EXAMINING THE RECIPROCAL ASSOCIATIONS BETWEEN DELINQUENCY AND PARENTAL MONITORING IN TWO ADOLESCENT SAMPLES: A WITHIN- AND BETWEEN-PERSON LATENT VARIABLE ANALYSIS

BY

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DISSERTATION

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ABSTRACT

This study assesses the extent to which parental monitoring is an action or reaction by examining the bidirectional relationship between delinquency and parental monitoring across adolescence. Using two samples, a normative and at-risk sample, the current study uses an innovative Autoregressive Latent Trajectory Model with Structured Residual (ALT-SR) to examine the within-person (time-invariant) and between-person (time-variant) associations between delinquency and parental monitoring over a long period of time. On average, delinquency and parental monitoring was highest at younger ages and decreased over time for both samples. Delinquency and parental monitoring were negatively associated at the between-person, trait-like level. Individuals who reported higher delinquency tended to report lower parental monitoring. Within-person cross-lagged results found support for parental monitoring as an action. Parental monitoring was associated with decreases in adolescent delinquency over time for both samples. Parental monitoring as a reaction differed by sample. For the normative sample, delinquency was associated with decreases in parental monitoring over time. When individuals reported higher levels of delinquency then their typical levels, they reported lower rates of parental monitoring at the next time point. However, the magnitude of this association was stronger during late adolescence. The at-risk sample did not suggest any evidence of parental monitoring as a reaction. Adolescent delinquency was not associated with parental monitoring during early/middle or late adolescence. Findings suggest the need for prevention and intervention efforts to target parenting ecologies. Programs that focus on improving parental monitoring efforts may find success in reducing delinquency in both normative and high-risk samples.

Keywords: Adolescent delinquency; Parental monitoring.

To My Fiancé, Ashleigh E. Jones

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CHAPTER 1: INTRODUCTION

The development of adolescent delinquency and antisocial behavior have been examined for several decades (Elliott, Huizinga, & Ageton, 1985; Hawkins, 1996; Hirschi, 2002). According to the U.S. Department of Justice, in 2013, over 1.1 million juveniles were formally charged with delinquency related criminal violations (Furdella & Puzzanchera, 2015). Though most youth engage in some form of delinquent or antisocial behavior during adolescence (Tremblay, 2000), these behaviors often desist as adolescents establish themselves as young adults. For some, however, these behaviors persist well into adulthood (Moffitt, 1993; 2006). Chronic forms of delinquent and antisocial behaviors are usually developed early in life, have neuropsychological and contextual origins, and have been found to influence developmental pathways that lead to the stability of delinquent and antisocial behaviors later in life (Moffitt, 1993, 2006; Moffitt, & Caspi, 2001; Loeber & Farrington, 2001; White, Moffitt, Earls, Robins, & Silva, 1990). To further examine these distinct trajectories researchers have developed several theories to explain the differential pathways of delinquency from early childhood to late adolescence and into adulthood (Bursik, 1988; Gottfredson & Hirschi, 1990; Hirschi, 2002; Moffit, 1993; Patterson, 1989; Thornberry, 1987; Wiatrowski, Griswold, & Roberts, 1981). One of the most well-known theories used to understand differential pathways in the continuity and discontinuity of adolescent delinquency and antisocial behavior is Moffitt's (1993, 2003, 2006) theory of adolescent limited and life-course-persistent antisocial behavior. This theory posits that adolescent limited antisocial behavior is restricted to adolescence and is due to a so-called *maturity gap*. Life-course-persistent antisocial behavior is associated with the co-occurrence of neuropsychological problems coupled with environmental risk factors (Moffitt, 1993). As such, several studies have examined the differential processes involved in the development of

delinquency and antisocial behavior among normative (adolescence limited) and at-risk (life-course-persistent) samples to better understand similarities and differences between these groups of adolescents (Hay, Meldrum, Widdowson, & Piquero, 2016). Furthermore, transition periods, like the transition from middle to late adolescence, are marked with environmental changes that require adaptations on the part of the adolescent. These shifts are sensitive periods that are associated with negative outcomes including increases in psychological distress (Barber & Olsen, 2004; Fenzel, 2000; Hirsch & Rapkin, 1987), and have also been linked to increases in delinquent and aggressive behaviors (Wang, Brittain, McDougall, & Vaillancourt, 2016). For example, high school is a time in which adolescents spend more time away from home and with their peers. The increased time away from home and increased engagement with peers may create an opportunity for delinquency to flourish. A better understanding of the relative salience of environmental risk and protective factors at different ages across adolescence can provide important insights into differences and similarities in rates of adolescent delinquency.

The parenting ecology is a contextual domain that is often examined in combination with the development of adolescent delinquency (Hawkins, 1996; Hirschi, 2002; Loeber & Farrington, 1998, 2001). In response to antisocial behaviors, parents have been found to implement various parenting strategies (e.g., rules, establishing communication, tracking whereabouts and activities) to reduce the level of adolescent delinquency with varying levels of success (Barnes, Reifma, Farrell, & Dintcheff, 2000; Harris-McKoy & Cui, 2013). As such, some research has sought to compare different forms of parenting behaviors to identify key differences in their associations with the development of adolescent delinquency. For example, Stattin and Kerr's (2000) distinction between parental monitoring and child disclosure suggest that parental knowledge is best gained through child disclosure and is thus the most effective strategy for reducing

adolescent problem behavior. Despite the importance of child disclosure in obtaining knowledge about the child, there are several studies that also suggest that parental monitoring is in fact an important buffer in mitigating the development of adolescent delinquency (Hayes, Hudson, & Matthews, 2003). Studies have shown that parental monitoring strategies are an important buffer in reducing engagement in delinquent behaviors across adolescence (Barnes et al., 2006; Hay et. al., 2016; Hayes, et. al., 2003; Merrin et. al., 2017; Slattery & Meyers, 2014). In addition, the parenting literature has been interested in the extent to which parental monitoring is an action or reaction. That is, the extent to which parental monitoring mitigates the development of delinquency (action), and the extent to which adolescent delinquency effects changes in parental monitoring behaviors (reaction) (Burke, Pardini, & Loeber, 2008). Parents may increase their monitoring habits in the presence of heightened rates of adolescent delinquency; at the same time, delinquency may decrease parental monitoring efforts (Huh, Tristan, Wade, & Stice, 2006). The extent to which increases in adolescent delinquency illicit increases in parental monitoring and whether these parenting efforts are effective remains unclear. This is particularly true for youth at varying levels of social risk (e.g., adolescence limited vs life-course-persistent antisocial behavior). Further, the transition from middle to late adolescence is a sensitive time with frequent changes that may create a context for delinquency to increase, particularly for youth with high levels of social risk. Because parental monitoring is known to decrease with age (Barnes & Hoffman, 2006; Merrin et. al., 2017), an evaluation of the extent to which parental monitoring practices mitigate the development of adolescent delinquency during developmental transitions can provide further insight into the effectiveness of parenting efforts across this transition. It can also help clarify the effects of delinquency on parental monitoring and how the association may differ for individuals who are characterized by adolescence limited versus life-

course persistent antisocial behavior. For example, since adolescence limited versus life-course-persistent groups are thought to have substantively different etiologies and trajectories of delinquency, there is potential for the effects or parental monitoring and delinquency to be different across these groups.

Typically, studies that examine the association between parental monitoring and adolescent delinquency use models that only assess average difference between people. While differences between people are important, they represent more stable, trait-like differences. To understand how parental monitoring and delinquency develop across adolescence, we must also examine how these constructs manifest within individuals over time. These are unstable, state-like differences that vary respective of an individual's *typical* level. As such, the current study uses an innovative design (Autoregressive Latent Trajectory model with Structured Residuals) to clarify and extend research that examines the association between delinquency and parental monitoring. Using a normative (adolescence limited) and at-risk (life-course-persistent) sample, we examine the bidirectional associations between delinquency and parental monitoring from early to late adolescence in two samples. By examining differential pathways in the development of delinquency across the transition from middle to late adolescence, at multiple levels of analysis (e.g., within-person and between-person), this study addresses several substantive and methodological limitations in the existing literature. First, we examine the association between parental monitoring and delinquency across adolescence (action). Second, we examine the extent to which increases in adolescent delinquency illicit increases (or decreases) in parental monitoring efforts (reaction). Third, we investigate these differential pathways in the development of adolescent delinquency using a normative and at-risk sample. Forth, we examine these associations across the transition from early/middle to late adolescence to identify potential

changes before and after this transition. Finally, we examine these associations using an innovative multilevel structural equation model (Auto-regressive Latent Trajectory model with Structured Residuals) that allows us to examine within-person cross-lagged effects (state-like) between delinquency and parental monitoring while also considering between-person associations (trait-like).

CHAPTER 2: LITERATURE REVIEW

BIOSOCIAL DUAL TAXONOMY

For most people, the development of delinquency from early to late adolescence tends to increase during mid-adolescence and decrease during emerging adulthood (Farrington, 1986; Monahan, Steinberg, & Cauffman, 2009). However, individuals with early onset antisocial behavior may characterize a group that displays continuity in delinquent and antisocial behavior well past adolescence (Moffitt, 1993). These individuals are at risk for criminal offending as adults. As such, several studies have attempted to further understand the developmental pathways leading to persistent forms of adolescent delinquency (Farrington & Hawkins, 1991; Lefkowitz, Eron, & Walder, 2013; Tremblay, 2000). One well known theory that has often been used to characterize different types of delinquent behaviors is Moffitt's (1993; 2006) biosocial dual taxonomy. This theory posits that there are two types of antisocial offenders, life-course-persistent, who display antisocial behaviors in early childhood and persist into adulthood, and adolescence-limited, who display antisocial behavior during adolescence only. According to this theory, neurodevelopmental processes are associated with individuals with life-course persistent antisocial behaviors whereas adolescence-limited antisocial behavior has its origins in social processes that begin during adolescence but cease in adulthood. Moffitt (1993, 2006) states that while relatively few individuals fall into the life-course persistent category, these individuals develop antisocial behaviors early in life and are persistent and pathological. Engagement in antisocial behaviors coupled with high-risk social environments are thought to exacerbate the problem behaviors. More specifically, a child begins with a neuropsychological variant that is expressed as cognitive deficits, difficult temperament, or hyperactivity. Coupled with the absence of prosocial reinforcements within various social ecological contexts (family, community, peer,

and/or school environments), over time this manifests in aggressive and antisocial behaviors within the child that continue into adulthood. In contrast, individuals in the adolescence-limited group are more common, transient, and normative. This form of antisocial behavior begins during puberty, when youth experience psychological distress during the transition between being a dependent youth and the desire for more autonomy. This period has been coined as the "maturity gap" and it is relatively normative for youth to engage in delinquent behaviors to exhibit their autonomy and build social status (Moffitt, 2006). Due to early exposure and engagement with prosocial behaviors, however, antisocial behaviors do not continue into adulthood.

The processes involved in the development of delinquency for these two groups may be very different and thus a better understanding is needed. As such, the current study seeks to examine similarities and differences in the developmental processes associated with adolescent delinquency for adolescence limited versus life-course-persistent antisocial behavior. More specifically, we seek to clarify the reciprocal relationship between delinquency and parental monitoring by examining differences in these associations between a normative (adolescence limited) and an at-risk sample - made up of adjudicated adolescents with early onset antisocial behavior (life-course-persistent). These distinctly different groups of adolescents are characterized by very different social contexts with different etiologies of delinquency. An application of Moffit's (1993) theory within the context of parenting ecologies would provide further insight into differences between these groups. The theory suggests that there is a great deal of continuity in delinquency for the life-course-persistent group, an examination of the fluctuation of delinquency within people can shed light on the extent to which there is

discontinuity in delinquency and how it changes across developmental transitions. This is an important point particularly for intervention efforts that seek ideal intervening entry points.

THE SOCIAL ECOLOGICAL FRAMEWORK

Ecology can be defined as the interactions that occur between an organism and their environment (Stokols, 1992). Adolescents are nested within systems of relationships that can influence the individual's development of delinquent behavior (Bronfenbrenner, 1974, 1986, 2009). Bronfenbrenner (1974, 1992) argues that to understand human development we must consider the entire ecological system with which growth occurs. As such, the social ecological framework focuses on social, interpersonal, institutional and cultural influences and describes the relationship between a developing individual and the settings within which the individual lives and interacts (Bronfenbrenner 1979; Stokols, 1995). Development is influenced by the interactions within these settings as well as the larger context in which the settings are nested within (Bronfenbrenner, 1974, 1994). The individual centered system consists of five subsystems that all influence the development of the individual. The subsystems include 1) microsystem that is a subsystem that is closest to the individual and describes interactions in their proximal surroundings such as with family, peer, school, and community; 2) mesosystem which describes interactions between microsystems such as, parent-teacher relationships; 3) exosystem refers to indirect influence of the individual such as local politics and social networks; 4) macrosystem consist of cultural or societal values, laws, and norms that govern behavior; and 5) chronosystem that captures the element of time and includes timing of critical events or age related changes in development. This framework has been widely used in tandem with other theories of antisocial behavior and delinquency to describe how various subsystems can influence children's development and behaviors.

The development of adolescent behavior problems, including delinquency, may be a result of the adolescent's maladaptation within several relationships experienced in a variety of settings (Dishion & Stormshak, 2007). The current study uses the social ecological framework to situate our research. Adolescents are nested within families and are influenced by parents, siblings, and other family members. Parental monitoring is one strategy that parents use to influence or mitigate the development of delinquent behavior. Youth spend a great deal of time with their families during early to late adolescence, although time spent with family tends to decrease with age. As such, families have long-term influences on the development of adolescents. The nested nature of individuals within families coupled with the long-term stable nature of the family context may result in parenting efforts like parental monitoring to influence the adolescents' development. Additionally, the current study also incorporates the less used chronosystem, that captures timing of age related changes in development like the transition from early/middle to late adolescence. By examining the effect of the family (microsystem) on the individual across adolescent development (chronosystem) we will be able to further unpack differences in the influence of parents on adolescents and how these change across developmental shifts. The chronosystem is an important facet of the social ecological model that is not examined as much as some of the other systems – namely the microsystem. However, time is a very important aspect of studying adolescent development considering it is a period when change frequent but normative. By examining how the individual-environment interaction may change over time can extend our understanding of both the micro and chronosystem regarding parental monitoring and the development of adolescent delinquency.

PARENTAL MONITORING AND ADOLESCENT DELINQUNECY

Parents use several strategies with varying levels of success to reduce the development of delinquency in their children. To evaluate the usefulness of various parenting strategies researchers have examined the extent to which constructs like parental warmth, knowledge, and monitoring are associated with lower rates of delinquency. Parental monitoring encompasses knowing the whereabouts of the adolescent and the activities in which they are engaged (Stattin & Kerr, 2000). Monitoring also involves fostering communication to help buffer the risk of developing antisocial and delinquent behaviors (Stattin & Kerr, 2000; Dishion & McMahon, 1998). Several studies have found strong associations between parental monitoring and lower rates of antisocial, delinquent behavior, and substance use over time (Barnes & Hoffman, 2006; Barnes, et. al., 2000; Benson & Buehler, 2012; Fosco, Stormshak, Dishion, & Winter, 2012; Hirschi, 2002; Kim & Neff, 2010; Li, Feigelman, & Stanton, 2000; Van Ryzin, Fosco, & Dishion, 2012). For example, Barnes and Hoffman (2006) examined the development of antisocial and delinquent behaviors over time and found that adolescents with higher levels of parental monitoring had lower initial levels of alcohol misuse and delinquency, and lower growth in alcohol misuse, illicit drug use, and delinquency over time. Additionally, Li, Feigelman, and Stanton (2000) focused their study on urban low-income African-American youth, and found that lower reports of parental monitoring were associated with higher levels of sexual-risk taking behavior, substance and drug use, drug trafficking, school truancy, and violent behaviors. Some studies have also examined the buffering role of parental monitoring across adolescence. A study by Merrin and colleagues (2017) found that parental monitoring significantly mitigated the positive association between peer deviance and the development of adolescent delinquency, such that, at high levels of peer deviance, parental monitoring was associated with lower levels of

adolescent delinquency over time. Taken together, the extant literature suggest that parental monitoring is a key protective factor for the development of adolescent delinquency. However, as youth get older parental monitoring efforts decline.

TRANSITION FROM MIDDLE TO LATE ADOLESCENCE

The transition from middle to late adolescence is a period when social and environmental changes are frequent but generally normative. These changes, like the transition from middle to high school, create uncertainty that adolescents must navigate. At the same time, parental monitoring decreases during late adolescence as parents release control and youth prepare for young adulthood. Adolescents also begin to spend more time away from home and with their peers, providing more opportunities to engage in antisocial and risk-taking behaviors (Arnett, 1999; Moffit, 1993). Time away from parents can make it more challenging to actively monitor a child. Peer groups can create the context and norms for delinquent behavior to play out. Several studies have examined the development of delinquency across developmental transitions (Barnes et. al., 2006; Merrin et. al., 2017). These studies generally find that on average delinquency and parental monitoring increase during early adolescence, peak around 8th or 9th grade, and decrease through the end of high school (Merrin et. al., 2017). No study to our knowledge has examined changes in the association between parental monitoring and delinquency from early/middle (ages 11-16) to late adolescence (ages 17-20). That is, it is possible that the strength of the reciprocal associations may differ across developmental stages providing insight into the effectiveness of parental monitoring to reduce delinquency at varying ages. Moreover, given the differential developmental pathways among the normative (adolescence limited) and at-risk (life-course-persistent) samples, there is potential for the relative importance of monitoring to differ. For example, because the life-course-persistent sample is expected to have relatively high levels of

delinquency across late adolescence, the effect of parental monitoring to reduce delinquency may be much weaker during late adolescence as their delinquent behaviors become more stable. Additionally, it could also be the case that for the at-risk group, these individuals have more room to reduce their delinquent behaviors. As such, there is potential for the effect of parental monitoring to be stronger for the at-risk group during late adolescence. A further understanding of the extent to which parental monitoring can buffer the development of delinquency across the transition from early/middle to late adolescences has the potential to influence intervention and prevention efforts.

This developmental period is also marked by increased parent-child conflicts that may make parental monitoring efforts more difficult (Arnett, 1999). As such, some scholars have examined the differences between consistent and declining parental monitoring efforts. Tobler and Komro (2010) constructed parental monitoring trajectories that consisted of high, medium, decreasing, and inconsistent parental monitoring to examine differences in substance use and delinquency among the groups. Results indicated, after controlling for family composition, youth in the decreasing parental monitoring group reported significantly higher substance use and delinquency in 8th grade. Indeed, parents and parenting practices appear to play an important role in reducing the development of adolescent delinquency, but there is also evidence to support the fact that delinquency impacts parental monitoring.

RECIPROCAL ASSOCIATION BETWEEN DELINQUNECY AND PARENTAL MONITORING

The bidirectional associations between delinquency and parental monitoring across adolescence has also been examined but to a less degree. The parenting literature has been interested in the question of whether parental monitoring is an action or reaction (Brody, 2003;

Kerr & Stattin, 2003). Typically, studies focus on the extent to which parental monitoring is associated with lower rates of adolescent delinquency (Barnes et. al., 2006), that is, to what extent do parents actively (action) monitor their child's activities and whereabouts. However, some studies have examined the association between adolescent delinquency on changes in rates of parental monitoring, or the extent to which adolescent engagement in delinquent behavior drives changes (reaction) in parental monitoring efforts (Gault-Sherman, 2012; Laird, Criss, Pettit, Dodge, & Bates 2008). Results from these studies have been mixed. In general, studies suggest that delinquency and parental monitoring mutually influence each other over time such that parental monitoring is associated with lower rates of delinquency, and in turn, delinquency is associated with higher rates of parental monitoring. Other studies have found that delinquency may actually decrease parental monitoring efforts (Huh, Tristan, Wade, & Stice, 2006; Yoo, 2017). For example, Huh and colleagues (2017) examined the reactive effect of parental monitoring among a sample of females and found that problem behaviors was associated with reductions in parental monitoring.

However, no studies to our knowledge have examined this association among a normative and at-risk sample. The magnitude of the effects of parental monitoring on delinquency have the potential to be different due to differences in social risk. For example, youth with lower rates of risk may have parents that take more active steps to monitor their behavior. However, it may also be the case that youth with higher levels of social risk illicit higher rates of parental monitoring efforts. The current study addresses this short coming by examining the reciprocal association between delinquency and parental monitoring in a normative (adolescence limited) and at-risk (life-course-persistent) sample. The processes among delinquency and parental monitoring have the potential to unfold differently across adolescence

among these two samples. A better understanding of how the association between delinquency and parental monitoring varies across two distinctly different samples has important implications for theory and practice.

CURRENT STUDY

Several studies have examined the longitudinal (Barnes et al., 2006; Merrin et. al., 2017) and reciprocal (Gault-Sherman, 2012; Laird, et. al., 2008) relations among adolescent delinquency and parental monitoring. Although these studies have uncovered notable associations between parenting monitoring and the development of delinquency, there are several limitations to the current literature. To begin, most studies that examine the development of delinquency and parental monitoring use models that only examine average between-person differences. While differences between people are important, it is also important to examine how individual develop over time respective of their own *typical* levels. Furthermore, most studies assess normative samples with low average rates of delinquency with few studies focusing on samples with high levels of delinquency. The current study advances the literature in several ways. First, we examine the within-person reciprocal relationship between parental monitoring and adolescent delinquency while also examining between-person effects. This clarifies and extends work in this area by leveraging novel methods that allow for the examination of longitudinal relationships at multiple levels of analysis (e.g., within and between individuals). Second, we examine differential pathways in the development of adolescent delinquency in normative and at-risk samples. For example, no study to date has examined the reciprocal associations between delinquency and parental monitoring using both a normative and an at-risk sample. Finally, we examine these associations across the transition from early/middle to late adolescence to identify potential differences during a time when adolescents begin to spend more

time with peers and away from their parents. Further, no study has considered these reciprocal associations at the within-person level of analysis across the transition from early/middle to late adolescence. Failure to consider on constructs manifest within people over time systematically ignores how individuals change over time with respect to their own trajectory (e.g., individual average), which is arguably the most meaningful level of analysis for development (Hoffman, 2015). Understanding how an individual's rate of problem behaviors change from his/her *typical* level over time can provide more nuanced information about the continuity and discontinuity in the development of delinquency during adolescence. Within- and between-person levels of analyses carry different substantive meaning; within-person level assesses state-like, time-variant deviation in delinquency, while between-person level assesses trait-like, time-invariant deviations in delinquency. Moreover, no study to our knowledge has examined these relationships in a normative and at-risk sample. As such, further evaluation of the reciprocal associations between parental monitoring and adolescent delinquency is needed to clarify and extend the current literature. We present a conceptual analytic model in Figure 1. Our goal was to examine the bidirectional association between delinquency and parental monitoring from early to late adolescence. To assess this at various levels of social risk we examine these association for a normative (adolescence limited) and at-risk (life-course-persistent) sample. We define *normative sample* as a sample of individuals that have relatively low average levels of delinquency, antisocial behavior, and social risk. We define *at-risk sample* as a sample of individuals that have relatively high average levels of delinquency, antisocial behavior, and social risk, and have also been involved with the criminal justice system.

Research questions

There are three general research questions. First, to what extent is parental monitoring an Action or Reaction? Research has found a great deal of support for parental monitoring as an action, however, findings are mixed for parental monitoring as a reaction. Some studies have found positive effects while others have found negative effects. Second, how do these processes unfold differently across a normative and at-risk sample? To test differences between two samples that characterize. The etiologies for delinquency and antisocial behavior are much different for individual in the adolescence limited versus life-course-persistent antisocial behavior groups, as such, there is potential for the association to differ across samples. Third, how does the relationship between delinquency and parental monitoring change across early/middle to late adolescence for each sample? Parental monitoring decreases with age as adolescents finish high school and prepare for emerging adulthood. As such, there is great potential for the magnitude of the effects, particularly for parental monitoring, to differ across stages of adolescent development.

CHAPTER 3: METHODS

PARTICIPANTS AND PROCEDURES

Normative sample

Data for the normative sample was derived from the "Bullying, Sexual, and Dating Violence Trajectories" study (Espelage, Low, & Anderson, 2007-2013) and included 1,162 students drawn from four middle schools in Illinois. At baseline participants were in 5th, 6th, and 7th grade and subsequently followed longitudinally for 5 years. At wave 1 30.5% were in grade 5, 37.2% were in grade 6, and 32.3% were in grade 7. The sample was racially diverse and included 30.2% White, 55.6% African American, 3.8 % Hispanic, and 10.4% Other (Includes Asian, Biracial, and Native American). The sample was 51.8% female and 48.2% male.

Human subjects approval was obtained by the University Institutional Review Board. Consent was obtained prior to data collection. Parental consent forms were sent to all students and parents. They were asked to sign and return the consent form only if they did not want their child to participate in the study. Student assent was obtained at each wave of data collection. Students completed the survey in school during standard school hours. On the day of the data collection, trained proctors obtained student assent, described the study, read the survey aloud (Waves 1 – 4 only, 5-7 read to themselves), and answered all student questions. The survey took approximately 30-45 minutes to complete.

At-risk sample

Data for the at-risk sample was derived from the 'The Pathways to Desistance' study (Mulvey, E. P., 2000-2010), and included 1,354 adjudicated adolescents from the juvenile and adult court system in Phoenix (n = 654) and Philadelphia (n = 700). Adolescents were 14 to 18 years of age at time of their offense and had been found guilty of a serious offense. Participants

were followed seven years from baseline and assessments were administered biannually. Parental consent was obtained from all participants under the age of 18. Surveys were completed on a computer in the participant's home or public facility. To maximize privacy, trained proctors read each item aloud while participants indicated a response. Twenty percent of the adolescents recruited for participation declined. There were much more males in the at-risk sample compared to the normative sample. Additionally, there were many more Hispanic participants in the at-risk sample, compared to the normative sample that consisted mainly of Black and White participants.

MEASURES (NORMATIVE SAMPLE)

Demographic variables

Demographic characteristics were determined through participants' reports of sex, race, age, Mother's education, and grade level. Sex was coded such that male was the reference group. Race was coded such that White was the reference group. Grade was coded such that 5th grade was the reference group. Age was treated as a continuous variable. Mother's education was treated as a proxy for socioeconomic status, response items included Some High School, High School Graduate, Some College and College Graduate.

Delinquency

This 8-item scale is based on Jessor and Jessor's (1977) General Deviant Behavior Scale and asks students to report how many behaviors listed on the measure they took part in during the last year. The scale consists of items such as "*Skipped school*" and "*Damaged school or other property that did not belong to you*." Responses are recorded on a 5-point Likert-type scale with options ranging from 1 (*Never*) to 5 (*10 or more times*). In the current study, Cronbach's alphas over time ranged from .70 - .92.

Parental monitoring/supervision

The Parental Supervision subscale from the Seattle Social Development Project (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002) was used to measure perceptions of established familial rules and perceived parental awareness regarding schoolwork and attendance, peer relationships, alcohol or drug use, and weapon possession. The subscale includes 8 items measured on a 4-point Likert-type scale ranging from 0 (*Never*) to 3 (*Always*). Example items include, "*My family has clear rules about alcohol and drug use*" and "*My parents ask if I've gotten my homework done*." In the current study, the Cronbach's alphas over time ranged from .86 - .90.

MEASURES (AT-RISK SAMPLE)

Demographics

Demographic variables included sex, race, socio-economic status, and age of delinquency onset. Sex was coded such that males was the reference group. Race was coded such that White was the reference group. Socioeconomic status and age of onset were both treated as continuous variables. The Hollingshead, which uses mother education as a proxy, was used to assess SES (see Hollingshead, 1971).

Delinquency

Adolescent delinquency, which included involvement in antisocial and illegal activities, was assessed using the Self-Reported Offending scale (SRO; Huizinga, Esbensen, & Weiher, 1991). This measure includes 24-items that examine various types of criminal behaviors over the past three months, including *"Broke in to steal"* and *"Shoplifted"*. Response option included "yes" or "no" and items were summed to create a total score reflecting number of delinquent behaviors. Cronbach alpha ranged from .85 – .93 over time.

Parental monitoring/supervision

The parental monitoring inventory was used to assess parenting practices and strategies related to supervision of the adolescent (Steinberg, Dornbusch, & Darling, 1992). The measure includes 9 items; five items assess parental knowledge and four assessed monitoring habits. Sample items include "*How much does your parent know about how you spend your free time,"* and *"How often do you have a set time to be home on weekend nights?"* Parental knowledge was assessed on a 4-point Likert scale ranging from "doesn't know at all" to "knows everything." Parental monitoring was assessed on a 4-point Likert scale ranging from "never" to "always." Among the current sample, Confirmatory Factor Analyses fitting a two-factor solution for the parental monitoring and knowledge construct found acceptable fit to the data (CFI = .92, RMSEA = .08). Cronbach alphas ranged from .90 – .94 over time.

ANALYTIC PLAN

Cohort effects (linkage), propensity weighting, and measurement invariance

We employed an accelerated longitudinal design (Duncan, Duncan, & Hops, 1996) using age as the time variable. As such, we treated various cohorts as one single trajectory to examine changes in delinquency and parental monitoring from early/middle to late adolescence. At baseline both samples had five cohorts. The normative sample ranged in age from 11 – 14 while the at-risk sample ranged in age from 14 -18 at baseline. To ensure estimated effects were not explained by cohort, an important first step was to test for cohort effects or linkage (Miyazaki & Raudenbush, 2000). To do this, we compared a null growth model with a growth model that included the cohort variables and cohort by time interactions (see Tables 1 - 4). There were significant cohort effects for all variables except the delinquency variable in the at-risk sample. To adjust for the significant cohort effects, we employed propensity weighting (TWANG; Ridgeway, McCaffrey, Morral, Burgette, & Griffin, 2014) using several baseline variables (e.g.,

SES, race, age of delinquency onset, parental education). Creating propensity weights helped to reduce the potential differences due to cohorts by creating weights based on a variety of variables. We then included the propensity weights in all models, including delinquency for the at-risk sample that did not have cohort effects, and compared the growth models again to reassess cohort effects. After adding the propensity weights the cohort effects were no longer significant. To verify the cohort effects were not due to our use of age as the index for time, we refit our models using wave as the index for time and obtained the same findings.

After adjusting for cohort effects, we tested measurement invariance for delinquency and parental monitoring in the normative sample to ensure that the construct validity of our scales was consistent across time (see Tables 5 & 6) (Little, 2013). We were unable to test for measurement invariance in the at-risk sample because we did not have item level information. To do this, we fit configural, weak, and strong tests of measurement invariance (Little, 2013). Configural invariance ensures that the relations among each indicator and its latent construct has the same free and fixed loadings across time. Weak or loading invariance tests whether the loadings of each respective indicator on the constructs are equivalent over time. Strong or intercept invariance constrains the intercepts to be equal over time. We found that the constructs were invariant across time. A test of strict invariance was not used due to the longitudinal nature of the data (Little, 2013).

Missing data and non-normality

To address missing data in our datasets we used Full Information Maximum Likelihood (FIML) using Mplus 7.4 (Muthén, & Muthén, 1998-2014). Unlike listwise deletion, FIML allows participants to contribute any information they have available to the likelihood function without the need to remove individuals with missing data on certain items. However, auxiliary variables

must be used in the model to adjust for potential mechanisms of missing data, otherwise, it is the equivalent to using listwise deletion (Enders, 2010). To adjust for this potential bias, we included several variables (Gender, Race, SES, Age of onset) that contributed to the source of missingness in our data (Enders, 2010). For example, people with low SES reported significantly more missing data on delinquency ($\beta = 31.42$, $p < .001$) and parental monitoring ($\beta = 31.70$, $p < .001$) compared to individuals with higher SES. Thus, we included a proxy for SES in our models. Under the missing completely at random (MCAR) and missing at random (MAR) assumptions, FIML has been found to produce unbiased estimates (Enders & Bandalos, 2001). To adjust for non-normality in our data we bootstrapped the standard errors (10,000) which helps reduce type II error rate.

Disaggregating within- and between-person effects

Studies that examine the longitudinal bidirectional relationships between delinquency and parental monitoring typically rely on traditional Autoregressive Cross Lag models (ARCL), however, these models pose several issues, thereby increasing the likelihood of obtaining bias estimates and standard errors (Berry & Willoughby, 2016). Instead, we used an Autoregressive Latent Trajectory model with Structured Residuals (ALT-SR) to examine the within-person cross-lagged associations between adolescent delinquency and parental monitoring in two samples – a normative sample and an at-risk sample (Berry & Willoughby, 2016; Curran, Lee, Howard, Lane, & MacCallum, 2012; Curran, Howard, Bainter, Lane, & McGinley, 2014). The ALT-SR model, introduced by Curran et al. (2012, 2014), is a novel method that allows one to model reciprocal relations between parental monitoring and adolescent delinquency as they manifest within-individuals over time (state-like), while also considering between-person relations among more stable, trait-like aspects of delinquency and parental monitoring (e.g.,

mean levels, average growth rates). One major issue with ARCL specifications is that they produce estimates that are a combination of within- and between-person effects weighted as a function of their respective reliabilities (Berry & Willoughby, 2016). In contrast, the ALT-SR model partitions within- and between-person variance such that between-person effects are represented by latent intercepts and slopes, and within-person effects are represented by cross-lagged associations. The ALT-SR model is more advantageous than the more popular ARCL model for several reasons. The ARCL models are a mixture of within- and between-person variances making their interpretations very difficult (e.g., convergence). The convergence effect assumes that the within- and between-person effects are identical, an assumption that is rarely true in practice (Hoffman, 2015). These levels of analyses hold very different substantive meaning. While between-person effects examine average differences between people; within-person effects examine how individuals differ from their own *typical* level which may be more developmentally appropriate to examine change over time (Hoffman, 2015; Hoffman & Stawski, 2009). The ALT-SR model also strengthens the internal validity of the reciprocal effects as each individual serves as his/her own control group, therefore accounting for all time-invariant confounds.

These models are only beneficial to the extent that there is sufficient within- and between-person variance. To examine the within- and between-person variance in the current samples we first calculated intraclass correlations (ICC) for each of our measures. The ICCs indicated that approximately 52% (.1170/.2257 = .5184) of variance in adolescent delinquency and 43% (.2854/.6644 = .4296) of variance in parental monitoring lay between people in the normative sample. For the at-risk sample, approximately 6% (53.14/870.31 = .0611) of variance in adolescent delinquency and 39% (.2126/.5469 = .3887) of variance in parental monitoring lay

between people. Thus, there appears to be adequate variance at both levels for the normative and at-risk samples to proceed with this approach.

ALT-SR model

Between-person effects are represented by latent intercepts and slopes. To begin we correlated the latent intercept and slope variables for delinquency and parental monitoring to examine between-person associations (see Figure 12). We then estimated within-person auto-regressive paths for delinquency and parental monitoring over time as well as within-time correlations between delinquency and parental monitoring (see Figure 6 & 7). Next, we added the lagged association between parental monitoring on delinquency and then delinquency on parental monitoring. Auto-regressive, cross-lagged paths, and within-time correlations are held constant across time to examine the average association over time. We then examined the transition from early/middle to late adolescences to identify differences before and after the transition by constraining the autoregressive and crossed-lagged paths to be equal during early/middle (11-16) and late (17-20) adolescence respectively. Improvements in model fit are used to assess differences between the constrained model and the model that frees estimates during early/middle and late adolescence.

Estimated models

The fitted models are presented in Figures 6 – 14 for both the normative and at-risk samples. Each model was tested in a stepwise fashion, adding cross-lagged associations into the model one at a time. The age range differs between samples; for the normative sample the age ranges from 11 – 19, and the at-risk sample ranges from 14 – 20. Figures 6 – 14 present the conceptual autoregressive and cross-lagged models. Figure 12 presents the full ALT-SR model with cross-lags (within-person) and growth parameters (between-person). Our final models are

presented in Figures 13-14 and specify full cross-lagged paths between delinquency and parental monitoring, and constrain paths during early/middle and late adolescence respectively. To test between-person associations we examined correlations between intercept and slope variables among delinquency and parental monitoring.

CHAPTER 4: RESULTS

DESCRIPTIVE STATISTICS

Normative sample

Descriptive statistics for the normative sample are presented in Table 7. The normative sample included five cohorts of youth who were 10 years (12%), 11 years (28.3%), 12 years (32.9%), 13 years (21.5%), and 14 years (5.3%) at baseline. These included 5th (32.4%), 6th (36.8%), and 7th (30.7%) grade students. Females (49.4%) and males (50.6%) were approximately evenly split. The sample was ethnically diverse and included individuals who were Black (58%), White (26%), Hispanic (3.4%), and Other (12.6%). Mother's education was used as a proxy for social economic status and included Some High School (8.9%), High School Graduate (32.7%), Some College (17.9%), and College Graduate (40.5%). On average, delinquency in this sample was relatively low (Range 1.22 – 1.37). Average growth in adolescent delinquency between 11 and 19 years of age was relatively stable over time (see figure 2). The trajectory of delinquency was lowest at young ages (11 and 12 years), increased and peaked at 15 years, and decreased to similar starting values by 19 years (see Table 8). On average parental monitoring remained relatively high (Range 3.43 – 2.43). Growth in parental monitoring was highest at younger ages and decreased steadily over time (see Figure 3). The largest average decrease in parental monitoring occurred between 17 and 19 years of age (see Table 9). Within-construct bivariate correlations for adolescent delinquency and parental monitoring were generally significant and positive over time. Further, as expected, cross-construct bivariate correlations for adolescent delinquency and parental monitoring were significant and negative over time (see Table 9).

At-risk sample

The at-risk sample included five cohorts of youth who were 14 years (14%), 15 years (18.8%), 16 years (30.4%), 17 years (30.5%), and 18 years (8.3%) at baseline. This sample was made up of mostly males (86.4%). The sample was ethnically representative and included Black (41.5%), White (20.2%), Hispanic (33.5%), and Other (4.8%). Mother's education was also used as a proxy for socio-economic status. Approximately 80% of the sample had mothers who had a high school degree or less (See table 10). More specifically, this included Grade School or Less (11.9%), Some High School (33.8%), and High School Graduate (32.2%). The at-risk sample was made up of adjudicated youth who were involved in delinquency to the point of being arrested. In the current sample 63.3% of participants had committed an offense by 10 years old and 7.8% of the sample reported being a gang member at baseline. On average delinquency in this sample was relatively high and averages decreased over time (Range 12.33 – 1.96) (See figure 4). Delinquency was highest at 14 years, fluctuated until 17 years, and decreased from 17 to 20 years (see Table 11). On average parental monitoring decreased over time (See figure 5). Specifically, average parental monitoring was highest at 14 years (3.02), decreased over time, and was lowest at 20 years (2.42). Bivariate correlations between adolescent delinquency and parental monitoring showed generally significant positive associations within constructs over time. The associations across constructs over time were generally negative, however several are not significant, particularly when constructs were further apart in time (see Table 12). For example, parental monitoring at baseline is not significantly associated with adolescent delinquency at the last time point.

BETWEEN-PERSON ASSOCIATIONS

Normative sample

Correlations among between-person effects represented by latent intercepts and slopes are presented in Table 13, Models 1-3. Latent intercepts, which represent conditional averages at age 11, were significant for delinquency (β = 1.26, SE = .016, p < .001) and parental monitoring (β = 3.39, SE = .060, p < .001). This suggests that for the normative sample, delinquency was relatively low and parental monitoring was relatively high at 11 years of age. Delinquency increased slightly and subsequently began to decrease slightly over time as shown by the linear (β = .059, SE = .009, p < .001) and quadratic (β = -.008, SE = .001, p < .001) growth functions. On average, parental monitoring decreased over time as shown by the linear (β = -.006, SE = .031, p = .857) and quadratic (β = -.011, SE = .005, p = .015) growth functions. At baseline, adolescent delinquency and parental monitoring were negatively correlated with each other (β = -.160, SE = .040, p < .001). That is, at 11 years of age, individuals who reported higher levels of parental monitoring reported lower levels of adolescent delinquency, and vice versa. Baseline levels of delinquency were not significantly associated with growth in parental monitoring over time (β = .007, SE = .005, p = .139). In contract, baseline levels of parental monitoring were positively associated with growth in delinquency over time (β = .011, SE = .004, p = .007). That is, individuals who reported higher levels of parental monitoring at 11 years of age, reported slightly higher rates of growth in delinquency over time. These findings suggest that while baseline levels of delinquency are not associated with increases in parental monitoring over time. Although not in the expected direction, baseline levels of parental monitoring are associated with increases in delinquency over time.

At-risk sample

Between-person findings for the at-risk sample are presented in Table 14, Models 1-3. Latent intercepts centered at age 14, were significant for delinquency (β = 116.9, SE = 12.45, p < .001) and parental monitoring (β = 2.94, SE = .048, p < .001), suggesting that both delinquency and parental monitoring were relatively high, and significantly different from zero, at baseline. Growth in delinquency was highest at 14 years and decreased slightly overtime as shown by negative linear (β = -9.27, SE = 5.16, p = .072) and quadratic (β = -.272, SE = .648, p = .675) growth functions. Parental monitoring was highest at 14 years and decreased over time as shown by the negative linear (β = -.080, SE = .031, p = .010) and quadratic (β = -.005, SE = .005, p = .312) growth functions. Like the normative sample, at baseline (14 years), adolescent delinquency and parental monitoring were negatively and significantly correlated (β = -25.43, SE = 6.84, p < .001). Individuals who reported higher levels of adolescent delinquency tended to report lower levels of parental monitoring at 14 years. Furthermore, in contrast to the normative sample, baseline levels of delinquency were positively associated with growth in parental monitoring over time (β = 5.78, SE = 1.64, p < .001). Individuals who reported higher levels of adolescent delinquency at age 14, also reported significant increases in parental monitoring over time. In contrast, baseline levels of parental monitoring were not significantly associated with growth in delinquency over time (β = -1.57, SE = 1.11, p = .159). These findings suggest that while baseline levels of delinquency are associated with increases in parental monitoring over time, and baseline levels of parental monitoring are not associated with increases in delinquency over time. Although these association only represent average, trait-like association, they highlight some of the differences between the normative and at-risk sample, while also providing some evidence for parental monitoring as an action and reaction.

WITHIN-PERSON CROSS-LAGGED ASSOCIATIONS

Normative sample

In the first model we estimated auto-regressive paths and within-time correlations for adolescent delinquency and parental monitoring. That is, we fit a model with delinquency predicting itself at subsequent time points, and parental monitoring predicting itself over time. As shown in Figure 15, a significant positive auto-regressive association was present for both adolescent delinquency (β = .389, SE = .116, p < .001) and parental monitoring (β = .210, SE = .046, p < .001) over time. That is, after accounting for systematic growth over time (Between-person), time specific deviations in delinquency (Within-person) significantly predicted increases in delinquency at subsequent time points. Parental monitoring followed the same pattern. That is, parental monitoring predicted increases in parental monitoring over time. Further, the within-time correlations between delinquency and parental monitoring were negative across time (β = -.022, SE = .006, p < .001). The significant negative correlation suggested that individuals who reported higher levels of adolescent delinquency tended to report slightly lower levels of parental monitoring over time. Figure 12, presents the cross-lagged effects between delinquency and parental monitoring, and examines our primary research question of whether parental monitoring is an action or reaction. The negative significant lagged effect from parental monitoring to adolescent delinquency (β = -.046, SE = .022, p = .033) demonstrated the extent to which parental monitoring was associated with decreases in delinquency at subsequent time points (Action). This indicated that, at time points that individuals reported higher parental monitoring then their *typical* amount (e.g., individual trajectory), they reported significantly less delinquency (then their *typical* amount) at the next time point. This corresponded to a standardized effect of -.075, and indicated that a one standard deviation increase in parental monitoring was associated

with -.075 standard deviation decrease in delinquency at the following time point. Further, the lagged effect from delinquency to parental monitoring tested the extent to which parental monitoring is a reaction, and, if so, the characteristics of the reaction. As indicated by the significant negative lagged path from delinquency to parental monitoring (β = -.234, SE = .067, $p < .001$), there was evidence for reactive parental monitoring in the normative sample (see Figure 17). Specifically, at time points when individuals reported higher rates of delinquency then their *typical* levels, they reported significantly lower levels of parental monitoring at the next time point. This corresponded to a standardized effect of -.142, and indicated that a one standard deviation increase in delinquency was associated with a -.142 standard deviation decrease in parental monitoring at the subsequent time point. Table 13 presents all estimates and fit statistics for the models.

In sum, for the normative sample, we found support for parental monitoring as an action. Higher rates of parental monitoring predicted lower rates of delinquency. We also found support for parental monitoring as a reaction. Delinquency predicted decreases in parental monitoring over time. Interestingly, and unexpectedly, in the normative sample, parents reacted to increases in their child's delinquency by reducing parental monitoring efforts.

At-risk sample

We began by fitting a model with autoregressive and within-time correlations for the at-risk sample. That is, we fit a model with delinquency predicting itself, and parental monitoring predicting itself over time. As shown in Figure 16, a significant positive auto-regressive association was found for both adolescent delinquency (β = .159, SE = .059, p = .008) and parental monitoring (β = .258, SE = .059, $p < .001$) over time. This indicated that there was a fair amount of stability over time in within-person effects of adolescent delinquency and parental

monitoring. Like the normative sample, within-time correlations between delinquency and parental monitoring were significant and negative over time (β = -9.84, SE = 2.90, $p < .001$). This indicated that, at any time point, as delinquency increases, parental monitoring decreases. Cross-lagged effects were again used to examine the extent to which parental monitoring was an action or reaction in the at-risk sample (see Figure 18). As expected there was evidence for parental monitoring as an action. Parental monitoring had a significant negative effect on adolescent delinquency over time (β = -27.0, SE = 7.85, $p < .001$). That is, at time points when individuals reported higher parental monitoring then their *typical* levels they reported significantly lower levels of delinquency at the next time point. In standardized units, a one standard deviation increase in parental monitoring was associated with a -.074 standard deviation decrease in delinquency at the proceeding time point. However, there was no evidence of parental monitoring efforts as a reaction (see Figure 18). The lagged effect from delinquency to parental monitoring was not significant (β = .001 SE = .001, p = .894), and suggested that for the at-risk sample, that there was no evidence of parental monitoring as a reaction in either direction (increasing or decreasing). Said differently, delinquency was not predictive of parental monitoring at subsequent time points. Table 14 presents all estimates and fit statistics for the models.

In sum, for the at-risk sample, we found support for parental monitoring as an action, indicated by the positive lagged path from parental monitoring to delinquency. However, we did not find support for parental monitoring as a reaction. The lagged path from delinquency to parental monitoring was not significant. This was a notable difference between the normative and at-risk samples, and indicated that for the at-risk sample that higher rates of adolescent delinquency did not illicit any parental monitoring reactions (increases or decreases). It is

interesting to note that the magnitude of the effect sizes in the normative (-.075) and at-risk (-.074) sample were quite similar for the lagged effect between parental monitoring on delinquency.

DEVELOPMENTAL SHIFT

Normative sample

To examine the differences in the pattern of findings from early/middle and late adolescence, we constrained the auto-regressive and cross-lagged effects to be equal during early/middle adolescence (11-17 years) and late adolescence (18-19 years). During early/middle adolescence the negative effect of parental monitoring on delinquency became non-significant (β = -.008 SE = .028, p = .773). During late adolescence, however, the magnitude of the effect was much larger and statistically significant (β = -.220 SE = .092, p = .017) compared to early/middle adolescence. That is, there is an effect of parental monitoring on delinquency during late adolescence but not during early/middle adolescence. In contrast, the effect of delinquency on parental monitoring was significant during early/middle (β = -.210 SE = .073, p = .004) as well as late (β = -.905 SE = .297, p < .001) adolescence (see Figure 19). Said differently, the effect of delinquency on parental monitoring was much weaker during early/middle compared to late adolescence. More specifically, a one standard deviation increase in delinquency was associated with a -.129 standard deviation decrease in parental monitoring at the next time point during early/middle adolescence, compared to almost a half a standard deviation decrease (-.478) in parental monitoring during late adolescence.

Considering the extent to which parental monitoring is an action and reaction at different times across adolescence we find notable differences. Parental monitoring as an action was not found during early/middle adolescence. In contrast, during late adolescence, we found evidence

of parental monitoring as an action. This was indicated by the significant negative effect from parental monitoring predicting delinquency. These findings suggest that increases in parental monitoring were associated with lower rates of delinquency only during later adolescence. Additionally, parental monitoring as a reaction was found during early/middle and late adolescence. Yet, the magnitude of the effect was much stronger during late adolescence suggesting that the ability for increases in delinquency to predicted decreases in parental monitoring efforts was stronger during late adolescence.

At-risk sample

To examine the developmental transition from early/middle (14-17 years) to late (18-20 years) adolescence for the at-risk sample we again assessed the reciprocal effects between delinquency and parental monitoring separately (see Figure 20). The effect of parental monitoring on adolescent delinquency was present during both early/middle (β = -219.1 SE = 60.3, $p < .001$) and late (β = -11.6 SE = 6.01, $p = .05$) adolescence, however the effect was much more pronounced during early/middle adolescence compared with late adolescence. A one standard deviation increase in parental monitoring was associated with more than a half a standard deviation (-.575) decrease in delinquency at the next time point during early/middle adolescence, compared to a -.037 standard deviation decrease in delinquency during late adolescence. The effect of delinquency on parental monitoring remained not significant during early/middle (β = .001 SE = .001, $p = .331$) or late (β = .001 SE = .001, $p = .586$) adolescence (see Figure 20).

Returning to the question of whether parental monitoring is an action and reaction at different times across adolescences we find noteworthy differences for the at-risk sample. Parental monitoring as an action was found during early/middle and late adolescence. This was

indicated by the significant negative lagged path from parental monitoring to delinquency. Similar to the normative sample, these findings suggest that increases in parental monitoring were associated with lower rates of delinquency. Contrary to the normative sample, parental monitoring as a reaction was not found during any time during adolescence. Looking across samples there are different patterns of findings. For the normative sample, parental monitoring as an action holds during late adolescence only. As a reaction, the association is negative across time, however the magnitude of the association is stronger during late adolescence. For the at-risk sample, parental monitoring as an action held across adolescence with the magnitude of the effect being much stronger during early adolescence. Conversely, parental monitoring as a reaction was not found during early/middle nor late adolescence.

CHAPTER 5: DISCUSSION

The current study advances the delinquency and parenting literature both substantively and methodologically by examining the longitudinal reciprocal effects of delinquency and parental monitoring in two adolescent samples. Substantively, this study extends the parenting literature by examining the extent to which parental monitoring is an action or reaction in both a normative and at-risk sample. Methodologically, this study extends current work by leveraging novel multilevel latent variable modeling techniques that allowed us to address several short comings in how these reciprocal associations are typically modeled. Specifically, we examined the association between delinquency and parental monitoring at the within- and between-person levels of analysis which hold different substantive meaning. This analytic approach allowed for a more nuanced examination of the reciprocal relations between delinquency and parental monitoring at am arguably more appropriate level of analysis for studying adolescent development – within-person. Generally, findings suggested that parental monitoring is an important and effective strategy to mitigate the development of delinquency, although the pattern of association differed by sample. Support for parental monitoring as a reaction was also found though the results varied by sample. These differences have notable implications for both theory and practice.

IS PARENTAL MONITORING AN ACTION OR REACTION?

The primary goal of this study was to assess the extent to which parental monitoring is an action or reaction in a normative and at-risk sample. More specifically, as an action, whether parenting efforts are effective at reducing adolescent delinquency, and as a reaction, how parents respond to their child's engagement in delinquent behaviors. Parental monitoring is associated with reductions in delinquency overtime, providing clear evidence for parental monitoring as an

action. Adolescents who reported higher rates of parental monitoring (respective of their own trajectories) reported lower rates of adolescent delinquency over time. This effect was found for both the normative and at-risk samples, although the magnitude of the effect was stronger for the at-risk sample. Extant literature has found strong support for parental monitoring as an action (Gault-Sherman, 2012; Laird, Criss, Pettit, Dodge, & Bates 2008). It is well accepted that parental monitoring is associated with engagement in less delinquency, these findings corroborate this claim and extend it by examining how delinquency and parental monitoring manifest within individual over-time (within-person), while also assessing more trait-like differences (between-person). Most studies that examine this association do not consider the nested structure of longitudinal data (Laird, Pettit, Bates, & Dodge, 2003; Yoo, 2017). Within- and between-person levels of analysis carry different substantive meaning, by plausibly disaggregating these effects our results provided more reliable estimates of the association between delinquency and parental monitoring across adolescence.

We also found some support to suggest that parental monitoring is a reaction, although the effect varied by analytic sample. For the normative sample, delinquency was associated with decreases in parental monitoring, suggesting that delinquency could make parental monitoring efforts more challenging. For the at-risk sample, however, delinquency was not associated with parental monitoring. In line with some research, our findings suggest that delinquency may influence parents to react in ways that reduce their parental monitoring efforts (Hoeve et al., 2009; Huh, Tristan, Wade, & Stice, 2006; Pardini, Fite, & Burke, 2008; Yoo, 2017). For example, a recent study by Yoo (2017) found that delinquency was associated with significant reductions in parental monitoring from 9 – 12 years of age. Perhaps for the normative sample, in which average delinquency was rather low, parenting efforts to monitor or control the child may cause

conflicts between the parent and child. There is some evidence to suggest that adolescence may increase delinquent behaviors to undermine parental monitoring efforts (Patterson, Reid, & Dishion, 1992). In response, parents may reduce monitoring strategies to prevent ongoing conflicts (Patterson 1982, 1992). However, for the at-risk sample our findings suggested that delinquency was not associated with changes (positive or negative) in parental monitoring. Parents did not react by reducing parental monitoring efforts to prevent conflicts as in the normative sample. Rather, parental monitoring efforts were not related to adolescent delinquency.

ARE THERE DIFFERENCES FROM EARLY/MIDDLE TO LATE ADOLESCENCE?

We examined the difference before and after the transition from early/middle to late adolescence in both the normative and at-risk sample. Only one other study, to our knowledge, has examined the bidirectional relationship among delinquency and parental monitoring across the transition from early/middle to late adolescence within two adolescent samples (Yoo, 2017). Our study extends Yoo's (2017) work by examining the bidirectional relationship during early/middle and late adolescence among a normative and at-risk sample while using a within-person cross-lagged approach across a longer period of time. For the normative sample, we found that the negative effect of parental monitoring on delinquency was much stronger during late adolescence compared to early/middle adolescence. In fact, the effect of parental monitoring on delinquency during early/middle adolescence became nonsignificant, suggesting that the identified association may have been driven by later years. In other words, during early/middle adolescence, as individuals reported more parental monitoring then their typical levels they did not in turn report lower levels of delinquency at the following time point. However, during late adolescence parental monitoring was associated with lower rates of delinquency. Results for the at-risk sample were much different. Specifically, the negative effect of parental monitoring on

delinquency was much stronger during early/middle adolescences compared to late adolescences. The effects between the normative and at-risk samples were essentially flipped.

These findings map on to the Moffit's (1993, 2006) Bio Social Dual Taxonomy. The normative sample represents the Adolescent Limited group while the at-risk sample represents the Life-Course-Persistent group. Adolescent Limited antisocial behavior grows during adolescence, however, decreases by the end of high school leading into emerging adulthood (Farrington, 1986; Monahan, Steinberg, & Cauffman, 2009). Coupled with the low average rates of delinquency, this may help explain why the effects of parental monitoring on delinquency are stronger during late adolescence. The end of high school is a period when delinquency decreases, this may create a context for parental monitoring to be more effective for these individuals during this time. Conversely, Life-Course-Persistent antisocial behavior starts early and remains generally high and stable across adolescence (Moffitt, 2006). These individuals are at an increased risk for engaging in delinquent and criminal behavior as an adult. As such, there is potential that the effect of parental monitoring is stronger during early/middle adolescence for the at-risk group because the individuals are involved in delinquency at early ages when parental monitoring efforts are effective. However, as these individuals get older their delinquency becomes more stabilized (Tremblay, 2000), such that the effectiveness and rates of parental monitoring may begin to diminish. Taken together, for the at-risk sample, parental monitoring efforts seem to be most effective during early/middle adolescence and weaken over time.

Examining the negative effect of delinquency on parental monitoring across the transition for the normative sample we found that the magnitude of the effect was much stronger during late adolescences compared to early adolescences. Our findings suggest that the magnitude of the effect between delinquency on decreases in parental monitoring is more than four and half times

stronger during late adolescence. Adolescence have been found to attempt to undermine parental monitoring efforts (Patterson, Reid, & Dishion,1992), our findings suggest late adolescence may be a time when these efforts are more prevalent. There effect of delinquency on parental monitoring for the at-risk sample remained nonsignificant, which again suggests that delinquency is not associated with parental monitoring efforts.

TRAIT-LIKE DIFFERENCES (BETWEEN-PERSON)

Adolescent delinquency and parental monitoring were negatively associated with each other such that, individuals who reported higher levels of delinquency reported lower levels of parental monitoring. However, changes in these associations differed by sample. Adolescent delinquency was associated with increases in parental monitoring over time for the at-risk sample. That is, youth who reported higher rates of delinquency at age 14, reported more positive growth in parental monitoring over time. Several studies have found an association between delinquency and higher rates of parental monitoring (Barnes et. al., 2006; Gault-Sherman, 2012; Laird, Criss, Pettit, Dodge, & Bates 2008). However, this relationship did not exist for the normative sample. Rather, youth who reported higher rates of parental monitoring at age 11, reported more positive growth in delinquency over time. These differences may have been due to the differences between the samples. The at-risk sample included youth who were actively involved in delinquency. As such, parents are likely aware of their child's delinquent behavior and are actively attempting to mitigate further development of these behaviors. This may be the reason we see more positive growth in parental monitoring for the individuals who reported higher baseline rates of delinquency. However, this association may not have held for the normative sample because average rates of delinquency were lower over time. Although, for the normative sample individuals that reported higher rates of parental monitoring at age 11,

reported slightly higher rates of delinquency over time. Considering the relatively low levels of delinquency in the normative sample, this may due to overparenting (Segrin, Woszidlo, Givertz, & Montgomery, 2013). Parents in the normative sample who monitor their children at higher rates at 11 years may characterize parents that are overprotective and intrusive (Hastings, Sullivan, McShane, Coplan, Utendale, & Vuncke, 2008), frustrating the child, thereby responding by engaging in more delinquent behaviors.

PRACTICE AND RESEARCH IMPLICATIONS

The current study provides important insight into the relation between parental monitoring and adolescent delinquency in two samples that has implications for both theory and practice. For theory, we found difference between the normative and at-risk samples which may suggest that the underlying mechanisms driving reactions in parental monitoring differ between these two samples. Further these differences between samples may characterize differences between Adolescence Limited and Life-Course-Persistent individuals whose etiologies of delinquent behaviors are much different. Adolescence Limited characterize a more normative trajectory while Life-Course-Persistent characterize a more pathological trajectory of delinquent and antisocial behavior. Additionally, our findings also highlight the social ecological model, by examining the associations between the individual and the microsystem (e.g., parental monitoring) how these association differ across the chronosystem (e.g., early/middle and late adolescence).

For practice, the detailed examination of parental monitoring sheds further light on the role parental monitoring plays in the association with delinquency across adolescence. The current findings have the potential to influence the development of prevention programs by considering the role of parental monitoring to offset the development of delinquency. Though

understandably difficult, programs may find success in encouraging parents to increase monitoring efforts particularly in the context of high engagement in delinquency. More specifically, to encourage parents with delinquent youth to remain persistent in the light of increases in delinquent behaviors. Further, programs could also focus on improving parental monitoring strategies and techniques that parents could use at home with their children. Though best used in collaboration with other types of interventions, programs like ImPACT that focus on improving parental monitoring strategies, have found some success at reducing adolescent delinquency (Li et. al., 2002; Stanton et al., 2000). Moreover, school based programs that focus on decreasing aggression and victimization and improving peer group relationships like Second Step (Espelage, Low, Polanin, & Brown, 2015) and WITS (Leadbeater & Sukhawanthanakul, 2011) may find reduced problem behaviors by incorporating lessons that aim to improve parental monitoring strategies. Although programs like these include some activities that include parents, more focus on including parents and providing them with resources to better monitor and build an open relationship with their child may be a good approach.

Our study also found that parental monitoring strategies can decrease delinquency at the next time point among serious juvenile offenders. Programs that focus on at-risk youth, like Multisystemic therapy (MST), focus on building parenting strategies. Treatment models like Multisystemic therapy (MST) are designed to treat youth with extreme forms of antisocial behavior by paying close attention to the role of parents and family members (Henggeler, 1997a; LaFavor & Randall, 2012). The home-based model uses parents to provide treatment in the comfort of the adolescent's home environment, and have found success in reducing delinquent and problem behaviors (Henggeler, 1997b). The home base model may also be a good approach for adolescent who are not serious juvenile offenders.

More recently, scholars have proposed a more flexible framework for parenting monitoring efforts that emphasizes the need to adjust parental involvement based on the situation. This approach has found some success. The Vigilant care framework is one example in which parents are taught to take warning signals about their child's behaviors to either increase or decrease involvement. (Omer, Satran, & Driter, 2016). The various levels of this framework (e.g., open attention, focused attention, and active protection) are geared to cover a range of parenting strategies that are thought to help parents decide when to use more caring attitudes versus more authoritative stances depending on the level of risk. Our findings suggest that a dynamic framework like Vigilant care, that fits various needs of parents facing a variety challenges with their children, may find success due to its flexibility.

LIMITATIONS

Despite the study finding support for the within-person time-variant reciprocal associations between parental monitoring and delinquency, several limitations in the current study should be noted. First, the study relied solely on self-reports of the participants, thereby increasing the risk for bias responses (Chan, 2009). Single reporter self-reports bias may have increased the effects that were found. Multiple reporters would have provided more robust information about the development of delinquency during adolescence. Further, combining other information with self-reports could also strengthen the findings. For example, future research could use self-reports from multiple reporters as well as official arrest records to corroborate individual self-reports. Second, the study used two samples of adolescents, one from the Midwest and another made up of a sample from the East coast and Southwest. As such, the generalizability of the findings is geographically limited. Future studies should include samples from other geographical regions to assess similarities and differences. Third, the study focuses

only on parental monitoring and delinquency. Future studies could include other factors like peer and neighborhood risk to further assess how the reciprocal association may be different in the context of these other variables. Fourth, while the ALT-SR model is more developmental appropriate for examining change over time, the within-person effects represent fixed or pooled effects across individuals over time. Finally, our inability to statistically compare the normative and at-risk sample limited our capacity to make comparisons across samples.

A more substantive limitation pertains to recent discourse in the parenting literature suggest that parental monitoring may not be the best parenting construct to examine parenting behaviors. Kerr and Stattin (2003) challenge the notion that well monitored children are less involved in delinquent activities and suggest that child disclosure is the true source of delinquency. They argue that, compared to active monitoring practices, child disclosure or the child's willingness to divulge information to their parents, is the primary source of parental knowledge. Child disclosure involves creating a relationship with the child in which the child feels comfortable divulging information to their parents about to their activities and whereabouts (Stattin & Kerr, 2000). This reinterpretation of the parental monitoring construct suggests that parental knowledge is principal, thus questions should focus on adolescent's willingness to disclose information rather than the parents monitoring practices. In other words, children's disclosure of information to their parent or lack thereof is the true source of variations in parent knowledge. Thus, more monitoring would not be an effective way to prevent engagement in delinquency, rather, a better understanding of why youth disclose or do not disclose to their parents might be needed. Monitoring efforts may not be useful in buffering the development of delinquency because the true mechanism driving parental knowledge is child disclosure. As such, prevention efforts should instead emphasize parent-child relationships to enhance child

disclosure and reduce the development of adolescent delinquency. More work is needed to further evaluate the differences in utility among parental monitoring and child disclosure.

CONCLUSIONS

Notwithstanding these limitations, the current study adds to the extant literature on the reciprocal effects of delinquency and parental monitoring across adolescence. By using the novel ALT-SR model we were able to examine differences between individuals, while also examining how parental monitoring and delinquency manifest within individuals over time. Overall, findings suggested that there were differences in parental monitoring as an action and reaction. However, these associations differed for the normative and at-risk sample and across adolescence. The present study provided a unique glimpse into the reciprocal associations between parental monitoring and adolescent delinquency at both the within- and between-person levels of analysis. Findings suggest that parental monitoring efforts are an important contributor to the early development of delinquency across adolescence. Prevention and intervention efforts that incorporate parental monitoring strategies may be successful at reducing adolescent delinquency. However, our study also suggests the need to consider the severity of the adolescent's delinquent behaviors. Parental monitoring efforts can illicit different responses from adolescents depending on the context. Taken together, parental monitoring appears to be a useful strategy that mitigates the development of delinquency during adolescence. The current study contributes to the conceptual understanding of delinquency during adolescence and further informs risk in parenting domains.

REFERENCES

Arnett, J. J. (1999). Adolescent storm and stress, reconsidered. *American Psychologist*, *54*(5), 317.

Arthur, M. W., Hawkins, J. D., Pollard, J. A., Catalano, R. F., & Baglioni, A. J. (2002). Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors: The communities that care youth survey. *Evaluation Review*, *26*, 575-601.

Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research*, *19*(1), 3-30.

Barnes, G. M., Hoffman, J. H., & Welte, J. W. (2006). Effects of parental monitoring and peer deviance on substance use and delinquency. *Journal of Marriage and the Family*, *68*.

Barnes, G. M., Reifma, A. S., Farrell, M. P., & Dintcheff, B. A. (2000). The effects of parenting on the development of adolescent alcohol misuse: A six-wave latent growth model. *Journal of Marriage and the Family*, *62*, 175-186.

Benson, M., & Buehler, C. (2012). Family process and peer deviance influences on adolescent aggression: Longitudinal effects across early and middle adolescence. *Child Development, 4*, 1213-1228.

Berry, D., & Willoughby, M. T. (2016). On the Practical Interpretability of Cross-Lagged Panel Models: Rethinking a Developmental Workhorse. *Child Development*.

Brody, G. H. (2003). Parental monitoring: Action and reaction. *Children's influence on family dynamics: The neglected side of family relationships*, 163-169.

Bronfenbrenner, U. (1974). Developmental research, public policy, and the ecology of childhood. *Child Development*, *45*, 1-5.

Bronfenbrenner, U. (1979). *Ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology, 22*(6), 723.

Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.), *Six theories of child development: Revised formulations and current issues* (pp. 187-249). London, UK: Jessica Kingsley Publishers.

Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education, Vol. 3, 2nd. Ed.* Oxford: Elsevier. Reprinted in: Gauvain, M. & Cole, M. (Eds.), *Readings on the* development of children*, 2nd Ed. (*1993, pp. 37-43). NY: Freeman.

Bronfenbrenner, U., & Bronfenbrenner, U. (2009). *The ecology of human development*: *Experiments by Nature and Design*. Harvard university press.

Burke, J. D., Pardini, D. A., & Loeber, R. (2008). Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *Journal of Abnormal Child Psychology*, *36*(5), 679-692.

Bursik, R. J. (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. *Criminology*, *26*(4), 519-552.

Chan, D., 2009. So why ask me? Are self-report data really that bad. In: Lance, C., Vandenberg, R.J. (Eds.), Statistical and Methodological Myths and Urban Legends: Doctrine, Verity and Fable in the Organizational and Social Sciences. Routledge/Taylor & Francis Group, New York, NY, pp. 309–336.

Chen, P., Voisin, D. R., & Jacobson, K. C. (2013). Community violence exposure and adolescent delinquency: Examining a spectrum of promotive factors. *Youth & Society*.

Curran P. J., Lee, T. H., Howard, A. L., Lane, S. T., & MacCallum, R. C. (2012) Disaggregating within-person and between-person effects in multilevel and structural equation growth models. In J. Harring & G. Hancock (Eds.) *Advances in Longitudinal Methods in the Social and Behavioral Sciences* (pp. 217-253). Charlotte, NC: Information Age Publishing.

Curran, P. J., Howard, A. L., Bainter, S. A., Lane, S. T., & McGinley, J. S. (2014). The separation of between-person and within-person components of individual change over time: A latent curve model with structured residuals. *Journal of Consulting and Clinical Psychology*, *82*(5), 879.

Dishion, T. J., & McMahon, R. J. (1998). Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation. *Clinical Child and Family Psychology Review*, *1*(1), 61-75.

Dishion, T. J., & Stormshak, E. A. (2007). *Intervening in children's lives: An ecological, family-centered approach to mental health care*. Washington, DC: American Psychological Association. http://dx.doi.org/10 .1037/11485-000

Duncan, S. C., Duncan, T. E., & Hops, H. (1996). Analysis of longitudinal data within accelerated longitudinal designs. *Psychological Methods*, *1*(3), 236.

Elliott, D. S., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Sage Publications.

Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, *8*(3), 430-457.

Espelage, D. L., Low, S., Polanin, J. R., & Brown, E. C. (2015). Clinical trial of Second Step middle-school program: Impact on aggression & victimization. *Journal of Applied Developmental Psychology*, *37*, 52-63. doi:10.1016/j.appdev.2014.11.007

Espelage, D., Low, S. & Anderson, C. (2007-2013) Bullying, sexual, and dating violence trajectories from early to late adolescence in the Midwestern United States. ICPSR34835-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2016-11-14. http://doi.org/10.3886/ICPSR34835.v1

Farrington, D. P. (1986). Age and crime. *Crime and Justice*, 189-250.

Farrington, D. P., & Hawkins, J. D. (1991). Predicting participation, early onset and later persistence in officially recorded offending. *Criminal Behaviour and Mental Health*.

Fenzel, L. M. (2000). Prospective study of changes in global self-worth and strain during the transition to middle school. *The Journal of Early Adolescence*, *20*(1), 93-116.

Fosco, G. M., Stormshak, E. A., Dishion, T. J., & Winter, C. E. (2012). Family relationships and parental monitoring during middle school as predictors of early adolescent problem behavior. *Journal of Clinical Child & Adolescent Psychology*, *41*(2), 202-213.

Furdella, J., & Puzzanchera, C. (2015). Delinquency cases in juvenile court, 2013. *Drugs*, *23*, 23.

Gault-Sherman, M. (2012). It'sa two-way street: The bidirectional relationship between parenting and delinquency. *Journal of Youth and Adolescence*, *41*(2), 121-145.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford University Press.

Harris-McKoy, D., & Cui, M. (2013). Parental control, adolescent delinquency, and young adult criminal behavior. *Journal of Child and Family Studies*, *22*(6), 836-843.

Hastings, P. D., Sullivan, C., McShane, K. E., Coplan, R. J., Utendale, W. T., & Vyncke, J. D. (2008). Parental socialization, vagal regulation, and preschoolers' anxious difficulties: Direct mothers and moderated fathers. *Child Development*, *79*(1), 45-64.

Hay, C., Meldrum, R. C., Widdowson, A. O., & Piquero, A. R. (2016). Early Aggression and Later Delinquency Considering the Redirecting Role of Good Parenting. *Youth Violence and Juvenile Justice*, 1541204016631805.

Hayes, L., Hudson, A., & Matthews, J. (2003). Parental monitoring: A process model of parent-adolescent interaction. *Behaviour Change*, *20*(1), 13-24.

Hawkins, J. D. (Ed.). (1996). *Delinquency and crime-Current theories*. New York: Cambridge University Press.

Henggeler, S. W. (1997a). Juvenile justice bulletin -- *Treating serious antisocial behavior in youth: The MST approach*. Washington, DC: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention. doi:10.1037/e379712004-006

Henggeler, S. W. (1997b). The development of effective drug abuse services for youth. In J. A. Egertson, D. M. Fox, & A. I. Leshner (Eds.), *Treating drug abusers effectively* (pp. 253-279). New York, NY: Blackwell Publishers.

Hill, K. G., Lui, C., & Hawkins, D. (2001). *Early precursors of gang membership: A study of Seattle youth.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Hirsch, B. J., & Rapkin, B. D. (1987). The transition to junior high school: A longitudinal study of self-esteem, psychological symptomatology, school life, and social support. *Child development*, 1235-1243.

Hirschi, T. (2002). *Causes of Delinquency*. New Brunswick, N.J.: Transaction Publishers.

Hoeve, M., Dubas, J. S., Eichelsheim, V. I., Van Der Laan, P. H., Smeenk, W., & Gerris, J. R. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, *37*(6), 749-775.

Hoffman, L. (2015). *Longitudinal analysis: Modeling Within-Person Fluctuation and Change*. Routledge.

Hoffman, L., & Stawski, R. S. (2009). Persons as contexts: Evaluating between-person and within-person effects in longitudinal analysis. *Research in Human Development*, *6*(2-3), 97-120.

Hollingshead, A.B. (1971). Commentary on The Indiscriminate State of Social Class Measurement. *Social Forces*, *49*(4), 563-567.

Huh, D., Tristan, J., Wade, E., & Stice, E. (2006). Does problem behavior elicit poor parenting? A prospective study of adolescent girls. *Journal of Adolescent Research*, *21*(2), 185-204.

Huizinga, D., Esbensen, F. A., & Weiher, A. W. (1991). Are there multiple paths to delinquency?. *Journal of Criminal Law and Criminology*, 83-118.

Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth.* New York: Academic.

Kim, Y. M., & Neff, J. A. (2010). Direct and indirect effects of parental influence upon adolescent alcohol use: A structural equation modeling analysis. *Journal of Child & Adolescent Substance Abuse*, *19*(3), 244-260.

LaFavor, T., & Randall, J. (2012). Multisystemic family therapy. *Family Therapy Review: Contrasting Contemporary Models*, 100.

Laird, R. D., Criss, M. M., Pettit, G. S., Dodge, K. A., & Bates, J. E. (2008). Parents' monitoring knowledge attenuates the link between antisocial friends and adolescent delinquent behavior. *Journal of Abnormal Child Psychology*, *36*(3), 299-310.

Laird, R. D., Pettit, G. S., Bates, J. E., & Dodge, K. A. (2003). Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: evidence of correlated developmental changes and reciprocal influences. *Child Development*, *74*(3), 752-768.

Lahey, B. B., Gordon, R. A., Loeber, R., Stouthamer-Loeber, M., & Farrington, D. P. (1999). Boys who join gangs: A prospective study of predictors of first gang entry. *Journal of Abnormal Child Psychology*, *27*(4), 261-276.

Leadbeater, B., & Sukhawathanakul, P. (2011). Multicomponent programs for reducing peer victimization in early elementary school: A longitudinal evaluation of the WITS primary program. *Journal of Community Psychology*, *39*(5), 606-620. doi:10.1002/jcop.20447

Lefkowitz, M. M., Eron, L. D., & Walder, L. O. (2013). *Growing up to be violent: A longitudinal study of the development of aggression* (Vol. 66). Elsevier.

Li, X., Feigelman, S., & Stanton, B. (2000). Perceived parental monitoring and health risk behaviors among urban low-income African-American children and adolescents. *Journal of Adolescent Health*, *27*(1), 43-48.

Li, X., Stanton, B., Galbraith, J., Burns, J., Cottrell, L., & Pack, R. (2002). Parental monitoring intervention: practice makes perfect. *Journal of the National Medical Association*, *94*(5), 364.

Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.

Loeber, R., & Farrington, D. P. (Eds.). (1998). *Serious and violent juvenile offenders: Risk factors and successful interventions.* Sage Publications.

Loeber, R., & Farrington, D. P. (2001). *Child delinquents: Development, intervention, and service needs.* Sage Publications.

McCord, J., Widom, C. S., & Crowell, N. A. (2001). *Juvenile Crime, Juvenile Justice. Panel on Juvenile Crime: Prevention, Treatment, and Control*. National Academy Press, 2101 Constitution Avenue, NW, Washington, DC, 20418.

Merrin, G. J., Davis, J. P., Berry, J., & Espelage, D. L. (2017) *Development changes in problem behavior from early to late adolescence: Association with parental monitoring and peer deviance*. Manuscript submitted for publication.

Miyazaki, Y., & Raudenbush, S. W. (2000). Tests for linkage of multiple cohorts in an accelerated longitudinal design. *Psychological Methods*, *5*(1), 44.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior. A developmental taxonomy. *Psychological Review*, *100*(4), 674-701.

Moffitt, T. E. (2003). Life-course-persistent and adolescence-limited antisocial behavior: a 10-year research review and a research agenda.

Moffitt, T. E. (2006). Life-course persistent versus adolescence-limited antisocial behavior. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental Psychopathology: Risk, disorder, and adaptation* (vol. 3, pp. 570-598, 2nd ed.). New York: Wiley.

Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course-persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology, 13*(2), 355-375.

Monahan, K. C., Steinberg, L., & Cauffman, E. (2009). Affiliation with antisocial peers, susceptibility to peer influence, and antisocial behavior during the transition to adulthood. *Developmental Psychology*, *45*(6), 1520.

Mulvey, E. P. (2000-2010). Research on Pathways to Desistance [Maricopa County, AZ and Philadelphia County, PA]. ICPSR29961-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor]. http://doi.org/10.3886/ICPSR29961.v2

Muthén, L. K., & Muthén, B. O. (1998-2014). Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

Pardini, D. A., Fite, P. J., & Burke, J. D. (2008). Bidirectional associations between parenting practices and conduct problems in boys from childhood to adolescence: The moderating effect of age and African-American ethnicity. *Journal of Abnormal Child Psychology*, *36*(5), 647-662.

Patterson, G. R. (1982). Coercive family process. Eugene, OR: Castalia.

Patterson, G. R. (1989). A developmental perspective on antisocial behavior. *American Psychologist*, 44, 329–335.

Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). A social learning approach: Volume 4. Antisocial boys. Eugene, OR: Castalia

Omer, H., Satran, S., & Driter, O. (2016). Vigilant care: An integrative reformulation regarding parental monitoring. *Psychological Review, 123*(3), 291-304.

Richters, J. E., & Martinez, P. E. (1993). Violent communities, family choices, and children's chances: An algorithm for improving the odds. *Development and Psychopathology*, *5*, 609-609.

Ridgeway, G., McCaffrey, D. F., Morral, A. R., Burgette, L. F., & Griffin, B. A. (2014). Toolkit for weighting and analysis of nonequivalent groups.

Sampson, R. J., & Lauritsen, J. L. (1994). Violent victimization and offending: Individual-, situational-, and community-level risk factors. *Understanding and Preventing Violence*, *3*.

Sampson, R. J., & Lauritsen, J. L. (1997). Racial and ethnic disparities in crime and criminal justice in the United States. *Crime and Justice*, 311-374.

Segrin, C., Woszidlo, A., Givertz, M., & Montgomery, N. (2013). Parent and child traits associated with overparenting. *Journal of Social and Clinical Psychology*, *32*(6), 569-595.

Slattery, T. L., & Meyers, S. A. (2014). Contextual predictors of adolescent antisocial behavior: The developmental influence of family, peer, and neighborhood factors. *Child and Adolescent Social Work Journal*, *31*(1), 39-59.

Stanton, B. F., Li, X., Galbraith, J., Cornick, G., Feigelman, S., Kaljee, L., & Zhou, Y. (2000). Parental underestimates of adolescent risk behavior: a randomized, controlled trial of a parental monitoring intervention. *Journal of Adolescent Health*, *26*(1), 18-26. doi:10.1016/s1054-139x(99)00022-1

Stattin, H., & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, *71*(4), 1072-1085.

Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: Authoritative parenting, school involvement, and encouragement to succeed. *Child Development*, *63*(5), 1266-1281.

Stokols, D. (1992). Establishing and maintaining healthy environments. Toward a social ecology of health promotion. *American Psychologist, 47,* 6–22. http://dx.doi.org/10.1037/0003-066X.47.1.6

Stokols, D. (1995). The paradox of environmental psychology. *American Psychologist, 50,* 821–837. http://dx.doi.org/10.1037/0003-066X.50.10.821

Thornberry, T. P. (1987). Toward an interactional theory of delinquency. *Criminology*, *25*(4), 863-892.

Tobler, A. L., & Komro, K. A. (2010). Trajectories or parental monitoring and communication and effects on drug use among urban young adolescents. *Journal of Adolescent Health*, *46*(6), 560-568.

Tremblay, R. E. (2000). The development of aggressive behaviour during childhood: What have we learned in the past century?. *International Journal of Behavioral Development*, *24*(2), 129-141.

Van Ryzin, M. J., Fosco, G. M., & Dishion, T. J. (2012). Family and peer predictors of substance use from early adolescence to early adulthood: An 11-year prospective analysis. *Addictive Behaviors*, *37*(12), 1314-1324.

Wang, W., Brittain, H., McDougall, P., & Vaillancourt, T. (2016). Bullying and school transition: context or development?. *Child Abuse & Neglect*, *51*, 237-248.

Welsh, W. N., Greene, J. R., & Jenkins, P. H. (1999). School disorder: The influence of individual, institutional, and community factors. *Criminology, 37*(1), 73-116.

White, J. L., Moffitt, T. E., Earls, F., Robins, L., & Silva, P. A. (1990). How early can we tell?: Predictors of childhood conduct disorder and adolescent delinquency. *Criminology*, *28*(4), 507-535.

Wiatrowski, M. D., Griswold, D. B., & Roberts, M. K. (1981). Social control theory and delinquency. *American Sociological Review*, 525-541.

Yoo, J. A. (2017). Developmental changes in the bidirectional relationships between parental monitoring and child delinquency. *Children and Youth Services Review*.

APPENDIX A: TABLES AND FIGURES

Table 1: Nested Growth and Cohort Models for Delinquency for the Normative Sample

	Parameter Estimates *(SE)*	
	Model A	**Model B**
Fixed Effects		
Intercept	1.32*** (.013)	1.22*** (.032)
Linear Slope	.047*** (.010)	.088*** (.019)
Quadratic Slope	-.009*** (.001)	-.014*** (.003)
Cohort 12		.072 (.041)
Cohort 13		.097* (.040)
Cohort 14		.109* (.043)
Cohort 15		.400*** (.070)
Time*Cohort 12		-.054* (.027)
Time*Cohort 13		-.014 (.030)
Time*Cohort 14		.005 (.062)
Time*Cohort 15		-.315 (.222)
Time*Time*Cohort 12		.009 (.005)
Time*Time*Cohort 13		-.005 (.006)
Time*Time*Cohort 14		-.016 (.013)
Time*Time*Cohort 15		.029 (.053)
Random Effects		
Intercept Within	.086*** (.003)	.086*** (.003)
Intercept Between	.137*** (.010)	.130***(.010)
Linear Slope	.010 (.007)	.010 (.007)
Quadratic Slope	.086*** (.001)	.001*** (.001)
Fit Indices		
-2LL	7906.4	7855.3
AIC	7926.4	7899.3
BIC	7988.1	8035.1

Note: The likelihood ratio test was significant ($\Delta LR = 51.1$, $df = 12$, $p < .001$). The cohort model includes cohort coefficients at level-2 and time by cohort interactions. Cohort effects were significant indicating that there were differences by age cohort.

Table 2: Nested Growth and Cohort Models for Parental Monitoring for the Normative Sample

	Parameter Estimates *(SE)*	
	Model A	**Model B**
Fixed Effects		
Intercept	3.32*** (.021)	3.35*** (.051)
Linear Slope	.042* (.017)	.082** (.031)
Quadratic Slope	-.023*** (.003)	-.032*** (.005)
Cohort 12		-.012 (.066)
Cohort 13		-.024 (.063)
Cohort 14		-.047 (.067)
Cohort 15		-.437*** (.109)
Time*Cohort 12		-.113* (.048)
Time*Cohort 13		-.135** (.052)
Time*Cohort 14		-.146 (.107)
Time*Cohort 15		-.242 (.375)
Time*Time*Cohort 12		.024 (.010)
Time*Time*Cohort 13		.025* (.011)
Time*Time*Cohort 14		.019 (.025)
Time*Time*Cohort 15		.064 (.093)
Random Effects		
Intercept Within	.247*** (.009)	.248*** (.009)
Intercept Between	.291*** (.024)	.279***(.024)
Linear Slope	.084** (.023)	.079** (.023)
Quadratic Slope	.006*** (.009)	.006*** (.010)
Fit Indices		
-2LL	15347.0	15297.9
AIC	15367.0	15341.9
BIC	15428.8	15477.7

Note: The likelihood ratio test was significant ($\Delta LR = 49.1$, $df = 12$, $p < .001$). The cohort model includes cohort coefficients at level-2 and time by cohort interactions. Cohort effects were significant indicating that there were differences by age cohort.

Table 3: Nested Growth and Cohort Models for Delinquency for the At-risk Sample

	Parameter Estimates *(SE)*	
	Model A	**Model B**
Fixed Effects		
Intercept	12.44*** (1.05)	11.62*** (3.02)
Linear Slope	-7.95*** (.993)	-7.26*** (2.86)
Quadratic Slope	1.49*** (.197)	1.30* (565)
Cohort 15		.257 (3.86)
Cohort 16		3.37 (3.57)
Cohort 17		-1.20 (3.56)
Cohort 18		1.42 (4.73)
Time*Cohort 15		-.514 (3.65)
Time*Cohort 16		-2.12 (3.38)
Time*Cohort 17		-.962 (3.38)
Time*Cohort 18		-2.96 (4.49)
Time*Time*Cohort 15		.137 (.723)
Time*Time*Cohort 16		.421 (.669)
Time*Time*Cohort 17		-.002 (.669)
Time*Time*Cohort 18		.570 (.892)
Random Effects		
Intercept Within	677.94*** (19.61)	678.35*** (19.62)
Intercept Between	878.78*** (59.73)	875.01***(59.61)
Linear Slope	471.11*** (57.40)	469.76*** (57.37)
Quadratic Slope	2.52 (2.55)	2.52 (2.55)
Fit Indices		
-2LL	60506.5	60496.9
AIC	60526.5	60540.9
BIC	60578.6	60655.5

Note: The likelihood ratio test was not significant ($\Delta LR = 9.6$, $df = 12$, $p = .651$). The cohort model includes cohort coefficients at level-2 and time by cohort interactions. Cohort effects were not significant indicating that there were no differences by age cohort.

Table 4: Nested Growth and Cohort Models for Parental Monitoring for the At-risk Sample

	Parameter Estimates *(SE)*	
	Model A	**Model B**
Fixed Effects		
Intercept	2.73*** (.020)	3.02*** (.053)
Linear Slope	-.026 (.024)	-.082 (.055)
Quadratic Slope	-.020** (.008)	-.009 (.015)
Cohort 15		-.176** (.068)
Cohort 16		-.248*** (.064)
Cohort 17		-.461*** (.064)
Cohort 18		-.606*** (.092)
Time*Cohort 15		-.110 (.072)
Time*Cohort 16		-.071 (.074)
Time*Cohort 17		-.017 (.079)
Time*Cohort 18		-.203 (.146)
Time*Time*Cohort 15		-.033 (.020)
Time*Time*Cohort 16		-.025 (.023)
Time*Time*Cohort 17		.012 (.026)
Time*Time*Cohort 18		-.017 (.056)
Random Effects		
Intercept Within	.265*** (.012)	.265*** (.012)
Intercept Between	.251*** (.023)	.222***(.022)
Linear Slope	.070* (.036)	.062* (.035)
Quadratic Slope	.004 (.003)	.003 (.003)
Fit Indices		
-2LL	7802.3	7688.2
AIC	7822.3	7732.2
BIC	7874.4	7846.8

Note: The likelihood ratio test was significant ($\Delta LR = 114.1$, $df = 12$, $p < .001$). The cohort model includes cohort coefficients at level-2 and time by cohort interactions. Cohort effects were significant indicating that there were differences by age cohort.

Table 5: Tests of Measurement Invariance for Delinquency for the Normative sample

Model Tested	X^2	*df*	*p*	RMSEA	RMSEA (90% CI)	CFI	TLI	Pass?
Configural invariance	166.62	74	<.001	.028	.022;.034	.982	.970	YES
Weak invariance	201.76	83	<.001	.030	.025;.035	.977	.964	YES
Strong invariance	237.02	92	<.001	.031	.027;.036	.973	.961	YES

Table 6: Tests of Measurement Invariance for Parental Monitoring for the Normative sample

Model Tested	X^2	*df*	*p*	RMSEA	RMSEA (90% CI)	CFI	TLI	Pass?
Configural invariance	330.45	74	<.001	.047	.041;.052	.963	.947	YES
Weak invariance	336.15	83	<.001	.044	.039;.049	.963	.947	YES
Strong invariance	360.61	92	<.001	.043	.038;.047	.961	.949	YES

Table 7: Descriptive Statistics of Normative Sample (N = 1,162)

	n(%)
Age	
10	139 (12%)
11	329 (28.3%)
12	382 (32.9%)
13	250 (21.5%)
14	62 (5.3%)
Gender	
Male	587 (50.6%)
Female	573 (49.4%)
Race	
White	291 (26%)
Black	650 (58%)
Hispanic	38 (3.4%)
Other	141 (12.6%)
Mother Education	
Some High School	44 (8.9%)
High School Grad	161 (32.7%)
Some College	88 (17.9%)
College Grad	199 (40.5%)
Grade Level	
5^{th}	377 (32.4%)
6^{th}	428 (36.8%)
7^{th}	357 (30.7%)

Table 8: Means and Standard Deviations for the Normative Sample of Delinquency and Parental Monitoring Across Time

Time	Delinquency		Parental Monitoring	
(Age)	*M*	*SD*	*M*	*SD*
11	1.26	0.45	3.43	0.72
12	1.24	0.37	3.46	0.68
13	1.34	0.51	3.29	0.77
14	1.35	0.50	3.23	0.75
15	1.37	0.47	3.15	0.74
16	1.34	0.46	3.16	0.76
17	1.33	0.43	3.02	0.87
18	1.30	0.49	2.83	0.96
19	1.22	0.38	2.43	1.11

Table 9: Bivariate Correlations among Delinquency and Parental Monitoring Across Time for the Normative Sample

	1	2	3	4	5	6	7	8	9	10	11	12
1. PMon0	1	-	-	-	-	-	-	-	-	-	-	-
2. PMon1	.51**	1	-	-	-	-	-	-	-	-	-	-
3. PMon2	.55**	.67**	1	-	-	-	-	-	-	-	-	-
4. PMon3	.46**	.48**	.55**	1	-	-	-	-	-	-	-	-
5. PMon4	.36**	.28**	.40**	.45**	1	-	-	-	-	-	-	-
6. PMon5	.30**	.32**	.28**	.32**	.47**	1	-	-	-	-	-	-
7. Del0	-.37**	-.33**	-.24**	-.24**	-.22**	-.25**	1	-	-	-	-	-
8. Del1	-.24**	-.31**	-.31**	-.33**	-.14**	-.17**	.49**	1	-	-	-	-
9. Del2	-.32**	-.35**	-.35**	-.33**	-.31**	-.27**	.46**	.59**	1	-	-	-
10. Del3	-.25**	-.28**	-.15**	-.32**	-.18**	-.10	.33**	.57**	.57**	1	-	-
11. Del4	-.12*	-.11*	-.20**	-.28**	-.32**	-.23**	.22**	.26**	.38**	.35**	1	-
12. Del5	-.06	-.08	-.07	-.15*	-.20**	-.16**	-.01	.06	.13*	.28**	.52**	1

Table 10: Descriptive Statistics of At-risk Sample ($N = 1,354$)

	n(%)
Age	
14	162 (12%)
15	255 (18.8%)
16	412 (30.4%)
17	413 (30.5%)
18	112 (8.3%)
Gender	
Male	1170 (86.4%)
Female	184 (13.6%)
Race	
White	274 (20.2%)
Black	561 (41.5%)
Hispanic	454 (33.5%)
Other	35 (4.8%)
Mother Education	
Grade School or Less	153 (11.9%)
Some High School	434 (33.8%)
High School Grad	414 (32.2%)
College/Trade School	283 (22.1%)
Age First Offense (10 or younger)	850 (63.3 %)
Gang Member	87 (7.8 %)

Table 11: Means and Standard Deviations for the At-risk Sample of Delinquency and Parental Monitoring Across Time

Time (Age)	Delinquency		Parental Monitoring	
	M	*SD*	*M*	*SD*
14	12.33	28.48	3.02	0.63
15	9.41	26.42	2.89	0.67
16	10.04	44.38	2.81	0.69
17	6.01	19.20	2.68	0.74
18	4.26	17.72	2.56	0.75
19	3.80	33.65	2.44	0.71
20	1.96	10.22	2.42	0.80

Note: PMon = Parental Monitoring; Del = Delinquency. *$p < .05$; ** $p < .01$

Table 12: Bivariate Correlations among Delinquency and Parental Monitoring Across Time for the At-risk Sample

	1	2	3	4	5	6	7	8	9	10
1. PMon0	1	-	-	-	-	-	-	-	-	-
2. PMon1	.44**	1	-	-	-	-	-	-	-	-
3. PMon2	.37**	.49**	1	-	-	-	-	-	-	-
4. PMon3	.34**	.40**	.52**	1	-	-	-	-	-	-
5. PMon4	.09	.29**	.28**	.49**	1	-	-	-	-	-
6. Del0	-.13**	-.04	-.07*	-.05	-.07	1	-	-	-	-
7. Del1	-.12**	-.18**	-.11**	-.12**	-.06	.22**	1	-	-	-
8. Del2	.01	-.08**	-.06	-.06	-.08	.10**	.20**	1	-	-
9. Del3	-.06*	-.01	-.07*	-.06	.01	.07*	.05	.10**	1	-
10. Del4	-.05	-.04	-.07*	-.10*	-.19*	.06*	.12**	.10**	.06*	1

Note: PMon = Parental Monitoring; Del = Delinquency. *$p < .05$; **$p < .01$

Table 13: Fit Statistics and Estimates for all nested models for the Normative sample

	Model 1 Parameter *(SE)*	Model 2 Parameter *(SE)*	Model 3 Parameter *(SE)*	
			Early/Middle Adolescences	Late Adolescences
Within-Person Cross-Lags				
Delinquency *on* Parental Monitoring	-	-0.046 (.022)*	-0.008 (.028)	-0.220 (.092)**
Parental Monitoring *on* Delinquency	-	-0.234 (.067)***	-0.210 (.073)**	-0.905 (.297)***
Auto-Regressive				
Delinquency *on* Delinquency	0.389 (.116)***	0.409 (.133)***	0.405 (.059)***	0.608 (.126)***
Parental Monitoring *on* Parental Monitoring	0.210 (.046)***	0.197 (.048)***	0.175 (.049)***	0.656 (.161)***
(Co)Variances				
Delinquency *with* Parental Monitoring	-0.022 (.006)***	-0.016 (.006)**	-0.030 (.008)***	
Delinquency_{int} *with* $\text{Parental Monitoring}_{int}$	-0.160 (.040)***	-0.133 (.042)***	-0.130 (.017)***	
Delinquency_{int} *with* $\text{Parental Monitoring}_{linear}$	0.007 (.005)	0.007 (.005)	0.007 (.003)*	
$\text{Parental Monitoring}_{int}$ *with* $\text{Delinquency}_{linear}$	0.011 (.004)**	0.009 (.004)*	0.011 (.003)***	
Delinquency_{int}	0.092 (.041)*	0.085 (.048)	0.070 (.013)***	
$\text{Parental Monitoring}_{int}$	0.192 (.030)***	0.184 (.029)***	0.218 (.022)***	
Residual (Co)Variances				
$\text{Delinquency}_{it11-it19}$	0.135 (.008)***	0.135 (.008)***	0.134 (.006)***	
$\text{Parental Monitoring}_{it11-it19}$	0.407 (.025)***	0.404 (.026)***	0.402 (.016)***	
Fit Statistics				
-2LL	8639.702	8627.790	8564.710	
AIC	8677.702	8669.791	8588.742	
BIC	8776.181	8778.636	8674.163	
RMSEA	0.048	0.045	0.044	
SRMR	0.054	0.048	0.047	
CFI	0.937	0.943	0.949	

Note: Model 1 includes estimates for autoregressive paths and within time correlations only. Model 2 includes the cross-lag paths between delinquency and parental monitoring. Model 3 constrains early/middle adolescences (11-17) and late adolescences (17-19) respectively. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 14: Fit Statistics and Estimates for all nested models for the At-risk sample

	Model 1 Parameter *(SE)*	Model 2 Parameter *(SE)*	Model 3 Parameter *(SE)*	
			Early/Middle Adolescences	Late Adolescences
Within-Person Cross-Lags				
Delinquency *on* Parental Monitoring	-	-26.98 (7.85)***	-219.1 (60.27)***	-11.59 (6.01)*
Parental Monitoring *on* Delinquency	-	0.001 (.001)	0.001 (.001)	0.001 (.001)
Auto-Regressive				
Delinquency *on* Delinquency	0.159 (.059)**	0.150 (.058)**	-0.053 (.121)	0.163 (.059)**
Parental Monitoring *on* Parental Monitoring	0.258 (.059)***	0.263 (.062)***	0.271 (.045)***	0.321 (.076)***
(Co)Variances				
Delinquency *with* Parental Monitoring	-9.836 (2.90)***	-10.617 (2.85)***	-10.94 (4.09)**	
Delinquency_{int} *with* $\text{Parental Monitoring}_{int}$	-25.434 (6.84)***	-24.88 (7.37)***	7.16 (14.5)	
Delinquency_{int} *with* $\text{Parental Monitoring}_{linear}$	5.78 (1.64)***	5.82 (1.64)***	2.59 (1.19)*	
$\text{Parental Monitoring}_{int}$ *with* $\text{Delinquency}_{linear}$	-1.57 (1.11)	-1.05 (1.17)	-5.01 (1.81)**	
Delinquency_{int}	724.91 (143.0)***	725.56 (143.5)***	688.30 (135.0)***	
$\text{Parental Monitoring}_{int}$	0.153 (.021)***	0.153 (.022)***	0.141 (.021)***	
Residual (Co)Variances				
$\text{Delinquency}_{it11-it19}$	492.22 (161.0)***	489.82 (158.9)***	469.40 (119.7)***	
$\text{Parental Monitoring}_{it11-it19}$	0.354 (.014)***	0.355 (.015)***	0.393 (.023)***	
Fit Statistics				
-2LL	90746.974	90741.892	90641.554	
AIC	90784.975	90783.892	90691.554	
BIC	90883.981	90893.319	90821.824	
RMSEA	0.047	0.045	0.044	
SRMR	0.051	0.049	0.046	
CFI	0.946	0.952	0.950	

Note: Model 1 includes estimates for autoregressive paths and within time correlations only. Model 2 includes the cross-lag paths between delinquency and parental monitoring. Model 3 constrains early/middle adolescences (14-17) and late adolescences (17-20) respectively. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Figure 1: Conceptual Model

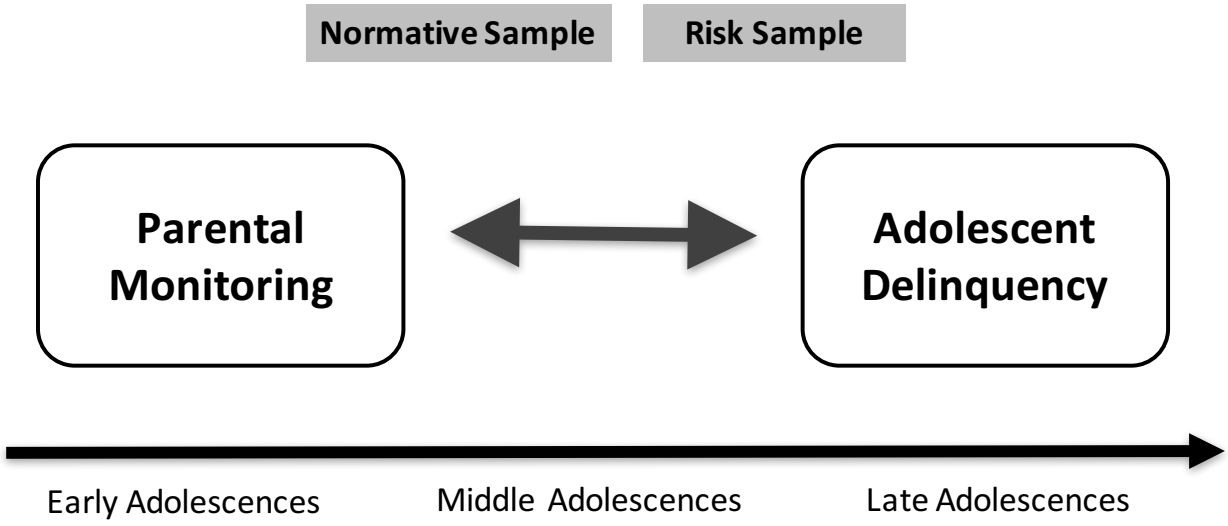


Figure 2: Average Delinquency Across Time for the Normative Sample

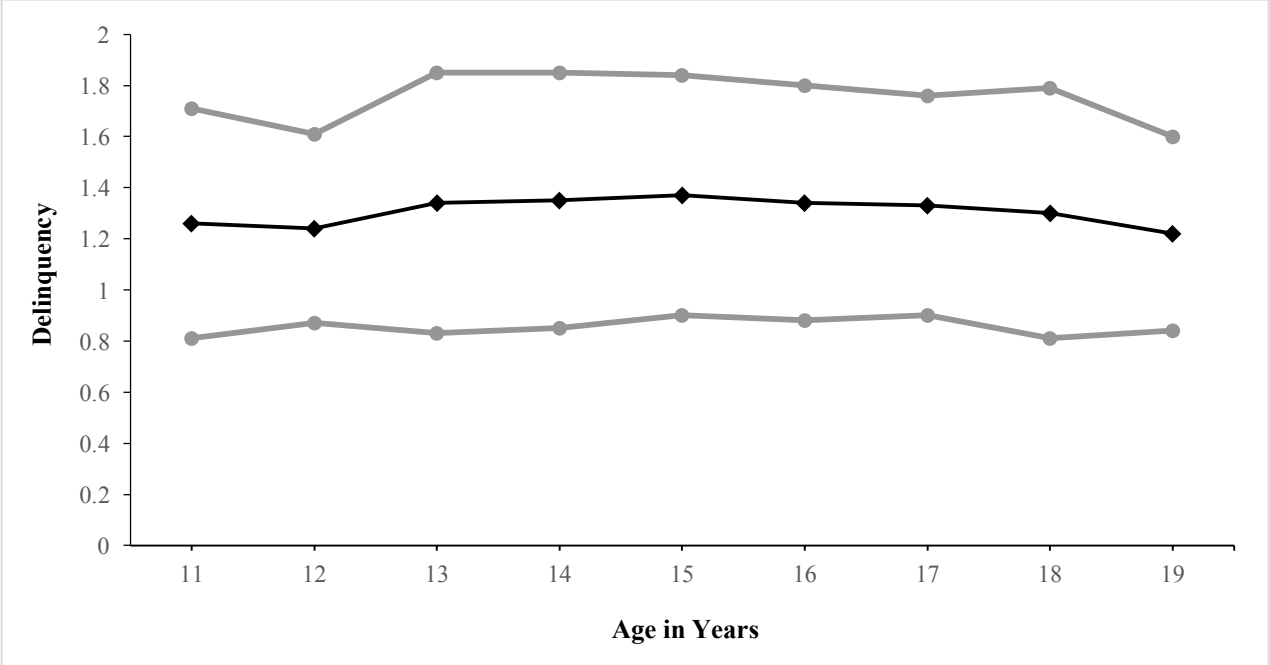


Figure 3: Average Parental Monitoring Across Time for the Normative Sample

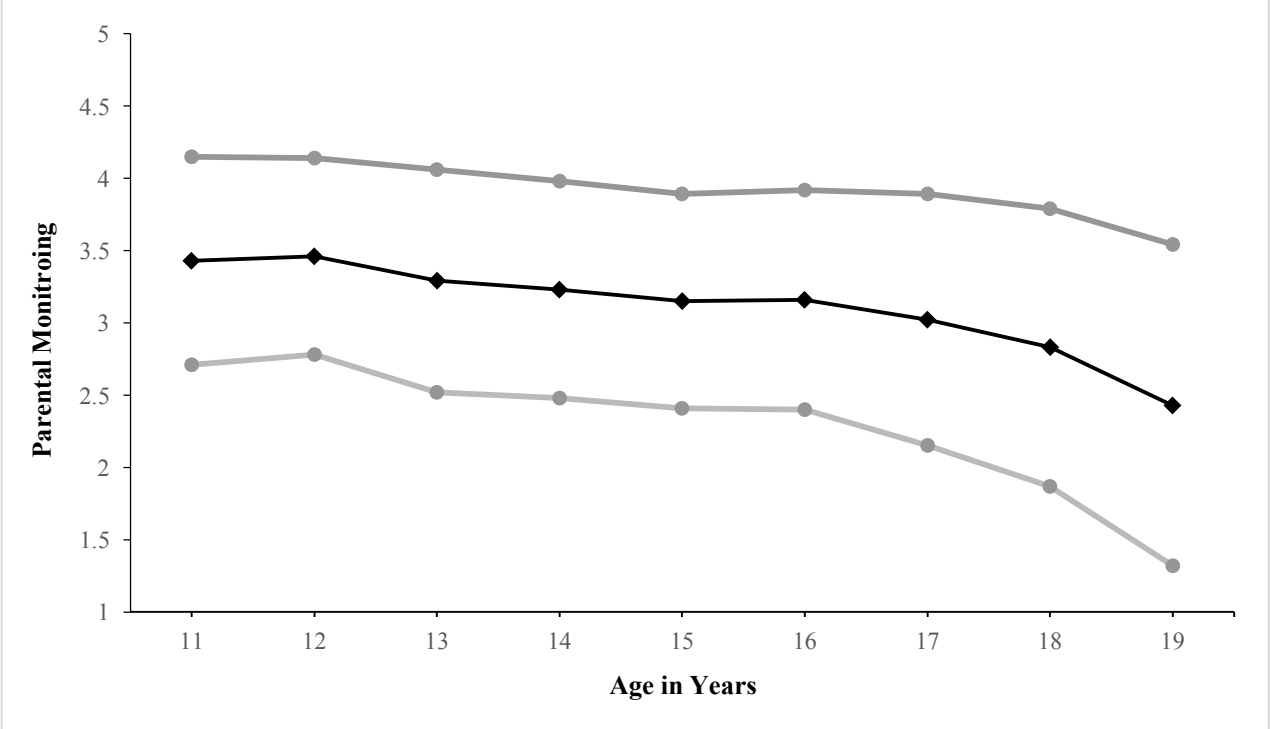


Figure 4: Average Delinquency Across Time for the At-risk Sample

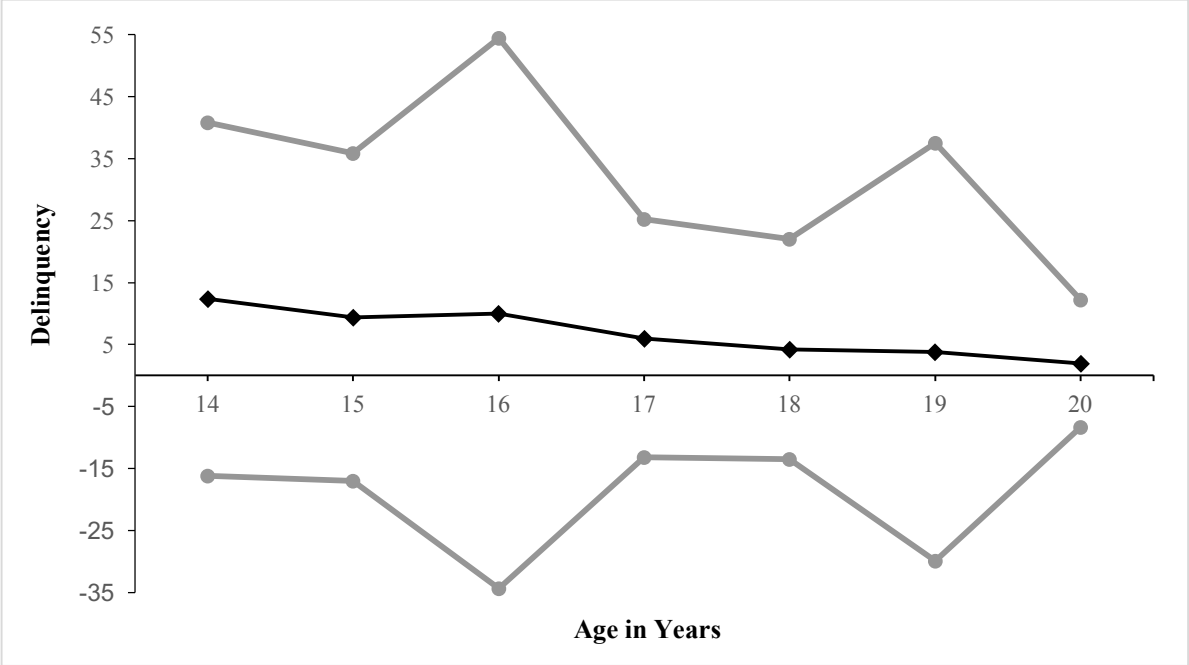


Figure 5: Average Parental Monitoring Across Time for the At-risk Sample

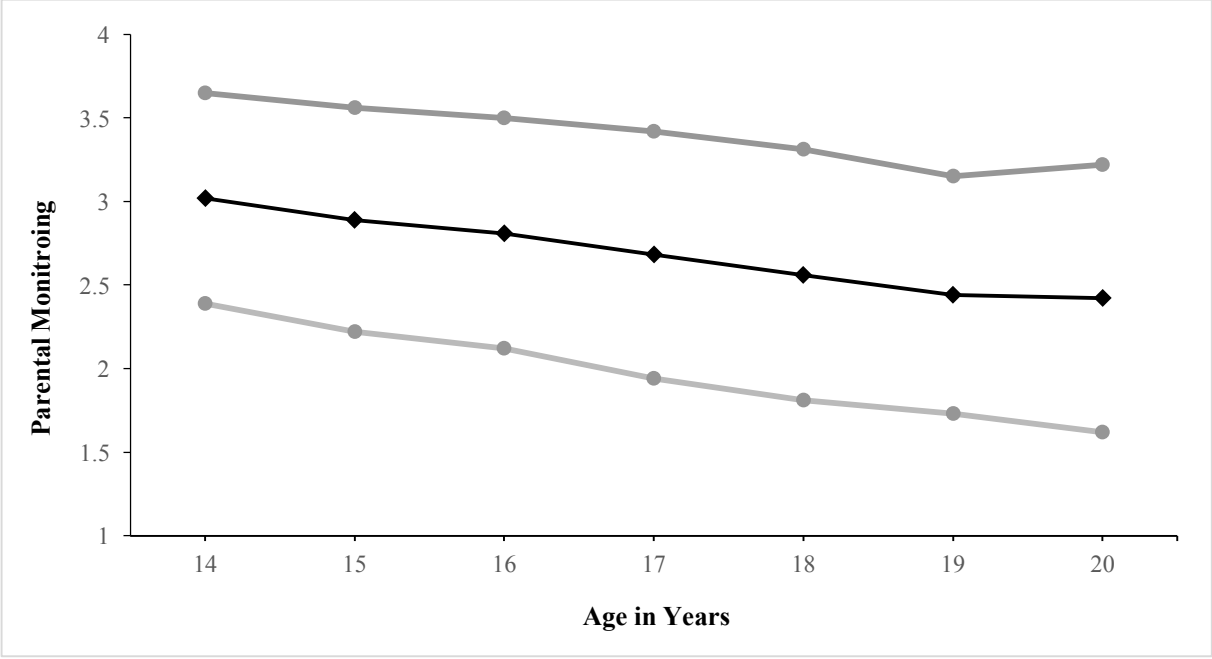


Figure 6: Auto-regressive and within time correlations of the Normative sample

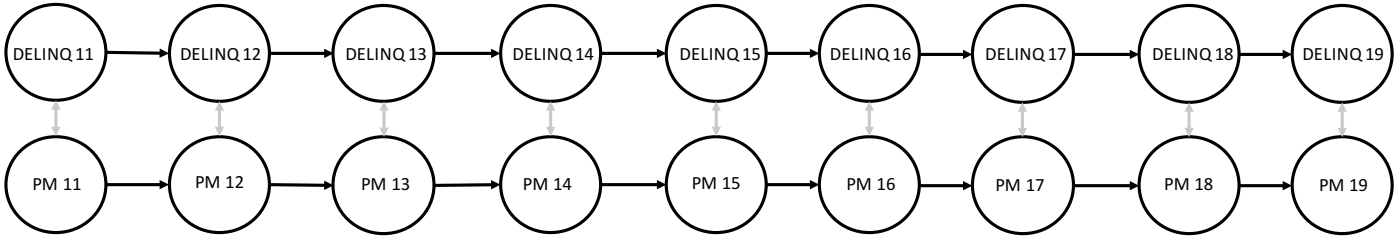


Figure 7: Auto-regressive and within time correlations of the At-risk sample

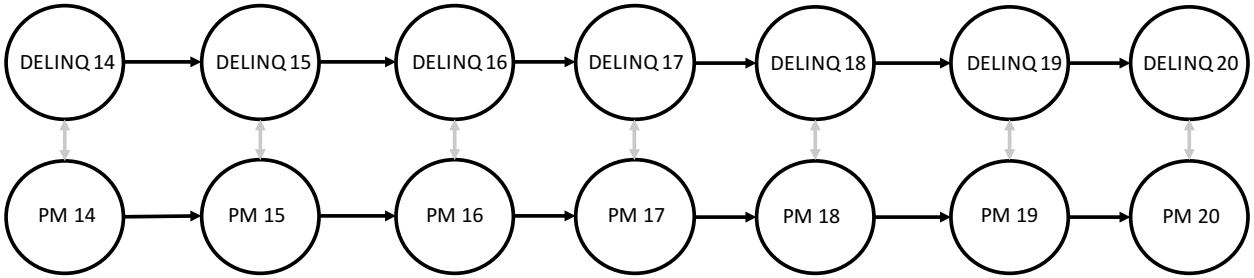


Figure 8: Lagged paths between Parental Monitoring on Delinquency for the Normative sample

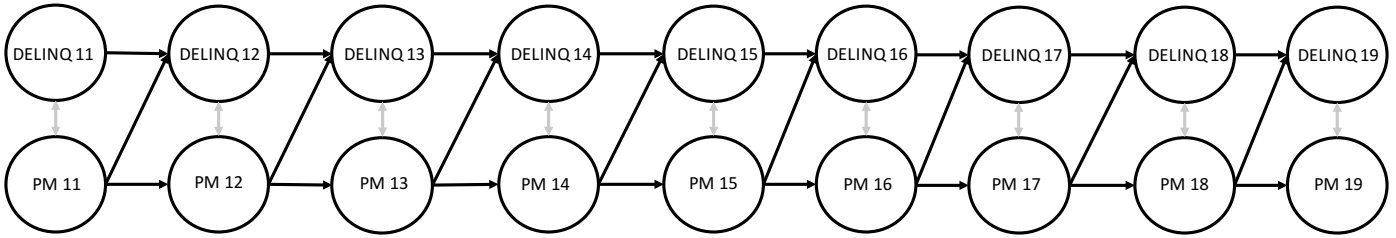


Figure 9: Lagged paths between Parental Monitoring on Delinquency for the At-risk sample

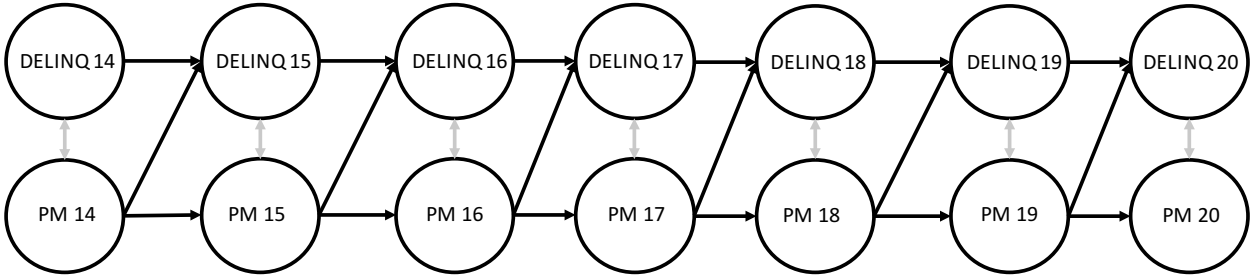


Figure 10: Lagged paths between Delinquency on Parental Monitoring for the Normative sample

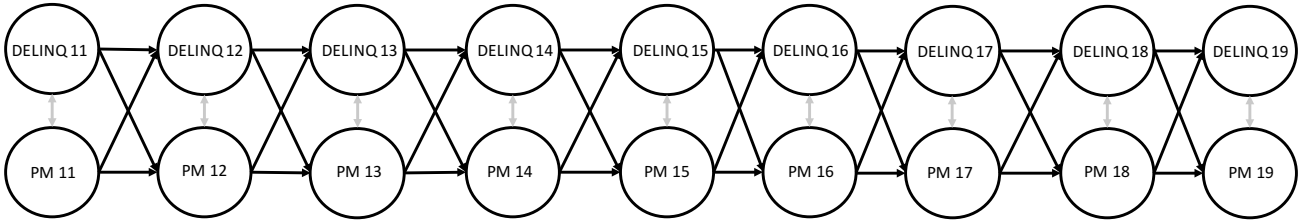


Figure 11: Lagged paths between Delinquency on Parental Monitoring for the At-risk sample

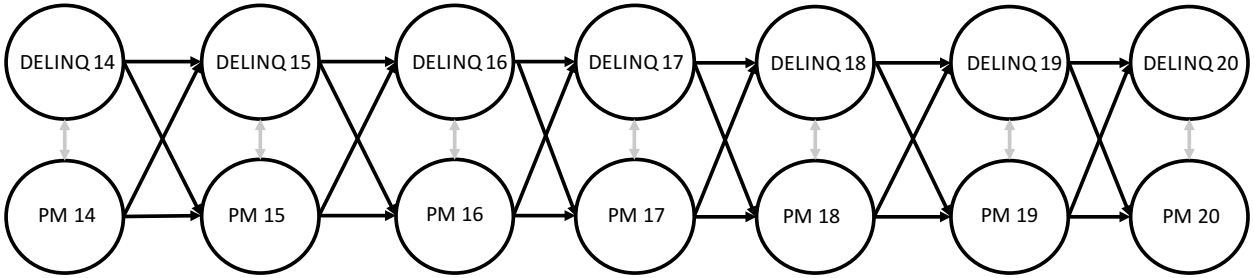
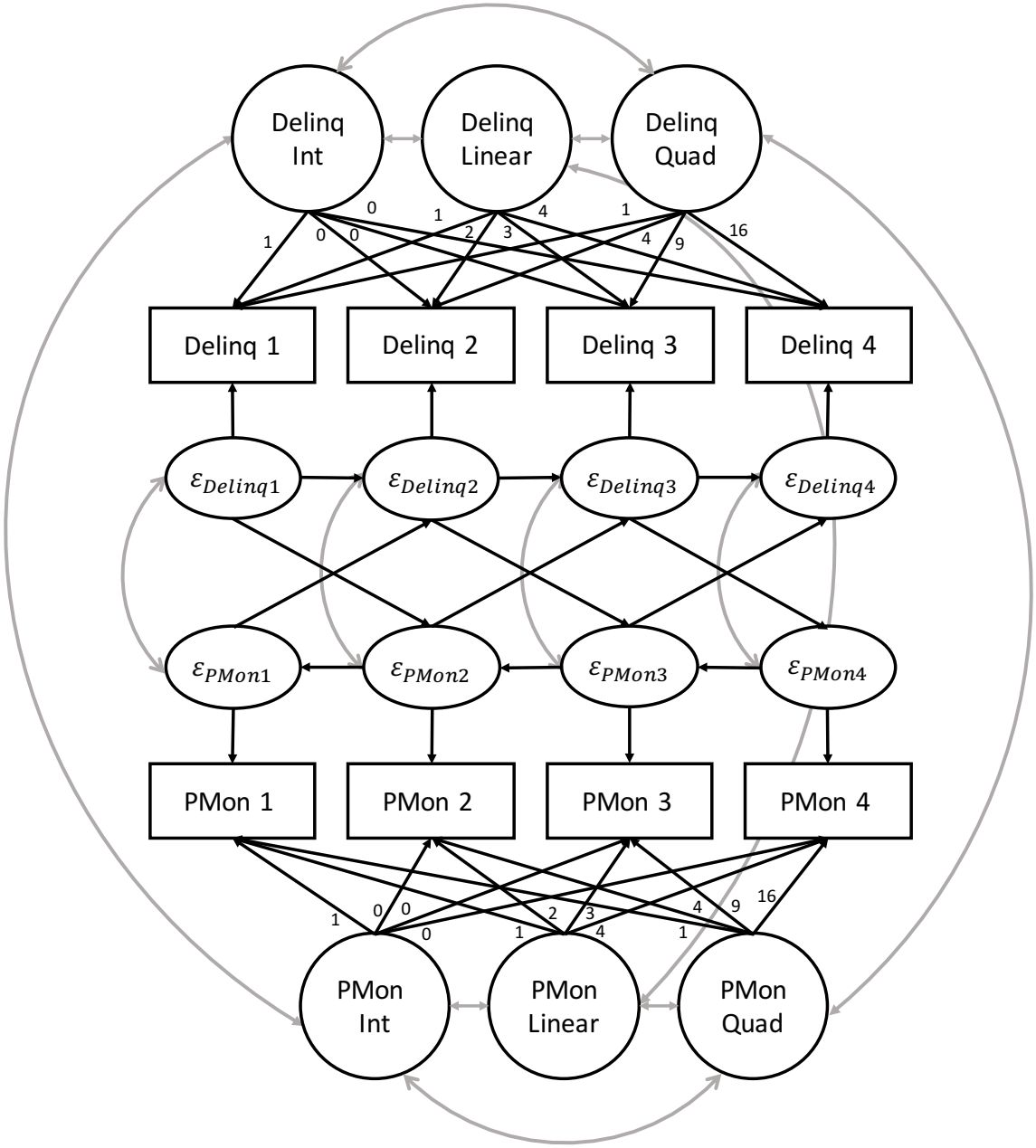


Figure 12: Auto-Regressive Latent Trajectory Model with Structured Residuals



Note: All models are specified as ALT-SR models as displayed above. We only present the proposed cross-lags in the other figures for ease of reading. Above figure only presents four waves.

Figure 13: Transition from middle to late adolescences for the Normative sample

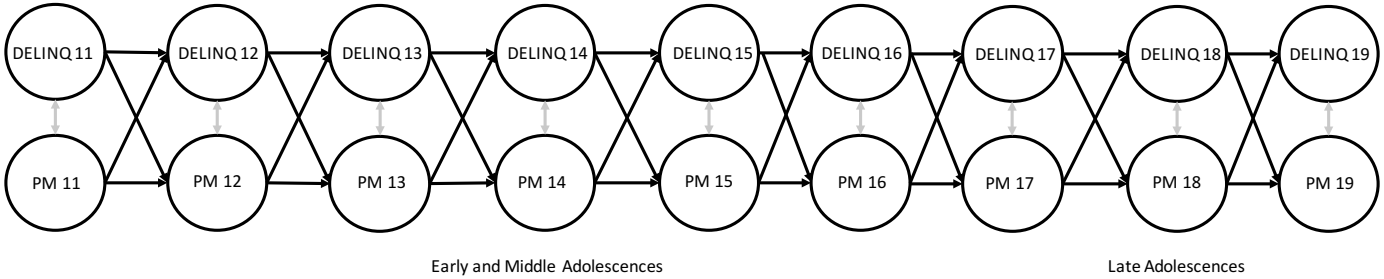


Figure 14: Transition from middle to late adolescences for the At-risk sample

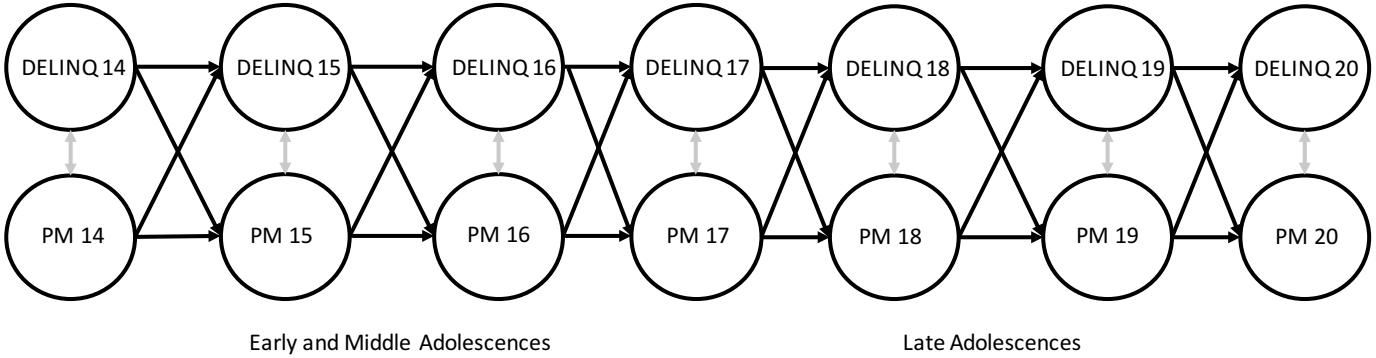
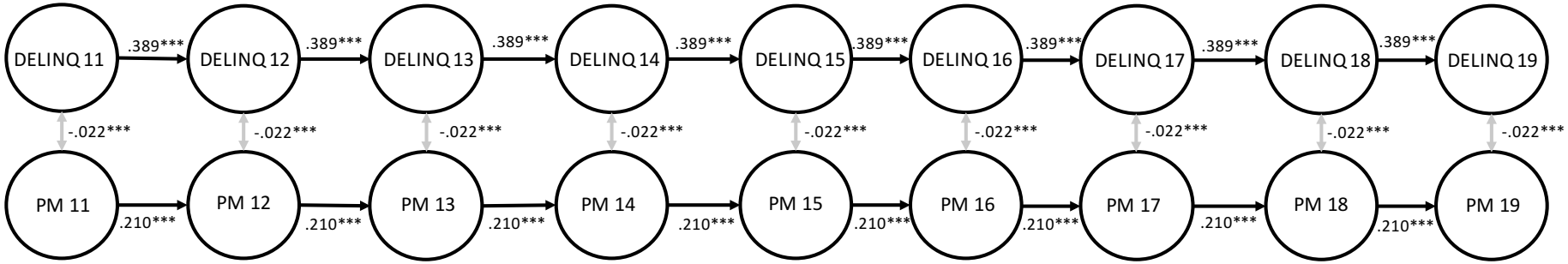
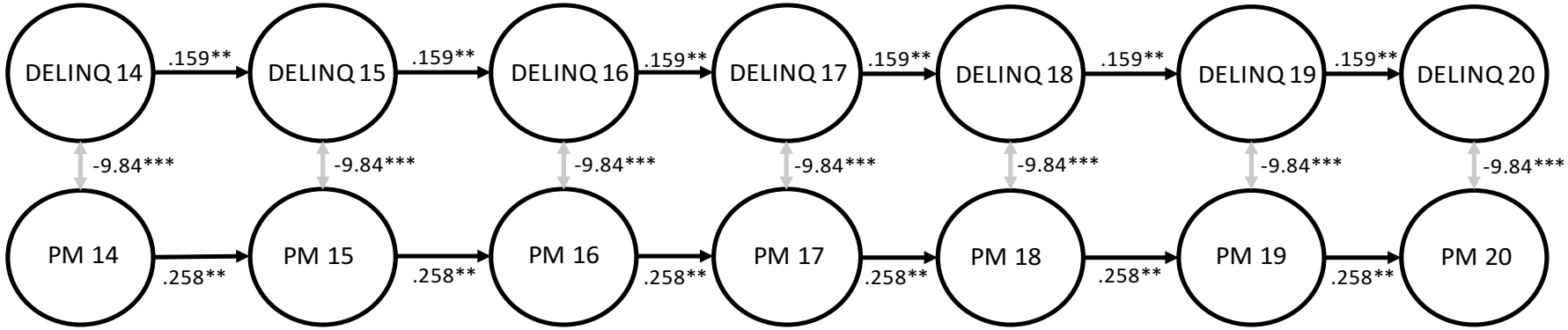


Figure 15: Auto-regressive and within time correlations of Delinquency and Parental Monitoring for the Normative sample



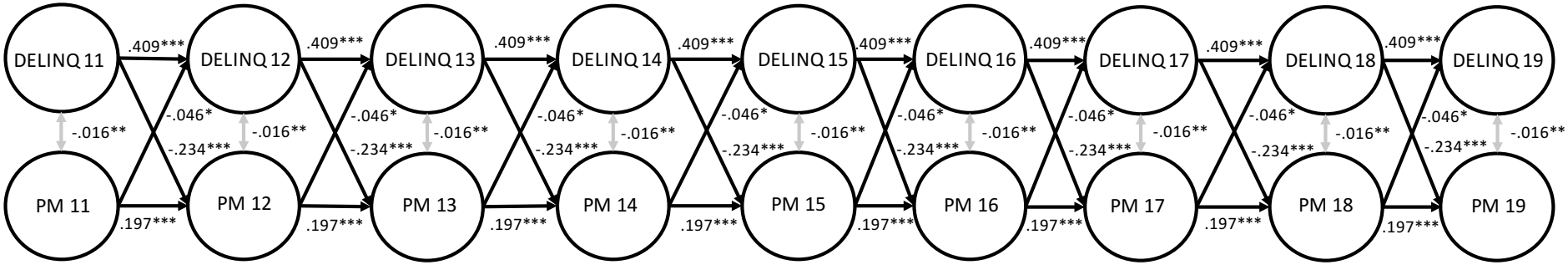
Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.

Figure 16: Auto-regressive and within time correlations of Delinquency and Parental Monitoring for the At-risk sample



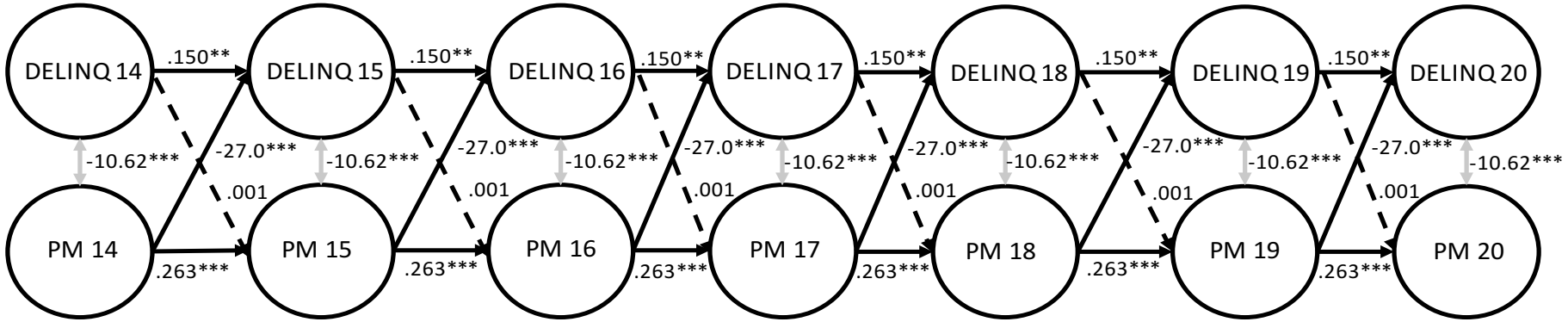
Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.

Figure 17: Lagged paths between Delinquency and Parental Monitoring for the Normative sample



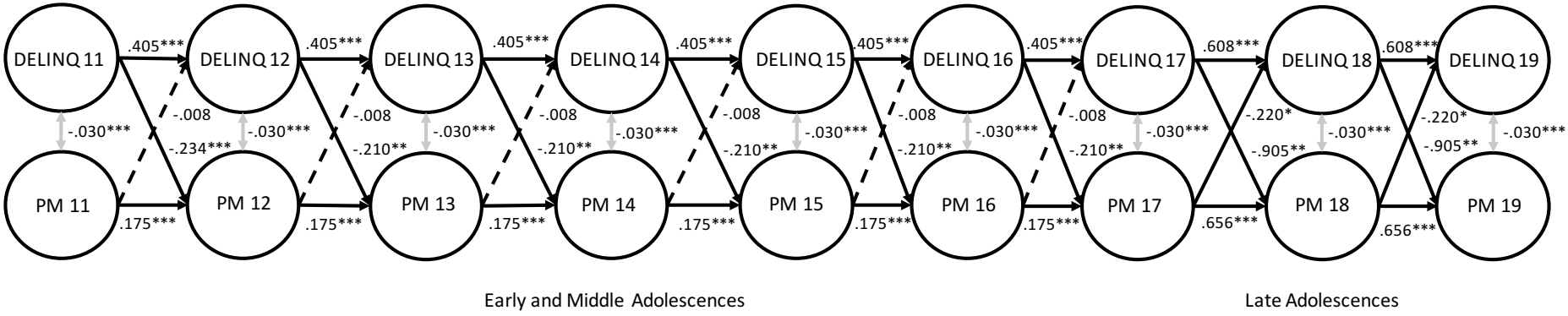
Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.

Figure 18: Lagged paths between Delinquency and Parental Monitoring for the At-risk sample



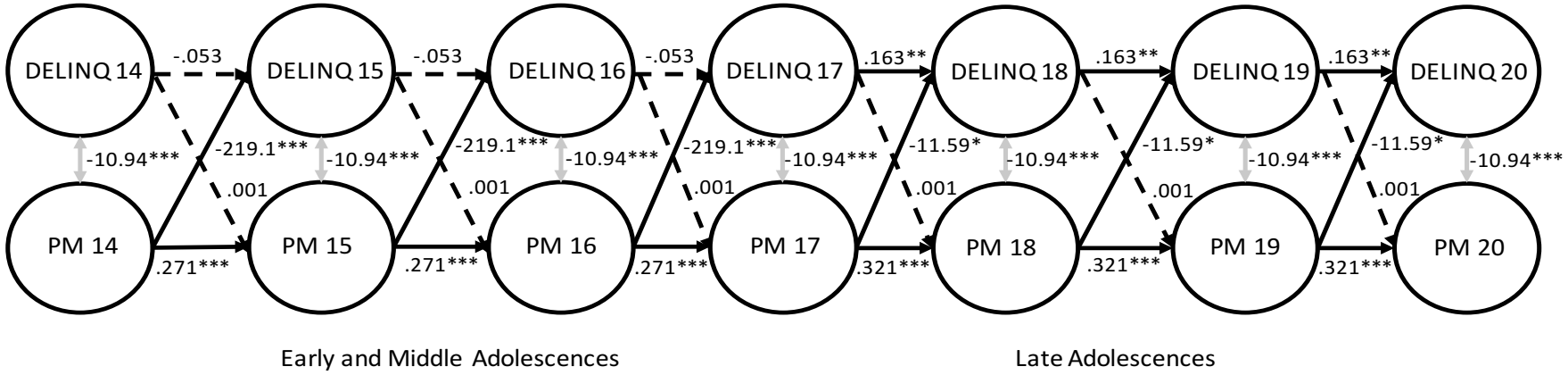
Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.

Figure 19: Transition from early/middle to late adolescences for the Normative sample



Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.

Figure 20: Transition from middle to late adolescences for the At-risk sample



Note: Delinq = Delinquency; PM = Parental Monitoring. *$p < .05$; **$p < .01$, ***$p < .001$.