have subsequently chosen delinquent associates.

Between-wave-self-selection cannot be a factor, however, for adolescents who retain the same set of friends across time. Therefore, I may be able to gain a better understanding of whether we should attribute the majority of the within-individual friend effects to: (a) year-to-year self-selection or (b) year-to-year forms of interpersonal influence, by examining whether the percentage of the stable friends interacts with the within-respondent friend effect. If the relationship between changes in friend delinquency and changes in respondent delinquency are equal regardless of the proportion of the friendship group who remains stable and the proportion who change, then we might assume that correspondence between behavioral changes in the respondent and behavioral changes in the friends is due to influence and not selection.

Another way I may be able to narrow the interpretational possibilities of the within-individual coefficients corresponding to the behavior of friends is to examine its interaction with network centrality. Haynie (2001), for example, noted that we would not expect an interactive effect between network centrality and the behavior of friends if the coefficient associated with friend behavior were simply measuring selective attraction. Using a lagged model of influence with the Add Health data, Haynie reported that network centrality and

friend behavior *did* interact to produce stronger similarity between adolescents and their friends when the adolescent held a central position within the friendship network.

### *Moderators of Interpersonal Influence*

As I noted in the literature review, there are reasons to suspect that interpersonal influence is stronger for some behaviors than others. Although the effect of friends was quite modest in these analyses, for the reasons I discussed in chapter 3, the influence of friends may be particularly strong for some behaviors while weak for other behaviors. There are also reasons to investigate whether parental supervision or parental attachment may moderate friends' influence and whether peer influence is stronger for certain racial or ethnic groups, or among rural or urban youth who have different opportunities to perform delinquent acts.

### *Experimental Research*

Although there may be a few ways in which I further can investigate the nature of peer influences on delinquency using survey methods, as I discovered through the work on this project, survey methods are simply unable to completely isolate the effects of selective attraction, shared environment, and interpersonal influence in a way that convincingly provides us with an ability to rule out alternative interpretations of our findings. As Jussim and Osgood (1989) have noted, separating the effects of interpersonal influence from effects of selective attraction and shared environment, and thus ruling out alternative interpretations of statistical findings, is most practical when friendships develop within groups of previously unacquainted individuals who undergo shared experiences. This is typically possible only in experimental research, although in certain circumstances, field research and natural experiments may provide additional opportunities for such study. Should I pursue this line of research beyond the extensions I noted above, I will likely turn to experimental work. This will be particularly true if I wish to examine situational and short-term forms of interpersonal influence in greater detail.

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# Jeffrey M. Ackerman

## Vita

The Pennsylvania State University  
Department of Sociology  
University Park, PA 16802-6207

### Education

#### The Pennsylvania State University

Ph.D.	Department of Sociology, Program in Crime, Law, and Justice Minor: Statistics Specialty Area: Social Psychology (Particularly Violence and Adolescence) Dissertation Title: Delinquents and their Friends: The Role of Peer Effects and Self-Selection	2003
M.A.	Department of Sociology, Program in Crime, Law, and Justice Thesis Title: Age and the Perceived Risk of Informal Sanction	1998
B.S.	Administration of Justice	1993

### Professional Employment

#### Research

2002 (Summer)	Research Associate on National Institute of Justice Funded Project, Repeat Domestic Assault Victimization.
1999 - 2002	Research Assistant to Professor Richard B. Felson, Repeat Victimization, Family Violence.
1998 - 1999	Research Assistant to Professor Chester L. Britt, Sentencing Disparity, Reanalysis of Hirschi's 1969 Richmond Data.

#### Teaching

##### 2002 - 2003

##### *Lecturer in Sociology*

2002 (Fall)	Soc 406 - Sociology of Deviance
2003 (Spring)	Soc 207 - Sociological Research Methods
2003 (Spring)	Soc 417 - Law and Society

##### 1999 - 2002

##### *Graduate Instructor*

2001 (Summer)	Soc/Clj 421 - Violent Crime
2000 - 2003	Soc 574 Lab - Graduate Statistics Lab: Data Analysis with SAS and SPSS
2000 (Summer)	Soc/Clj 111 - Introduction to U.S. Criminal Justice
1999 (Summer)	Soc/Clj 012 - Introduction to Criminology

### Publications

Richard B. Felson and Jeff Ackerman. (2001) Arrest for Domestic and Other Assaults. *Criminology*, 39: 655-676.

Jennifer Schwartz and Jeff Ackerman. (2001) In Search of a Dependent Variable: Comment on Avakame 1998. *Criminology*, 40:301-311.

Richard B. Felson, Jeff Ackerman, and Seong-Jin Yeon. (In Press) The Infrequency of Family Violence in the United States and Korea. *Journal of Marriage and the Family*.

### Grants and Awards

2002	Richard B. Felson, Jeff Ackerman, and Cathy Gallagher. Repeat Domestic Assault Victimization.	(NIJ - \$35,000).
2002	Jeff Ackerman. Youth Violence Prevention Summer Institute - Travel Grant.	(NCOVR - \$1,000).

### Areas of Specialization and Interest

Criminological Theory, Juvenile Delinquency, Statistical Methods, Social Psychology, Violent Crime, Domestic Violence, Neighborhoods, Gender and Crime