I, Brandon C Dulisse, hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Criminal Justice.

It is entitled:

Does Stickiness Matter?
A Longitudinal Examination of the Stability of Adolescent Peer Groups

Student’s name: Brandon C Dulisse

This work and its defense approved by:

Committee chair: J.C. Barnes, Ph.D.
Committee member: Francis Cullen, Ph.D.
Committee member: Pamela Wilcox, Ph.D.
ABSTRACT

Using data from the Teenage Networks in Schools (TEENS) project, this dissertation provides an empirical test of Warr’s (1993a) “sticky friends” hypothesis. Warr (1993a) argued that, “delinquent friends, once acquired, are not lost in subsequent years” (p. 31). Analyzing data from 9th grade students at a mid-sized Kentucky high school, this dissertation builds on Warr’s work by examining three research questions: (1) are levels of delinquency among peers stable over time?; (2) are the peers themselves stable over time?; and (3) does the stability of peers interact with their delinquency to affect the target respondent’s delinquency? The longitudinal multilevel model for change was the primary analytical tool due to the focus on stability and change over time. Overall, the findings from the analysis support Warr’s (1993a) conclusion that delinquent peers maintain stable relationships with one another, even while controlling for several potential selection effects. Additionally, this analysis adds to the literature by finding that delinquent peers—meaning the actual people themselves and not just their behavioral repertoires—largely remain stable over time. Finally, the results suggest recent friendships may be more influential as a cause of delinquency compared to more stable, long-term friendships. Limitations of the data and methods are discussed as well as directions for future research.
Dependent Variables ........................................................................................................ 80
Key-Independent Variables ............................................................................................ 84
Control Variables ........................................................................................................... 85
ANALYTIC STRATEGY ..................................................................................................... 93
The Case for Longitudinal Designs ................................................................................ 93
CHAPTER 5 ANALYSES AND RESULTS ........................................................................... 95
RQ1: ARE LEVELS OF DELINQUENCY FOR ALTERS STABLE OVER TIME? ........... 97
  Empirical Growth Plots ............................................................................................... 97
  Bivariate Analyses ..................................................................................................... 100
  Multilevel Models for Change (MMC) ....................................................................... 101
  Linear Growth Modeling with Controls ..................................................................... 105
  Sensitivity Analysis: Weighted by Number of Alters .................................................. 109
RQ2: ARE THE ALTERS THEMSELVES STABLE OVER TIME? ................................ 111
RQ3: DOES THE STABILITY OF ALTERS INTERACT WITH THE DELINQUENCY OF
  ALTERS TO AFFECT THE EGO? ................................................................................. 115
  Empirical Growth Plots ............................................................................................... 115
  Multilevel Models for Change ..................................................................................... 116
  Linear Growth Modeling with Controls ..................................................................... 120
  Summary ...................................................................................................................... 121
CHAPTER 6 DISCUSSION .................................................................................................. 122
SUMMARY OF FINDINGS ............................................................................................... 122
  Stability of Criminal Behavior for Alters .................................................................... 123
  Stability of Alter Behavior for each Observed Ego ...................................................... 124
  The Impact of Stability and Delinquency of Alters on
  the Delinquency of the Ego ......................................................................................... 126
IMPLICATIONS FOR THEORY ....................................................................................... 129
LIMITATIONS OF STUDY .............................................................................................. 131
CONCLUSION .................................................................................................................. 134
REFERENCES .................................................................................................................. 138
ACKNOWLEDGEMENTS

I believe in order to truly appreciate your own accomplishments, it is important to acknowledge those who have built the foundation. Without the persistent support, love, and optimism of my family and friends I would not be where I am today. For that I am forever grateful and this is only a small portion of the thanks I wish I could give to those who have assisted me in accomplishing my dreams. I dedicate this work to those who never let me fail and to those who inspired me to undertake this journey.

Dr. Cullen and Dr. Wilcox, it has been more than a privilege and honor to consider myself your student and to learn from some of the foremost scholars in my discipline. Your lectures and classes have opened my mind, but your advice, wisdom, and mentorship has truly touched my heart. Despite being some of the most intelligent, wise, and hardworking people I have ever met, you are also incredibly humble, patient, and generous. I could not have had a better experience with you as my professors and I have learned what it is to be a scholar and teacher from two of the best examples academia has to offer.

Dr. Barnes, my dissertation chair, you have taught me more than you will ever realize in the short amount of time that we have known each other. I will always hold you in the highest esteem, not necessarily for your academic accomplishments (which are remarkable and irrefutable proof of your knowledge and skill), but for your mentorship and friendship you have provided me in the past year. While it is an honor to call you my dissertation chair, it is even more humbling to call you my friend. You made this process seamless, the work enlightening, and the editing constructive. I am grateful and excited to say that my academic lineage stems from your guidance and I will never forget the way you treated me like a colleague and equal during my time here.

I also want to thank Dr. Boutwell for being on my committee. Your contributions and willingness to be part of my committee has been a privilege. Your expertise and knowledge has been invaluable and I look forward to working with you in the future.

To all of my closest friends here at the University of Cincinnati, I thank you for your support. Mark Morgan and Sam Peterson, I cannot wait for our annual reunions and reminiscing about the program and hearing about your most recent accomplishments and accolades. Matt Logan, your work ethic and resolve are inspirational. I am honored to have you in my wedding and know that you will achieve great success wherever you end up. There will always be room for Blink-182 at ASC.

My parents deserve much more than a paragraph in a dissertation and have been my single greatest source of support for the last nine years of college. I love you both with all of my heart. You both have always been there for me and pushed me to continue striving for my goals. You gave everything you had and more to see me succeed and I attribute anything positive that comes out of my life to both of you. Thank you for being there for me whenever I needed someone to talk to and being a constant source of optimism in my life. I hope that I can continue to make you proud.

Thank you to Melissa, my fiancé and future wife. You have loved me more than I thought was possible and supported me throughout this last year. Knowing that I have your support is a constant reminder each day that I can move mountains and take on the world. I cannot verbally express what you mean to me but I can acknowledge your contributions to this dissertation.
Without you, I would not be here. You are my motivation and my love. Thank you for being there for me throughout this process.

Last and not least, my God is wholly responsible for all the good in my life. God has looked down on me with compassion and opened the doors I could not have opened myself. I am thankful and blessed to be in this position, and will always be fortunate for the opportunities that have been offered to me by the University of Cincinnati.
CHAPTER 1

INTRODUCTION TO THE PROBLEM:
ADOLESCENT SOCIAL LEARNING AND PEER GROUP FORMATION

One of the strongest predictors of criminal and delinquent behavior is the number of delinquent peers to which a youth is exposed. Most delinquent behavior is committed in groups, a finding that is consistently reported in nearly every study measuring peer influence on antisocial behavior (Akers et al., 1979; Empey et al., 1982; Erickson, 1971; Klein, 1969; Reiss, 1986; Shaw & McKay, 1931; Sutherland, 1947; Warr, 1996). Juveniles who self-report their behaviors are overwhelmingly more likely to admit to committing delinquent activity with peers rather than alone (Warr, 2002). For example, a self-report survey by Gold (1970) revealed that 75 percent of the 2,490 delinquent offenses reported in a sample of youth from Flint, Michigan were committed with delinquent peers. Twenty years later, a survey of adolescents in Racine, Wisconsin revealed that less than 20 percent admitted to committing delinquent acts alone (Shannon & Mac Kim, 1991).

Despite mounds of evidence suggesting peers play a vital role in the etiology of juvenile delinquency, it remains unclear why adolescents are so heavily influenced by their peers. One answer is that the effect is rooted in the social structure of society. Post-industrial societies place a strong emphasis on an extended period of education that postpones the entry of teenagers into adulthood (Barnes & Beaver, 2010; Moffitt, 1993). This postponement extends beyond physical maturity and is dominated by age-segregated interaction in schools and classrooms (Warr, 2002). The result is a subculture based on segregated youth experiences and interaction; which has been consistently supported in the social literature (Coleman, 1974; Erikson, 1960; Felson, 1994;
Adolescents are simultaneously thrust into unfamiliar contexts with the rest of their age cohort while significantly decreasing the amount of time spent with more traditional environmental controls like the family. The severance of these past ties to conventional authorities like parents gives way to new emotional attachments to individuals experiencing similar life events during this tumultuous transition to adulthood. Describing this unique transformation, Coleman (1974, p. 9) concluded that, “...the world of the maturing child, formerly dominated by the home, is now monopolized on the formal level by the school and on the informal level by the age group.” That is to say, the peer group takes on a vital role in human development during the adolescence time period.

This societal phenomenon may also have been heavily influenced by recent social changes in the last century. In particular, aspects unique to mid-20th century American culture like the rise of the automobile, both parents working, and teenagers working have all contributed to the transformation of peer influence (Wright & Cullen, 2004). Scholars have attempted to understand how these cultural changes may be reflected in the adolescent’s trajectory to relinquish psychological dependence on parents and allow peer groups to act as a replacement for the family influence—at least until adulthood (see Brown, 1990). Peers also hold an influential advantage over parents during adolescence because peers share very similar and unique life experiences with one another. Adolescents are drawn to the comfort and support that these similar experiences provide (Brown, 1990).

In many ways, the natural and rapid formation of peer relationships in adolescence reinforces how most human relationships function, which is grounded in comfort and security and is manifested through the development of relationships based on proximity and social homophily (McPherson, Smith-Lovin, & Cook, 2001). The motivation for desiring these traits
(comfort and security) is rooted in an individual’s desire to be able to more successfully and safely avoid being victimized. Group formation is the result of this motivation. It is widely known that humans form relationships with others who most closely resemble themselves (i.e., selection) in places that are in close proximity to their own territory (i.e., propinquity). Therefore, it remains particularly intuitive that adolescents who are new to the social complexities that group formation creates, would follow these same processes. Even more so, the unfamiliarity in social situations and contexts, combined with recent biological changes like puberty, may create a heightened sense of importance in establishing and maintaining strong relationships with a group of peers.

The robust nature of the correlation between juvenile delinquency and peer interaction has led researchers to consider delinquency a predominately group behavior (Reiss, 1988; Warr, 2002). This consensus is in part related to the types of offenses juvenile delinquents often commit. Contrary to the more hardened and persistent adult offenders, juvenile delinquents tend to be healthy, normal teens experiencing dysphoria from the “…relatively roleless years between their biological maturation and their access to mature privileges and responsibilities” (Moffitt, Caspi, Harrington, & Milne, 2002; p. 180). This maturity gap as Moffitt and colleagues called it (Barnes & Beaver, 2010), may explain why levels of delinquency and crime peak in late adolescence and begin to steadily decline once adult privileges and responsibilities are endowed. The adolescence-limited offending pathway proposed by Moffitt (1993) ultimately suggested that an overwhelming majority of juvenile delinquency is committed by otherwise normal and future law-abiding members of society. Instead of violent or even property crime, most adolescents only engage in delinquent activities of a group nature like drug use or public order offenses (Reiss, 1988; Warr, 2002). This leads to a very important question about the etiology of
adolescent delinquency: if offending spikes for most individuals in adolescence (including those who previously had little or no antisocial tendencies), where/how is this behavior being learned or transmitted? The answer appears to lie in the peer group that is often established within the school setting (Pratt et al., 2010; Reiss, 1986; Sutherland, 1947; Warr, 2002).

**PEER INFLUENCE IN THE SCHOOL SETTING**

The prevalence of group delinquency in adolescence is a well-known phenomenon. Dating back to the work of Shaw and McKay’s (1931) *Report on the Causes of Crime*, social scientists have known that a majority of delinquent acts are group-type crimes and are committed with others present. Analyzing data from the Juvenile Court of Cook County in 1928, Shaw and McKay (1931) found that 81.8% of all juvenile offenses involved more than one offender. Similar findings throughout the years led Gold (1970, p. 83) to conclude that, “…youngsters more often commit those kinds of offenses which others will commit with them.” These types of acts would be more easily recognized as delinquent (i.e. status offenses) rather than criminal in nature. This makes sense, as most empirical evidence suggests that teens engage in status offenses that would otherwise be legal at later ages (Elliott, Huizinga, & Menard, 1989; Gold, 1970; Gottfredson, 2001). According to Gottfredson (2001), three-fourths of high school students reported having drunk alcohol in the last year, with half of them reported being drunk. Additionally, 40% reported being in a fight and more than half reported having sex. In a nationally representative study of adolescents from the 1970s, 76% of males and 52% of females reported some form of delinquent behavior (Elliott, Huizinga, & Menard, 1989). The extensiveness of the research on peer delinquency and group offending will be reviewed more comprehensively in Chapter 3. For now, suffice it to say that social learning theorists would
argue that adolescent interactions are primarily responsible for adolescent deviance, but that these interactions must occur in a context where the learning and transmission of behaviors can occur quickly and many times within a short period. The school fits all of these criteria and offers a staging ground for delinquent and criminal learning and behavior.

The school is a unique and critical location for understanding the etiology of peer offending throughout adolescence. For nearly all of adolescence, one of the most permanent and powerful institutions has been the school. Students are confined to the premises for most of the day with a majority of their birth cohort from the local community. This creates a unique opportunity for peer interaction to develop over time but more important to the present focus is that the school can be a catalyst in either the prevention or onset of adolescent delinquency. Schools that socialize students to fit into the larger (prosocial) society created at the school will prevent most delinquency and lower the rate of problematic behavior. On the contrary, schools that fail to socialize and otherwise alienate students run the risk of increasing delinquent activity in the school as well as in the local community (Gottfredson, 2001; Hirschi, 1969). Although schools may be able to decrease delinquent behavior within their walls, the relationships formed in school will influence behavior outside of the institution as well.

The correlation between schools and peer delinquency is not a newly discovered phenomenon as scholars for decades have emphasized the importance of schools as a potential protective factor in delinquency (Cohen, 1955; Kvaraceus, 1945; Shaw & McKay, 1969). In fact, one study (Shaw & McKay, 1969, p. 384-385) went so far as to say that teens who fail in school, drop out, or lose interest end up in an “institutional void,” leading to a high incidence of delinquent behavior because of the loss of a conventional lifestyle and structure that the school
maintains. More recently, similar arguments have been used to build race-specific theories of offending such as Unnever and Gabbidon’s theory of African-American offending (2011).

With the integration of so many juveniles from different backgrounds in close proximity to one another, it should come as no surprise that schools can be a staging ground for delinquent and criminal behavior. The culmination of new adolescents being placed in an unfamiliar setting with various traits and behaviors creates a sort of “melting pot” of behavioral transference. The transmission of behavior can be delinquent or nondelinquent, but given the amount of time and close proximity that teens spend in school, it can be assumed that a high frequency of interactions and learned behaviors occur each day. Although much of adolescent delinquency occurs outside of the school, over one-third of all serious violent delinquent acts involving adolescents transpires at or on the way to/from school (Gottfredson et al., 2005). Moreover, many of the factors related to violent encounters occur during school hours and spill over into after-school confrontations (Brunson & Miller, 2009). The spill-over effect of these in-school conflicts is so prevalent in some instances that Snyder and Sickmund (1999) reported that 19% of juvenile violent crimes occurred in the 4 hours after the school day ends.

The unique social context that the school provides for understanding peer interaction and juvenile delinquency makes it an ideal setting for the present study. The context of the school provides perhaps the greatest amount of peer interaction and influence on a daily basis. If a majority of peer interactions and relationships are conducted and formed during school hours, it reasons to believe that the most effective way of observing peer influence would be to examine it in the school setting. The present study uses data collected from a single, isolated school in the state of Kentucky as a means of measuring the influence and outcome of delinquent peer relationships.
THE PRESENT STUDY

Although much is known regarding the overall group nature of adolescent delinquency, less is known about the extent to which these relationships develop over short time intervals. This dissertation addresses present limitations of the existing literature by examining how peer relationships develop and change in two week intervals over the course of several months during the 9th grade year.

This dissertation extends the work of Warr (1993a) by exploring the effects that delinquent peers hold on adolescents. It may be that delinquent juveniles are more likely to attract and learn from other delinquent peers, creating a reciprocal relationship of offending and potentially alienating less delinquent adolescents. This outlook would be more compatible with the work of Warr (1993a) and the social learning theory tradition of Burgess and Akers (1966).

Before presenting the findings from the present analysis, the following chapters will provide a comprehensive discussion of the evolution of social learning theory (Chapter 2) as well as a review of the empirical literature bearing on the role of peer groups in adolescent delinquency. Chapter 2 begins by explaining the historical and theoretical origins of social learning theory. Rooted in the observations of Frederic Thrasher (1927) on juvenile gangs in Chicago, social disorganization theory used official data to explain the transference of delinquent behavior by unsupervised adolescents. The original theory of social disorganization proposed by Clifford Shaw and Henry McKay (1942) was, in many ways, repurposed as a theory of peer learning by Edwin Sutherland (1947). Sutherland’s work became known as differential association theory. The work of Ruth Kornhauser (1978) exposed the limitations of Sutherland’s work (1947), which led to Ronald Akers and Robert Burgess (1966) to reconceptualize
differential association into a new theory on social learning. This process of theoretical
development is expounded upon in Chapter 2. Chapter 2 also presents the empirical status of
social learning theory in detail and a brief literature review on the gender gap of adolescent
offending.

Chapter 3 explains the dynamics of the delinquent peer group and how the mechanisms
of the group can create an environment conducive to initial and sustained delinquent behavior.
Chapter 3 concludes by presenting the “sticky friends” hypothesis and research questions that
form the foundation of this dissertation's analysis. Chapter 4 provides a detailed account of the
research design and statistical methods used in this dissertation. In addition, a thorough
explanation of the data and measures used in this study are provided. Chapter 5 presents the
findings of the statistical analyses. Careful consideration of the substantive interpretations of the
results is provided in Chapter 6 along with a discussion of the limitations of the research and
directions for future work in this area of inquiry.
CHAPTER 2

THEORETICAL OVERVIEW:

THE HISTORICAL EVOLUTION OF SOCIAL LEARNING THEORY
AND ITS ROLE IN EXPLAINING ADOLESCENT DELINQUENCY

The evolution of social learning theory in criminology dates back to the now famous “Chicago School” (Lilly, Cullen, & Ball, 2007). The goal of this chapter is to provide a historical overview of the various theories and developments that have come from the social learning theory tradition. This chapter will also focus on how social learning theory explains complex peer relationships. Whether competing theories can explain peer delinquency and how social learning theorists attempt to defend their explanation against outside explanations will also be considered. Finally, this chapter concludes by examining the existing empirical literature on adolescent peer relationships and the various factors that influence these relationships.

THE ORIGINS OF DIFFERENTIAL ASSOCIATION THEORY

Differential association theory dates back to the early 20th century at a time when American sociologists were examining the impact of the Industrial Revolution on American cities. Differential association is rooted in the urban ecological observations by Frederic Thrasher and the sociological paradigm of social disorganization proffered by University of Chicago theorists Clifford Shaw and Henry McKay. Dating back to 1927, Thrasher’s book, The Gang: A Study of 1,313 Gangs in Chicago, offered one of the first in-depth examinations into the repercussions of densely populated neighborhoods characterized by a lack of adult supervision and an excessive number of uncontrollable youths. The result, as observed by Thrasher was an
inability for the city to control or stop the development of juvenile criminal organizations (i.e. gangs). This resulted in youth free from the constraints of adult supervision and authority, creating an environment where youth roamed the streets and transmitted criminal values and skills without the fear of punishment.

Frederic Thrasher (1927) was not the only Sociologist in Chicago to observe this phenomenon within the slums of the urban city. Around the same time, Clifford Shaw and Henry McKay were conducting in-depth interviews on the “life histories” of wayward adolescents in an attempt to better understand the transmission of criminal traits among these youths (see, e.g., Shaw, 1966 [1930]). These qualitative assignments, combined with the work of Thrasher led Shaw and McKay in the development of their own theory regarding juvenile crime. The initial purpose of social disorganization theory was to create an explanation of crime and delinquency in urban areas through the use of spatial data, rather than the more popular individual-level biological determinist theories of their time. Shaw and McKay relied upon the previous work of colleagues Robert Park and Ernest Burgess, who had created the concentric zone theory. This theory suggested that cities and communities held significant influences on human behavior and that this behavior is fueled by the social and physical environment. In addition, Burgess posited that cities are seen as organic, naturally growing in a predictable manner with certain “zones” or “proximities” around the heart of the city (Burgess, 1925).

Building on the concentric zone model, Shaw and McKay (1942) compiled Chicago juvenile court cases and commitments for three time periods between 1900 and 1933. Mapping each case spatially on a geographic map of Chicago revealed an undeniable pattern. Specifically, neighborhoods centered just outside of the industrial heart of the city contained the highest levels of crime and delinquency. These neighborhoods also possessed high levels of poverty and
residential mobility. These findings were initially reported in the book by Shaw, Zorbaugh, McKay, and Cottrell (1929). Later, these ideas were revisited in the now famous book by Shaw and McKay (1942) titled *Juvenile Delinquency and Urban Areas*.

Over time, Shaw and McKay’s empirical analysis combined with their ethnographic work on juveniles in Chicago (see *The Jack-Roller*, 1930; *Brothers in Crime*, 1938) led them to conclude that places, not people, are responsible for a majority of crime and delinquency in urban areas. One of the most significant findings from this body was the discovery that the areas plagued with the highest crime/delinquency rates all possessed high rates of residential mobility, ethnic heterogeneity, and low socioeconomic status (Shaw & McKay, 1942). The ideas and data set forth by Shaw and McKay provided the foundation for many modern sociological theories on crime and delinquency (see Kornhauser, 1978), including differential association theory (see Akers, 1977; Sutherland, 1947).

Edwin Sutherland, a disciple of the Chicago School, adopted many of the ideas posited by social disorganization theory and built off of them to create multiple theories of crime. Initially, Sutherland’s views aligned closely with those of Shaw and McKay. Specifically, Sutherland rejected the explanations of crime that argued for a biological determinist approach toward human behavior. Instead, he was convinced that social organization (the context in which individuals are embedded) is the catalyst that regulates criminal participation. Sutherland also supported Shaw and McKay’s tenet that culture plays a major role in delinquency and that some social groups are arranged differently than others. According to Sutherland (1973), every society contains cultural heterogeneity with some cultures being more tolerant of criminal behavior than others. There are many cultures in society and each defines criminal behavior in a distinct way. Therefore, some cultures may be more tolerant of criminal behavior than others. With many of
these cultures in close spatial proximity to one another, culture conflicts are to be expected. In other words, cultures with different normative values will, at times, clash over issues governing social behavior and attitudes. These concepts provided the roots for two of Sutherland’s theories that are interrelated: differential social organization (Sutherland, 1947) and differential association (Sutherland, 1942).

Differential social organization theory is a macro-level theory concerned with examining the process by how social groups are arranged. Sutherland argued that social groups can be arranged in two different ways. Some are organized in support of criminal activity. Others are organized against criminal activity. This concept builds off of Shaw and McKay’s idea that values and belief systems are transmitted between individuals in social groups. Therefore, values and beliefs that are transmitted within law-abiding social groups would be organized against criminal activity, whereas values and beliefs that are transmitted within deviant social groups would be organized in support of criminal activity. This point closely corresponds with the work of Shaw and McKay (1942) who assumed that lawlessness would be more common in areas where criminal organizations had strong influence and, therefore, the cultural transmission of this influence had taken root.

In order to explain how subcultures transmit their values and beliefs, Sutherland (1947) attempted to build on Shaw and McKay’s (1942) work by supporting their position that varying subcultures influence neighborhood behavior. Instead of stopping there, however, Sutherland posited that the mechanism through which values and beliefs are transmitted is the process of learning. According to Sutherland, criminal behavior is learned through complex social interactions and can be transmitted from one generation to the next. Intergenerational transmission facilitates the creation of a stable, continuous state of either crime/delinquency or
law abiding behavior in neighborhoods. These ideas led Sutherland to describe the learning process by which sets of values and beliefs are culturally transmitted through social interaction as differential association.

**DIFFERENTIAL ASSOCIATION THEORY**

With *differential social organization* designed to explain group and neighborhood level criminal behavior, *differential association* was created by Sutherland (1939) to present a compatible individual-level explanation. If complex social groups and subcultures transmitted their values and beliefs through each other and over time, Sutherland argued, the process by which the *individuals* in these groups learn these values and beliefs can offer a more complete explanation of crime. Though initially explicated in his 1939 version of *Principles of Criminology*, the principles for differential association were revised in the 1947 version of the text. Since this version, the principles of learning have remained unchanged. With these principles of learning, Sutherland differentiated his individual-level theory on crime from the popular biological determinist theories by describing nine propositions that clarify criminal behavior as a product of what is learned. The nine propositions are as follows (Sutherland, 1947, p. 6-8):

1. Criminal behavior is learned.
2. Criminal behavior is learned in interaction with other persons in a process of communication.
3. The principal part of the learning of criminal behavior occurs within intimate personal groups.
4. When criminal behavior is learned, the learning includes:
a. techniques of committing the crime, which are complicated or simple.
b. the specific direction of motives, drives, rationalizations, and attitudes.

5. The specific direction of motives and drives is learned from definitions of legal codes as favorable and unfavorable.

6. A person becomes delinquent because of an excess of definitions favorable to violation of law over definitions unfavorable to violation of law. This is the principle of differential association.

7. Differential associations may vary in frequency, duration, priority, and intensity.

8. The process of learning criminal behavior by association with criminal and anticriminal patterns involves all the mechanisms that are involved in any other learning.

9. While criminal behavior is an expression of general needs and values, it is not explained by those general needs and values since noncriminal behavior is an expression of the same needs and values.

These propositions created a more transparent model of how criminal beliefs and values are transmitted while at the same time presenting a more inclusive theory than Shaw and McKay’s (1942) previous work. By extending his theory beyond juveniles in socially disorganized neighborhoods, Sutherland launched differential association into the forefront of sociological explanations of crime and created a theory that attempted to explain varying types of criminal behavior and typologies. The key portion of differential association that separates it from other individual level theories at the time was centered in the idea that criminal behavior is learned. This was a significant departure from many socio-psychological theories on crime that relied on a multi-factor approach. Competing theories that suggested criminal behavior was the
result of feeble mindedness, psychopathology, and mental/physical deficiency were rejected by Sutherland since these theories could not explain crime at all levels of social status (Warr, 2001). If criminal behavior is learned, there is little room for genetics or poverty explanations. Instead, differential association assumes that the primary mechanism by which behaviors are learned is attitude transference, meaning that individuals acquire “attitudes or definitions” consistent with delinquency from significant others (Warr, 1993). This general explanation of crime gave differential association the capacity to be applied generally to explain all types of criminal behavior.

KORNHAUSER’S CRITICISM AND THE RECONCEPTUALIZATION OF SOCIAL DISORGANIZATION THEORY

The generality and applicability of Sutherland’s differential association theory in explaining criminal behavior helped it to become one of the most popular cultural deviance theories of the 20th century. While many studies and theories of behavior were developed from the basis of differential association during this time (See Burgess & Akers, 1966; Cloward & Ohlin, 1960; Cohen, 1955), Sutherland’s work was met with staunch criticisms. No critique was more thorough and influential than that of Ruth Kornhauser (1978). Kornhauser reexamined Shaw and McKay’s (1942) Juvenile Delinquency and Urban Areas, and ultimately suggested that social disorganization theory is a “mixed-model” with diametrically opposed fundamental assumptions about human behavior. Kornhauser suggested the two paradigms that are built from these assumptions (control and cultural deviance theories) cannot be reconciled, therefore producing a fatal flaw in the social disorganization model. Although differential association theory is characteristically unique from social disorganization theory, both theories share many
of the fundamental assumptions of human nature, society, and deviance through the use of cultural deviance explanations.

Though the central focus of Kornhauser’s (1978) work was to separate the mixed-model of social disorganization into a pure model, her criticism of cultural deviance as an explanation of the transmission of behavior was particularly disparaging to the legitimacy of Sutherland’s (1947) differential association theory. As a control theorist, Kornhauser (1978) fundamentally opposed cultural deviance theories and surmised that these faulty paradigms ultimately arrive at the conclusion that, “…man has no nature, socialization is perfectly successful, and cultural variability is unlimited” (p.34). This core value, Kornhauser argued, cannot be reconciled with the core values of control theories, which led the author to suggest that social disorganization theory must discharge one or the other to avoid contradiction.

Cultural deviance models, assume that humans are born as blank slates and that the variability of culture is limitless (Kornhauser, 1978; Pinker, 2002). This is in opposition to the control perspective which suggests that humans are hedonistic and utilitarian with a single normative culture that they either ascribe to or deviate from (Gottfredson & Hirschi, 1990; Pinker, 2002). In short, the cultural deviance perspective argues that individuals commit crime and delinquency due to their contact with and socialization into values that promote delinquency. The control perspective suggests insufficient socialization of values that discourage delinquency allow individuals the opportunity to commit delinquent acts (Gottfredson & Hisrchi, 1990; Hirschi, 1969; Pinker, 2002).

According to Kornhauser (1978) and the control perspective, individuals already possess definitions favorable to the violation of law. These definitions are assumed as part of human nature, what some have termed the Hobbesian view of human nature (Pinker, 2002). Inherent in
the definitions is the motivation to commit crime. If motivation is ever-present and required to commit crime, motivation is ubiquitous and cultural deviance can be reduced to a control theory. Kornhauser (1978) elaborates on this key point by explaining that like motivations, procriminal beliefs and interests do not vary appreciably and do not have any impact on criminal behavior. Instead, all that varies are commitments and beliefs in conventional behavior. This suggests that cultural deviance perspectives, including differential association, are specious. Critics of the control perspective suggest that Kornhauser (1978) relies on the assumption that definitions of behavior derived from a singular morality—such as middle-class values—are the only definitions that are important (see Matsueda, 1988). This semantic discrepancy regarding whether one normative morality or varied set of morals and values exists in society continues to be a core disagreement between cultural and control theorists.

Kornhauser’s (1978) critique of the cultural deviance model did not eliminate these perspectives from the field of criminology, but instead allowed these perspectives to be scrutinized, modified, and ultimately improved to better explain deviance and crime. Even though her work led to the segregation of cultural deviance from social disorganization theory and more pure control theories, it is important to note Kornhauser never completely ignored the role of culture. On the contrary, the author endorsed the possibility of weakened culture playing a role with her reformulated social disorganization model (Kornhauser, 1978). Initially referred to by Kornhauser as “cultural disorganization,” this process is now commonly referred to as “cultural attenuation” (Warner, 2003). According to Kornhauser (1978), cultural disorganization is compatible with a control perspective because the normative culture that influences all human behavior can vary in its influence on humans over time. Periods of weakened influence or involvement in the normative culture would allow the naturally hedonistic human to engage in
deviant behavior. This view stands in opposition to cultural deviance perspectives and currently remains the predominant view on culture by modern control theorists.

SOCIAL LEARNING THEORY

Kornhauser’s (1978) critique created a visible divide between control theories and cultural deviance theories. While few would argue Kornhauser’s point that these perspectives are fundamentally opposed in their initial assumptions about the nature of man, there was opposition to Kornhauser’s supposition that differential association theory was a cultural deviance theory (Akers, 1996; Matsueda, 1988; 1997). Critics of this assumption were quick to point out that differential association theory is not a pure cultural deviance theory and that Sutherland’s work had been misunderstood (See Akers, 1996; Akers & Jensen, 2006; Bernard & Snipes, 1996; Matsueda, 1988; 1997). While this point has been a hotly debated topic between control and differential association/social learning theorists, there is a consensus that Sutherland’s differential association theory was too vague in attempting to explain how criminal behaviors are learned.

The shortcomings of differential association theory are well documented but one of the theory’s most critical shortcomings is the lack of explanation of how deviant peer associations are formed. Moreover, Sutherland did not illuminate the mechanisms that underlie the learning process. This ambiguity was exploited by Kornhauser (1978) in her critique of cultural deviance theories and led her to conclude differential association was not a sufficient explanation of the nature and socialization of man. Yet, not all who reviewed Sutherland’s work considered this a fatal flaw.
Burgess and Akers (1966) were among the first to dissect differential association theory by attempting to elucidate the learning process of individuals. By adopting the rationale popular in psychological behaviorism (see Bandura, 1977), the authors concluded the learning process can be explained through the foundational principles of operant conditioning (Bandura, 1977). This was carried out by integrating the foundational concepts of differential association with behavioral learning theory. What emerged was a new theory based on this concept which Burgess and Akers (1966) termed “differential association-reinforcement” theory. The merging of differential association theory with the underlying mechanisms of operant conditioning formed the basis for social learning theory. In doing so, Akers modified the original nine propositions of Sutherland’s differential association theory into a new set of seven principles (Akers, 1998, p. 45):

1. Criminal behavior is learned according to the principles of operant conditioning
2. Criminal behavior is learned both in nonsocial situations that are reinforcing or discriminative and through that social interaction in which the behavior of other persons is reinforcing or discriminative for criminal behavior.
3. The principal part of the learning of criminal behavior occurs in those groups which comprise the individual’s major source of reinforcement.
4. The learning of criminal behavior, including specific techniques, attitudes, and avoidance procedures, is a function of the effective and available reinforcers, and the existing reinforcement contingencies.
5. The specific class of behaviors which are learned and their frequency of occurrence are a function of the reinforcers which are effective and available, and the rules or norms by which these reinforcers are applied.
6. Criminal behavior is a function of norms which are discriminative for criminal behavior, the learning of which takes place when such behavior is more highly reinforced than noncriminal behavior.

7. The strength of criminal behavior is a direct function of the amount, frequency, and probability of its reinforcement.

This modification of Sutherland’s nine principles represented an updating of differential association theory rather than a new and unique theory (Akers, 1973). Akers has maintained that the aspects of differential association theory are subsumed under social learning theory and that critiques toward differential association should instead be directed at social learning theory (Akers, 1998). Akers also stressed that social learning theory offers an explanation of the acquisition, maintenance, and change in criminal and deviant behavior. In doing so, Akers and Jensen (2006) adamantly emphasize that social learning theory cannot be classified as a theory of cultural deviance. The most significant improvement over Sutherland’s work however, was the capability for social learning theory to be tested empirically, as the author carefully explained the mechanisms behind the learning process including how to measure them. Unlike differential association theory, social learning theory focuses on four measurable principles: differential association, differential reinforcement, imitation, and definitions.

*Differential association* is the process whereby one is exposed to normative definitions that are relatively more favorable or unfavorable to law abiding or illegal behavior (Akers, 1998, 2001). The groups that provide these normative definitions to the individual provide the major social contexts for which all of the mechanisms of social learning operate. A normative definition describes the various patterns of norms and values that an individual is exposed to through the learning process. This process can be direct or indirect, as the individual can be
exposed through the direct interaction and association of a group or through indirect identification with more distant reference groups (Akers, 1998).

*Differential reinforcement* refers to the balance of the anticipated or actual rewards and punishments that are consequences of a given behavior (Akers, 1998, 2001). According to Akers and the basic principles of operant conditioning, a person will refrain or commit a given action (crime) based on the past, present, and anticipated future rewards and punishments for their actions. This component measures how criminal behavior is continued or suspended. The rewards or punishments can be a result of positive, social, physical, or self-reinforcement as well as direct or indirect punishment.

*Definitions* represent an individual’s own attitudes or meanings that one attaches to a given behavior. Definitions can be general or specific and can be used to engage and sustain behaviors over time (Akers, 1998). They can be described as the “orientations, rationalizations, definitions of the situation, and other attitudes that label the commission of an act as right or wrong, good or bad, desirable or undesirable, justified or unjustified” (Akers 2002, p. 141). Individuals acquire or internalize their own definitions in many ways but the exposure to others’ shared definitions is paramount to this process. This is one example of how these dimensions interact with each other, as definitions are heavily influenced by differential association, imitation, and differential reinforcement and vice versa.

*Imitation* refers to the engagement in a given behavior after the observation of a similar behavior in others. The characteristics of the group, the behavior observed, and the observed consequences of the given behavior all affect whether or not the modeled behavior will be imitated by the individual (Akers, 1998, 2001). This concept allows for more broad social
contexts to be examined like the media, Internet, and other influences outside of the more immediate and direct sources of influence like family and friends.

According to Akers (2002), all four of these concepts facilitate the process by which an individual learns how to commit crime. In a sequence that develops over time, individuals begin to commit crimes (primarily through imitation and differential association) and later cease or persist in these crimes (through their development of definitions and differential reinforcement). This elaboration on Sutherland’s vague explanation of criminal stability and change offered a concise and testable way to examine differential association and the influence of peers on behavior. These four concepts became the foundation for social learning theory and created the ability for the theory to be tested empirically against competing theories. Akers (1998) argued that four unique hypotheses could be formulated from each of these concepts. “The individual is more likely to commit violations when (Akers, 1998, p. 51):

1. He or she differentially associates with others who commit, model, and support violations of social and legal norms.
2. The violative behavior is differentially reinforced over behavior in conformity to the norm.
3. He or she is more exposed to and observes more deviant than conforming models.
4. His or her own learned definitions are favorable toward committing the deviant acts”.

This example is one way that Akers’ social learning theory provided a more developed theory than Sutherland’s differential association theory. Sutherland proposed that definitions can become internalized, and therefore regulate individual decision-making. According to Akers (1998), definitions have multiple dimensions that possess varying effects on future behavior. These definitions can be general or specific to given situations, can be negative or positive
toward certain criminal behaviors, and can even incorporate neutralization by “justifying or excusing” criminal behavior (Akers, 2000, p. 77).

Akers (1998, 2000) also suggested that individuals engage in criminal behavior through imitation as well as definitions. More specifically, the author argued that modeling criminal conduct (imitation) and creating favorable views of crime (definitions) are the most instrumental methods of initial criminal conduct. After the commencement of criminal activity, individuals continue to commit illegal acts based on the social reinforcements they receive. The reward and punishment given for a criminal act will dictate whether an individual is reinforced to persist or desist from further conduct (Akers, 2000). Therefore, the central proposition of social learning theory can best be summarized as (Akers, 1998, p. 50):

The probability that persons will engage in criminal and deviant behavior is increased and the probability of their conforming to the norm is decreased when they differentially associate with others who commit criminal behavior and espouse definitions favorable to it, are relatively more exposed in-person or symbolically to salient criminal/deviant models, define it as desirable or justified in a situation discriminative for the behavior, and have received in the past and anticipate in the current or future situation relatively greater reward than punishment for the behavior.

THE EMPIRICAL STATUS OF SOCIAL LEARNING THEORY

One of social learning theory’s greatest contributions was the presentation of testable hypotheses and the consideration of competing explanations of crime, especially those Kornhauser (1978) argued were diametrically opposed to the theory (e.g., control theories). All four of social learning theory’s principles are observable and measurable phenomena. This
allows researchers to measure the dimensions of social learning theory and test their relationship with delinquent behavior. While few of these concepts have shown consistent support, overall the research has provided much support for social learning theory as a leading explanation of crime and delinquent behavior.

In one of the first direct tests of social learning theory, Akers, Krohn, Lanza-Kaduce, and Radosevich (1979) observed self-reported alcohol consumption and drug behavior of 3,065 adolescents in grades 7 through 12. The use and the abuse of alcohol and drug behavior was then decided based on the frequency of the individual’s usage of these substances. The authors operationalized and measured all four principles of social learning theory: differential association, differential reinforcement, definitions, and imitation. Results indicated that by combining the four explanatory variables, the social learning predictors accounted for 68% of the variance in marijuana use (39% of abuse) and 55% of the variance in alcohol use (32% of abuse) by adolescents. The two most important predictors were delinquent peer associations and definitions. While all four social learning principles combined for a substantial percentage of delinquent drug behavior, the influence of delinquent peer associations held the strongest effect on the adolescents. Not only was this the first time social learning theory had been directly tested, but it also displayed strong evidence that delinquent peer associations may be the result of social learning processes in adolescence.

Other recent work has focused on empirically testing the elements of social learning theory. In a study measuring the effect of peer attitude vs. peer behavior (differential association vs. social learning theory), the authors found that while peer attitudes can mediate adolescent behavior, it is not a sufficient explanation of peer influence (Warr & Stafford, 1991). This study illuminated the advantages of social learning theory over its predecessor by demonstrating the
limitations of differential association while also reaffirming that social learning mechanisms such as imitation, vicarious reinforcement, and group pressure present a strong influence on adolescent behavior.

Support for social learning theory has been found in a wide array of studies not specific to adolescents. In a meta-analysis of predictors of recidivism, two measures associated with social learning theory, antisocial values and peer associations, were found to be strong predictors of reoffending (Andrews & Bonta, 1998). Support for social learning theory has also been shown as accounting for a significant amount of the variation in crime among 1,153 felony offenders of both genders (Alarid, Burton, & Cullen, 2000). These results have led researchers to apply social learning principles to rehabilitation programs for various types of offenders. Evaluations of correctional rehabilitation programs that are consistent with the principles of social learning theory (targeting antisocial values and peers) have shown to be effective at lowering recidivism rates (Cullen & Gendreau, 2000; Cullen, Wright, Gendreau, & Andrews, 2003).

In recent years, advances in statistical techniques have created the opportunity to summarize large bodies of research through the process of meta-analytics. In a meta-analysis of 133 studies that examined differential association and social learning variables, Pratt, Cullen, Sellers, Winfree Jr, Madensen, Daigle, Fearn, and Gau, (2010) found that the mean effect sizes of two of the four social learning variables (differential association and definitions) were consistently the strongest predictors. These variables were so strong in fact, that both were statistically significant in over 70 percent of the statistical models assessed. The magnitudes of these effects even compare well to other predictors of crime such as self-control, which has also been subjected to meta-analysis in the past (Pratt & Cullen, 2000). Not all of the social learning variables fared as well as differential association and definitions however. The mean effect sizes
for the differential reinforcement and modeling/imitation were generally weak and statistically insignificant across the sample (Pratt et al., 2010).

While the meta-analysis by Pratt et al. (2010) suggested that the effect of social learning variables may not be stronger than competing explanations, research has consistently shown that social learning variables measured together are effective at explaining delinquency and crime. When social learning variables are integrated into models that incorporate different theories and variables with the same sample and data, these variables show the strongest main and net effects (Elliott et al. 1985; Jang 2002; Kaplan et al. 1987; Thornberry et al. 1994). Social learning theory has also shown consistent effects across cultures and nations (Hwang & Akers, 2003; Kandel & Adler, 1982; Kim & Koto, 2000; Meneses & Akers, 2011; Wang & Jensen 2003; Zhang & Messner, 1995).

Both control and social learning theorists continue to support their opposing views of human nature, and thus, their views on the causality of delinquent peer activity. Based on the lack of consensus between these two interpretations, Elliott and Menard (1996) conducted an empirical analysis to test both hypotheses. Using data collected from National Youth Survey respondents (aged 11-20), the authors created scales for both social learning and social control variables. The results indicated that the exposure to delinquent peers in most cases precedes the onset of the adolescent’s own illegal behavior (Elliott & Menard, 1996). Furthermore, from early to middle adolescence, individuals are most likely to be susceptible to delinquent friends. The authors did concede that once illegal behaviors begin and delinquent relationships are made, some of the illegal behavior precedes further involvement in other delinquent peer groups. Overall, the results were more consistent with social learning theory than any of the other theories tested, and provide empirical support that delinquent peers can precede an adolescent’s
involved in crime. While the interpretation of the correlation between delinquent peers and delinquent behavior is still a hotly debated topic, a deeper understanding of the group organization and process can provide support that the relationship between adolescents and their peer groups are not purely epiphenomenal.

Studies finding support for only portions of social learning and control theories like Pratt et al. (2010) and Elliot and Menard (1996) have led some researchers to suggest that these theories are not incompatible and perhaps should be integrated (Unnever, Cullen, & Agnew, 2006). In a classic test of the two rival theories, Unnever, Cullen and Agnew (2006) observed the relationship between ineffective parenting and delinquency. Instead of measuring and testing the theories as pure predictor variables, they observed both low self-control and aggressive attitudes as mediating variables in their model. Results indicated that ineffective parenting affected both self-control and aggressive attitudes, which in turn influenced violent and nonviolent delinquency. This important study was among the first to predict social learning and social control variables as mediators rather than purely exogenous predictors of delinquency. By doing so, the authors suggested that parenting practices may contribute to both low self-control and aggressive attitudes, which in turn contributes to delinquency. This study was important to the empirical study of social learning theory because it proposed that these competing criminological theories of crime may not be mutually exclusive and that instead of predicting delinquency, these variables may be mediating important predictors like ineffective parenting. The authors called for an integration of these “general” theories of crime to provide a better explanation for delinquency rather than the endorsement of one over the other.

Although scholars have shown that peers often resemble each other on antisocial behaviors such as drug use, sexual promiscuity, and delinquency (Pratt et al., 2010), less is
known regarding the correlation of specific behavior outcomes of adolescents in peer groups. Recent inquiries into this subject have revealed that group dynamics may possess a causal influence on the behaviors of individual members spreading throughout social networks resulting in similar outcomes including the consumption of alcohol, obesity, depression, and smoking (Christakis & Fowler, 2007, 2008; Rosenquist, Fowler, & Christakis, 2011; Rosenquist, Murabito, Fowler, & Christakis, 2010). One important finding in this body of work was that authors discovered that the influence of the subjects’ social networks proved to be bidirectional, at least for alcohol consumption (Murabito, Fowler, & Christakis, 2010). That is to say that in subjects who developed relationships with heavy drinkers were more likely to drink more heavily, while subjects who developed relationships with abstainers were significantly more likely to abstain from alcohol in subsequent measurement waves. These findings provide additional evidence that social behaviors (positive and negative) spread through the social network and are malleable over time depending on the strength of the friendship and involvement in the peer group.

**Summary**

Overall, the contribution of social learning theory to the existing research, especially to research on the role of peer influence in the etiology of delinquency, has left a lasting mark on criminology. In the last half century, a substantial number of journal articles, books, and other published research have examined social learning-relevant variables and have found support for the hypotheses set forth by the theory (Akers & Jensen, 2006). Currently, the strongest predictor of criminal involvement is differential association as measured by the “amount of delinquent friends” as reported by survey respondents (Lilly, Cullen, & Ball, 2010). According to Akers and Jensen (2006), the volume of studies and the positive findings, with few negative findings,
provide greater empirical support for social learning theory than for any other major social psychological theory of crime and deviance.

However, critics of differential association/social learning theory advocate that the association between delinquent peers and criminal behavior is confounded by various sources of unmeasured variance. Most prominent is the argument that the temporal ordering of delinquent peer groups and delinquent behavior is misspecified. The idiom “birds of a feather flock together” is often used to characterize the problem because it is one of self-selection; delinquent adolescents find each other because they share the same antisocial or delinquent traits (Gottfredson & Hirschi, 1990; Hirschi 1969; McPherson et al. 2001; Sampson & Laub, 1993). This argument suggests that both delinquent behavior and delinquent peer groups reflect the same underlying construct (see Campbell & Fiske, 1959). Although many control theorists still maintain this position, recent studies have scrutinized the legitimacy of this claim using factor analysis (e.g., Agnew, 1991; Meldrum & Boman, 2013; Young et al., 2013; Zhang & Messner, 2000). These authors have mostly concluded that the perception of peer deviance by the respondent and the subjects’ personal deviance are distinct empirical constructs, dispelling the notion that peer influence and personal deviance can be considered the same factor.

Akers (1977) has always recognized the possibility of a reciprocal relationship between delinquent behavior and delinquent peers and does not assert that self-selection cannot occur. While research has indeed supported some self-selection into peer groups, studies have also suggested that the association with delinquent peers can still magnify delinquent involvement over time (see Harris, 2011; Warr, 2002; Wright & Cullen, 2000). This point may best be summarized by Akers (1999) when he contended that even if “birds of a feather may flock together”, it can also be true that “if you lie down with dogs, you get up with fleas” (p. 480).
Unfortunately, the bulk of the research attempting to back Akers’ (1999) claim that have found large effects have been cross-sectional, making it challenging to rule out simultaneity (Young, Rebellon, Barnes, & Weerman, 2014). In the few that have attempted longitudinal models of reciprocal influence between perceived peer behavior (Time 1) and individual delinquency (Time 2), only weak (Matsueda & Anderson, 1998) or nonsignificant (Rebellon, 2012; TenEyck & Barnes, 2015; Young et al., 2013) relationships have been found. These confictions led Young and Colleagues (2014) to longitudinally examine over 1,000 early-adolescent students through the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR) School Project. Using structural equation models that measured the respondent’s behavior with their perceived peer behavior, two behavioral domains were observed (substance use and property offending). The authors concluded that adolescents inaccurately perceive their peers’ behavior and also found little or no support that the perceptions of peer deviance influence the respondent’s own behavior. If these findings are replicated, it may indicate that social learning principles cannot explain adolescent delinquency.

In addition to the analysis by Young and colleagues, others have questioned some of the central tenets of social learning theory. According to Haynie, Doogan, and Soller, (2014, p.2) a major criticism of the recent peer effects literature is that most of the prior work in this area has overlooked, “…the network structures in which adolescents are embedded.” In an effort to rectify this, researchers have begun using longitudinal network methods to more accurately establish the role of selection and influence processes in shaping delinquency (Dijkstra Lindenberg, Veenstra, Steglich, Isaacs, Card, & Hodges, 2010; Weerman, 2011; Weerman & Bijleveld, 2007). Additionally, Haynie and colleagues (2014) suggest that more direct measures of peer delinquency are necessary to truly unpack the peer effect. A prime example of this
shortcoming derives from the findings of Pratt and colleagues (2010) in an empirical test of social learning variables. The authors procured the body of empirical literature on all four social learning variables to meta-analysis and discovered that only two maintained strong effect sizes (differential association and definitions) for relationships of crime or deviance. The other components of social learning theory (differential reinforcement and modeling/imitation) were modest at best. All four components possessed significant variation in effect size based on the model and research design across the studies used in the meta-analysis. These findings support the call for reevaluation within the social learning framework and a possible reconceptualization for some of the components that have long been considered a mainstay of the social learning tradition.

Extending back to the work of Shaw and McKay (1942), the finding of delinquent peer associations having a strong influence on delinquency itself has been as pervasive as any other correlate of antisocial behavior. The examination of adolescent delinquency by generations of social scientists studying the spatial proximity (Shaw & McKay, 1942), social status (Cohen, 1955), opportunities (Cloward & Ohlin, 1960), social bonding or control (Hirschi, 1969; Kornhauser, 1978), and learning process (Burgess & Akers, 1966; Sutherland, 1937) has assisted in the advancement of empirical techniques to measure and analyze the effects that peers have on each other. The importance of the etiology of peer groups is paramount to understanding crime, especially delinquency. More importantly, an in-depth examination of the traits of the peer group including age, gender, size, and strength must be appreciated in order to make informed decisions regarding the correlates of adolescent behavior. The following chapter will discuss these factors.
CHAPTER 3
THE STRUCTURE AND FUNCTION OF DEVIANT PEER ASSOCIATIONS ON THE ADOLESCENT

The importance of the peer group in the etiology of adolescent delinquency has long been recognized (Akers, 1973; Shaw & McKay, 1931; Sutherland, 1947). As early as 1931, Shaw and McKay concluded that adolescents commit much more delinquency in the presence of others than alone. In fact, Shaw and McKay’s (1931) observation into delinquent cases in Cook County in 1928 discovered that more than 80% of all juveniles that had appeared before the Chicago Juvenile Court had accomplices. More recent works have supported this finding, including studies observing adolescent gang networks (Klein, 1969; Sarnecki, 1986) and self-reported delinquency (Erickson, 1971; Gold, 1970; Shannon & Mac Kim, 1991). This phenomenon is not unique to American culture; the nature of these findings appear to be stable across cultures (see McCarthy & Hagan, 1995; Sarnecki, 1990; Zhang & Messner, 1995).

The role of peers in adolescent delinquency is so robust that in one of the most comprehensive narratives on delinquency, Reiss (1986, p. 152) stated that, “Solo offending is relatively uncommon at young ages and does not become the modal form of offending until the late teens or early 20s.” Although the correlation between peer groups and delinquency is well documented, relatively little is still understood regarding the overall nature of the delinquent group (Warr, 1996). Part of this reason is based on the deep theoretical divides on the part of social learning and social control philosophies. These two camps are diametrically opposed in
their fundamental view of human nature, which directly influences their understanding on the etiology of delinquent groups.

At the base, the argument stems from the contested view on the causal importance of peers. Those who dismiss the importance of the peer group argue that delinquent companionship can be found in most adolescent activities since it is not a function of differential association, but rather an innate lack of control over one’s self (see Glueck & Glueck, 1950; Gottfredson & Hirschi, 1990; Hirschi, 1969; Kornhauser, 1978). This lack of control leads the delinquent to seek out others who are similar following the basic sociological principle of homophily. According to McPherson, Smith-Lovin, and Cook (2001), homophily is the “principle that a contact between similar people occurs at a higher rate than among dissimilar people” (p. 416). This essentially means that information that flows through networks (whether it be cultural, genetic, behavioral, etc) will be localized in social space and that the social entities responsible for this information will obey specific fundamental dynamics during its transmission (McPherson et al., 2001). A more in-depth examination of the literature on the effect of homophily on peer networks will be examined in detail in this chapter.

THE PRINCIPLES OF PEER GROUP FORMATION

Organization of the Peer Group

Understanding the structure and functions of the peer group can provide insight into the process through which delinquency is learned, transmitted, and reinforced among group members. The existing research has documented the significance of the peer group in its role of influencing adolescents. As a result, much is known regarding the structure and demographic characteristics of the typical adolescent peer group as well as how delinquency is transmitted or
learned. The following section reviews this literature in an attempt to better understand the process behind this phenomenon.

There are eight processes that are likely to play a role in the development, maintenance, and influence of the adolescent peer group. They are: instigation; stability; collectivity; morality; age; size; proximity/propinquity; homogeneity/homophily; and time spent. Each process is responsible in part for the creation and power of the adolescent peer group and the unique influence that the group exerts on the individual at this point in the life-course.

**Instigation**

Before adolescents are members of peer groups, they must be introduced to and accepted by the group. Reiss (1986) suggested that this process occurs through an informal recruitment by adolescents who are systematically unique from other members of the group. Reiss termed the instigating members “recruiters” while others who participate in delinquent conduct are termed “joiners.” In a study examining a self-report survey of a national probability sample of 13-16 year olds (the National Survey of Youth), Warr (1996) reported that most delinquent peer groups do contain an identifiable instigator. The instigators were more likely to be older, more experienced and closer to the other members in the group.

If there are multiple typologies in the delinquent group, key etiological variables (e.g., family, attachment to school, age) must be examined to isolate and identify the members who are more dangerous (recruiters) and likely to influence those who are less delinquent (joiners) (Warr, 1996). On the other hand, Warr (1996) found that those who are frequently involved in delinquent activity act as both instigators and joiners. This would support the finding that most offenders are generalists (Gottfredson & Hirschi, 1990) and might indicate that the frequency of their activity is driven by an underlying criminal trait(s) rather than etiological variables.
There is still a lack of consensus on whether peer delinquency or lack of parental attachment is a chief instigator in the introduction of delinquent behavior by the adolescent. Warr (1993b) attempted to explain this phenomenon by analyzing data from the National Youth Survey consisting of 1,726 persons aged 11 to 17 in 1976. The author examined survey questions that probed the individual on time spent with and attachment to parents as well as self-reported delinquency and peer delinquency. According to Warr (1993b), the importance of this study was rooted in testing the two major competing theoretical explanations of peer behavior. If peers were found as potential instigators to delinquency, support for differential association/social learning theory would be found. On the other hand, if parents were observed as potential barriers to delinquency, support for control theories would be found. For this reason, the work and subsequent results from Warr’s study (1993b) help to answer some of the longstanding theoretical questions brought on from this debate. Unfortunately, Warr’s findings did little to resolve the debate. Indeed, his analysis of the National Youth Survey data provided partial support for both hypotheses. The amount of time spent with family reduced the influence of peer behavior on the adolescent. In contrast, the level of attachment to parents did not appear to have any such effect on providing a barrier to delinquency. This finding is important because it suggests that no direct effect by parents on delinquency can be made (Warr, 1993b). Instead it appears that parents exert an indirect effect on their children to limit delinquent activity. By spending time with and creating strong attachments to parents, adolescents are much less likely to have time or interest in seeking out delinquent friends. This in turn creates less opportunity for these adolescents to become influenced into delinquent acts. There is a caveat to this finding however. According to Warr, (1993b, p. 257):
The principal conclusion, however, is that parental attachment does not reduce the effect of delinquent peers among adolescents who are (already) exposed to them. Although attachment to parents may inhibit the development of delinquent friendships, it apparently does little to reduce delinquency among those who already have delinquent friends.

These findings suggest that while partial support can be found for control theory, differential association/social learning theory may offer a more proximal explanation for why adolescents become involved in delinquency.

**Stability**

The instigation of peers into a delinquent group may be more of an informal process due to the constant fluctuation of the group (Warr, 2002). Based on the existing literature examining the stability of the delinquent peer group, offending delinquents do not ordinarily stay with the same compatriots for long periods of time and can belong to many offending groups at the same time (Reiss, 1986; Sarnecki, 1986; Warr, 1996). However, there may be a plausible explanation for this lack of stability in membership and activity in delinquent peer groups. According to Reiss (1986), the precipitous shift in membership is due to residential mobility, the incarceration of members, and shifts to more conventional careers. This results in peer groups with “transitory” affiliations that are much more informal than street gangs (Reiss, 1986: p. 130).

Delinquents are also not confined to committing offenses in the presence of specific members. Warr (2002) postulates that even if offenders have a specialization in a particular offense type, most commit their crimes in a combination of solo and group offending. Warr (2002) went so far as to suggest that “based on the existing evidence, delinquent groups are not highly stable, nor are they highly organized” (p. 36). In fact, Warr (1996) suggested that it may
not make much sense to term these peer affiliations groups, since involvement was so short-lived. Instead Warr (1996) indicated that his results more resembled Yablonsky’s (1959) characterization of the near-group. On the latter point, Yablonsky collected data on thirty delinquent gangs in New York City for four years in the 1950s through a crime prevention program focusing exclusively on two violent gangs. The author noticed that not all of the gangs were the same, leading him to argue that the term “group,” “gang,” or “mob” may be oversimplifying a more complex set of human collectivities. Instead, Yablonsky (1959) argued that some of these social collectives should be classified as near-groups (p. 109). The near-group is unique in that it possesses particular factors: (1) diffused role definition, (2) limited cohesion, (3) impermanence, (4) minimal consensus of norms, (5) shifting membership, (6) disturbed leadership, and (7) limited definition of membership expectations (Yablonsky, 1959). Warr (1996) suggests that this near-group, which falls somewhere between an organized group and a mob or crowd, more accurately reflects the peer group of most delinquent adolescents.

Despite lacking stability, most delinquent events are group events with co-offenders around the same age that are known to each other (Warr, 1996; 2002). Even if most peer relationships more closely resemble the near-group coined by Yablonsky (1959), the lack of leadership and consistently shifting members does not negate the transmission of many of these delinquent values and behaviors. In fact, the anonymity, diffusion of responsibility, and group excitement that delinquent peer relationships provide may act as a catalyst for the quick transmission and acquisition of new criminal behaviors (Warr, 2002).

**Collective Behavior**

In Warr’s (2002) book *Companions in Crime*, the author acknowledges specific advantages that groups provide delinquent adolescents to engage and persist in antisocial
behavior. Dating back over 100 years scientists have observed how the power of the multitude can influence the individual to commit acts they normally would not commit by themselves. According to LeBon (1897) an individual can become lost in the “collective mind” that groups provide through anonymity, unaccountability, and invincibility. This collective mind argument fits into a more general collective behavior framework which would suggest that some adolescents would otherwise not engage in delinquent behavior if not for the presence of a delinquent group. This framework coincides with the proposition held by Wikström (2006) who suggested that criminal actions stem from the predispositions and situational contexts that individuals find themselves in. Along these lines, an adolescent without a strong predisposition for delinquent behavior would require situational inducements provided by the surrounding context (i.e. peer group) to provide motivation to commit crime. These adolescents would not otherwise possess adequate motivation to commit a deviant act, which is an interesting theory given that most adolescents only commit delinquency in the presence of others (Warr, 2002) and eventually desist as they enter adulthood (Moffitt, Caspi, Harrington, & Milne, 1993).

There is ample research highlighting the methods by which a group provides the adolescent opportunities to commit delinquent acts (For a review see: Warr, 2002, p. 84-86). The sometimes spontaneous behavior of crowds (riots, looting, mob-like behavior) can lead to bizarre and at times violent expressions that would not otherwise be seen by individuals acting alone (LeBon, 1960). This collective behavior phenomenon has many possible sources, but according to Warr (2002) anonymity, diffusion of responsibility, and delinquency as “rowdy” behavior that the group context provides are the three most important techniques by which the collective antagonizes delinquency.
Overall, research has been inconsistent on whether the effect of anonymity encourages adolescent offending (see Diener, 1977; McPhail, 1991). While some suggest that being a member of a group only exacerbates an already delinquent personality, some research contends that the anonymity that a group provides can create a powerful outlet for criminal conduct that would otherwise not exist. For instance, a study by Festinger, Pepitone, and Newcomb (1952, p. 382) suggested that the “freedom from restraint” that characterizes people in crowds can occur in groups of all sizes and types and is not limited to only large groups. This advocates that being part of any group provides a sort of alternative identity that allows adolescents to rationalize their behavior through the group identity rather than their own. Following the work of Sykes and Matza (1957) on the techniques of neutralization, the freedom that groups may provide for adolescents could in actuality be a source of neutralization through the appeal to higher loyalties or the denial of responsibility.

The diffusion or denial of responsibility is another important aspect of collective behavior that Warr (2002) contends may act to amplify adolescent delinquency. In many delinquent groups, an older and more experienced adolescent acts as an instigator and leader. Other members often give respect or admiration to the more experienced delinquent which can act as a deflection of responsibility by the less experienced members to those members with the most experience (Warr, 2002). This diffusion of responsibility is not maintained solely by the experience and confidence of the leader or instigator though. In fact, according to Caspi (1999) it is the greater privileges, experience, resources, and freedom that these leaders enjoy that makes them adored and respected among their fellow peers. The lack of access to mature privileges and responsibility that biologically mature adolescents experience is a strong motivator in seeking out these leaders (see Moffitt et al., 2002). These benefits that more experienced offenders can
provide create a diffusion of responsibility as the younger adolescents rationalize their actions through the attainment of adult privileges that are viewed as innate to the biologically mature. The group setting in which this occurs provides not only the context, but the opportunity for delinquent behaviors.

Additional research examining the diffusion of responsibility that groups provide has supported the assertion made by Caspi (1999) and Warr (2002). In a recent study by Gardner and Steinberg (2005), adolescents were placed in a driving simulator and told to drive as far as they can within a fixed amount of time. During the experiment, the adolescent encounters multiple traffic lights that turn yellow as they approach each intersection. The authors found that juveniles were twice as likely to take risks and pass through the intersection risking an accident when accompanied by peers during the simulation than when alone. This finding supports previous assertions made by pioneers in the field that suggested that the diffusion of responsibility in the group setting allows the freeing of a sense of obligation or blame, encouraging more risky behaviors (see Darley & Latane, 1968; Latane & Darley, 1968). These findings are similar to those presented by Csikszentmihalyi and Larson (1984). These authors suggested that the rowdy behavior characteristic of many adolescents may be due to the newfound “group excitement” and the “disappearance of personal control” provided by the peer group context (p. 170). If true, this description would help explain why adolescent peer groups are more likely to engage in group deviant behavior than any other age group throughout the life-course (Warr, 2002).

**Morality**

The presence of co-offenders or accomplices when engaging in delinquent behavior may have the power to alleviate the adolescent from personal responsibility or guilt for violating an established moral code. This neutralization involves the lowering of a perceived cost of crime
(See Warr, 2002), which alters the perceived cost-benefit decision making process. Since one cost of crime may be the moral guilt or shame one feels during the commission of the act (Clarke, 1992; Grasmick & Bursik, 1990), it makes sense that those committing delinquent acts within the group context may attempt to appeal to these rationalizations. While the notion of groups creating unique moral climates is not a new phenomenon, there is no consensus regarding the extent and method that moralities are altered, maintained, or accepted in this context.

Remembering the early work of cultural deviance theorists like Sutherland (1947), the learned definitions of the peer group may have the power to effectively nullify existing moral values and replace them with the group’s established morality. In an earlier study of sixth and seventh graders, Devereux (1970) held structured interviews with the adolescents by asking them hypothetical situations that contrasted peer desires against some “adult-approved or autonomously held standard or value” (p. 103). Not surprisingly, the author discovered that adolescents who preferred peers over their parents and who reported spending a majority of their time with peers were much more likely to yield to peer pressure. This led Devereux (1970) to conclude that the mechanism which appeared to underlie the strength of peer influence was not based on ridicule, loyalty, or status, but instead “lower feelings of guilt” (p. 118).

Age

Along with gender, age is one of the other most consistent predictors of both delinquent peer associations and deviant behavior (Hirschi & Gottfredson, 1983; Jang, 1999; Mears & Field, 2002; Thornberry, 1987). Rooted in social learning theory (Akers, 2009), Thornberry’s (1987) interactional theory proposed that delinquent peer associations vary with age as an individual’s identity changes through childhood, adolescence, and adulthood: as children reach
adolescence, peer associations exhibit more influence on the individual (see also Warr, 2002; Coleman, 1980).

Other research has focused on the swift descent of many new adolescents into delinquent peer associations and subsequent delinquent behavior. Based on the research of Jang (1999), peer networks become much more significant to the identity of the early adolescent as they transition from control of conventional authorities (e.g., teachers and parents) to more complex friend networks. These “youth in transition” become more susceptible to networks of pro-delinquent friends when their, “…influence and social support are strong enough to override conventional authorities” (Jang, 1999: p.675). This developmental trajectory does not last for a majority of delinquent adolescents however. As individuals age out of adolescence, peer networks lose some of their influence resulting in more conventional and prosocial behavior. (Laub, Nagin, & Sampson, 1998; Moffitt, 1993; Sampson & Laub, 1993).

More recently, a study by Young (2014) sought to examine whether social status (popularity) would increase or decrease over adolescence based on violent behavior of male teens. Armed with a sample of 1,845 males from age 11-32, the author applied Moffitt’s (1993) dual-taxonomy theory to explain the “chronic violence” committed by the very few adolescent males (or what Moffitt would consider life course persistent offenders). Based on this hypothesis, Young (2014) proposed that as adolescents age, they would be exposed to and subsequently engage in more risky behavior. This change would be attributable to the small group of persistently antisocial adolescents, or what Young called “role magnets” (p. 104). Using semi-parametric group-based trajectory modeling and growth-curve modeling techniques, the author discovered that the persistently violent group showed consistently lower levels of popularity from ages 11 to 19. Yet, while these chronically violent individuals experienced lower
average levels of popularity, they did experience increases in popularity during early adolescence. This latter result suggests that the persistently violent youth may experience increases in their popularity as they teach the non-violent youth how to engage in delinquency. This newfound popularity, however, is fleeting. Indeed, Young’s analysis showed that the popularity levels quickly returned to their pre-adolescent levels as soon as the teenage years passed. These results reinforce the current research that suggests that early adolescents are more susceptible to the deviant peer influences of the more antisocial peer groups than they are as they age and begin to move into adult roles (Laub, Nagin, & Sampson, 1998; Moffitt, 1993; Sampson & Laub, 1993; Warr, 2002).

The importance of studying age as it relates to peer association is two-fold. First, peers may have a stronger influence during adolescence than any other point during the life-course and this may be especially true for delinquent peers (Young, 2014). Adolescence is, on average, the point in the life-course that individuals engage in their highest level of offending (see Figure 3.1 below). Evidence gathered from studying the rapid onset of peer associations and the transition of children into adolescence suggests that the relationship between these two factors is not purely coincidental (Berndt, 1979; Coleman, 1974; Warr, 2002). This finding helps illuminate the second important reason for age and peer associations. That is, the sudden onset of delinquency brought on by adolescence coincides with the sudden and rapid increase in the value of peer associations. Research by Berndt (1979) demonstrated this point by revealing that conformity to peers in terms of antisocial behavior increased from grade 3 to grade 9. This relationship also coincided with an uninterrupted decline in conformity to parents during the same span. This study reinforces the preference and influence that adolescents have for their peers over time, as
opposed to the more conventional authorities (i.e. parents and teachers) that displayed greater influence during preadolescence.

**Figure 3.1: The Age-Crime Curve for Aggravated Assault**

![Age-Crime Curve for Aggravated Assault](image)

**Size of the Peer Group**

According to Warr (2002, p. 36), “the most solidly established feature of offending groups is their size.” Overall, most studies have shown that the typical delinquent groups consists of a range of two to four members (Gold, 1970; Hood and Sparks, 1970; Reiss, 1986; Sarnecki, 1986; Shaw & McKay, 1931; Warr, 1996). The size of these groups is not consistent throughout adolescence however, as the size of the group appears to diminish with age. This decrease may be a part of a larger trend during adolescence of a diminished influence of the peer group on the adolescent. This trend parallels the age-crime curve and ultimately results in an adult offender who participates in offending alone. Reiss and Farrington (1991, p. 376) suggested that this

---

1 Created using 2013 UCR data for total reported aggravated assaults.
transition results from older offenders who are less likely to “require peer support” for their antisocial activities. Larger groups consisting of four or more are more likely to appear in early adolescence, with smaller (two to three members) more tight-knit groups appearing in middle to late adolescence (Hood & Sparks, 1970; Reiss, 1986).

The idea that the number of adolescents engaging in delinquency is linked with greater levels of delinquency in the peer group is not a new concept. One solidly established feature of the social learning perspective suggests that higher levels of exposure to peer deviance will hypothetically prompt higher levels of delinquency across all individuals, based on the greater chance of the transmission of deviant norms, behaviors, reinforcement strategies, and opportunities over time (McGloin, 2009). In many ways, co-offending as opposed to individual delinquency provides a type of ‘social exchange’ where opportunities, motivations, and odds for success are analyzed and encouraged (McGloin & Piquero, 2009). Since many young adolescents are new to the delinquent environment provided by the group, it is intuitive that the size of two to four members would be an ideal setting to experiment with new behaviors and the subsequent rewards and punishments from these behaviors. The small group provides enough size for experimentation and support without the pressure and potential ridicule that a larger group with more diverse ideas and goals would provide.

**Proximity/Propinquity**

Research has consistently shown that peer group formation mirrors group formation on a more general level. As early as the 1950s, researchers have observed that married couples in student housing projects were most likely to name their friends as those peers that lived closest to them. As the distance increased between the subjects and their peers, the intensity of their friendships decreased (Festinger, Schachter, & Back, 1950). A little over a decade later, Sherif
and Sherif (1964) observed the friendship development of boys moving into summer camps. The authors discovered that those who shared living quarters formed stronger friendships than those who did not. However, when boys were moved into new living quarters, their friendships with the old housing units weakened and new friendship networks within their new living quarters emerged. This quick transition of new peer networks supported the notion that proximal features like accessibility and familiarity may be stronger than individual personality characteristics.

In a more modern attempt to understand how these mechanisms operate, Sacerdote (2001) analyzed the influence that freshman college students have on each other. Compiling a sample of 1589 Dartmouth freshman randomly assigned roommates in the university dorms, the author examined the effect that these new peers exhibited on each other. Sacerdote (2001) discovered peer influence on grade point average as well as decisions to join social groups such as fraternities. Peer effects were found at the room level for GPA and at the room and dorm level for social group membership. This study adds to the already strong literature that proximal location among adolescents maintain a strong influence on the development and decision making of individuals.

All of these principal studies speak to the power of proximity as a correlate of peer formation and stability. Yet, one of the most vivid illustrations of the influence of proximity on peer relationships comes from Cairns and Cairns (1994, p. 108):

The effects of propinquity are not limited to infancy in humans and animals. Beyond childhood, close relationships tend to become established when people are brought into proximity to each other, whether the constraints are by employment, training, or geography. Friendships and groups are formed by people who attend the same college,
become assigned to the same military installation, attend the same church, or work together in the same factory.

The significance of proximity in peer group formation was not the only correlate discovered by the authors when they examined school-age friendships and groups. The long accepted principle of social homophily (i.e., people desire to be around others like themselves) was also reinforced by Cairns and Cairns (1994). Two key findings from the authors’ study help support the principle of social homophily. First, and most predictably, the authors found that school-age friendships are most likely to form among the most common characteristics: age, sex, race, and social class. This is consistent with many years of social science research that has supported ascriptive characteristics as the primary driving force behind social homophily (McPherson et al., 2001). Also of interest, however, was the finding that friendship formation is based on other characteristics like popularity, aggression, achievement, leadership, physical attractiveness, physical maturation, and sports participation.

The study by Cairns and Cairns (1994) led to the hypothesis that students develop friendships from among a, “…larger, identifiable pool of individuals who resembled themselves” rather than the choosing of individual students (p. 114). This hypothesis is particularly important when being applied to the development of delinquent peer associations as it implies that adolescents choose peers who hold similar characteristics (i.e., birds of a feather flock together) rather than the alternative hypothesis that adolescents are influenced by and absorbed into delinquent peer groups (i.e. lay down with dogs, wake up with fleas).

**Homogeneity/Homophily**

The principle of social homophily also proposes that groups of similar individuals will exhibit very similar if not the same demographic characteristics. It is well established that most
delinquent groups possess single sex members during adolescence. In the uncommon instance of peer groups possessing members of both genders, research has found that females who are delinquent are much more likely to be members of mixed-sex groups than females who were not (Warr, 1996). This means that if a female group had male members, it was much more likely to maintain delinquent activity than female groups without. The consensus that males commit much more violent delinquent acts compared to their female counterparts is a possible explanation for this gender segregation of many adolescent peer groups. Since females are primarily not violent offenders, it may be the case that the few females who are not put off by more nefarious criminal behavior (i.e. violence) would be the most likely to be members of these mixed-sex groups.

If many adolescent peer groups are routinely segregated based on gender, mixed-groups should hold the key to understanding how each gender influences the other in terms of protective and exacerbating factors. In a recent study attempting to address this question, Avshalom Caspi and colleagues (1993) selected a cohort of New Zealand girls from childhood through adolescence and measured the sex composition of their schools (all-girl vs. mixed-sex) in addition to their levels of delinquency. Even after controlling for factors related to delinquent propensity and childhood background, the authors discovered that girls who attended schools with mixed genders were more likely to engage in delinquency throughout adolescence as opposed to girls that attended all-girls schools.

Biological and social factors may be able to explain this difference in offending and segregation of peer groups. Biologically, pubertal timing leads to changes in hormone levels during adolescence which is connected to many sex-specific features, including aggression, social dominance (Schaal, Tremblay, Soussignan, & Susman, 1996; Susman, Inoff-Germain, Nottelmann, Loriaux, Cutler, & Chrousos, 1987), and emotional distress (Brooks-Gunn, Graber,
& Paikoff, 1994; Susman, Dorn, & Chrousos, 1991). As a result of pubertal triggers, males and females become more differentiated. This change may be a catalyst in the formation of unisexual peer groups as boys and girls begin to exhibit new behaviors and traits and seek the comfort of similar peers. Puberty has also been shown to manifest at the same time developmentally as the onset of increased offending and a variety of clinical disorders (McGee, Feehan, Williams, Partridge, Silva, & Kelly, 1990; Moffitt, 1990). Socially, environmental factors may have specific effects on sex-specific methods or may interact with differences produced by biological factors. For example, gender intensification theory (Hill & Lynch, 1983) suggests that physical changes elicited from puberty may activate social cues to escalate the pressure for more sex-specific behavior. Whether or not these factors can fully explain the unisexual nature of peer groups, the fact remains that boys and girls are much more likely to congregate toward peers that are much more similar in feature and characteristics.

**Time Spent with Peers**

The last significant aspect of deviant peer associations refers to the length and sustainability of these relationships in adolescence. As previously stated, adolescents experience fluctuations in their susceptibility to peer influence, experiencing a strong increase in the early teenage years that peaks and wanes around mid to late adolescence (see Jang, 1999). These “youth in transition” as Jang (1999) and others have labeled them, are most vulnerable during mid-adolescence to deviant peer influences that have the possibility to create lengthy relationships if fostered and maintained. Aseltine (1995) was among the first to empirically observe this trend by using a three-wave panel study consisting of public high school students in the city of Boston in 1988 ($N = 435$). Initially, Aseltine (1995) desired to address whether parental attachment or deviant peer influence held the greater effect on adolescents over time.
Most studies up to this period were cross-sectional in nature and were unable to address potential variations of influence over time. Each student was observed in one-year intervals on a wide variety of measures designed to capture both parental and peer attachment and influence. Based on the use of covariance structure models and the use of polychoric correlations on study variables, Aseltine (1995) concluded that friends were the prevailing source of influence on mid-adolescent behavior.

Perhaps the most important finding of this study was the discovery of a mutually-reinforcing social process of delinquent behaviors over time. According to Aseltine (1995), there occurs a mutual interdependence of selection and socialization influences of peers on the adolescent that allows the intensification of involvement in delinquent behavior (particularly illicit drug use). Put simply, adolescents are introduced to drugs, creating more intimate relationships with drug users, which in turn creates additional opportunities and pressures to use (Aseltine, 1995). Regarding the lack of support for parental influence, Aseltine suggests that adolescents who maintain stable levels of problem behaviors overtime will attempt to evade parental monitoring. This evasion adds to the cumulative reinforcement of the problem behavior by removing a potential barrier (parental supervision) to illicit drug use, further increasing the probability of delinquent activity over time. These findings led Aseltine (1995) to emphasize the importance of “social interaction, as opposed to social influence, in general theories of problem behavior” (p. 116). The continued interaction of deviant peer groups provides the motivation and opportunity for sustained involvement in problem behavior. This effect is magnified in adolescence, as juveniles are more likely than children or adults to desire the company of peers.

While the work of Aseltine (1995) affirmed that the length of time spent with delinquent peers will increase the probability of illicit behavior by the adolescent, other work has studied the
opportunity structure created by these sustained relationships. Work by Osgood, Wilson, O’Malley, Bachman, and Johnston (1996) extended the routine activities theory to adolescent individual offending by analyzing time spent in unstructured socializing activities. To observe this, Osgood et al. (1996) obtained data from the Monitor the Future study which consisted of a nationally represented sample of more than 1,700 18- to 26-year-olds across five waves. Results indicated that socializing with peers away from home and authority figures present ample opportunities for deviant behavior. Additionally, the amount of time spent in unstructured socializing activities (e.g., spending evenings going to parties) creates situations conducive to deviance and strongly correlate with the absence of authority figures.

Based on this evidence, it is assumed that teens and young adults who spend a majority of their free time in unstructured social settings with peers will experience more opportunities to offend than those who do not. The importance of this study is the interaction of time spent with peers and type of social setting (unstructured and unsupervised). If opportunity is created in the typical routine activities fashion (i.e. offender motivation, suitable target, lack of guardianship), the increased time spent with peers within this window of opportunity will drastically increase the chances for delinquent activity to occur.

In a more modern test of opportunity and time spent with peers, Haynie and Osgood (2005) tested competing theories on how peer relations affect delinquency: socialization/normative influence and opportunity. According to socialization theory, adolescents with more delinquent friends will be more willing to engage in delinquency themselves, even after controlling for selection. Theories of socialization/normative influence date back to Sutherland (Sutherland & Cressey, 1955) and Akers (1985). Conversely, opportunity perspectives suggest that adolescents who spend more time in unstructured social activities away
from authority figures will engage in more delinquency after controlling for peer effects (see: Cohen & Felson, 1979; Hawley, 1950; Osgood et al., 1996). Haynie and Osgood (2005) tested these competing theories by using a three-wave nationally representative survey (National Longitudinal Survey of Adolescent Health) of 8,838 teens, in 7th through 12th grades. Although support was partially found for both hypotheses, Haynie and Osgood suggest that the time spent with other peers is of primary importance to delinquency, regardless of the levels of delinquency of the peer group. This finding argues that by spending lots of time “hanging out” with friends is of greater importance than the actual delinquency of the friend group in whether or not an individual will commit further delinquent acts. This support of situational opportunity is yet another study that proposes time spent with others is an important characteristic in adolescent group formation.

Summary

This section has discussed many of the characteristics that underlie the development, maintenance, and influence of the adolescent peer group. Each of these characteristics is believed to play a role in the creation and magnitude of the influence of the adolescent peer group and the unique influence and effects that the group exerts on the individual during this point in the life-course. Ultimately, the formation of the peer group coalesces into an influential force that dwarfs the influence of other institutions (e.g. school, parents, police) during the adolescent years (see Warr, 2002). The next section focuses on the peer effect and how the will of the “many” can impact the views, traits, and behaviors of the “few.”
EXPLAINING THE PEER EFFECT

Thus far, this chapter has outlined the various factors that affect the organization of a peer group, but less attention has been paid to explaining the mechanisms by which peers exert their influence. Based in the foundation of social learning theories (Akers, 1973; Burgess & Akers, 1966; Sutherland, 1947), most adolescents are believed to quickly pick up on social cues and the unique social structure provided by peers in order to fit in. In many cases, this assimilation of an individual into the group consists of the individual giving up certain aspects of their personality or behavior to imitate the (often implicitly) agreed upon characteristics of the group. This section focuses on the mechanisms used by the peer group to manipulate or control the behavior of the individual.

Fear of Ridicule

The use of ridicule as a mechanism of social control has been observed in many if not all human societies (Bierstedt, 1957). The power of ridicule rests in its ability to call into question an individual’s fitness for membership in a group, thereby providing the group an opportunity to decide if they can rely or depend on the individual. This social mechanism is particularly important during adolescence because acceptance among peers is one of the top priorities for this age-group (Warr, 2002). According to Warr (2002), “the mere risk of ridicule may be sufficient to provoke participation in behavior that is dangerous, illegal, or morally reprehensible” (p. 42). To many adolescents, acceptance among peers is a commodity that is valued above all other prosocial objectives, placing increased power in the use of ridicule as a social tool (Savin-Williams, 1980). The importance of group acceptance during adolescence is so strong that the loss of group acceptance may cause the juvenile to lose a sense of identity or purpose.
This risk of ridicule is indeed a powerful motivator that can influence the few to do the bidding of the many. Warr (2002) states that adolescents who lose their group membership reported feeling a loss of the sense of belonging, identity, and prestige that group acceptance may create. The dominance that ridicule possesses over many adolescents is based on the power that is placed on peer acceptance during these years. Unlike the identity created by parents, teachers, and other social contexts, the identity created by peer groups rests exclusively in the hands of others and can vary rapidly based on applying social ridicule in specific contexts. A study relevant to this discussion comes from Beyth-Marom, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, (1993) who asked both adult and adolescents to list the possible consequences associated with accepting or declining to engage in particular risky behaviors (e.g., smoking marijuana, drinking and driving). Not surprisingly, when rejecting a risky behavior, the reaction of peers was the most frequently cited consequence (mentioned by 80-100% of respondents across situations). Although peer reaction was the main concern, it was much less salient as a reason for performing the behavior. Additionally, adolescents as opposed to adults were more likely to mention social reactions and considered fewer consequences overall for risky behaviors. These findings by Beyth-Marom et al. (1993) coincide with the assertion by Warr (2002) that avoiding ridicule from peers is in itself a motivator to commit delinquent acts within the group.

**Loyalty**

The virtue of loyalty is considered an important element in creating friendship bonds and is readily appreciate by most adults (Warr, 2002). Loyalty may be even more important during adolescence as many new teens are vulnerable to ridicule and rely on the trust and support of their closest peers in order to gain acceptance. With regard to the delinquent peer group, loyalty can also be a powerful trait that can enhance a delinquent relationship. Being that the nature of
delinquent behavior requires the lack of capable guardianship to be successfully carried out, group members rely on each other to remain silent about their activity to authoritative figures like teachers, parents, and law enforcement. Without a strong belief of loyalty among members of a delinquent group, the threat of punishment, social ridicule, loss of freedom, or even loss of life can result from a ‘snitch’ or ‘rat’ (Warr, 2002). Because loyalty is so rare among delinquents, most offenders generally approach each other with a sense of distrust, offering one explanation of why snitches remain at the bottom of the social hierarchy in prison (McCarthy, Hagan, & Cohen, 1998; Tremblay, 1993).

Early peer formation in adolescence is the first effort for new teens to create an identity outside of the family. This identity remains with the individual throughout adolescence in most cases so it is of great importance to the adolescent to choose peers that will remain loyal throughout this experimental period. Numerous studies that have interviewed adolescents and asked them what they believe are the most important elements of friendship will include loyalty in their assessment (Coleman, 1980; Savin-Williams & Berndt, 1990; Youniss & Smollar, 1985). The trait does not only suggest that one remain silent on the details of delinquent excursions, but also it may mean the willing engagement into risky or illegal behavior that one may not otherwise participate in (Warr, 2002). In this way, loyalty becomes a direct demonstration of friendship which creates acceptance and may ward off future ridicule. This tactic may also be used by adolescents to implicate another that may otherwise divulge information regarding the illegal activity.

One study that empirically assessed this trait using the National Youth Survey was Warr’s (1993a) seminal piece examining how age and peers interact and contribute to delinquency. While not the main focus of the author’s analysis, Warr discovered that adolescents
were more likely than children or adults to admit that they would lie to the police in order to protect their friends. This finding makes sense based on the enhanced value that loyalty holds during this transitional period. According to Warr (2002), “When young persons express mutual loyalty to one another, they create a pact that holds at bay the fear of rejection and isolation that haunts so many of them” (p. 50). This pact can also act as a sort of *moral cover* that allows the adolescent to justify or nullify the gravity of the illegal act.

**Status**

Status is seen as the respect or prestige that is conferred upon an individual by a group (Warr, 2002). The concern to attain or maintain a social status in the adolescent peer group is a potential motivator that can lead to delinquent behavior. While loyalty and fear of ridicule are effective “compliance mechanisms” in encouraging conformity among the members of the group, status has the power to directly produce delinquent acts through the threat to provoke the established social hierarchy (Warr, 2002, p. 55). The importance of status among adolescents is derived from the common feature of all primate species to establish status hierarchies in groups in order to promote cooperation and stability while reducing physical confrontations (Savin-Williams, 1980). This is reflected in the speed in which status hierarchies are created and maintained once introduced to each other (Levine & Moreland, 1990). The creation of status occurs through observable characteristics that separate group members giving each social value. The level of social value given to each member in turn creates the social hierarchy based on status (Berger, Cohen, & Zelditch, 1972). Members who are designated with a higher status are expected to be more competent and are given more influence in group decisions.

According to Troyer and Younts (1997), the highest-status members of a group will “(1) be asked to contribute to the group more often, (2) accept invitations to contribute more often,
(3) receive more positive evaluations, and (4) exercise greater influence over other members” (p. 694). This assertion raises two important points regarding how status affects peer groups. First, members have varying levels of influence within the peer group based on their social value in the group. This is important to note because studies attempting to measure the strength of peer influence may be neglecting the mediating effect that social-status has on each member. For example, a self-report survey asking how friends influence adolescents may find much higher or lower levels of peer influence based on the social status of the individual surveyed and the friend in question. Second, if Troyer and Younts (1997) are correct in their assumption that higher-status group members maintain more influence and offer greater contribution to group decisions, then members should vary in their perceived value of their own influence and contribution into a group. If peer group members believe they are of varying importance and influence to the group, each individual’s perception of their own contribution must be taken into consideration when analyzing self-survey data on the influential strength of the peer group.

Other important studies examining the influence of status in peer groups has observed the same finding that social value can affect a member’s behavior and self-value. According to Cohen and Silver (1989) individual participation within the group setting is guided by two primary motives: (1) contributing to group performance and (2) avoiding status loss. The authors also add that lower-status members benefit the least from participation within the group as they are the most likely to receive negative evaluations for their contributions. This observation is interesting as it creates a paradox in which lower-status members feel the need to participate group activities in order to raise their status, but receive lower evaluations that in turn cement their social value near the bottom of the hierarchy.
While much of the discussion on social status has focused on creating stable social hierarchies, there are instances when these hierarchies are upset or challenged by members of the peer group or outsiders within a larger social context. Similar to a challenge to loyalty or threat of ridicule, challenges to social status can act as a catalyst for criminal behavior or physical confrontation. Violent responses are especially evident with males in an effort to maintain identity or “save face” (Felson, 1993). It is no mistake that males are more likely to ignore the insults of females or older persons, but often respond when insulted by other young males (Warr, 2002). In socioeconomically depressed areas, status is one of the only possessions that young males can lay claim to. Thus, heavy penalties (physical confrontation) are doled out to those who challenge status through the disrespect of another (Anderson, 1999). These penalties are often immediate resulting in status changes that are displayed to the entire group or larger social context like a neighborhood. Corroborating the discovery of quick and public responses to challenges to status, Felson (1993) found that bullies were more likely to wait for situations where their predatory behavior could be seen by peers.

Although status is important to all adolescents, some demographics (young black males living in low income neighborhoods) are more likely to take greater consideration of the rewards and consequences. Responding to the idea that respect and social status are the most important possessions for disenfranchised young males, Anderson (1994, p. 92) replied that these intangibles are “something extremely valuable (and) at stake in every interaction.” The result of mastering the intentions of these interactions creates a “code” that considers even the most subtle and unintended affronts as potential reproaches to an individual’s status, most often resulting in violent or savage responses (Anderson, 1994).
The acquisition of social status through aggression is often the catalyst that leads to delinquent action. Short and Strodtbeck (1965) were among the first to explain the direct connection between status and delinquent behavior by suggesting that delinquency manifests itself through the qualities that young males value most—spontaneity, toughness, leadership, daring—qualities that are generally accepted by society in special circumstances (e.g. military, fire rescue, sports, emergency rescue). In addition to characteristics that manifest through aggression, status can be procured through valuable objects or the control of access to specific territories. Some peer groups consisting of inner city youth have been observed to place an enhanced emphasis or status on items like cars, clothes, phones, shoes and other items that can be worn or seen by the neighborhood (Anderson, 1999; Short, 1997; Thornburg, 1982). In addition, quantitative research has observed that the status of a group can be maintained through the control of territory or “turf.” By requiring invitation or respectable deference for safe passage, the group asserts themselves as the dominant force in the area (Sullivan, 1989). Perhaps the best summation of how status influences peers to commit deviant acts was by Muuss (1980, p. 175) who articulated:

The reward system of the peer group (social acceptance, status with the opposite sex, and prestige) appears to be more potent than that of parents and teachers and sometimes even the law. Hence, an individual may feel that the possibility of injury or legal sanctions or even death is preferable to not being accepted by one’s peers.

Summary

Without a doubt, the influence of peers during adolescence plays a crucial role in the behavior of individuals during these formative years. These “peer pressures” exert their strongest effects during this time period in the life-course. While all of these effects are unique and can be
used in isolated instances, they are all interrelated and used with the same goal in mind: to
influence an individual in behaving the way the group desires. Some might say this phenomenon
is as close to a universal truth as any social construction that has been observed. The effect of
peer influence is of central interest in the hypotheses of this dissertation. Based on the
aforementioned mechanisms by which peers exert their influence, this study expects to discover
that adolescents who assimilate with delinquent peers will maintain more delinquent ties over
time. Conversely, those who maintain very few delinquent friendships will be more likely to
continue on a trajectory of non-delinquent peer relationships. These hypotheses will be formally
developed in the next chapter. For now, we turn to a discussion of a hypothesis developed by
Mark Warr in the early 1990s. Warr’s work form the foundation of the analyses presented in
later chapters.

**WARR’S “STICKY FRIENDS” HYPOTHESIS**

The function and structure of the adolescent peer group is well known, but less is
understood regarding the stability or level of influence that peer groups possess. While most
differential association/social learning theorists agree that peers are a main instigator in
delinquency, some control theorists argue that the unique age distribution of crime cannot be
explained by any known variable, including peer influence (see Gottfredson and Hirschi, 1990;
Hirschi & Gottfredson, 1983). In an attempt to disprove this notion and gain a greater
understanding into the peer group, Warr (1993a) tested aspects of differential association using
data from the National Youth Survey. The NYS is uniquely appropriate for the study of peer
associations because the questions are carefully crafted to extract information about delinquent
peers. This was accomplished by referring to specific persons rather than vague descriptions of
friend groups (Warr, 1993b). The survey yielded results of 1,726 persons aged 11-21 for five years which produced an effective $N$ of approximately 7,600.

One pivotal reason for Warr’s (1993a) test of peer relations on delinquency was the author’s additional examination into Sutherland’s (1947) claim regarding the duration and priority of delinquent associations. Recall that Sutherland initially proposed that criminal behavior is learned behavior and that delinquent behavior is more likely to be transmitted when individuals are differentially exposed to delinquent associates. Attitude transference was the primary mechanism by which the delinquent definitions were transmitted and learned. Warr (1993a) acknowledged that while Sutherland (1947) was correct in that behavior is learned and transmitted, he disagreed on the importance of attitude transference by affirming it “is not the sole or even primary mechanism of transmission,” lending support to the behaviorist reformulation of the theory (see Akers, 1985; see also Burgess & Akers 1966). The limitations of Sutherland’s theory are well documented (see Chapter 2), but Warr made this point to emphasize and clarify the aspects of peer relations that are commonly critized by control theorists. These aspects that Warr (1993a, p. 19) believed were important in the transmission of behavior were:

1. Differential exposure to delinquent peers (the number of delinquent peers reported by respondents at different ages)
2. Time spent in the company of peers
3. The importance of friends to respondents
4. Respondents’ commitment or loyalty to their own particular set of friends.

By focusing on these mechanisms that create and sustain the peer group, Warr (1993a) was able to dissect the age distribution of crime and determine the effect that delinquent peers exerted onto adolescents.
The results from Warr’s (1993a) analysis produced support for differential association by observing a strong relationship between peer influence and delinquency. The variable *peer relations* (measured as the exposure to delinquent peers, time spent with peers, and loyalty to peers) varied dramatically over the 11-21 age range. This variation actually paralleled that of the crime curve during the same period with an increase in early adolescence, peaking in mid-adolescence and a steady decline in early adulthood. Based on these initial results, Warr (1993a) desired to test the effects of age on delinquency in an effort to determine whether or not the relationship between peer relations and delinquency was spurious. Initially suggesting an age effect, once peer influences were controlled for, all effects of age on self-reported delinquency were mostly left insignificant. What had initially begun as evidence for the age-crime curve, had developed into an important statement on the power of the peer group. These findings lent additional support to the hypothesis that peer influence is the chief motivation for the increase in delinquency during adolescence.

While Warr (1993a) had discovered a commonly found relationship between peer relationships and crime, he had also discovered that the *priority* and *duration* of these relationships were both significant correlated with peer delinquency. Both of these parameters were logically distinct as measured, but were strongly correlated across all individuals examined. This indicated that the “…cumulative number of years in which an adolescent has delinquent friends has a positive effect on his or her current behavior.”

Warr (1993a) was not unique in his discovery of the priority and duration of delinquent relationships having an effect on adolescents, but the author was among the first to explain it empirically. Sutherland (1947, p. 7) had previously stated that, “delinquent behavior (that) developed in early childhood may persist throughout life.” In fact, Sutherland’s differential
association theory is predicated on attitude and behavior transference that is much more likely to occur as an individual spends more time around those who can teach and model delinquent behaviors. What Sutherland eluded, Warr (1993a) described in detail. In empirically dissecting the NYS response patterns, Warr found that a small percentage of the alcohol usage patterns (15.6%) accounted for two-thirds (67.1%) of individuals with delinquent friends. The special ordering of these sequences revealed that adolescents are likely to retain delinquent friends once they have been acquired (Warr, 1993a).

Warr (1993a) attempted to explain this phenomenon by describing these highly stable relationships as “sticky friends.” He described this concept simply when he said “delinquent friends, once acquired, are not lost in subsequent years” (Warr, 1993a, p .31). This is not to say that adolescents retain the exact same delinquent friends throughout these years, but rather that these individuals find and establish peer networks that are consistently delinquent. While this statement may seem clear, Warr’s conclusion regarding the acquisition of delinquent peers can be understood in two different ways. In the first way, Warr appears to suggest that it is the delinquent friends themselves that are “sticky” or are the primary cause for retention throughout adolescence. This argument places the origin of delinquent influence on the peer group, further suggesting that a peer effect, rather than a selection effect, is causing the individual to maintain stable delinquent relationships. The second possible interpretation of Warr’s conclusion on the effect of peers on delinquency stems from a possible selection effect rather than a peer effect. For example, if delinquent friends are consistently being maintained throughout adolescence, it may actually be the adolescent himself that is drawing interest from delinquent friends. This self-selection argument is diametrically opposed to that of a peer effect argument and is the explanation that many control theorists maintain when attempting to describe the creation and
stability of delinquent peer relationships (Gottfredson & Hirschi, 1990). Based on the ambiguity of Warr’s (1993a) seminal finding on “sticky” relationships, this dissertation will focus on answering this question and better understanding the relationship between delinquent peers and the effect of their influence on others.

The importance of the “sticky friends” hypothesis lies not only in the greater understanding of the peer group, but also the instigation and timing of delinquent ties and friendships. If one can assume that those who acquire delinquent peers are more likely to keep them, it is a natural extension to assume those who acquire these relationships at younger ages (greater priority) are more likely to possess longer histories of delinquent friendships (greater duration) (Warr, 1993a). One caveat to the sticky friends hypothesis involves the types of offenses measured. Only four offenses (alcohol use, marijuana use, cheating, and theft) were measured in Warr’s analysis, with the substance use variables holding to the pattern of “sticky friends” much more than cheating and theft. Thus, not all offenses may be as prevalent in the peer group as drug offenses.

The finding by Warr (1993a) that less serious acts of deviance and crime are much more likely to follow a discernible pattern makes sense when looking at the power of peer influence. For example, a delinquent peer group may be able to convince a new member to smoke marijuana or drink alcohol just through the application of ridicule, status attainment, loyalty, or camaraderie. Conversely, for more serious crimes like assault or robbery, the threshold for persuading one to commit these acts will be much higher. Thus, peer influence is expected to be much more effective when convincing others to commit less serious group behaviors (i.e. status offenses) than violent or serious property crimes.
Summary

Warr’s (1993a) study remains a seminal piece in the juvenile criminological literature, though it is not without its limitations. While Warr was able to render the relationship between age and self-reported delinquency insignificant by holding peer influence constant, he was only able to provide partial support for Sutherland’s (1947) proposition that duration and priority are mutually independent and reinforcing factors of delinquent influence on peers. The fundamental discovery that, “…recent friends rather than early friends have the greatest effect on delinquency” (p. 35) yields support for Sutherland’s proposition that recency matters while at the same time generating doubt about the previously accepted notion that duration of delinquent relationships is a primary motivator in problem behaviors.

Ultimately, Warr conceded that the observed “sticky-friends” phenomenon may be the result of a unified process of “feathering” and “flocking” friendships over time (Elliott et al., 1985). Adolescents are introduced into delinquent situations by their friends and after awhile become more selective in their choices of friends and behaviors. The problem with this explanation is that the root causes of delinquency can still reside in either the adolescent (self-selection) or the peer group (peer-effects). The partial support for differential association does not nullify the possibility of selection effects nor does it address the more recent call for hereditary and genetic factors that have been previously neglected in the sociological literature (see Barnes, Wright et al., 2014; Cullen, 2010). The following section touches on some of these limitations by presenting the available empirical literature related to Warr’s “sticky friends” phenomenon.
Empirical Tests of the “Sticky Friends” Hypothesis

Armed with the same National Youth Survey data as Warr (1993a, 1996), Mears and Field (2002) empirically tested competing theories of peer influence and delinquency on various types of adolescent offending (for theories, see Gottfredson & Hirschi, 1987; Warr, 1993a; Thornberry, 1987; Elliott & Menard, 1996). The authors hypothesized that delinquent peer associations will produce varied effects among older versus younger youth. This idea is rooted in previous findings that have observed peer influence decrease as adolescents age (Jang, 1999; Young, 2014). Other studies that have examined the structured role of adulthood and the responsibilities and privileges it provides have suggested a decreased effect of peer influence for new adults (Laub, Nagin, & Sampson, 1998; Moffitt, 1993; Sampson & Laub, 1993; Warr, 2002). Rooted in Warr’s (1993a) “stickiness” of delinquent peers for substance abuse-related offenses, Mears and Field (2002) conceded that these effects should only be observed for these types of offending. Since the use of drugs and alcohol are notorious for being group behaviors, these behaviors should be observed more frequently from delinquent adolescents that are not necessarily violent or persistent in their illegal behavior. Results from multiplicative interactions in ordinary least squares regression (OLS) indicated partial support for Warr’s (1993a) “sticky friends” hypothesis. More specifically, Mears and Field (2002), found an increased effect of delinquent peer associations on drug-related offenses for the older age groups. In other words, peers matter more for older respondents. One exception was the non-drug offense burglary, which exerted an increased effect with age. Warr (1996) had previously indicated that burglary has a high group violation rate but does not follow the typical “sticky friend” pattern as laid out by Warr (1993a). The increased effect on older youths to engage in drug offenses can be attributed to what Mears and Field (2002, p. 27) revealed was:
…the nature of drug offending among adolescents: as the context of drug offending becomes increasingly embedded in peer networks, youths increasingly are expected to engage in drug-related crimes, especially using marijuana and getting drunk.

More recently Beaver, Gibson, Turner, DeLisi, Vaughn, and Holand (2009) conducted a biosocial test of Warr’s (1993a) “sticky friends” hypothesis. Instead of using the oft-cited National Youth Survey data (see Warr, 1993a; 1993b; 1996; Mears & Field, 2002), Beaver et al. (2009) examined twin data from the National Longitudinal Study of Adolescent Health (Add Health). Testing the hypothesis that delinquent peer associations are relatively stable during adolescence, Beaver et al. (2009) applied behavioral genetic models isolating the genetic and environmental forces that influence youths. In separating the genetic and environmental influences in twins, the authors discovered that both genetic and environmental factors contribute to the development of delinquent peer groups. More importantly, however, was that over time genetic influences increased greatly contributing to 58% of the observed variance in peer behavior at Wave 1 and 74% at Wave 2. This finding may be in part due to the established knowledge that genetic influences appear to increase or intensify from childhood to adolescence to adulthood (Kendler, Jacobson, Gardner, Gillespie, Aggen, & Prescott, 2007; Reiss, Neiderhiser, Hetherington, & Plomin, 2000, Rutter, 2006).

The importance of the study by Beaver et al. (2009) is two-fold. First, the authors provide additional support for the hypothesis that delinquent peers are inherently criminogenic and stability in delinquent peer networks increase a youth’s chances of delinquency. Genetic factors accounted for between 37% and 62% of the variance in drug-using peers and between 40% and 56% of the variance in low self-control (Beaver et al. 2009). While more support was discovered for a genetic influence on this relationship, the authors refrain from stating that environmental
sources are not an important factor in the formation of delinquent relationships. Second, the dissecting of the mechanisms affecting the formation of delinquent relationships directed the authors to advise readers that a more multifactorial arrangement of genetic and environmental factors may be more appropriate in the study of adolescent delinquency (see also: Moffitt, 2005; Raine, 1993; Rutter 2006; Walsh & Beaver, 2009). This new marriage of social and biological factors may be imperative to the future of more fully understanding the relationship between adolescents and delinquent peer relationships (see generally, Barnes, Wright, Boutwell, Schwartz, Connolly, Nedelec, & Beaver, 2014).

The aforementioned studies make up the breadth of direct tests of Warr’s “sticky friends” hypothesis, but there have been other important empirical tests that have contributed to the knowledge of adolescents’ adherence to delinquent friendship networks and delinquency in general. Work by Haynie (2002) focused on the actual friendship networks, measuring the participation in delinquency and personality characteristics of the peer group members. The reason for focusing on friendship networks was embedded in Sutherland’s (1947) differential association theory, which assumed that the ratio of definitions favorable to those unfavorable to law violation will influence the probability of delinquent behavior. Moreover, delinquent friends provide favorable definitions of delinquent behavior and modeling, while nondelinquent friends would provide unfavorable definitions and the modeling of prosocial behavior. Adopting this perspective, Haynie (2002) concluded that observing the proportion of delinquent and nondelinquent friends in a peer group may be more critical to understanding peer influence than the frequency of delinquent acts committed overall.

While some past studies measured peer delinquency as the absolute number of delinquent friends, absolute level of delinquency occurring by friends, and the average delinquency
committed by friends, Haynie (2002) created a more relative measure of peer delinquency based on the analysis of friendship networks, rather than individual peers and their corresponding levels of delinquency. Based on the National Longitudinal Adolescent Health Survey (Add Health), Haynie (2002) used a multistage cluster sampling design that drew on a sample of 12 high schools in the United States. Two waves of data were observed, an in-school/in-home survey conducted in 1995, and an in-home survey conducted in 1996 creating a complete social network data set (N = 3,702). The survey allowed for adolescents to nominate up to 10 friends, giving the author the ability to find these individuals (if they were attending the same school), and observe their self-reported delinquent activity. If the nominated friends were deemed “close” by the respondent, they were considered part of the respondent’s social network.

The results of Haynie’s (2002) social network analysis revealed two major implications that support the overall theme of this dissertation. First, the author discovered that friendship networks are not homogenous in their participation in delinquent behavior. Haynie (2002) found that for most networks, delinquent and non-delinquent friends coexist and that a majority of all adolescents have at least some delinquent friends in their peer networks (p. 124). This seems to support the original premise of Sutherland (1947) regarding the ratio of pro-criminal and pro-social definitions. As the proportion of delinquent peers increases in the friendship network, the greater chance that delinquent definitions can become what some have termed embedded (see Coleman, 1988; Granovetter, 1985), increasing the acceptance of delinquency in the group. The second was Haynie’s (2002) implication that the findings did not support the main paradigm of social control theories. The discovery that most peer groups were heterogenous in their proportion of delinquent friendships contradicts the well-known social control perspective that suggests that “birds of a feather flock together” (Hirschi, 1969). While some evidence is
provided that delinquents cluster together, most of the sample possessed a fairly mixed group of delinquent and non-delinquent friendships.
CHAPTER 4

THE PRESENT STUDY:

HYPOTHESES AND ANALYSIS PLAN

The literature on peer relationships remains at the forefront of theoretical discussion in criminology. The conclusion by Warr (1993a, p. 32-33) that delinquent peers are “sticky” and that they demonstrate “a general, though far from universal, tendency for adolescents to retain delinquent friends once they have been acquired” was a clear indication that he believed these relationships to be unique and a previously unexplained phenomenon. While Warr (1993a) briefly describes his “sticky friends” observation by stating that delinquent relationships have a tendency to persist throughout adolescence, dissecting the principal cause of this stability has been a challenge (see Chapter 3). The lack of a clear understanding of what “sticky friends” are, as well as how they perpetuate delinquent behavior, is of principle concern to this study and will be a primary focus in the forthcoming analysis. Before moving to the analysis, a definition of “sticky peer” is offered.

WHAT IS A “STICKY PEER”?

Although the work of Mark Warr has, without question, furthered the existing literature on peer influence, the principal findings in his seminal piece: Age, Peers, and Delinquency raises many questions regarding the “sticky friends” phenomenon. The first question is, “what does the term ‘sticky’ even mean?” In Warr’s (1993a) discussion of the term, he offers the summary that “delinquent friends, once acquired, are not lost in subsequent years” (p. 31). Based on this description, it appears Warr is suggesting that, over time, delinquent relationships operate in a similar way to substances that maintain a sort of “stickiness” to them. The most important
characteristic of “stickiness” seems to be that substances remain attached to other objects as a consequence, and in many cases an undesired and unintentional consequence. Applying this rationale to Warr’s (1993a) hypothesis suggests stable delinquent relationships are not of deliberate construction, but rather an outcome of a complex interaction of selection and peer effects over time. The “stickiness” of these relationships turned out to be the result of this interaction and was the observed outcome in his work.

If this is true, there are two mutually exclusive explanations for the “sticky friends” observation. The first is that the peer group creates an environment of delinquent exposure that envelops an adolescent, making it less likely that the adolescent can leave the delinquent network over time. This explanation falls in line with the peer-effect and social learning literature that states that differential association to delinquent peers will create an environment conducive to the transference of delinquent activity (see Akers 1973, 1998, 2009; Sutherland, 1947). An example of this phenomenon in nature may be the inadvertent path of a fly into the web of a spider. The fly (being the adolescent) did not necessarily direct itself into the web, but was intercepted based on the trajectory it was following. The spider web (delinquent adolescent network) did not attempt to forcefully keep the fly attached, but by nature of the sticky characteristics of a spider web, the fly was unable to detach itself—the emphasis of “stickiness.”

The notion that “stickiness” is applied to the peer group inadvertently suggests that the actors (or peers) in these groups are not as important as the group itself. In other words, the actors are interchangeable and do not possess the unique qualities that attract lone adolescents to engage in delinquent activity. Rather, it is the collective power—perhaps it is an emergent property (Matsueda, 2013; McGloin, Sullivan, & Kennedy, 2011)—and influence of group acceptance that manipulates the adolescent. The peer group is uniquely set up to maximize
influence (recall the previous work on peer group formation in Chapter 3), and in doing so offers the comfort and benefit of “fitting in” and diminishing the possibility of opening up oneself to scrutiny or ridicule (Warr, 2002). If peer influence is demonstrated to be the principle cause of adolescent delinquency, the peer group can be declared the source for “stickiness” over time.

The second possible explanation for the “stickiness” of delinquent relationships may be grounded in the self-selection of peers into comfortable and opportunistic environments. Recall the social and self-control literature argues that adolescents are more likely to self-select into environments that are similar to their current behavioral preferences (Gottfredson & Hirschi, 1990; Hirschi, 1969; Kornhauser, 1978). If adolescents are predisposed to seeking out similar environments, those with delinquent tendencies would be much more likely to seek out and join like-minded individuals. Fundamental to Warr’s conclusion that delinquent relationships are not lost in subsequent years is the principle that these relationships vary over time and do not require the same exact peers. This leaves open the possibility that the adolescent, not the group, is actually responsible for the “stickiness” attributed to stable delinquent behavior throughout these teenage years.

If “stickiness” truly refers to the traits of the individual (i.e., the preferences that guide decision-making and group selection) rather than the group, Warr should have observed strong evidence of this trend. On the contrary, Warr (1993a) concluded that, “…recent rather than early friends have the greatest effect on delinquency” (p. 35). In explaining this finding, Warr clarified that the cumulative number of years in which an adolescent maintains delinquent friendships has a positive effect on their behavior, but among adolescents possessing the same duration of these friendships, those with most recent delinquent friends were most prone to delinquency (Warr, 1993a). While this partial support of social learning tradition (see Sutherland, 1947) indicates
that “stickiness” is more than likely representative of a group phenomenon, the possibility is left open for interpretation. Warr admitted that it was “premature at this point to attach any definite interpretation” to the “sticky friends” hypothesis. In doing so, he left the door open to future research attempting to better uncover the process behind these “sticky” observations.

The purpose of this study is to build off the work by Warr (1993a) and to more clearly define the term “sticky” as well as to determine whether this “stickiness” matters in predicting delinquency. Using a prospective, longitudinal dataset and constructing measures of both peer delinquency and individual characteristics, this study seeks to better understand the root causes underlying the stability of delinquent adolescent peer associations. Although it is previously stated that the possible “stickiness” of the individual and the group are mutually independent concepts, they may not be mutually exclusive and could represent two elements of the same construct. The following research questions have been created in an attempt to better appreciate these concerns and to provide the foundation for empirically testable explanations.

**RESEARCH QUESTIONS AND ANALYTICAL TERMINOLOGY**

This study will analyze the responses of multiple students who at times are considered respondents and at other times considered part of a peer group. Depending on the specific research question being addressed, an adolescent who was considered a respondent in one test may be considered a member of the peer group in another. To avoid confusion and ambiguity, this study will henceforth adopt the terminology that has become standard in social network analysis (e.g. Christakis & Fowler, 2007; Fowler & Christakis, 2008; Podolny & Baron, 1997). The term “ego” represents the individual of focus or the person whose behavior is being analyzed as the focal respondent. In most cases, ego will constitute the respondent, or adolescent
considered in isolation from the peer group at the time of analysis. Conversely, “alter” is an individual connected to the ego; this is the person(s) who is potentially influencing the behavior of the ego (Fowler & Christakis, 2008). A group of alters would constitute a peer group and is referred to as thus in the subsequent analysis. Thus, in short, the term ego refers to the focal respondent and the term alter(s) refers to the member(s) of the ego’s peer group.

Building on the theoretical foundation outlined in the previous chapters, three research questions will guide the analysis presented below:

RQ1: Is the delinquency of alters stable over time?
RQ2: Are the individual alters stable over time?
RQ3: Does the stability of alters (RQ2) interact with their delinquent behavior to affect the ego’s delinquency?

DATA

Sample

The present analysis relied on student survey data collected as part of the Rural Substance Abuse and Violence Project (RSVP), which was funded by the National Institute of Drug Abuse (DA-11317, Richard Clayton, PI). The RSVP is a large four-year study of adolescents across Kentucky. Annual surveys were administered to a sample of nearly 4,000 students within 60 schools. Following the RSVP, investigators deliberately selected one school from the original sample that would provide respondents for a second study. This second study would aim to analyze the short-term longitudinal changes in peer networks of freshman (9th grade) students from one mid-sized high school in Kentucky. This follow-up study is referred to as the Teenage Networks in Schools (TEENS) project. Data were initially collected by project staff who

---

2 It is important to note that the high school selected for the TEENS project was the only public school in the county.
administered the self-report baseline surveys during the homeroom period of the second week of the 2006-2007 academic year (mid-August). Nearly all students who were present and had active parental consent the day of the survey administration participated in the study.3

The resulting baseline sample included 541 participants, approximately 78% of the school’s student population. The sample was very similar to the overall population for the high school in terms of gender (52% female) but slightly overrepresented nonwhites (15% of the sample versus 10% of the population). Almost all of the nonwhite students were African American. Additionally, the sample is slightly skewed toward younger ages, as the response rate was higher among the larger ninth-grade cohort than it was for the rest of the school (84% versus 78%). Succeeding the baseline survey for all participating students were five follow-up surveys. These follow-up surveys were administered in two-week intervals and were only given to the 9th grade cohort. For the specific purposes of this dissertation, attention and subsequent analyses will be confined to the 9th grade cohort. The 9th grade cohort consisted of 213 total students with active parental consent being obtained from 84% of these students, producing a total cohort sample size of 178. Among these 178 students, survey completion rates ranged from 88% to 95% over the course of the six measurement periods (baseline plus five biweekly follow-ups).

Although this sample may lack generalizability4 the TEENS project has several unique characteristics that make it an inimitable resource. When examining the short-term changes and

---

3 Active parental consent was obtained through face-to-face contact between study investigators and the parents at a booth during a one-week registration fair at the school in July 2006. The school district asks that parents accompany their child to this fair each summer in order for them to register for classes. Only two parents contacted at this fair refused to let their child participate in the study. Nearly all of those for whom consent was not obtained were either non-attendees or were missed by investigators at the fair. In other words, “no contact” as opposed to “refusal” was the most common reason for non-participation.

4 Though generalizability is somewhat limited, it is noteworthy that the county in which the sampled high school is located is representative, demographically speaking, of the counties in the Commonwealth of Kentucky. For instance, U.S. Census estimates at the time of survey administration suggested that the county population was 90.9% white and 7.5% African American, compared with 90.1% and 7.3% for the state of Kentucky overall. Other census figures revealed compatibility between residents within the county of the sampled school and Kentucky residents.
behaviors of the peer group, it is necessary to have participation as close to 100% of the students in the targeted population as possible. This allows researchers to map out peer relationships\textsuperscript{5} with fewer chances for error. The school district itself was ideal for the purpose of this analysis as well. Geographic localities with only one public school that would be attended by all adolescents of the same age (exceptions being private schools, home-schooling, or truant/graduated adolescents) increase the probability that most of the interactions between adolescents will be observed and analyzed (Marsden, 1987).

Another important characteristic is the age of the respondents. The decision to focus exclusively on the 9\textsuperscript{th} grade cohort affords certain benefits to those analyzing peer influence. There are multiple reasons for this claim. First, 9\textsuperscript{th} grade students are close to the age of peak offending (Farrington, 1986) and have just entered a new and unfamiliar social setting, the high school. Based on the commentary regarding the organization of the peer group in Chapter 3 of this dissertation, the transition from childhood to adolescence via an amalgamation of new contexts (puberty, introduction of a new social setting, autonomy through acquisition of a driver’s license, decreased influence from parents and teachers, increased influence in peers) provides the ideal setting for an analysis of peer influence. Based on the available literature examining the strength of peer influence (see Warr, 2002), it can be reasonably assumed that this age group, perhaps more than any other, should experience the strongest and broadest peer effects.

\textsuperscript{5} Romantic relationships were purposefully left out of the forthcoming analysis. The reason for this is that romantic relationships may possess substantively different “types” of influence on the ego compared to the peer group in general (See: Giordano, 2003; Haynie, Giordano, Manning, & Longmore, 2005; McCarthy & Casey, 2008).
The social setting provided by this sample is also ideal for a social network dataset consisting of peer groups and relationship patterns. The Kentucky high school chosen for this study is situated in a primarily rural setting, away from any major metropolises or transient populations more commonly observed in urban areas. According to Verbrugge (1983), residential proximity is the single best predictor of how many times peers meet to socialize. This isolation is highly desired when tracking relationships between those who are members of the sample. For instance, students attending a high school in Los Angeles would be much more likely to have friends and relationships outside of the high school. The sheer number of similarly aged individuals per capita in a large city drastically increases the chances of friendship ties being formed outside of the school population. This is a serious concern with many social network datasets like the Add Health (Haynie, 2001). The setting for the TEENS data was relatively isolated from other areas with dense populations, meaning it is likely that peers were identified with much greater coverage than in other datasets. The Kentucky school being observed also had the designation of being the only public high school in the surrounding area.\(^6\) This allowed for the acquisition of information on nearly every friend listed on the self-report surveys since almost all of the self-reporting students maintained friendships with other students involved in the study.

Another advantage of examining a small, isolated community when looking at peer relationships is the level of network closure (i.e., the interconnectedness within a social network) that smaller communities can maintain. Community size has the ability to affect outcomes by indirectly changing aspects of the network structure (Allcott, Karlan, Möbius, Rosenblat, & Szeidl, 2007). Social networks residing in smaller communities can be expected to exhibit greater network closure based on a smaller pool of potential friends. This limited collective of

\(^6\) There was one private school in the same county.
potential relationships increases the extent to which a network of two friends are likely to overlap (Allcott et al., 2007). Neighborhoods or schools with greater overlap create stronger relationships and more interaction within the community. Networks with higher closure will generate greater trust and social sanctions between friends, increasing the incentives for cooperation and improved welfare (Coleman, 1990). Empirical assessments have validated this claim, as schools with larger grade sizes were found to negatively correlate with prosocial behaviors of students (see Allcott et al., 2007).

While the unique characteristics of the sample provide an essential starting point for inquiry, the measures available for analysis are also distinct in several ways. In addition to inquiring about peer relationships, the survey contained in-depth questions regarding key demographic and background characteristics (i.e., self-control), self-reported delinquency, unstructured socializing, as well as substance use. Thus, many of the key peer offending variables were measured by creating new variables based on each individual’s response and their own friendship with other respondents. This created the possibility for the examination of change versus stability within the school’s social network, peer influence, and the processes of peer selection. Measurement of these key processes are discussed more fully below.

**MEASURES**

**Social Network Measurement**

Each survey (baseline and five two-week follow up surveys) asked egos to write down the first and last names of their five closest friends. Every peer nominated by an ego was then given a randomized ID code (only the random ID was available in the analytical dataset). These friends were not required to be students in the same school as the ego. Based on the lack of data
for individuals residing outside of the high school, measurement for this dissertation is restricted to the social network of nominated friends who were also in the 9th grade cohort of the target school. Although this potentially creates an issue of generalizability, based on the small community and being the only public high school in the county, it reasons that strong network closure and a majority of students being captured will allow for a precise reflection of the friendship network within the social setting.

**Dependent Variables**

The present analysis will draw on two main dependent variables: the *alters crime* and *ego crime*. The first dependent variable was *ego crime*. All respondents were asked the following questions at each of the six waves of measurement: “Thinking about the last two weeks, please indicate the number of days on which you participated in the following activities.” The thirteen responses were: 1) threatened to hit or hurt someone; 2) pushed, grabbed, or shoved someone; 3) punched, hit, slapped, or kicked someone; 4) intentionally caused injury to someone else that required medical attention; 5) intentionally caused injury to yourself; 6) carried a gun; 7) carried a weapon other than a gun; 8) used a gun to threaten or injure someone; 9) used a weapon other than a gun to threaten or injure someone; 10) stole money or property worth less than $50; 11) stole money or property worth more than $50; 12) stole a car or motor vehicle; 13) vandalized public or private property. Each of the thirteen response items had an associated ordinal scale ranging from 1 = “0 days” to 7 = “13 or more days.” Responses to each of the individual items were coded so that higher values indicated a greater amount of time spent engaging in each activity over the course of the two weeks prior to survey administration. Responses to each of

---

7 The baseline survey consisted of the same ordinal scale but offered differing values since the original question asked egos “Thinking about the *last summer*, please indicate the number of days on which you participated in the following activities.” Based on the ordinal scale, the proportion of time spent (1 = “0 days spent” to 7 = “60 or more days”) stays relatively the same to the time of the bi-weekly survey and will not affect the subsequent analysis.
these items were averaged together for each respondent, meaning a single score representing the average amount of crime committed by the focal respondent was available at all six waves of data collection. Higher values reflect a greater level of involvement in criminal activity. The average level of *ego crime* at the baseline interview was 1.33 (S.D. = .805); at Wave 1 it was 1.26 (S.D. = .867); at Wave 2 it was 1.18 (S.D. = .461); at Wave 3 it was 1.23 (S.D. = .755); at Wave 4 it was 1.24 (S.D. = .814); and at Wave 5 it was 1.30 (S.D. = 1.047).

The second dependent variable—*alters crime*—was created by combining the self-reported average crime for each alter at each of the six waves. Recall that all respondents—aside from those missing cases discussed above—in the 9th grade cohort where asked about their involvement in criminal activity (see above) and that each respondent was asked to identify his/her five best friends. Relying on these two properties of the survey allowed for the linking of egos with their alters. In other words, it was possible to identify the peer network within which each ego was situated. Once the alters were linked to each ego, the amount of crime committed by the alters was assessed by drawing on their answers to the criminal behavior questions. Averaging across the alters’ delinquency allowed for the creation of a single score for each ego at each wave. In other words, *alters crime* reflects the average amount of crime committed by the average alter in the peer network. Higher values indicate a higher level of criminal involvement in the peer network.

It is important at this point to discuss one complication that arose during the measurement phase of the study. Specifically, not all egos listed five friends. Some listed one or two friends, while others consistently listed five. Averaging the amount of crime present in the peer network overcomes this problem because it scales the amount of crime in the peer network by the number
of alters who are present. The measure of *alters crime*, therefore, is best represented with the following equation:

\[ \text{alters crime}_e = \frac{\sum_{a=1}^{A} \text{crime}_a}{A} \]

where the subscript \( e \) represents the amount of alters crime present in ego \( e \)’s peer network; the numerator sums the amount of crime committed by all alters in the peer network, starting with the first alter (i.e., \( a=1 \)) and summing across all of the alters in the network (i.e., \( A \)); and the denominator divides the total sum by the number of alters \( A \) nominated by the target ego \( e \).

Figure 4.1 presents the mean, standard deviation, range and observation count for each of the averaged scores for alters (friends) 1 through 5 at each wave for criminal behavior in the past two weeks. Each *alters crime* scale is created as an average of the specific wave that it is listed next to it in Figure 4.1 and is labeled as “Alter Crime,” referring to the average crime of all alters at each corresponding wave. The variable presented in the last column of Table 4.1, the column labeled “Alter Crime” will be used in the analyses presented below.
Data was missing for alters labeled as Friend 4 during Wave 4. In order to account for this, weighted scales were created for the dependent variable alter crime in an effort to determine whether or not the missing data would present a statistically significant effect on the analysis. Figure 5.6 presents the results from this sensitivity analysis and demonstrate an insignificant effect of the missing data on the dependent variable.

Table 4.1: Descriptive Statistics for Alter Crime

<table>
<thead>
<tr>
<th></th>
<th>Friend 1</th>
<th>Friend 2</th>
<th>Friend 3</th>
<th>Friend 4</th>
<th>Friend 5</th>
<th>Alter Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.373</td>
<td>1.317</td>
<td>1.190</td>
<td>1.352</td>
<td>1.333</td>
<td>1.335</td>
</tr>
<tr>
<td>SD</td>
<td>.798</td>
<td>.852</td>
<td>.492</td>
<td>1.019</td>
<td>.811</td>
<td>.479</td>
</tr>
<tr>
<td>Range</td>
<td>5</td>
<td>6</td>
<td>3.23</td>
<td>6</td>
<td>6</td>
<td>3.86</td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td>115</td>
<td>105</td>
<td>121</td>
<td>102</td>
<td>158</td>
</tr>
<tr>
<td><strong>Wave 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.551</td>
<td>1.500</td>
<td>1.312</td>
<td>1.223</td>
<td>1.363</td>
<td>1.404</td>
</tr>
<tr>
<td>SD</td>
<td>1.538</td>
<td>1.364</td>
<td>1.022</td>
<td>0.751</td>
<td>.990</td>
<td>.774</td>
</tr>
<tr>
<td>Range</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5.04</td>
</tr>
<tr>
<td>N</td>
<td>101</td>
<td>102</td>
<td>87</td>
<td>83</td>
<td>73</td>
<td>143</td>
</tr>
<tr>
<td><strong>Wave 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.123</td>
<td>1.162</td>
<td>1.078</td>
<td>1.104</td>
<td>1.111</td>
<td>1.132</td>
</tr>
<tr>
<td>SD</td>
<td>.373</td>
<td>.416</td>
<td>.201</td>
<td>.255</td>
<td>.314</td>
<td>.311</td>
</tr>
<tr>
<td>Range</td>
<td>3.08</td>
<td>2.08</td>
<td>1.27</td>
<td>1.54</td>
<td>2.08</td>
<td>3.08</td>
</tr>
<tr>
<td>N</td>
<td>113</td>
<td>91</td>
<td>102</td>
<td>85</td>
<td>77</td>
<td>152</td>
</tr>
<tr>
<td><strong>Wave 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.185</td>
<td>1.178</td>
<td>1.136</td>
<td>1.151</td>
<td>1.155</td>
<td>1.132</td>
</tr>
<tr>
<td>SD</td>
<td>.626</td>
<td>.605</td>
<td>.435</td>
<td>.457</td>
<td>.528</td>
<td>.446</td>
</tr>
<tr>
<td>Range</td>
<td>4.15</td>
<td>4.15</td>
<td>3</td>
<td>2.62</td>
<td>2.62</td>
<td>4.15</td>
</tr>
<tr>
<td>N</td>
<td>102</td>
<td>91</td>
<td>85</td>
<td>90</td>
<td>82</td>
<td>145</td>
</tr>
<tr>
<td><strong>Wave 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.520</td>
<td>1.403</td>
<td>1.266</td>
<td>0⁸</td>
<td>1.138</td>
<td>1.338</td>
</tr>
<tr>
<td>SD</td>
<td>1.647</td>
<td>1.229</td>
<td>0.762</td>
<td>0</td>
<td>0.682</td>
<td>0.711</td>
</tr>
<tr>
<td>Range</td>
<td>12.38</td>
<td>6</td>
<td>4.08</td>
<td>0</td>
<td>6</td>
<td>4.18</td>
</tr>
<tr>
<td>N</td>
<td>102</td>
<td>104</td>
<td>86</td>
<td>0</td>
<td>82</td>
<td>140</td>
</tr>
<tr>
<td><strong>Wave 5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.060</td>
<td>1.299</td>
<td>1.094</td>
<td>1.306</td>
<td>1.420</td>
<td>1.239</td>
</tr>
<tr>
<td>SD</td>
<td>0.228</td>
<td>1.046</td>
<td>0.323</td>
<td>0.986</td>
<td>1.211</td>
<td>0.659</td>
</tr>
<tr>
<td>Range</td>
<td>1.54</td>
<td>6</td>
<td>2.38</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>N</td>
<td>51</td>
<td>77</td>
<td>74</td>
<td>69</td>
<td>59</td>
<td>118</td>
</tr>
</tbody>
</table>

⁸ Data was missing for alters labeled as Friend 4 during Wave 4. In order to account for this, weighted scales were created for the dependent variable alter crime in an effort to determine whether or not the missing data would present a statistically significant effect on the analysis. Figure 5.6 presents the results from this sensitivity analysis and demonstrate an insignificant effect of the missing data on the dependent variable.
Key-Independent Variables

The key independent variable in this dissertation is time, which was indexed by the wave of measurement being analyzed. Being a longitudinal examination, this study desires to observe the rate of change in *alters crime* and *ego crime* over time. The *wave* variable consists of six independent values, each representing an observation point from the study. All six waves were conducted at equal two-week intervals that spanned over a two-month period. Thus, the *wave* variable was coded as a count variable where 0 = *baseline interview*, 1 = *wave 1 interview*, and so on to 5 = *wave 5 interview*.

The length of time in between each wave in this dissertation is extremely important to point out. One of Warr’s (1993a) most surprising findings was that recent friendships rather than early friendships have the greatest effect on delinquency. Based on this finding, we should logically expect that in observations occurring in more proximate intervals (e.g., weeks rather than years), criminal behavior should maintain its strongest presence. In other words, by measuring time in shorter intervals, this dissertation presents an extension of Warr’s (1993a) “sticky friends” test by more accurately testing these recent friendships and their impact on the observed adolescent. Figure 4.2 presents a visual example of the separation between observations for both Warr’s (1993a) National Youth Survey data and the data from the TEENS study which will be analyzed here.
Although the key focus of this dissertation is the influence of peer relationships on the stability of deviance over time, several additional variables are controlled (see Table 4.3 and Table 4.4). At the initial baseline survey, the following variables were measured and are controlled in the multiple regression models: sex, age, race, parental attachment, commitment, and involvement. After the initial baseline, involvement was also measured at each subsequent wave. Sex was measured as a dichotomous measure where male = 0 and female = 1. An interval scale was created for age and all respondents reported being between 14 and 16 years old. The average age for the sample was 14.37 years old, Respondent race was measured as a dichotomous measure of white = 0 or nonwhite = 1. The sample was comprised of roughly 16% nonwhites.

A 12-item scale was created to assess maternal attachment. For all 12 items, the respondent was asked, “How often do the following things happen with your mother?” The items captured unique aspects of the respondent’s relationships with their mothers exclusively.\(^9\) The

---

\(^9\) Items related to father attachment were omitted from this scale, as preliminary descriptive analyses showed mothers to be more universally involved in the daily lives of the respondents, with lower response rates for items related to fathers.
response categories for each item ranged from 1 (“never”) to 5 (“always”), with an overall average of 3.897 (S.D. = .775). All of the items identified as measuring maternal attachment covaried significantly and an exploratory factor analysis suggested one latent measure was sufficient to summarize the total variable in the 12 items (see Table 4.5). The Cronbach’s α = .89. The response average for each item included in the maternal attachment scale can be observed in Table 4.3 below. Higher values indicate greater maternal attachment at the baseline observation.

To measure commitment, an index that averaged student responses across six items that covaried significantly with each other was used. The questions used were measured with a five-point Likert scale and the items asked how strongly the student agreed or disagreed with various statements about their relationships with teachers, attitudes toward school, and the importance of scholastic achievement (Cronbach’s α = .710). The responses were used to indicate the extent to which the respondent agreed with statements such as “I care what my teachers think about me,” “Classes are not a waste of time,” and “I look forward to coming to school.” The sample’s average level of commitment was 3.992 (S.D. = .708). All of the six unique items that make up the commitment scale can be observed in Table 4.3. Higher values indicate a greater commitment to obtaining an education and to teachers at the school.
Table 4.3: Descriptive Statistics, Variables, and Scales

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale</th>
<th>Obs (N)</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>(0 = Male, 1 = Female)</td>
<td>165</td>
<td>0.509</td>
<td>0.501</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Age</td>
<td>(In years)</td>
<td>163</td>
<td>14.374</td>
<td>0.557</td>
<td>14 - 16</td>
</tr>
<tr>
<td>Race</td>
<td>(0 = White, 1 = Nonwhite)</td>
<td>166</td>
<td>0.157</td>
<td>0.365</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

*Parental Attachment Variables*

“My Mother”:

- Understands me
  - (1 = Never to 5 = Always) 164 3.811 1.071 1 - 5
- Makes fair rules
  - (1 = Never to 5 = Always) 164 3.561 1.131 1 - 5
- Knows where I am
  - (1 = Never to 5 = Always) 163 4.276 0.958 1 - 5
- Knows who I am with
  - (1 = Never to 5 = Always) 162 4.136 1.012 1 - 5
- Is concerned with my schoolwork
  - (1 = Never to 5 = Always) 163 4.546 0.855 1 - 5
- Helps me with homework
  - (1 = Never to 5 = Always) 164 3.463 1.195 1 - 5
- Talks to me about my report card
  - (1 = Never to 5 = Always) 164 3.945 1.240 1 - 5
- Sets time for me to be home at night
  - (1 = Never to 5 = Always) 164 3.884 1.340 1 - 5
- Makes me feel wanted
  - (1 = Never to 5 = Always) 163 4.294 1.116 1 - 5
- Allows me to share my feelings and thoughts
  - (1 = Never to 5 = Always) 161 3.143 1.332 1 - 5
- And I do things (watch TV, go to dinner) together
  - (1 = Never to 5 = Always) 162 3.549 1.185 1 - 5
- And I talk to each other
  - (1 = Never to 5 = Always) 163 4.141 1.005 1 - 5

*Commitment Variables*

- I care what my teachers think of me
  - (1 = Strongly Disagree to 5 = Strongly Agree) 165 3.848 1.080 1 - 5
- Teachers are interested in what I say or do
  - (1 = Strongly Disagree to 5 = Strongly Agree) 163 3.773 1.151 1 - 5
- Wouldn't quit school if possible
  - (1 = Strongly Disagree to 5 = Strongly Agree) 165 4.527 0.991 1 - 5
- Classes are not a waste of time
  - (1 = Strongly Disagree to 5 = Strongly Agree) 164 3.933 1.209 1 - 5
- Getting an education is important
  - (1 = Strongly Disagree to 5 = Strongly Agree) 165 4.624 0.851 1 - 5
- Look forward to coming to school
  - (1 = Strongly Disagree to 5 = Strongly Agree) 166 3.229 1.315 1 - 5

87
Involvement was measured at each observation point including the initial baseline. All of the six items related to involvement covaried significantly, as the exploratory factor analysis suggested one latent measure was sufficient to summarize the total variable in the six items. This latent measure looked at the respondent’s average level of involvement for each of the six waves (See Table 4.4). Each respondent was asked, “During the last two weeks, how much time was spent…”, with twelve unique questions assessing multiple dimensions of involvement in various activities where antisocial or peer influence would be weak or nonexistent. Specifically, the twelve questions that made up the involvement scale at each wave were: 1) watching TV or DVDs; 2) reading for fun; 3) doing homework; 4) playing video or computer games; 5) spending time in an online community; 6) spending time surfing the web or doing email (not IM); 7) spending time with family; 8) doing chores around the house; 9) working a job; 10) attending church; 11) participating in school sports; 12) participating in extracurricular activities. Responses ranged from 0 = “none” to 6 = “50+ hours” with larger values indicating more time spent (or involved) in the prosocial activity. The average of these responses was taken for each wave. The overall average in the sample at the baseline survey was 2.382 (S.D. = .641). The involvement scale for the baseline registered the lowest Cronbach’s α score with .64. The Cronbach’s α score was greater than .78 for all other waves.

After a scale of involvement was created for each of the six waves, these averages were added and divided by the total number of waves to create the mean overall involvement of egos (Cronbachs α = .906). The complete average level of involvement for all egos was 2.342 (S.D. = .600). The main reason for constructing this scale was to measure involvement in a manner similar to the other variables being controlled. In other words, a respondent-level (rather than a time-specific) scale of involvement was created so that all control variables were static measures.
The subsequent analyses will refer to these scales when controlling for respondent’s attachment, commitment, and involvement in conventional norms.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale</th>
<th>Obs. (N)</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the last two weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>how much time was spent:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watching TV or DVDs</td>
<td>1 = None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = 1-4 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading for fun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing Homework</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing computer or video games</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spending time in an online</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spending time online surfing the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>web or doing email (not IM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 5</td>
<td>135</td>
<td>2.281</td>
<td>1.454</td>
<td>1 – 6</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td></td>
</tr>
</tbody>
</table>

**Spending time with family**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>152</td>
<td>3.441</td>
<td>1.491</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>160</td>
<td>3.275</td>
<td>1.396</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>152</td>
<td>3.276</td>
<td>1.401</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>151</td>
<td>3.066</td>
<td>1.408</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>135</td>
<td>3.096</td>
<td>1.435</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>

**Doing chores around the house**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>154</td>
<td>2.455</td>
<td>1.194</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>159</td>
<td>2.352</td>
<td>1.126</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>153</td>
<td>2.340</td>
<td>1.131</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>153</td>
<td>2.209</td>
<td>1.173</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>133</td>
<td>2.368</td>
<td>1.252</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>

**Working a job**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>152</td>
<td>1.743</td>
<td>1.210</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>159</td>
<td>1.711</td>
<td>1.155</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>152</td>
<td>1.743</td>
<td>1.176</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>152</td>
<td>1.816</td>
<td>1.314</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>135</td>
<td>1.822</td>
<td>1.286</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>

**Attending church**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>154</td>
<td>2.006</td>
<td>1.306</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>160</td>
<td>1.819</td>
<td>1.081</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>150</td>
<td>1.953</td>
<td>1.260</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>152</td>
<td>2.000</td>
<td>1.302</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>135</td>
<td>2.059</td>
<td>1.337</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>

**Participating in school sports**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>152</td>
<td>2.211</td>
<td>1.601</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>159</td>
<td>2.063</td>
<td>1.508</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>151</td>
<td>2.093</td>
<td>1.458</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>149</td>
<td>2.013</td>
<td>1.400</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>134</td>
<td>2.104</td>
<td>1.557</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>

**participating in extracurricular activities**

<table>
<thead>
<tr>
<th>Baseline</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>153</td>
<td>1.954</td>
<td>1.294</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 2</td>
<td>159</td>
<td>1.975</td>
<td>1.273</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 3</td>
<td>152</td>
<td>2.033</td>
<td>1.268</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 4</td>
<td>152</td>
<td>1.967</td>
<td>1.319</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Wave 5</td>
<td>135</td>
<td>2.059</td>
<td>1.397</td>
<td>1 – 6</td>
</tr>
</tbody>
</table>
Table 4.5: Factor Analysis Results for the First Factor

<table>
<thead>
<tr>
<th>Scale</th>
<th>Obs. (N)</th>
<th>Mean</th>
<th>Eigenvalue</th>
<th>Proportion</th>
<th>Reliability Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Average Interitem Covariance</td>
</tr>
<tr>
<td>Attachment</td>
<td>155</td>
<td>3.897</td>
<td>5.32</td>
<td>0.891</td>
<td>0.537</td>
</tr>
<tr>
<td>Commitment</td>
<td>162</td>
<td>3.992</td>
<td>1.89</td>
<td>1.11</td>
<td>0.354</td>
</tr>
<tr>
<td>Involvement (Baseline)</td>
<td>143</td>
<td>2.381</td>
<td>2.12</td>
<td>0.59</td>
<td>0.248</td>
</tr>
<tr>
<td>Involvement (Wave 1)</td>
<td>142</td>
<td>2.399</td>
<td>3.08</td>
<td>0.721</td>
<td>0.421</td>
</tr>
<tr>
<td>Involvement (Wave 2)</td>
<td>156</td>
<td>2.261</td>
<td>3.24</td>
<td>0.677</td>
<td>0.392</td>
</tr>
<tr>
<td>Involvement (Wave 3)</td>
<td>143</td>
<td>2.314</td>
<td>4.15</td>
<td>0.834</td>
<td>0.529</td>
</tr>
<tr>
<td>Involvement (Wave 4)</td>
<td>142</td>
<td>2.243</td>
<td>4.26</td>
<td>0.784</td>
<td>0.539</td>
</tr>
<tr>
<td>Involvement (Wave 5)</td>
<td>131</td>
<td>2.295</td>
<td>4.83</td>
<td>0.756</td>
<td>0.7</td>
</tr>
</tbody>
</table>
ANALYTICAL STRATEGY

Given the longitudinal structure of the TEENS data, the multi-level model for change (Singer & Willett, 2003) was estimated using the “xtmixed” command in *Stata 13.1*. A longitudinal design is the most appropriate approach for this dissertation because all major research questions refer to stability/change over time. Also, the manner in which the data were collected (six separate waves) is ideal for statistical analysis in the longitudinal format.

The Case for Longitudinal Designs

While cross-sectional designs allow for certain inferences to be made, longitudinal designs are thought to be superior for addressing temporal ordering concerns; though it is worth noting that temporal ordering is not always easy to establish even with longitudinal data. The reason for this is inherent in the design of measuring variables over time; temporal ordering can be established with greater certainty when it can be shown that variance in $y$ is observed after (temporally speaking) variance in $x$ occurs. While longitudinal designs may not be able to completely elucidate causal inference—generally speaking, they do not allow one to address the non-spuriousness criterion any better than cross-sectional designs—they do allow for a more precise estimation of the temporal ordering of the observed variables (Shadish, Cook, & Campbell, 2002). This advantage alone is enough to promote the use of longitudinal data analysis over cross-sectional when a choice is permitted.

Even with such a strong case for longitudinal data analysis, there are many scholars who still prefer using cross-sectional techniques (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1995). Many of these advocates suggest that by measuring outcome differences for a time-related variable, for instance age, real change over time can be imitated. While observed “change” may be the true explanation, “cross-sectional data can never confirm this possibility
because equally valid competing explanations abound” (Singer & Willett, 2003, p. 9). This is because any random sample at one age may differ dramatically from a random sample at another. Any observed differences in outcomes may be due to alternative explanations related to the specific age cohort and not to a systematic individual change. In statistical terms, cross-sectional studies confound age effects with those attributable to cohort/history and are prone to selection bias (Singer & Willett, 2003).

While longitudinal data analysis has been established as a more sound and effective method of measuring change, some methods of collecting data for this type of analysis are more efficient than others. For instance, longitudinal studies that only collect two waves of data are only marginally better than a typical cross-sectional data set. For many years, researchers argued it was sufficient to study change by creating a narrow definition of change as an increment: the simple difference between scores assessed on two measurement occasions (see Willett, 1989). The problem with this observation is that it views change as the acquisition (or loss) of the initial increment. This limited perspective creates a few issues because the size of an increment is not able to describe the actual process of change. The first issue is centered on the inability to determine the shape of each person’s individual growth trajectory. Second, by measuring change as an increment we are unable to distinguish true change from measurement error. Both of these issues can lead to an erroneous conclusion that change is occurring when in reality, we are unable to determine what type of change is occurring or if it is an artifact of measurement error or, simply, regression to the mean (Shadish, Cook, & Campbell, 2002).

Effective use of a longitudinal analysis requires multiple waves of data, but scholars differ on their position of how many waves are enough. In general, more waves are better and create more reliability. Thus, cost and logistical constraints often circumscribe the data collection
process. That being said, more waves create the possibility for applying more elaborate statistical models. The fact that the TEENS data includes six separate waves all equally spread over the course of two months is one of the most important features of this data source. This will allow for the estimation of growth as a nonlinear effect (if necessary), a feature that is generally not available to researchers using fewer than 4 waves of data.
CHAPTER 5
ANALYSES AND RESULTS

This chapter presents the results gleaned from the analyses used to answer the three research questions outlined in the previous chapter. The analysis unfolded in a series of steps, where the primary goal was to address—in turn—each of the three research questions outlined above. When addressing RQ1 and RQ3, the following steps were followed. First, a simple descriptive analysis of the observed growth in the dependent variable of focus (alters crime first and ego crime second) was conducted. The second step was to estimate the bivariate relationships between the wave-specific measures of focus. The third step to the analysis was to estimate the multilevel model for change (MMC; Singer & Willett, 2003) for both of the dependent variables.

RQ2 required a different type of analysis that was more descriptive than it was inferential. In order to examine the relative stability of individual alters in ego networks, it was necessary to create a way to measure the rate of reselection of alters by individual egos from wave to wave. This reselection, what will be referred to here as “recycling”, was measured by observing the nominations by the ego for wave $w$ and calculating the number of those alters who were nominated in previous waves (e.g., the pervious wave $w-1$). The probability that an ego would recycle an alter from a previous wave to the current wave was then measured and observed, creating a descriptive analysis of relative stability for each ego’s alter network.
RQ1: IS THE DELINQUENCY OF ALTERS STABLE OVER TIME?

Empirical Growth Plots

One of the most effective ways to investigate a longitudinal data set is to begin by conducting exploratory probes to observe how individuals change over time. Descriptive analyses are essential to this end, as they can reveal the nature and idiosyncrasies of each individual’s pattern of growth (Singer & Willett, 2003). In this section a basic exploratory analysis will be conducted in the form of an empirical growth plot to assist in visualizing how an individual changes over time.

The purpose of an empirical growth plot is straightforward; it is the simplest way of visualizing how an individual changes over time. This temporally sequenced graphic demonstrates an individual’s (or individuals’) empirical growth over time and is an effective visual aid during preliminary examinations into any longitudinal data set. While a growth plot of each ego can be constructed for all 155 respondents, the amount of information would be overwhelming. To correct for this, a random sample of 20 egos was selected out of the original sample of 155. Figure 5.1 shows the empirical growth of alters crime for each of the 20 randomly drawn egos. The horizontal axis begins with the baseline measurement (or Wave “0”) and ends with the sixth measurement point (Wave “5”). The vertical axis presents the averaged level of crime by alters at each time period (i.e., alters crime). Since egos were asked to list five alters at each wave, every wave in the growth plot represents the mean level of crime for all alters A nominated where A can range between 1 and 5, which is to say that alters crime was generated based on the total number of nominations made even if that number was below the maximum of 5 (see the description and the accompanying equation for alters crime in the Measures section).
Several important observations can be made based on the results of Figure 5.1. First, *alters crime* seems to remain relatively stable throughout most of the individual cases. With the exception of ego 12, 28, 46, and 82, growth slopes appear relatively weak with most hovering around a slope of 0. This finding is an important preliminary observation because it supports the previous work of Warr (1993a) that would suggest that a majority of adolescents maintain steady delinquent or nondelinquent relationships over time. Another important observation can be drawn from these growth plots. Taking a further look into the four cases of greater instability (case 12, 28, 46, and 82), we see that egos who report friendships with alters who engage in criminal activity maintain similar criminal patterns over time. This directly supports the “sticky friends” hypothesis and seems to reinforce the principle that among egos who do associate with delinquent alters, those alters appear to remain stable at least in kind (i.e., one who has delinquent alters at time $t$ is likely to have delinquent peers at time $t^1$, $t^2$, and so on).

Although this inquiry provides preliminary support for the stability of criminal and noncriminal alters over time, it is not enough to conclude that peer effects or selection effects are the root cause behind this constancy in behavior. Rather, Figure 5.1 only provides a visual example of the relative dichotomy in behavior that can be expected from peer groups; that a majority do not commit crime at all and that a small minority are responsible for a disproportionate amount of crime (Wolfgang, Figlio, & Sellin, 1972).
Figure 5.1: Empirical Growth Plots of *Alters Crime* for 20 Randomly Drawn Egos
Bivariate Analyses

Table 5.2 displays the bivariate correlation coefficients for the *alters crime* variable at the baseline and five subsequent waves. Most of the correlations are statistically significant at a probability level of $p < .05$. Based on the limited sample size ($N = 155$), these levels of significance are not necessarily empirically expected (Agresti & Franklin, 2013). Of the correlations, all except Wave 2 are significantly correlated with the Baseline Wave. Additionally, these correlations maintain a strong relationship ranging from .2741 to .4723. One of the general weaknesses with Warr’s (1993a) analysis of the NYS data was the year long gap in observations. This exposes his analysis to potential internal validity threats as the corresponding rates of deviance over time could be attributed to factors other than those observed. Since this study uses much more frequent observations, finding that average levels of crime for the first wave of data (baseline) correlate significantly with the last wave of data, would add to the existing research by suggesting a significant degree of stability in bi-weekly adolescent delinquency. Supporting the general conclusion drawn from the empirical growth plots, the bivariate correlations suggest there is general stability in criminal behavior for alters over time.

### Table 5.2: Avg. *Alters Crime* Bivariate Correlations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Avg.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 1 Avg.</td>
<td>.4723*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 2 Avg.</td>
<td>.159</td>
<td>.2703*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 3 Avg.</td>
<td>.2900*</td>
<td>.4110*</td>
<td>.6290*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wave 4 Avg.</td>
<td>.3167*</td>
<td>.3722*</td>
<td>.2162*</td>
<td>.5328*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wave 5 Avg.</td>
<td>.2741*</td>
<td>0.1683</td>
<td>.4354*</td>
<td>0.1693</td>
<td>0.1847</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < .05*
Multilevel Models for Change (MMC)

This section presents the MMC analyses and subsequent results displayed in Tables 5.3 through 5.6. The first step in any MMC analysis is to assess whether the dependent variable varies significantly across each independent time period. This is accomplished by using a model in which only an intercept (i.e., no predictors or slope) for each observation point is captured by plotting only the means of crime over time. This initial model is referred to as an unconditional means model and can be observed in Table 5.3 and visually in top-right panel of Figure 5.4. In this analysis, the overall mean for alters crime was approximately 1.278 (S.E. = .315, p < .05). The random variance component (in standard deviation units) was 0.315, meaning that approximately 68% of the sample had an intercept value that fell between 1.278 ± 0.315. The means model provides the overall mean across all six measurement periods but it does not indicate whether that mean level rises, falls, or stays stable over the course of the study period. That issue will be addressed in the next two models.

Since change over time is the main theoretical focus of this study, the second step of this analysis is to enter the wave variable into the model and assess whether alters crime significantly changes over time. The results from this model (unconditional linear growth) are shown numerically in Table 5.3 and graphically in the bottom-left panel of Figure 5.4. When adding wave into the linear growth model, the unstandardized parameter estimate of changes in alters crime was -.012 for each additional unit of time (wave). In other words, the parameter reveals a trend of slightly negative growth in alters crime over time. The slope of this analysis is not statistically significant at the p < .05 level, suggesting that time does not possess a significant influence on average alters crime. In other words, the intercept-only model appears to remain the best-fitting model. The random variance component for the linear wave coefficient was 0.056,
indicating that roughly 68% of the sampled respondents exhibited linear changes in *alters crime* that ranged between -0.068 and 0.044.

Although the linear model provides preliminary support for a stable behavior pattern among alters, there is the possibility that the relationship between these two variables is in fact not a linear relationship. If this were the case, the linear model might have masked all growth, revealing a non-significant slope for the *wave* variable. To investigate for this possibility, a non-linear growth model was created to observe whether or not *alters crime* follows a non-linear trajectory. The results from the non-linear growth model are examined numerically in Table 5.3 and visually in the bottom-right panel of Figure 5.4. Based on the results from the non-linear model, it appears the rate of change does become steeper, albeit in a negative direction over time (mean growth rate = -0.107). The slope also achieves statistical significance at the $p < .05$ level, suggesting *alters crime* trends in a non-linear trajectory over time and a non-linear model should be the appropriate statistical model to capture this change.

While the relationship between alters crime and time maintains a slight non-linear trajectory (see bottom right panel Figure 5.4), model fit statistics suggests that this trajectory may not be substantially better at explaining *alters crime* compared to the much more parsimonious linear (or intercept-only) model. One reason for this assertion can be found by observing the log likelihood fit statistic for both the linear and non-linear models in Table 5.4. As a model improves in its predictive power of the observed relationship, the log likelihood value (written as $\ln(\text{likelihood})$ in the table) will approach zero. As can be seen in, the log likelihood only changes from -701.07 to -696.86. By design, non-linear models possess greater predictive power, so if the non-linear model was shown to be the best fit, the log likelihood for the model should be
substantially closer to zero than the linear model. Since both are extremely close in value, the rule of parsimony suggests we should prefer the simpler model.
<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Unconditional Means Model</th>
<th>Unconditional Linear Growth</th>
<th>Unconditional Non-Linear Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (mean initial level), ( \gamma_0 )</td>
<td><strong>1.278</strong> (*) .029</td>
<td><strong>1.306</strong> (*) .036</td>
<td><strong>1.366</strong> (*) .042</td>
</tr>
<tr>
<td>Wave (mean growth rate), ( \gamma_{10} )</td>
<td>-</td>
<td>-.012</td>
<td>-.107 (*) .034</td>
</tr>
<tr>
<td>Wave(^2), ( \gamma_{20} )</td>
<td>-</td>
<td>-</td>
<td><strong>.020</strong> (*) .007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>St. Deviation</th>
<th>St. Error</th>
<th>St. Deviation</th>
<th>St. Error</th>
<th>St. Deviation</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variance in intercept, ( \sigma_{0i} )</td>
<td>.315</td>
<td>.026</td>
<td>.292</td>
<td>.044</td>
<td>.291</td>
<td>.043</td>
</tr>
<tr>
<td>Random variance in linear slope, ( \sigma_{1i} )</td>
<td>-</td>
<td>-</td>
<td>.056</td>
<td>.021</td>
<td>.058</td>
<td>.021</td>
</tr>
<tr>
<td>Level 1 error variance, ( \sigma_\varepsilon )</td>
<td>.494</td>
<td>.013</td>
<td>.483</td>
<td>.015</td>
<td>-.003</td>
<td>.390</td>
</tr>
</tbody>
</table>

**Rho, \( \rho \)** | .289                  | .268                  | .270                  |


**AIC** | 1414.605             | 1414.146             | 1407.720             |

**BIC** | 1428.862             | 1442.660             | 1440.986             |

Note: \( b \) = unstandardized parameter estimate; St. Error = standard error; St. Deviation = standard deviation

\(*)p<.05\) (two-tailed tests)
Figure 5.4: Multivariate Graphs for Change in *Alters Crime*
Linear Growth Modeling with Controls

The third step in the analysis is to add individual-level controls to the linear growth model. First, individual-level scales related to social bond theory (attachment, commitment, and involvement) are added one-by-one to determine whether the relationship between time and average alters crime will significantly change. Table 5.5 presents the results for all three of these independent linear growth models. These models reveal that when attachment, commitment, or involvement are controlled, the relationship between alters crime and time is not statistically significant for all three models. On its surface, the findings from these three models suggest involvement in conventional activities has a positive effect on alters crime (i.e., the coefficient of relationship between all three bonds and alters crime is negative and statistically significant). Yet, the main point of the analysis was to control for the social bond variables and then see whether the impact of the wave variable was substantively altered due to their inclusion. As was see, there was no substantive change to the impact of time on alters crime, suggesting the finding from the initial round of analyses was not an artifact due to the omission of relevant control variables.
Table 5.5: Multilevel Models for Change (MMC) with Controls for *Alters Crime*

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Linear Growth Controlling for Attachment</th>
<th>Linear Growth Controlling for Commitment</th>
<th>Linear Growth Controlling for Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(n = 161, 821 Obs.)                      |  
(n = 163, 831 Obs.)                      |  
(n = 169, 850 Obs.)                      |
| Intercept (mean initial level), $\gamma_{00}$ | 1.622  .158 | 1.687  .178 | 1.06  .121 |
| Wave (mean growth rate), $\gamma_{10}$ | -.012  .011 | -.012  .011 | -.012  .011 |
| Control Variable | -.081*  .039 | -.094*  .044 | .104*  .121 |

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variance in intercept, $\sigma_{0i}$</td>
<td>.297</td>
<td>.045</td>
<td>.29</td>
<td>.045</td>
<td>.283</td>
<td>.044</td>
</tr>
<tr>
<td>Random variance in linear slope, $\sigma_{1i}$</td>
<td>.057</td>
<td>.022</td>
<td>.054</td>
<td>.022</td>
<td>.057</td>
<td>.027</td>
</tr>
<tr>
<td>Level 1 error variance, $\sigma_{\varepsilon}$</td>
<td>.490</td>
<td>.015</td>
<td>.491</td>
<td>.015</td>
<td>.485</td>
<td>.015</td>
</tr>
<tr>
<td>$Rho$, $\rho$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$AIC$</td>
<td>1374.578</td>
<td>1392.553</td>
<td>1407.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$BIC$</td>
<td>1407.551</td>
<td>1425.611</td>
<td>1440.682</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $b =$ unstandardized parameter estimate; St. Error = standard error; St. Deviation = standard deviation

*p<.05 (two-tailed tests)*
The final model estimated in this portion of the analysis included all of the social bonds variables and the demographic controls simultaneously in the same model. As before, the primary aim is to investigate whether the impact of wave is affected by the inclusion of the other variables. Table 5.6 presents the results for the linear growth model controlling for attachment, commitment, involvement, age, race, and sex. This model reveals that after controlling for all relevant behaviors and demographic characteristics, the relationship between time and alters crime does not substantively change. In fact, only one of the coefficients (sex) was statistically significant at the p < .05 level. Based on the coding of sex (0 = “male” and 1 = “female”) a coefficient of -.129 represents a significant decrease in alters crime for females compared to males.
Table 5.6: Multilevel Models for Change (MMC) with Controls for *Alters Crime*

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>( b )</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (mean initial level)</td>
<td>1.414</td>
<td>.823</td>
</tr>
<tr>
<td>Wave (mean growth rate), with controls</td>
<td>-.015</td>
<td>.011</td>
</tr>
<tr>
<td>Attachment</td>
<td>-.064</td>
<td>.045</td>
</tr>
<tr>
<td>Commitment</td>
<td>-.055</td>
<td>.051</td>
</tr>
<tr>
<td>Involvement</td>
<td>.061</td>
<td>.051</td>
</tr>
<tr>
<td>Age</td>
<td>.011</td>
<td>.056</td>
</tr>
<tr>
<td>Female (=1)</td>
<td>-.129*</td>
<td>.061</td>
</tr>
<tr>
<td>Non-White (=1)</td>
<td>.030</td>
<td>.027</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>Estimate</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variance in intercept, ( \sigma_{0i} )</td>
<td>.286</td>
<td>.047</td>
</tr>
<tr>
<td>Random variance in linear slope, ( \sigma_{1i} )</td>
<td>.044</td>
<td>.027</td>
</tr>
<tr>
<td>Level 1 error variance, ( \sigma_{e} )</td>
<td>.492</td>
<td>.015</td>
</tr>
<tr>
<td>Rho, ( \rho )</td>
<td>.252</td>
<td></td>
</tr>
<tr>
<td>( \ln(likelihood)[df] )</td>
<td>-649.929[12]</td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>1323.857</td>
<td></td>
</tr>
<tr>
<td>BIC</td>
<td>1379.967</td>
<td></td>
</tr>
</tbody>
</table>

Note: \( b \) = unstandardized parameter estimate; St. Error = standard error; St. Deviation = standard deviation

*\( p < .05 \) (two-tailed tests)
Sensitivity Analysis: Weighted by Number of Alters

A potential concern with the previous analysis is the possibility that egos did not always nominate five alters. Such missing data *could* alter the substantive meaning of the *alters crime* variable, meaning this measure may reflect something other than that which was intended. The problem is that the previous analysis treated all measures of *alters crime* equally, but one might argue that peer networks with more individuals (i.e., those with more alters) should be given more weight compared to those with fewer individuals. In an effort to correct for this and relax this assumption, a sensitivity analysis was conducted. Specifically, the MMC from the previous section was re-estimated, this time weighting observations according to the number of alters that were used to calculate the *alters crime* variable. Thus, the weight was equal to the denominator from the *alters crime* calculation that was presented in the Measures section.

Table 5.6 presents the linear growth model with controls after weighting each case according to the number of alters they nominated in each wave. Results from the sensitivity analysis indicate that by weighting the scales for the dependent variable, *alters crime*, the overall substantive conclusions are unchanged. In fact, after adjusting for the weights the parameter estimates maintain the same level of statistical significance with the exception of sex, which becomes statistically insignificant (-.129 *p* < .05 to -.107 *p* > .05).
<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Linear Growth Model</th>
<th>Weighted Linear Growth Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>St. Error</td>
</tr>
<tr>
<td><strong>Level 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (mean initial level), $\gamma_{00}$</td>
<td>1.414</td>
<td>.823</td>
</tr>
<tr>
<td>Attachment</td>
<td>-.064</td>
<td>.045</td>
</tr>
<tr>
<td>Commitment</td>
<td>-.055</td>
<td>.051</td>
</tr>
<tr>
<td>Involvement</td>
<td>.061</td>
<td>.051</td>
</tr>
<tr>
<td>Age</td>
<td>.011</td>
<td>.056</td>
</tr>
<tr>
<td>Sex</td>
<td>-.129*</td>
<td>.061</td>
</tr>
<tr>
<td>Race</td>
<td>.030</td>
<td>.027</td>
</tr>
<tr>
<td>Wave (mean growth rate), with controls</td>
<td>-.015</td>
<td>.011</td>
</tr>
<tr>
<td><strong>Random Effects</strong></td>
<td><strong>Estimate</strong></td>
<td>St. Error</td>
</tr>
<tr>
<td>Random variance in intercept, $\sigma_{0i}$</td>
<td>.286</td>
<td>.047</td>
</tr>
<tr>
<td>Random variance in linear slope, $\sigma_{1i}$</td>
<td>.044</td>
<td>.027</td>
</tr>
<tr>
<td>Level 1 error variance, $\sigma_{e}$</td>
<td>-.492</td>
<td>.027</td>
</tr>
<tr>
<td>$Rho, \rho$</td>
<td>.252</td>
<td></td>
</tr>
<tr>
<td>$ln(likelihood)[df]$</td>
<td>-649,929[12]</td>
<td></td>
</tr>
<tr>
<td>$AIC$</td>
<td>1323.857</td>
<td></td>
</tr>
<tr>
<td>$BIC$</td>
<td>1379.967</td>
<td></td>
</tr>
</tbody>
</table>

Note: $b$ = unstandardized parameter estimate; St. Error = standard error; St. Deviation = standard deviation

*p<.05 (two-tailed tests)
RQ2: ARE THE INDIVIDUAL ALTERS STABLE OVER TIME?

The second part of the analysis is designed to answer the second research question: “Are the individual alters stable over time?” In order to answer this question, descriptive statistics were compiled by analyzing all of the nominated alters for each ego at all waves. Over the course of data collection, each ego had the opportunity to nominate up to five alters for each of the six waves, for a total of thirty alters. Each nomination corresponded to an alter that the ego had been spending the most amount of time with. All nominated alters that were not members of the 9th grade cohort under study were removed from the subsequent analysis. The remaining alters were given unique identification codes that persisted throughout the course of the study. An analysis was then conducted to determine the rate at which egos would nominate the same alters from one time period to the next; referred to here as the “recycling rate” for each ego. The proportion of alters each ego recycles—on average—is presented in Table 5.7.

Results from Table 5.7 indicate that as egos progress from one time period to the next, the probability that they will recycle a previously nominated alter increases monotonically. The statistic of focus is the proportion of alters who have been previously nominated by the focal ego. When considered across the entire sample, the value of focus is the average probability that alters are “recycled” over time. For example, there was a 62.3% chance that an ego had nominated at least one alter from the baseline again at the first wave. Then at wave 2, that rate increased to a 71.1% chance that an alter nominated by an ego had been previously selected at either the baseline or first wave. This continues until the last wave, wave 5, where alters have an approximately 89% chance of being nominated previously by the same ego sometime during the course of the study.
Table 5.7: Probability of Ego's rate of Recycling Alters over time (N = 1044)

<table>
<thead>
<tr>
<th>Probability of Alter being the same from all previous Waves:</th>
<th>Alter 1</th>
<th>Alter 2</th>
<th>Alter 3</th>
<th>Alter 4</th>
<th>Alter 5</th>
<th>Average Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.724</td>
<td>.690</td>
<td>.649</td>
<td>.575</td>
<td>.477</td>
<td>.623</td>
</tr>
<tr>
<td>SD</td>
<td>.447</td>
<td>.463</td>
<td>.477</td>
<td>.495</td>
<td>.500</td>
<td>.295</td>
</tr>
<tr>
<td>Wave 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.845</td>
<td>.770</td>
<td>.741</td>
<td>.621</td>
<td>.580</td>
<td>.711</td>
</tr>
<tr>
<td>SD</td>
<td>.363</td>
<td>.421</td>
<td>.438</td>
<td>.485</td>
<td>.494</td>
<td>.233</td>
</tr>
<tr>
<td>Wave 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.891</td>
<td>.845</td>
<td>.851</td>
<td>.787</td>
<td>.661</td>
<td>.807</td>
</tr>
<tr>
<td>SD</td>
<td>.312</td>
<td>.362</td>
<td>.357</td>
<td>.409</td>
<td>.474</td>
<td>.194</td>
</tr>
<tr>
<td>Wave 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.948</td>
<td>.971</td>
<td>.833</td>
<td>.799</td>
<td>.770</td>
<td>.864</td>
</tr>
<tr>
<td>SD</td>
<td>.222</td>
<td>.167</td>
<td>.373</td>
<td>.401</td>
<td>.421</td>
<td>.174</td>
</tr>
<tr>
<td>Wave 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.931</td>
<td>.891</td>
<td>.879</td>
<td>.868</td>
<td>.880</td>
<td>.880</td>
</tr>
<tr>
<td>SD</td>
<td>.254</td>
<td>.312</td>
<td>.325</td>
<td>.339</td>
<td>.191</td>
<td>.191</td>
</tr>
</tbody>
</table>
The main substantive finding that can be taken from this analysis is that egos appear to possess stable alters throughout the course of the study. This results in a more stable peer group due to the “recycling” of the actual peers themselves. A visual display of the recycling rates over each wave can be seen graphically in Figure 5.8. The black line represents the overall mean of the wave while the grey lines represent the frequency of egos recycling rate at each wave. As time passes, egos are much more likely to spend a lot of time with many of the same alters that they spent time with previously. That is to say that egos tend to nominate the same alters. Put differently, peer networks are relatively stable over short time periods.

This finding strengthens the conclusions from the first part of this analysis by discovering that not only are alters crime rates stable over time, but that egos’ maintenance of these social networks (criminal or noncriminal) are stable over time. While these findings are extremely important in answering more broad questions regarding stability in adolescent behavior, the question remains whether the stability of the peer group interacts with that peer groups’ level of delinquency in affecting the ego’s delinquency. In other words, do more stable peer groups have a larger influence on the members of the group?
Figure 5.8: Recycling Rate of Alters over time
RQ3: DOES THE STABILITY OF ALTERS (RQ2) INTERACT WITH THEIR DELINQUENT BEHAVIOR TO AFFECT THE EGO’S DELINQUENCY?

Empirical Growth Plots

The last step in this analysis is focused on answering the third research question. In order to answer this question, the dependent variable from the first research question (alters crime) will become a predictor variable while ego crime will be used as the dependent variable. Before progressing into linear growth models and more complex inferential statistics, empirical growth plots were created to briefly explore the change in ego crime over time. While average alter crime was the dependent variable and main focus for analyses in RQ1, average ego crime was the focus for this research question. As with RQ1, the first step to the analysis was to extract 20 randomly drawn cases and explore their empirical growth in ego crime over time. As can be seen in the Figure 5.9, there appears to be overwhelming stability in the behavior of the randomly selected egos over time. While the figure does not allow for statistical inferences to be made regarding the stability of ego crime, it does provide initial evidence of the stability in delinquent behavior for adolescents; this time for the ego.
Figure 5.9: Empirical Growth Plot of *Ego Crime* for 20 Randomly Drawn Cases

<table>
<thead>
<tr>
<th>Wave</th>
<th>0</th>
<th>5</th>
<th>0</th>
<th>5</th>
<th>0</th>
<th>5</th>
<th>0</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>188</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>217</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>229</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>248</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>255</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>269</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>370</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>378</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>397</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>464</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>499</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>528</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>545</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>546</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>578</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>581</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Multilevel Models for Change (MMC)

Much in the same progression as the first linear growth models conducted on *alters crime*, preliminary analyses into the effect of time on average *ego crime* was performed. Results from the analysis can be seen in Table 5.10 and graphically in Figure 5.11. The means model revealed the average value of *ego crime* was 1.26 (S.E. = .051, p < .05) with a random variance component (expressed in standard deviation units) of 0.603. Thus, 68% of the sampled respondents were estimated to have an intercept value that was between 0.657 and 1.863.

To determine the direction and magnitude of change in *ego crime* over time, a linear growth model is estimated using the variable *wave* as the predictor. The results from this model (unconditional linear growth) are shown numerically in Table 5.10 and graphically in Figure 5.11. With the addition of *wave*, the unstandardized parameter estimate changes from an intercept of 1.26 to an intercept of 1.20 (S.D. = .051 compared to S.D. = .061). The slope (.023) revealed slightly positive growth over time. The slope of this analysis is statistically insignificant at the p < .05 level, suggesting that *average ego crime* does not vary significantly over time. The slope did, however, vary across respondents with 68% of the sample evincing growth rates between -0.155 and 0.201. In an effort to rule out the possibility of a non-linear relationship driving this relationship, a test for non-linearity is also conducted (See Table 5.10 and Figure 5.11). A test for non-linearity determined that the relationship between average ego crime and time was not statistically significant when placed in a non-linear model ($\gamma_{10} = -.058, \gamma_{20} = .014$). This reinforced the decision to use a linear model fit for the analyses that follow.
Table 5.10 Multilevel Models for Change (MMC) for *Ego Crime* (*n* = 169 Respondents and 749 Person-Waves)

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Unconditional Means Model</th>
<th>Unconditional Linear Growth</th>
<th>Unconditional Non-Linear Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>b</em></td>
<td>St. Error</td>
<td><em>b</em></td>
</tr>
<tr>
<td>Intercept (mean initial level), $\gamma_{00}$</td>
<td>1.26*</td>
<td>.051</td>
<td>1.20*</td>
</tr>
<tr>
<td>Wave (mean growth rate), $\gamma_{10}$</td>
<td>-</td>
<td>-</td>
<td>.023</td>
</tr>
<tr>
<td>Wave$^2$, $\gamma_{20}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>St. Deviation</th>
<th>St. Error</th>
<th>St. Deviation</th>
<th>St. Error</th>
<th>St. Deviation</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variance in intercept, $\sigma_{0i}$</td>
<td>.603</td>
<td>.041</td>
<td>.562</td>
<td>.063</td>
<td>.560</td>
<td>.063</td>
</tr>
<tr>
<td>Random variance in linear slope, $\sigma_{1i}$</td>
<td>-</td>
<td>-</td>
<td>.178</td>
<td>.020</td>
<td>.178</td>
<td>.020</td>
</tr>
<tr>
<td>Level 1 error variance, $\sigma_{\varepsilon}$</td>
<td>.557</td>
<td>.016</td>
<td>.484</td>
<td>.017</td>
<td>.483</td>
<td>.017</td>
</tr>
<tr>
<td>Rho, $\rho$</td>
<td>.539</td>
<td></td>
<td>.574</td>
<td></td>
<td>.573</td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>1558.653</td>
<td></td>
<td>1508.291</td>
<td></td>
<td>1508.744</td>
<td></td>
</tr>
<tr>
<td>BIC</td>
<td>1572.509</td>
<td></td>
<td>1536.003</td>
<td></td>
<td>1541.076</td>
<td></td>
</tr>
</tbody>
</table>

Note: *b* = unstandardized parameter estimate; St. Error = standard error; St. Deviation = standard deviation

*p* < .05 (two-tailed tests)
Figure 5.11: Multivariate Graphs for Change in *Ego Crime*
Linear Growth Modeling with Controls

After determining the linear growth model as the most appropriate model of fit for the rest of the analyses, relevant control factors are added to the model to observe whether average alters crime or the rate at which egos recycle alters can explain any of the variation in average ego crime. Additionally, an interaction between average alters crime and the recycling rate of alters was created to determine whether these two measures act in concert to influence the crime of the ego. Results from Table 5.12 reveal a few notable findings. First, and unsurprisingly, average alters crime possesses a statistically significant effect on average ego crime at the $p < .01$ level. This finding falls squarely in line with the consensus of the existing empirical literature that suggests that adolescent deviance is a group phenomenon and that peers maintain high levels of influence during this time period. In fact average alters crime maintains a strong positive effect (.346) on ego crime.

The recycling rate, or the rate at which egos maintain similar alters over time was marginally significant ($p < .10$ level) and should be interpreted cautiously. This measure too had a relatively strong effect on average ego crime (.390) suggesting that the stability of alters or “stickiness” increases the risk of crime for egos. Perhaps most importantly, the interaction between average alters crime and recycle rate of alters demonstrates a slight negative effect on ego crime. This interaction was borderline significant at the $p < .10$ level ($p = .099$) so interpretations of this relationship must be taken cautiously. If genuine, this finding suggests that as egos maintain more stable alters (higher recycling rates), the effect of those alters weakens the effect of alters crime on the ego crime. Further discussion of these findings is provided in Chapter 6.
Table 5.12: Multilevel Models for Change (MMC) with Controls for *Ego Crime*

<table>
<thead>
<tr>
<th>Linear Growth Model with Controls (n = 162, 678 Obs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
</tr>
</tbody>
</table>

**Level 1**

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (mean initial level), $\gamma_{00}$</td>
<td>.752</td>
<td>.183</td>
</tr>
<tr>
<td>Wave (mean growth rate), with controls</td>
<td>.006</td>
<td>.019</td>
</tr>
<tr>
<td>Average Alters crime</td>
<td>.346*</td>
<td>.128</td>
</tr>
<tr>
<td>Recycle Rate</td>
<td>.390+</td>
<td>.222</td>
</tr>
<tr>
<td>Average Alters crime*Recycle Rate</td>
<td>-.253+</td>
<td>.153</td>
</tr>
</tbody>
</table>

| **Random Effects**        |

<table>
<thead>
<tr>
<th>Estimate</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random variance in intercept, $\sigma_{0i}$</td>
<td>.483</td>
</tr>
<tr>
<td>Random variance in linear slope, $\sigma_{1i}$</td>
<td>.138</td>
</tr>
<tr>
<td>Level 1 error variance, $\sigma_{\varepsilon}$</td>
<td>.471</td>
</tr>
<tr>
<td>$Rho, \rho$</td>
<td>.513</td>
</tr>
<tr>
<td>$ln(likelihood)[df]$</td>
<td>-645.052</td>
</tr>
<tr>
<td>$AIC$</td>
<td>1308.105</td>
</tr>
<tr>
<td>$BIC$</td>
<td>1348.777</td>
</tr>
</tbody>
</table>

Note: $b =$ unstandardized parameter estimate; St. Error $=$ standard error
* $p < .05$ (two-tailed tests)
+ $p < .10$
CHAPTER 6

DISCUSSION

This chapter places the findings from the previous chapter in the substantive/theoretical context outlined in earlier chapters. This will include a discussion of the findings and how they address the relevant research question of focus. Theoretical implications are presented as well as the limitations of this research. Finally, future directions for research are considered with specific attention given to the importance and place of this dissertation within the greater criminological literature.

SUMMARY OF FINDINGS

This dissertation answered three research questions related to the stability of adolescent deviance and peer relationships over time. Regarding the first research question, the analysis discovered that after controlling for social bond measures and demographic characteristics, the average amount of crime in the peer network did not change significantly over time. That is to say that peer delinquency is relatively stable over time. Only sex was related to alters crime, where males associated with alters who reported more crime than did females.

This study also discovered that the rate at which egos “recycle” alters from one time period to the next increases over time, resulting in an 88% chance that an alter selected at one point in time would be selected again by the ego at another point during the course of the study. The increase in stability of friendships over time provides evidence that over the 10-week period, egos spent the most amount of time with much of the same alters. Put differently, adolescent peer networks remain relatively stable in terms of the personnel who make up the network over short time intervals.
Lastly, this study tested whether there was an interaction between the stability of *alters crime* and the recycling rate of alters on the crime of the ego. Results from the analysis suggest that *alters crime* produces a strong effect on *ego crime* (statistically significant at the *p* < .05 level). The interaction effect was marginally significant (*p* < .10 level), but actually produced a negative effect on ego crime. This negative effect suggests older friendships have a weaker effect on the ego over time compared to more recent friendships.

The subsequent sub-sections dissect each research question and consider: 1) how the analysis answered the research question, 2) whether the results of the analysis are consistent with previous research, and 3) how the analysis extends previous research.

**Stability of Criminal Behavior for Alters**

RQ1 examined whether levels of crime among the peer group (i.e., *alters crime*) remained stable over time. The analysis suggested stability of peer behavior was the norm and that there was little change in the behavior of peers over time. In all of the models, the relationship between average *alters crime* and *time* remained statistically insignificant; implying that the rate of change in *alters crime* was not significantly different in any of the observed time periods. These relationships persisted even after the inclusion of control variables designed to represent the three most influential social bonds (Hirschi, 1969): attachment, involvement, and commitment.

Based on initial linear growth models without controlling for demographic characteristics, attachment and commitment functioned as protective factors by significantly decreasing average alters crime over time. Involvement in conventional activities actually had a positive effect on *alters crime*. According to previous studies, conventional involvement may have no substantial effect on decreasing crime and may even act to reinforce it because
substantial blocks of time are still available for deviance even with those heavily involved in conventional activities (Paternoster, Saltzman, Waldo, & Chiricos, 1983). Other empirical inquires have suggested that involvement may even be better evaluated as part of commitment rather than a separate social bond (Krohn & Massey, 1980).

One interesting, although not surprising finding from the full model was that sex was the only statistically significant predictor of alters crime over time. In fact, being female resulted in a reduction of alters crime of .129 over the six waves. Considering the average decrease in crime over time (net of any controls) was only .012, sex differences represent the single greatest predictor of whether or not alters will engage in criminal activities over time. This finding is consistent with a large body of empirical research and remains a point of consensus among criminological theorists today.

The findings from the linear growth model reaffirm the null hypothesis and answer the first research question by concluding that average levels of crime by alters remain relatively stable and are not in constant flux over short periods of time. This analysis advances the findings of Warr (1993a) by filling in the gap of time by using shorter time periods while adhering to many of the same control and outcome variables. Thus, where Warr (1993a) concluded, “Delinquent friends, once acquired, are not lost in subsequent years” (p .31), this study concludes, “Delinquent friends, once acquired, are not lost in subsequent weeks.”

**Stability of Alter Behavior for each Observed Ego**

RQ2 asked whether the individual alters of the observed ego’s peer group are stable over time. The analysis suggested this stability of the peer group was the norm. Starting from the second observation point (Wave 1) to the last observation point (Wave 5), descriptive statistics gathered on each ego’s previous alter nominations revealed remarkable consistency in alter
selection over time. In fact, the average rate at which an ego reselects or “recycles” an alter from a previous wave increased monotonically over time, from a rate of .62 at the second observation point to .88 at the final observation point. Although these findings were only constructed through the use of descriptive statistics thus creating an inability to test for statistical significance, the strong rate of recycling alters over time does provide an indication of the stability of alters over the ten week study.

The seminal study by Warr (1993a), which is the focus of this dissertation, suggests that recent peer interactions are more influential in delinquent activity than the overall duration of peer relationships. In particular, Warr clarified that among adolescents possessing the same delinquent friendships, those with most recent delinquent friends were most prone to delinquency (1993a). While Warr’s study consisted of data collected annually, this dissertation’s bi-weekly observations fit within the “recent” context that Warr noted. The analysis extends this previous research by suggesting that adolescents spend the most amount of time with many of the same peers over relatively short periods of time (bi-weekly). Additionally, this analysis presents evidence that Warr’s (1993a) findings regarding recent delinquent peer group formation may be an inaccurate description of the term, as this study illuminates that the stability of friendships remains relatively strong during short periods of time. In summation, these “recent” friendships observed by Warr had nearly a year to develop and were found to contribute the most to peer influence in delinquency. One important directive from this finding is to revisit the idea of “recent friendships” and promote future inquiry into a more appropriate measurement in the amount of time it takes for delinquent friendships to develop and strengthen.
The Impact of Stability and Delinquency of Alters on the Delinquency of the Ego

RQ3 asked whether the stability of alters (i.e., the length of the friendship) interacts with the delinquency of alters to affect the ego. In order to address this question, the analysis conducted multilevel models for change in almost the exact same process as the first analysis for the first research question, with a few minor changes. First, instead of examining the impact of time and ego demographic characteristics on alters crime, the analysis used average ego crime as the outcome measure; with alters crime, recycling rate of alters, and the interaction between the two as predictors. The analysis found support for the effect of alters crime on ego crime as the relationships was statistically significant at the $p < .05$ level ($b = .346$), with the recycling rate of alters being marginally significant ($p < .10$ level, $b = .390$). Both predictors produced a positive effect on ego crime in the theoretically predicted direction (See Warr, 2002). While it may have been expected that peer delinquency and stability are positively associated with adolescent delinquency, the interaction between the two variables yielded substantively novel results. The interaction between alters crime and recycling rate of alters produced a negative impact on ego crime ($b = -.253$). These results must be interpreted with caution however because the interaction term was only marginally significant ($p < .10$). Nonetheless, this finding is particularly interesting as it suggests that as egos maintain more stable relationships with alters (higher recycle rates), the effect of those alters on the ego weakens. Put another way, recent friendships affect the ego more strongly than older friendships.

This finding may reveal that peers have varied levels of influence on their friends over time. If most adolescents join peer groups for a greater sense of identity, shared experiences, and the protection from ridicule, over time adolescents may grow comfortable in the group. As the adolescent grows more comfortable in the group, the peer influence may weaken as the
adolescent begins to reveal his/her true self. By experiencing comfort within the security of the peer group, the influence that may persuade the adolescent to commit delinquent acts to fit in would dissipate and the adolescent would feel safe to return back to his/her normal behavior and personality. If true, this finding provides implications for future testing on effect of peer influence on adolescents, as adolescents may be masking their true personalities by engaging in temporary delinquency until they are no longer a focus of the group. In short, more recent friendships may matter more than older friendships (at least in terms of the peer effect on delinquent behavior).

Table 6.1 provides a brief summary of the results gleaned from the present analysis. The table offers a short discussion of the present findings and how they can be situated within the available literature. Also, Table 6.1 considers the how future research may be informed by the results laid out here.
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Substantive Results</th>
<th>Situated within the Available Literature</th>
<th>How it Extends Previous Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: Are levels of delinquency for alters stable over time?</td>
<td>Yes. Consistent support was found suggesting alter delinquency is stable over time.</td>
<td>This analysis is consistent with previous research analyzing the overall stability of adolescent deviance over time (See Warr, 2002).</td>
<td>This research demonstrates that peer group delinquency is stable in very short time periods (weeks as opposed to years).</td>
</tr>
<tr>
<td>RQ2: Are the individual alters stable over time?</td>
<td>Yes. Evidence suggests alters of observed egos remain stable over time.</td>
<td>This analysis is consistent with previous research that has demonstrated adolescents maintain stable peer groups over time (Aseltine, 1995; Warr, 2002).</td>
<td>This analysis extends previous research by providing detailed descriptive data on the rate at which peers will maintain similar friendships over short amounts of time.</td>
</tr>
<tr>
<td>RQ3: Does the stability of alters interact with their delinquent behavior to affect the ego?</td>
<td>Alters’ delinquency was statistically significant at the $p &lt; .05$ level but the interaction between alter stability and alter delinquency was not ($p &lt; .10$). The interaction was negative suggesting stable relationships matter less over time.</td>
<td>This analysis partially supports the suggestion by Warr (1993a) that more recent relationships matter more than longer relationships (see Warr, 2002).</td>
<td>This analysis extends research by providing evidence that recent friendships may do more to affect one’s behavior than longer, more stable friendships.</td>
</tr>
</tbody>
</table>
IMPLICATIONS FOR THEORY

The results from this dissertation have six major implications for social learning theories of adolescent delinquent behavior: 1) peer delinquency is stable over relatively short periods of time; 2) the stability of peer delinquency over time does not seem to be affected by the strength of attachment to, commitment to, and involvement with prosocial persons and institutions; 3) adolescents spend a majority of their time with much of the same peers (at least in the short term); 4) peer delinquency has a strong positive effect on adolescent delinquency over short periods of time; 5) the stability of peer relationships has a strong positive effect on adolescent delinquency over time; 6) recently acquired peers may be more influential than peers who have enjoyed longer relationships. Each of these implications is considered, in turn, below.

First, this research displays evidence that theory should consider the amount of time between observations when measuring the effect of time on peer offending outcomes. As previously mentioned, much of the existing research has focused on delinquency changes for peers over years, a gap in observations that may produce a myriad of internal validity issues. The findings of this dissertation highlight the stability or “stickiness” of delinquent peers over the course of 10-weeks. If future theorists wish to expand on Warr’s (1993a) “sticky friends” hypothesis, they must acknowledge the finding that peer “stickiness” is relatively strong for short durations of time as well. Not only should future studies consider the time frame of observations, but whether or not the magnitude of these “sticky” relationships is contingent on the amount of time that they persist.

Second, the stability of peer delinquency does not seem to be affected by prosocial qualities of the adolescent. The findings of this study reveal that social-bonds commonly associated with self-selection into particular peer groups and subsequent behavioral typologies
(Hirschi, 1969) did not affect the trajectory of peer network delinquency over time. Future testing should continue to address the potential influence of social bonds while also attempting to procure measures for self-control (Gottfredson & Hirschi, 1990) or interaction effects (Thornberry et al., 1987) to parse out potential selection effects (Agnew, 2001).

Third, this research presents evidence that adolescents spend a majority of their time with most of the same peers. This finding further highlights the potential for “stickiness” in delinquent peers, as the propensity to retain delinquent relationships was one of the main qualities that Warr (1993a) used to describe the “sticky friends” he observed. Recall that Warr never said “sticky” relationships require the same exact peers, but instead the same type (delinquent) over time. The results of this dissertation suggest that both mechanisms are likely at play. Specifically, the behavior of one’s peer groups are stable over short time periods. Perhaps not surprising, the actual peers themselves are stable meaning adolescents tend to retain the same peers over short time intervals.

Fourth, it appears that peer group delinquency has very strong effects on adolescent delinquency over short time intervals. The consistency of these findings despite the shortened time frame between measurements suggests that delinquent peer influence may act extremely swift and does not take much time to convince adolescents to engage in illicit behaviors. Future research should attempt to further understand how peer influence operates over time in order to better comprehend the mechanisms behind it.

Fifth, this research finds that stable peer relationships maintain a strong positive effect on adolescent delinquency over time. This finding strongly mirrors the initial discovery by Warr (1993a) that duration of delinquent friendships was significantly related to future adolescent delinquency (although duration was not the main driving force behind the relationship, recency
was). This dissertation builds off of Warr (1993a) by suggesting that stability in peer relationships, in very short intervals, can still produce strong positive effects on adolescent delinquency. Future research should also take into consideration whether stability in peer relationships can be measured by examining the probability of reselecting friends as it was done in this dissertation.

Sixth, results from the analysis provide evidence that recently acquired peers may be more influential than peers who have enjoyed longer relationships. In line with Warr’s (1993a) results suggesting that recency rather than duration was most important in the maintenance of stable delinquent relationships, this dissertation provides similar evidence on a shorter scale of time. In fact, having more observations in a much shorter time period allows for this study to provide a much stronger case that “recent” friendships are impactful in the stability and sustainability of delinquency over time. Future efforts should focus on the aspect of time and, more specifically, how long peers maintain their delinquent influence. In other words, what does it mean to say recent peers matter more? What delineates “recent” peers from “old” peers? Creating a better measure for recency would allow for a clearer understanding of the mechanisms behind adolescent peer development and delinquent outcomes.

**LIMITATIONS OF THE STUDY**

Although this dissertation addresses important research questions and contributes to the existent literature examining the stability and influence of peer groups on adolescents, key questions remain. Specifically, there are several limitations that are worth mentioning. First, inherent to the type of research design chosen for this dissertation, it is not possible to establish a concrete causal relationship between ego and alters crime. Although this analysis presents
findings displaying a statistically significant effect of alters crime on ego crime over time, this finding does not rule out the possibility of a reverse causal order (Gottfredson & Hirschi, 1990), interaction effects (Thornberry et al., 1987), or even that uncontrolled third variable(s) would render the relationship insignificant (TenEyck & Barnes, 2015; Young et al., 2014). Therefore, while conclusions regarding statistically significant correlations can be made, assertions of causality must be avoided. This limitation is not a unique criticism however, as criminologists have yet to come to a consensus on the causal mechanisms behind peer group delinquency (Young et al., 2014). While this study provides evidence supporting the differential association/social learning tradition—delinquent peer influence precedes adolescent delinquency—the possibility of self-selection into delinquency cannot be ruled out (TenEyck & Barnes, 2015; Young et al., 2014).

Second, there are general limitations intrinsic to conducting secondary research. One of these limitations is the potential lack of generalizability of the sample to a broader adolescent population. This study analyzed a sample from a small school in one state. When attempting to generalize the findings of this study to the greater population, it is important to take into consideration the rural setting, high network closure, isolated area, and relatively homogenous (85% white) sample that was observed. While the unique characteristics of the sample are not so distinct as to remove any ability to generalize the findings, broad sweeping conclusions should be avoided.

The current state of criminological literature on adolescent deviance suggests that both environmental and biological factors contribute to the behavior and susceptibility to influence by peer groups (Buss & Shackelford, 1997; TenEyck & Barnes, 2015). Additionally, biosocial empirical tests of Warr’s (1993a) “sticky friends” hypothesis have discovered significant
correlations between genetic factors and the tendency for adolescents to retain delinquent peers (Beaver, Gibson, Turner, DeLisi, Vaughn, & Holand, 2009). The data used in this analysis do not contain any measure of biological or genetic characteristics; therefore, it is not possible to model relationships between these factors on the outcome of peer or adolescent delinquency. One can, however, speculate as to whether the inclusion of genetic effects would impact the results. Based on the simulation analysis performed by Barnes, Boutwell and colleagues (2014), it is possible that certain relationships are spurious owing to uncontrolled genetic influences. Indeed, Barnes, Boutwell et al. revealed that moderate-to-large correlations can be rendered spurious when genetic factors have a moderate effect on $x$ and $y$.

Another limitation is that this dissertation did not consider substance use by alters or by egos. One of the seminal findings by Warr (1993a) was that his “sticky friends” hypothesis seemed to apply strongest to adolescents engaging in status offenses or substance use with other peers. Since the types of crimes and deviance observed in the factor created for alter and ego crime were minor crimes comparable to status offenses or group delinquent behavior, average alters crime was used as the outcome to test key aspects of Warr’s hypothesis. Although this substitution prevents this dissertation from being a true replication study, findings from the analysis suggest that “sticky friends” are also found through peer crime as well.

A potential limitation that also must be considered has bearing on the creation and measurement of the “recycle rate” of alters used in this dissertation. Based on how the alters were measured (recall that respondents were prompted to identify the peers they had spent the most amount of time with recently) this measure could be observing opportunities for crime more so than close friendship ties. It is unclear how much (and in which direction) this concern may have impacted the results, yet it may be the case that the two concepts share a lot of
variance since peers that you spend the most time with are most likely to be your closest friends. Additionally, while this study claims that the “recycling rate” can be used as a measure of peer group stability, it is important to note that the measure likely masks certain elements of adolescent peer groups. For example, the level of true stability observed in the increased recycling rate of alters by egos may be masking intermittent changes in friendships and time spent with each other in between waves. An ego may nominate an alter once in the beginning and once at the end of the study. In this case, the alter will have been “recycled” and the ego’s value for his/her recycling rate would be increased. Yet, there may be meaningful reasons why the alter was not nominated in the intervening waves. Perhaps the ego and alter severed ties (e.g., had a fight) but then reconciled prior to the final wave (prompting the second nomination at the end of the study). The present approach to measuring peer “recycling” does not allow one to identify such nuanced changes in peer group stability. Thus, future studies should incorporate a measure of intermittent change within the “recycling rate” of ego friendships. By observing change or stability between each wave, it creates the possibility to observe any changes to friendships between the ego or alter that were originally masked.

Last, while this research was able to control for many of the demographic and social-bond characteristics of adolescents that are likely to influence an individual’s propensity to commit delinquent behaviors, it must be noted that it is probable that other unmeasured mechanisms are partially responsible for the behavior of egos and alters. Beyond biological and genetic factors, even within the environment, future research should make a point to focus on any and all possible mechanisms that may help explain ego and alters crime as well as their temporal ordering.
CONCLUSION

Even after careful consideration of the previously mentioned limitations, this dissertation makes an important contribution to the available literature by extending previous research and providing further support for stability in peer behavior. First, this study found that there is stability in delinquent peer behavior over time, even after controlling for demographic factors and social bonds. This finding supports the previous work of Warr (1993a), and provides further evidence of a “sticky” relationship between peers and the adolescents who are integrated into the peer group. Second, the analysis presented here provides evidence linking alters (peer group) to the same ego (adolescent) over time. This study presents an advancement over Warr’s (1993a) findings by displaying evidence that most peer relationships are stable (RQ2) and that peer delinquency does not substantively change over time (RQ1). While Warr suggested that “sticky friends” refers more generally to the stability of types of friends, this study suggests that “sticky friends” may be attributable to specific delinquent friends. Third, this dissertation provides evidence of a correlation between delinquent peer relationships and adolescent delinquency. Although this finding is not unique, the research design used presents an important advancement over previous studies. By examining multiple waves of data at relatively short intervals, this study minimizes the probability of the observed relationship between peer and adolescent delinquency to be the result of an unobserved time-related factor (e.g., a historical validity threat).

Last, the overall findings of this dissertation advance the work of Warr (1993a) by discovering additional evidence of the “sticky friends” phenomenon. By uniting the results of all three research questions, this study illustrates that a stable pattern of delinquent behavior and peer relationships have a positive effect on adolescent delinquency. This falls in line with the
“stickiness” Warr (1993a) observed with one major improvement: these relationships maintained much of the same peers of the course of the study. Where Warr (1993a) cautioned that juveniles may not retain the exact same delinquent friends throughout adolescence, this study suggest that this may actually be the case.

Although this work presents an advancement in coming closer to defining the term “stickiness,” it does not fully elucidate the causal mechanism underpinning this phenomenon. That is to say, it appears that “sticky friends” may not necessarily be a group or an individual-level phenomenon. Rather, and more closely related to Thornberry’s (1987) interactional theory, the “sticky” properties of delinquency may operate in a feedback loop that involves both the individual and the group. An example of this occurs during the application of an adhesive (such as glue) to permanently attach two desired components. Initially, glue may be applied to one of the two components but once these components are combined and the glue is allowed time to interact with both components, it is nearly impossible to discern which part the glue was initially applied to. In the same way, when adolescents form groups, these groups are made up of individuals. Each individual provides some form of influence in the formation and direction of the group. While the “sticky” properties of these friends creates a stable pattern of delinquency, it may be impossible to ascertain the causal ordering of this “stickiness.”

While this study does not answer where “stickiness” comes from, it does answer whether “stickiness” in adolescent peer relationships is observable and whether it matters. Warr (1993a, p. 31) stated that, “delinquent friends, once acquired, are not lost in subsequent years.” The present analysis provides several new layers of support for Warr’s conclusion and extends his work by showing that the peers themselves tend to stay stable over relatively short time periods. That is to say peer relationships, once acquired, are not lost in subsequent weeks.
REFERENCES


Young, J. T., Rebellon, C. J., Barnes, J. C., & Weerman, F. M. (2014). Unpacking the black box of peer similarity in deviance: understanding the mechanisms linking personal behavior, peer behavior, and perceptions. *Criminology, 52*(1), 60-86.
