Co-Trajectories in Delinquency and Attachment With Non-Resident Fathers Among Low-Income Adolescents

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ABSTRACT

Families that reside in low income communities have higher rates of non-resident, biological fathers. Although there is a substantial body of literature on attachment in adolescence, much less is known about both attachment quality and trajectories across adolescence with non-resident, biological fathers. Using longitudinal data from a sample of over 2,000 low income families from the Welfare, Children, and Families: A Three City Study, the current study will investigate trajectories of attachment quality between adolescents and their non-resident, biological father and delinquency across adolescence, as well as how the two constructs co-vary. Results indicated that on average, feelings of trust and communication declined across adolescence, rates of delinquency increased, and feelings of anger and alienation remained stable, although there were individual differences in trajectories of each. After the addition of covariates into the model, the only the slopes of anger/alienation and delinquency remained significant ($B = 0.15$, $SE = 0.05$, $p < 0.01$), such that individuals who were changing in anger/alienation were also changing in delinquency. The results indicate that attachment between adolescents and their non-resident fathers is not a particularly influential predictor of delinquency above and beyond the effect of other ecological risk factors. While was found that individuals changing in anger/alienation were also changing in delinquency, this relationship was not clear enough to estimate the direction of the changes. Despite this, low-income, minority adolescents do appear to display unique attachment trajectories, and this should be noted in future research in to similar samples.

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Relative to other cultures and communities in America, families with low socioeconomic status (SES) who reside in dense, urban areas face a unique set of challenges, experiences, and conditions (McLoyd, 1998). Thus, in the face of welfare reform in the 1990's, it is no surprise that researchers desired a greater understanding of challenges that these families faced and how these families adapted to changes in their environment. From this interest came the Children, Welfare, and Families: A Three City Study - research that collected data on over 2,000 low-income families living, in Boston, Chicago, and San Antonio over the course of 1999-2006. Collecting information on three different occasions, the Three City Study provided longitudinal data on the family processes and emotional, physical, and academic well-being for adolescents and young children. The Three City Study revealed a unique family structure among this demographic: over 80% of the families in the sample had non-resident biological fathers. Considering both the high frequency of and the lack of research done on non-resident fathers, the current study aims to expand understanding of adolescents in families with non-resident fathers. Specifically, the goal of the study is to expand understanding of the trajectories between the adolescent's attachment to their father and delinquency behaviors across 10-21 years of age. These variables will be researched within the larger family and community contexts in which they occur to understand whether the association between adolescent attachment to their non-resident father affects delinquency above and beyond the effects of their family and environment.

Juvenile delinquency - the violation of "social norms and/or the rights of others" (Barret & Katsiyannis, 2017, p. 4) by individuals under the age of 18- was chosen as a particularly important variable of interest in its covariance with father-adolescent relationships for three

reasons. First, there is a strong relationship between adolescent delinquency and paternal attachment (Craig, 2015). Second, positive relationships between non-resident fathers seem to ameliorate the risks of not being in the household (Fabricius, Sokol, Diaz, & Braver, 2012). Third, adolescence is a period where delinquency not only spikes (over 50% of all criminal activity was committed by individuals between 16 and 17 years of age), but is generally observed at higher levels among low SES individuals (Murray & Farrington, 2010).

The following paper will begin by outlining why the gender of the parent matters in research on attachments between adolescents and their parents, as well as why the parent's gender matters in predicting adolescent delinquency trajectories. It will then proceed to address delinquency and its consequences, discuss theories aimed at explaining delinquent behavior, and describe influences of adolescent delinquency that occur within the larger relational and environmental systems in which the adolescent resides. The paper will then outline what is known about the association between father-adolescent relationships and delinquent behavior, along with theories that may explain why the relationship has been observed as it is. The introduction will proceed with a review of literature previously published from the Three City Study that has addressed the influence of paternal relationships on adolescent delinquency. The introduction will conclude with addressing gaps in the literature on the association between adolescent's attachment to their father and delinquency trajectories.

The role of the father

The aim of the current study is to expand understanding of the role of the father in their adolescent's life, however, does the gender of the parent matter in terms of developmental outcomes? It been argued that the gender of the parent does indeed matter, and that fathers play a unique role in their adolescent's life (Lamb, 2004). While developmental research initially

focused on mothers in their families, calls for change from Bronfenbrenner and Lamb shifted the focus to include more members and environments of the family (Lamb, 2015). One member that gained specific interest was the father. Specifically, two variables related to the father in the family have received significant interest: father involvement with their adolescent and the relationship quality between the father and their adolescent. Father involvement entails the level of contact and communication between the father and their adolescent, as well as how much responsibility the father takes for attending to their adolescent's needs. This is commonly assessed by the frequency with which the father spends time with, communicates with, and meets the needs of their adolescent. Paternal attachment, however, measures the bond between the father and their adolescent. Specifically, the measure of attachment used in the Three City Study measures the quality of the relationship between the father and their adolescent, such as how comfortable they feel confiding in their father, or how much they feel their father cares about them. Thus, while father involvement describes the frequency of relationship activities between the father and their adolescent, the measure of attachment assesses the quality of the relationship between the two.

Not only do fathers appear to play a unique sociological role in the family (i.e. source of gender roles), but their presence, involvement, and relationships with their adolescents are generally associated with positive developmental outcomes (Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2007). Father involvement (i.e. frequent contact) and relationships (i.e. warm and trusting) with adolescents are positively associated with cognitive development, academic performance, prosocial behaviors and healthy coping mechanisms (Panksepp, Burgdorf, Turner, & Gordon, 2003), as well as negatively associated with delinquency in adolescence (Coley & Medeiros, 2007; Flouri & Buchanan, 2004; Foster et al., 2005). In fact, communication between

the father and their son appear to be protective against different delinquent acts than communication between the mother and their son (Luk, Farhat, Iannotti, and Simons-Morton, 2010). Research on father absence seems to corroborate these findings as well, as adolescents with absent fathers suffer cognitively, academically, socially, and emotionally more than their peers with resident fathers. This makes sense, as having a second parent in the household is correlated with more resources and support (McLoyd, 1998). There is also evidence that the biological father specifically influences the adolescent above and beyond simply being a father figure. Adolescents in families with an absent biological father, but with step-father in the household, display worse externalizing behavior than their peers with resident biological father (Fluori, 2007). The risk associated with having an absent father, however, seems to be tempered by having positive relationships with the non-resident father (Fabricius, Sokol, Diaz, & Braver, 2012). Further evidence that the father uniquely influences the adolescent comes from attachment research. As adolescents mature, both boys and girls begin to show different attachment patterns between their mother and father (Higgins, Jennings, & Mahoney, 2010). Distinguishing between attachments to parents suggests that adolescents rely on their mothers and fathers for different needs. However, despite the importance of both involvement and attachment between the father and the adolescent, only attachment will be used as a primary variable in the study.

Delinquency

Juvenile delinquency, as mentioned above, is criminal activity by minors. Delinquent activity is a broad term that captures a multitude of activities, however generally it can be distilled into three major categories: violent, property, and drug offenses. Regardless of the offense type, juvenile delinquency has both perpetrators and often victims, with potential

consequences for both (Office of Juvenile Justice Department, 2014). While victims of criminal activity can suffer severe trauma related to the delinquent behavior they are subjected to, offenders tend to suffer as well. Severely delinquent individuals tend to experience deficits cognitively (Haller, Handly, Chassin, and Bountress, 2010) and emotionally (Chassin et al., 2010), as well as experience greater risk for victimization and incarceration. Furthermore, delinquent activities can cost taxpayers millions of dollars each year (OJJDP, 2014). Aside from paternal attachment, delinquent activity is associated with adolescent age, academic achievement, child rearing practices, child abuse, family disruption, antisocial parents, family size, SES, peer influences, school environment, and community problems (Murray & Farrington, 2010). However, how and why these factors appear to influence delinquency will be discussed in further detail below.

Juvenile delinquency patterns have displayed remarkably similar trends over the last two decades (OJJDP, 2014), however simply looking at national percentages of criminal behavior by minors may not accurately represent the nature of delinquency in the country (Sherman, 2006). For example, when looking at the number of juvenile arrests in 2015 compared to the juvenile population, the national percentage of minors engaging in delinquent behavior is around 1.2% (OJJDP, 2015). This may not accurately portray the nature and severity of juvenile delinquency in the country. Crime in general tends to be concentrated in low income, dense urban areas, and while the national rates of criminal activity may fall close to 1%, areas like Boston or Detroit have numbers significantly higher (Sherman, 2006). Furthermore, many juvenile crimes do not lead to arrests, and self-reports of criminal activity are a function of memory and willingness to disclose information. Thus, delinquency appears to have two contexts in which it can be measured: from law enforcement and from self-report. While using arrest records of juvenile

delinquents is an effective way to map responses to delinquency from law enforcement, self-reports of delinquent behavior are a more effective way to estimate day to day delinquent activities of an individual (OJJDP, 2014). The measure of delinquency used in the current study consists of three self-report subscales: serious delinquency and alcohol/drug use. The serious delinquency scale measures criminal behavior, such as theft and assault, and the alcohol/drug scale measures use of illegal substances. All measures of delinquent behavior in the current study were reported by the adolescent, and thus may be more representative of the total delinquent behavior the adolescent engages in (OJJDP, 2014).

Further, looking at delinquency trajectories across adolescence is a valuable method because delinquency is a dynamic process. Early research revealed two important delinquency trajectories individuals may follow: childhood persistent and adolescent-onset (Moffit & Caspi, 2001). Childhood onset delinquents tend to have an early presence of harsh parenting and disruptive behaviors and temperaments compared to adolescent onsets. Interestingly, sex differences are almost non-existent in childhood persistent compared to adolescent onset where boys display much higher rates. One explanation for this may be that girls who mature earlier are at greater risk for delinquency, and high-risk environments are often associated with early ages of sexual maturity (Caspi, Lynam, Moffit, and Silva, 1993). Thus, high risk environments seem to promote offending regardless of gender. However, persistent offending particularly poignant for boys when childhood aggressive behaviors are high (Broidy et al., 2003). Subsequent research has suggested a more complex set of trajectories (Higgins, et al., 2009; Pittsburgh Youth Study, 1988). Observation of youth between ages 14-17 over seven years following a felony conviction observed five patterns of offenders: low, mid, late onset, desisters, and persisters (Pittsburgh Youth Study, 1988). The low and mid groups of offenders began the study

with low levels of delinquent activity, and did not show increases in those activities over time; these groups accounted for 26% and 31% of participants, respectively. Late onset youth began with low levels of offending, but increased their levels of delinquent activities over time, this group made up 12% of participants. Desisters began with high levels of delinquent activity, but subsequently reduced in delinquency as they aged, they made up 21% of youth in the study. Finally, persisters (10%) began with high rates of offending and continued with this pattern as they aged. These patterns were consistent across all types of offenses. This is surprising, as some research has indicated that different offending types affect adolescents differently. For example, delinquent adolescents who abuse substances tend to display much more psychological immaturity than offenders who do not, indicating that they may be more likely to persist in delinquent behavior (Chassin et al., 2010). Similar trends also appear in adolescents who had not experienced a serious conviction, with 19% being non-offenders, 50% starting off with low levels but increasing with age, 25% beginning with low levels, increasing, and then decreasing, and 6% increasing from a high-baseline level, only to eventually decrease (Higgins, et al., 2009). While the current study is not tracking specific classes of offending, it does provide support that there are significant individual differences in delinquency trajectories related to baseline measures.

Theories of delinquency

The cost of delinquent behavior to society has prompted criminological, sociological, and psychological researchers for decades to investigate causes of juvenile delinquency. While previous theories of crime focused on either structural or individual traits, eventually theories began to shift to a socio-psychological perspective (Froggio, 2007). From this perspective emerged two important theories: Social Control Theory (SCT; Hirschi, 1969) and General Strain

Theory (GST; Agnew, 1992). Hirschi explained delinquency as being influenced by social bonds; when adolescents have strong social bonds with their attachments to others, commitments to achievement, commitment to activities, or commitment to societal norms, they will refrain from delinquent behaviors lest the illicit activates lead to social rejection and the weakening of their bonds with others and personal goals. However, when these bonds are weaker they do not have to worry about maintaining the bonds, and are thus able to engage in delinquent behavior. However, examination of the National Youth Survey (NYS) data revealed that SCT is only able to weakly explain delinquent behavior (i.e. assault, robbery, theft; Agnew, 1991). The NYS was a nationally representative survey, with two waves of data collection that occurred one year apart. The goal of the survey was to understand delinquency behaviors of youth aged 11-17. Using social control variable as predictors of delinquent behavior, Agnew reported that only 3% of the variance in delinquent behavior was explained.

GST, however, has continued to amass empirical support not only longitudinally, but also cross-culturally (Lin et al., 2014). Agnew posited that deviant behavior serves to preserve oneself in the face of stress. In essence, this theory states that when people are not experiencing satisfactory relationships with others, they may turn to deviant behavior as a means of coping with the negative affect that arises from this relational dissatisfaction. In fact, strain in relationships that makes the individual feel anger are thought to be the most influential in the development of delinquent behavior. According to Agnew, two types of strain exist: objective and subjective. Objective strain is present when an individual experiences a condition that violates a norm of their community, such as abuse from their parents. Subjective strain occurs when an individual experiences a condition that is perceived as unacceptable by them, and is not exclusively rooted in social norms. Rather, depending on personal characteristics and values

possessed by the adolescent, each individual may experience subjective strain differently. Agnew further theorized three categories of strain to exist: Strain that prevents or threatens to prevent the adolescent from achieving a desirable goal, strain that removes or has the potential to remove desirable factors in their life, and strain that presents or has the potential to present undesirable factors in their life. These strains may lead the adolescent to experience disappointment, depression, or fear, but experiencing anger is theorized to be key for turning toward delinquent behavior. Strains in the adolescent's life that are perceived as unfair, high in magnitude, and out of the adolescent's control are thought to be the most likely to lead to delinquent behavior. Considering that human nature revolves around self-preservation, it seems logical to conclude that adolescents who experience relational strains in their lives will use the resources available to them to cope with the strain they experience. This may explain why adolescents in dense, urban, low SES areas are at a greater risk for delinquent behavior: crime, gangs, and substance abuse are more salient outlets than in higher SES areas (Mcloyd, 1998). In fact, when viewed from this lens, it makes sense that so many policy initiatives for delinquency recommend community and school programs build life skills and support systems (Greenwood, 2008), as they increase the amount of positive coping resources for adolescents.

Pathways to delinquency

A large body of literature has revealed a collection of personal, familial, and environmental strains that appear to play a key role in delinquent behavior among adolescents (Murray & Farrington, 2010). These strains often exist in different contexts of the adolescent's environment, and may each contribute towards delinquent behavior in adolescents. This is consistent with Bronfenbrenner's ecological systems theory of development, which posits that developmental pathways unfold in relation to interactions between different levels of the

individual's environment (Bronfenbrenner, 1977). These environmental levels include immediate family and home, neighborhoods, schools, communities, societal institutions, and overall culture within which the individual resides. Thus, it appears plausible that delinquency is a behavior that develops in response ecological stressors. In fact, Murray and Farrington's (2010) literature on influences of delinquency provides convincing evidence for just that. The review encompassed a large number of longitudinal, large community-sample studies that measured a wide variety of variables using both self and other report. The variables identified as having a significant effect on delinquent behavior include low self-esteem, depression, poor moral judgment, lack of social information processing, childhood temperament, agreeableness and conscientiousness, empathy, low IQ, low educational attainment, adolescent rearing practices, adolescent abuse, familial disruption, parental antisocial personality, family size, SES, school, peers, and communities. However, in the interest of parsimony, only factors that have displayed the strongest and most consistent associations with delinquency and were measured in the Three City Study will be discussed in detail.

Discussion of predictors and covariates of delinquency is important for one primary reason: adolescent development occurs within much larger context than simply their relationship with their parents. Adolescents are a product of their environments, and a diverse interplay of risk and protective factors paint delinquency as a dynamic process with multiple possible pathways leading towards it. Thus, discussion and control of the following variables does not serve to dismiss their importance, but rather acknowledge it. Isolating particular influences in the development of delinquency does not justify ignoring other facets, however does allow for prevention and intervention programs to focus their resources on specific risk and protective factors for delinquent behavior. Therefore, considering that the covariation between delinquency

and paternal attachment undoubtedly occurs within a larger context of risk factors, it is important to understand and control for other influential factors in the analysis. This will help to parse out the effect off paternal attachment on adolescent delinquency in the context of other environmental factors.

The individual factor that demonstrates a notable link with delinquency is low academic achievement. Low academic achievement is a factor that predicts increases in delinquency, especially violence and aggression (Haller, Handly, Chassin, and Bountress, 2010; Savage, Ferguson, & Flores, 2017). In fact, this relationship has been observed even when controlling for SES (Beebe & Mueller, 1993; Chavez, Oetting, & Swaim, 1994; Pittsburgh Youth Study, 1988), and has been identified as a significant risk factor for later delinquency by multiple longitudinal cohort studies (Busch et al. 2009; Hughes et al. 2009; Zagar et al. 2009a). One possible explanation that has emerged is that adolescents who struggle academically also struggle with abstract concepts. This can facilitate impulsive behavior, inability to foresee consequences, and poor school performances. This may stem from lower IQ's or undiagnosed learning difficulties, which are frequently linked with academic achievement (Van IJzendoorn et al., 2005) and delinquency (Lynam, Moffitt, & Stouthamer-Loeber, 1993; Ttofi et al., 2016). In fact, adolescents with low intelligence are more than twice as likely (OR = 2.32) to offend than adolescents with high intelligence. Another interpretation of the relationship between adolescent delinquency and poor academic achievement is that when adolescents perform poorly in school, educational goals may no longer be appraised as a feasible pursuit. This in turn may lead towards investing in other endeavors, and may explain why schools that focus strongly on the academic success of their students report less delinquent behavior (Murray & Farrington, 2010).

Social factors affecting delinquency are also varied, with two factors emerging as important correlates: SES and high-risk communities (i.e. crime, poverty; Murray & Farrington, 2010). Without a doubt, higher rates of delinquent behavior have been observed in low SES families, specifically families who have low incomes, are dependent on welfare, and reside in poor housing. Effect sizes for this relationship vary, with low SES displaying the strongest relationship with problem behaviors (r = .16), followed by criminal behavior (r = .13), aggression (r = .09) and violent behavior (r = .07; Derzon, 2010). While multiple theories on this association exists, there is strong support that families with low SES status tend to face more risks and stressors, which in turn may lead to delinquent behavior. However, not all facets of SES contribute to this relationship. While financial strain and poor housing predict delinquency, parental job prestige does not. Thus, it is plausible that stressors associated with these conditions may make delinquency a salient and tangible outlet. However, considering that the sample of the current study were all in low income areas, it is likely that the effects of SES has already been captured and controlled for through sampling procedures, thus is not included as a covariate.

The last important social factor is the community in which the adolescents reside. Without a doubt, low-income, dense, urban areas display the highest levels of delinquency. As noted by many researchers, it is difficult to study whether it is the community environment that produces delinquent behavior, or rather the difficult circumstances that families in these communities have found themselves in that tend to produce them (Murray & Farrington, 2017). For example, one large-scale study did in fact find that while adolescents with a high risk for delinquent behavior were likely to offend regardless of their living situation, adolescents with low risk to offend were more likely to engage in delinquent activity if they were in a high-risk neighborhood (Murray & Farrington, 2017).

Many other influences on adolescent delinquency arise from the family (Barret & Katiyannis, 2017; Demuth & Brown, 2004). These variables include child rearing practices, child abuse, family disruption, and antisocial parents (Murray & Farrington, 2010). Childrearing is a multifaceted category, however poor parental supervision, harsh discipline, and a rejecting attitude have emerged as predictors of delinquency (Hoeve et al., 2009). In fact, harsh, cold, and authoritarian parents had adolescents most at risk for delinquent behavior (Berk, 2013). Furthermore, parents who either invest too little time into monitoring their adolescent's behavior, or parents who spend too much time controlling their adolescent also see increases in delinquent activities (Harris-McKoy, 2016). In Hoeve's (2009) meta-analysis of nearly 200 studies, neglectful (r = .29), harsh (r =.28), rejecting (r =.26) and psychologically controlling parenting practices (r =.23) emerged as some of the strongest predictors of increased delinquent activity. These parenting practices have the potential to promote a hostile view of the world from the adolescent's perspective, increase aggression, lead to rejection from prosocial peers and acceptance from antisocial peers, build unhealthy coping styles, and maladaptive emotional responses (Lyons-Ruth, Bronfman, & Parsons, 1999; Sroufe et al., 2005). It is important to note that in certain circumstances these harsh parenting practices are adaptive and protective, particularly among minorities and low SES families (Baumrind, 1972; Querido, Warner, & Eyeberg, 2002).

Familial disruption is another consistently cited predictor of delinquent behavior. Living in a single parent household, even when controlling for SES, parenting style, substance abuse, and parental criminal activity, remained a significant predictor of delinquency (Murray & Farrington, 2017). Living in single parent households predicts both problem (r = .12) and criminal (r = .09; Derzon, 2010) behavior, albeit with small effect sizes. Despite the small effect

sizes, however, the relationships have been both consistently studied and replicated in a multitude of studies (Derzon, 2010). Single parent households also seem to indirectly affect delinquency. Adolescents in single parent households are significantly more likely to engage in delinquent behavior. Explanations for this are varied, with some reporting that having a single parent means the adolescent receives less supervision (Wagner et al., 2010), and others reporting that a single parent is not able to meet the adolescent's physical and emotional needs as well as two parents (McLoyd, 1998).

Antisocial, incarcerated, or substance abusing parents are another predictor of delinquency. Adolescents with incarcerated parents are significantly more likely (*OR* = 1.6) to display antisocial behaviors if they have an incarcerated parent, and more than twice as likely (*OR* = 2.0) if aged 11-17 when the parent was incarcerated (Murray, Farrington, & Sekol, 2012). One reason for this may be, again, that families where parents display these patterns have a risk for an intergenerational exposure to risks. However, other explanations that have emerged are that criminal parents may encourage this behavior from their adolescents, may have sub-optimal parenting styles, or that society may transmit biases of criminal parents towards their adolescents.

Gender differences in delinquency

Not surprisingly, boys and girls not only engage in delinquent behaviors with different frequencies, but also display different outcomes with predictors and covariates of delinquency. These differences begin at an early age, with research observing that boys tend to externalize in response to stress, while girls tend to internalize (Berk, 2013). As they mature and gain access to different outlets, these differences manifest in the delinquent activities they engage in. In fact, the tendency for boys to externalize is represented in national self-reports of delinquent behavior

- the Office of Juvenile Justice Department (2014) reported that males were more likely to engage in violent crimes, gang activity, weapon and narcotic use. This is corroborated by arrest records, which found males being arrested at higher frequencies than girls in all criminal activities except prostitution (OJJDP, 2014). Furthermore, other publications using Three City Study data have found gender as a significant predictor of delinquency (Yoder, Brissen, & Lopez, 2016).

The ways that boys and girls respond to risk and protective factors appears to vary as well. For example, Griffen et al., (2000) reported that while parental monitoring significantly reduced levels of underage drinking for boys in general, eating family dinners was associated with less delinquency in girls from single-parent families only. Other research that studied the association between violent victimizations and delinquency found that while both genders reported subsequent increases in delinquency after experiencing violent victimization, females displayed faster reduction in delinquent behaviors over time than males (Kim & Lo, 2016). Furthermore, evidence suggests that males and females view crime and desistance differently. Desistence in males tends to be effectively measured when self-reported, while desistance in females is effectively measured when using arrest records (Massoglia & Uggen, 2007). Considering that the Three City Study used the adolescent's self-report of delinquent behavior, it is possible males and females may show differences in delinquency trajectories based on reporting biases.

Paternal attachments

As addressed above, the attributes of the family play an important role in predicting delinquent behavior. One particularly influential family-related variable that has emerged as a predictor of delinquency is the quality of the parent-adolescent relationship (Yoder, Brissen, &

Lopez, 2016). In the current study, the parent-adolescent relationship scale measures the quality of the relationship between the parent and adolescent using the adolescent's self-report. It consists of two subscales: trust/communication and anger/alienation. Trust/communication measures positive feelings between the adolescent and the father such as feeling respected and valued by the parent, while anger/alienation measures negative feelings between the adolescent and the father such as unreasonable expectations and feelings of shame. Although referred to as the parent-adolescent relationship scale, trust, communication, anger, and alienation are all facets of relationships derived from attachment theory (Armsden & Greenberg, 1987), and thus are commonly referred to as 'attachment'. However, these facets of attachment are not mutually exclusive, and thus providing one overall measure of attachment may not accurately capture the nature of the relationship quality between the adolescent and their father. Thus, researchers tend to address each subscale as a separate variable (Yoder et al., 2016).

While GST has produced convincing explanations why adolescents may turn to delinquent behavior, theories on parental attachment shed light on why negative parental relationships may be a source of strain in the adolescent's life.

Attachment theory

Attachment Theory (AT) was initially developed through the joint efforts of Anisworth and Bowlby (Ainsworth & Bowlby, 1991), and theorized that through reciprocal interactions with their mothers, infants develop either a secure or insecure perception of the world around them. Mothers who are consistently available, warm, and affectionate develop secure attachments with their infants, while mothers who do not display these patterns develop insecure attachments with their infants. Furthermore, reciprocity from the child affects the mother's behavior as well, making the relationship a product of both individual's behaviors. These infant

attachments appear to, at least in part, influence the nature of future relationships with others (Ainsworth, 1989). However, as research on the subject progressed, it was observed that attachments to people not only persist throughout the lifespan, but serve different functions during different stages in life. For example, while in infancy attachment to a parental figure is related to the infant's survival, attachments to parents in adolescence set the foundation for emotional regulation (Ruhl, Dolan, & Burhmester, 2014). While many have argued that attachment to peers becomes more important to individuals during adolescence than attachments to parents (Laible et al., 1999), adolescent attachment to their parents remains an important source of security (Nickerson & Nagle, 2005). In fact, it is this positive source of security, trust, and communication between the adolescent and their parent that sets the foundation for future relationships the adolescent may engage in (Ainsworth, 1989). Through this source of security and positive interactions, the adolescent is able to create a working model of trust towards others.

Just as delinquency trajectories vary across adolescence, adolescent attachments with their fathers vary as well (Higgins, Jennings, & Mahoney, 2009). Supportive and satisfactory relationship experiences between adolescents and their fathers throughout adolescence encourage more secure attachments to fathers (Erich, Hall, Kanenburg, & Case, 2009), while conflict, criticism, and pressured relationship experiences promote insecure attachment patterns (Van Ryzin & Leve, 2012; Anhalt & Morris, 2008; Gallarin & Alonso-Arbiol, 2012). There appear to be five distinct attachment trajectories between adolescents and their fathers (Higgins et al., 2009). This was observed in families who participated in the Gang Resistance Education and Training (GREAT) program (1995–1999). This program followed over 400 families sampled from six major cities in the United States, and followed adolescents from the age of 12 to 16. The first pattern consisted of only 3.92% the sample and followed a consistently low attachment

quality trajectory across adolescence. The second pattern was displayed by 15.14%, and began with mid-levels of attachment quality, decreased, and then increased for the final measurement. The third pattern was displayed by 34.52% of the sample, with adolescents beginning at mid-levels of attachment quality and slowly decreasing with age. The fourth pattern appeared in 35.06% of participants, and had adolescents displaying consistently high levels of attachment quality over time. The fifth pattern consisted of 11.36% of participants, was similar to the fourth, but the levels of attachment quality were even higher. When analyzed in conjunction with delinquency, it was found that adolescents who had decreasing attachment-security trajectories with their father were more likely to engage in delinquent behavior. These trajectories were observed using a group-based trajectory analysis. This provided an in depth look into how paternal attachments and adolescent delinquency trajectories vary with age, however did not examine attachments to non-resident fathers specifically, nor did it solely focus on low SES families.

Thus, considering that attachment to parents is a dynamic process and an important facet for optimal emotional regulation in adolescents, it is feasible to assume that experiencing deprivation in this domain may result in perceived strain from the adolescent. This is consistent with GST, as Agnew (1992) posited that parental rejection was a particularly influential form of strain. Using GST and AT in conjunction, one would expect to see adolescents who have undesirable relationships with their fathers displaying more distress and delinquent behavior. In fact, that is exactly the trend that has been observed: adolescents with poor attachments to their fathers display more emotional distress and delinquent behavior (Hoeve et al., 2009). It is this dissatisfactory relationship that appears to produce both feelings of anger and alienation towards parents, with delinquency appearing as a response to these emotions (Greenberg & Speltz, 1988;

Patterson, Debaryshe, & Ramsay, 1989). In fact, rejection and hostility from parents towards their adolescents accounts for 11% of variability in delinquency according to a meta-analysis of over 161 studies (Hoeve et al., 2009). Some literature, however, has found a stronger effect between adolescent attachment to mothers and delinquency - adolescents with less secure attachments to their mothers displayed higher amounts of externalizing and delinquent behavior, with attachment security accounting for 24% of the unique variation in externalizing behaviors, and 25% in delinquency (Allen et al., 1998). The effect of adolescent attachment to their mother on adolescent delinquency has been observed when using both parental and adolescent reports of attachment and behavior (Vivona, 2000). However, some studies have suggested that the effect of paternal attachment on delinquency trajectories does not become apparent until 16 years of age. This may explain why many studies have found a stronger effect size from maternal rather than paternal attachments, as many have not used longitudinal data that spanned adolescence.

Gender differences in attachment to father

Boys and girls display both similarities and differences in attachment patterns to their fathers. During adolescence, girls typically display more secure attachments to their fathers than boys (Allen et al., 2003). However, although girls score higher in attachment security, the gender of the adolescent does not appear to influence the trajectory patterns that their attachments will follow (Higgins et al., 2009).

While poor parent-adolescent relationships predict delinquent behavior for boys and girls, the effect of the attachment is stronger if the adolescent and parent's genders matched (Demuth & Brown, 2004). Thus, when studying the effect of non-resident paternal attachments with their adolescents, it is conceivable that the effect may be stronger for boys than girls. Furthermore, since girls generally display different types of delinquent behaviors than do boys, and report

higher levels of attachment security with their parents than boys, it is plausible that the effect of attachment on delinquency across adolescence will vary between genders.

Current knowledge and literature gaps

Two previous studies (Coley & Medeiros, 2007; Yoder, Brissen, & Lopez, 2016) have investigated relationships between non-resident fathers and adolescent delinquency using the Three City Study. Coley and Medeiros investigated bidirectional trajectories between adolescent delinquency and father involvement. Their sample consisted of adolescents aged 10-14 years old at the first wave of measurements, and they found evidence that as paternal involvement increased, delinquency decreased across adolescence. Furthermore, they found initial evidence that it was changes in adolescent delinquent behavior that initiated subsequent changes in father involvement.

Yoder et al., (2016) used the same data set for a similar study, but rather than father involvement, they investigated the effect of father-adolescent attachment on adolescent delinquency trajectories. Furthermore, the study used all three waves of data collection, and thus measured delinquency trajectories across adolescence, however delinquency trajectories were only measured in terms of a baseline score of the father-adolescent relationship. This means that the trust/communication and anger/alienation scores at the first wave of data collection (which consisted of adolescents aged 10-14 years old) were used to predict changes in delinquency trajectories across the subsequent waves of data collection. Results indicated that, at the baseline, trust/communication was negatively related to delinquency levels, and anger/alienation was positively related to delinquency levels. However, only trust/communication predicted reductions in delinquency trajectories, while anger/alienation did not predict subsequent changes in delinquency.

Both studies provided important insight into the influence of non-resident father in low SES families. Coley and Medeiros (2007) found non-resident father involvement to be negatively associated with delinquency trajectories across adolescence, and Yoder et al., (2016) found trust/communication between the father and their adolescent to be associated with faster reductions in delinquent behavior later in adolescence. However, there is still more to be understood. For example, as mentioned above, both delinquency and attachments vary across adolescence. Thus, using a baseline measure of paternal attachment alone may not accurately portray how the two change together over time. Furthermore, while initial evidence was produced that it is changes in delinquency that affect changes in father involvement, that observation was not extended to include paternal attachment.

Current Study

The current study aims to provide insight into three important domains of the relationships between adolescents and their non-resident fathers: how their delinquency varies across adolescence, how their attachment to their fathers varies across adolescence, and how the two co-vary. Using data from Welfare, Children, and Families: A Three City Study, the current study will use Mplus software to produce two latent growth curve models of delinquency and paternal attachments across seven years and three waves of longitudinal data. There will be a single model for each attachment sub-scale. Drawing from previous research, the current study will test seven hypotheses using two models:

H1: Adolescents with more anger/alienation towards their fathers at baseline will report higher levels of delinquency.

H2: Adolescents with more trust/communication towards their fathers at baseline will report lower levels of delinquency.

H3: Trust/communication baseline scores will predict delinquency trajectories.

H4: Anger/alienation baseline scores will predict delinquency trajectories.

H5: Trust/communication and delinquency trajectories will demonstrate a negative relationship with each other across adolescence,

H6: Anger/alienation and delinquency trajectories will demonstrate a positive relationship with each other across adolescence.

H7: Child gender will significantly predict delinquency and attachment.

Methods

Participants

Data was collected on low-income families living, in Boston, Chicago, and San Antonio over the course of 1999-2006. Initial screening of households produced a sample size of over 40,000 families, however stratified, random sampling for households in the original sample produced the final sample for the first wave of data collection (n = 2,402). Of these families, 40% were receiving welfare cash payments (n = 961), and all had an income less than 200 percent of the government poverty line. In order to select families, the researchers began by selecting neighborhoods that had a high concentration of adolescents living in poverty. From their sample of potential neighborhoods, specific blocks were selected that would allow their sample to consist of the maximum amount of families in poverty without having to sample from middle and high-income neighborhoods. Once the neighborhood selection was complete, the researchers used probability sampling (based on size of neighborhood), and then used random sampling of the eligible families in neighborhood based on initial screening.

The households in the final sample had a focal adolescent (49.5% female, n = 1190, 50.4% male, n = 1211) aged either 0–4 (50.6%, n = 1,216), or 10-14 (40.4%, n = 1,186). One

hundred percent of the primary caregivers were female, whose ages ranged from 15-24 (*M* = 32.79, *SD* = 9.93). The majority of the focal adolescents did not have their father living in the household (84.4%, n = 2028). Racial/ethnic distributions of the focal adolescents were African American (46.9%, n = 1126), Caucasian (30.8%, n = 740), American Indian/Alaskan Native (0.9%, n = 22), Asian/Pacific Islander (0.1%, n = 3), and the remaining did not identify as any of the options (21.1%, n = 508). The second wave of data collection occurred over the course of 2000-2001, and saw a response rate of 88% (n = 2,158). The final wave of data collection occurred over the course of 2005-2006, and had a response rate of 79.7% (n = 1944) of the adolescents who responded in wave 1.

Procedure

Four methods were used in data collection: computer-assisted personal interview (CAPI), computer-assisted telephone interview (CATI), face-to-face interview, and telephone interview. The interviews were separated into two portions: adult and adolescent. The adult portion of the interview primarily focused on three aspects: demographic information (i.e. race, age, gender), family characteristics (i.e. income, education, marital status), and experiences with welfare services (i.e. food stamps, time spent participating in welfare activities). The adolescent portion of the interview focused on the behavioral, cognitive, socio-emotional, and physical development of the focal adolescent. The first portion of the interview (100 minutes) was conducted with the focal adolescent's primary caregiver. If the focal adolescent was 10 years or older, a second interview (30 minutes) was conducted with the focal adolescent after the first portion with the primary caregiver.

Measures

As mentioned above, numerous other factors have displayed significant relationships with adolescent delinquency. Thus, in order to understand the true strength and direction of the relationship between paternal attachment and adolescent delinquency trajectories, the following variables will be added into the analysis following the association between paternal attachment and delinquency. These variables are measures used in the Three City Study that represent influential factors in adolescent delinquency. General demographic covariates, including child's sex, child and caregiver age, the child's relationship to their caregiver, the marital status of the primary caregiver, the presence of a substitute father figure, and race/ethnicity were also included in the model.

Covariates

Academic achievement. This variable measured the grades the adolescent received on their last report card. It consists of a single item, "The last time [ADOLESCENT] got a report card, what were [his/her] grades", and was scored on a Likert type scale, ranging from 1 = A's to 5 = F's. Higher scores indicated worse report card grades.

Neighborhood problems (*a* = .80). Mother report of problematic neighborhood characteristics was used to assess the quality of the neighborhood. The measure consists of 11 items that were rated on a 3-point Likert scale, ranging from 1 (*no problem*) to 3 (*a big problem*). Example items include unsupervised adolescents and absence of police. Higher scores represent more neighborhood problems. This variable is indicative of community problems in which the adolescent resides. See Appendix A for full scale.

Financial strain (*a* = .72). This scale assesses the financial strain using mother report. The scale consists of five items, on a 5-point Likert scale, ranging from 1 (*no difficulty at all*) to 5 (*a great deal of difficulty*). Example items are "during the past 12 months, how much difficulty

did your household have paying bills?" and "Does your household have enough money to afford the kind of housing, food and clothing you feel you should have?". See Appendix B for full scale.

Mother-child Trust/communication (*a* = .90). This scale measures trust/communication between the adolescent and the mother using adolescent report. The scale consisted of six items and is measured using a 5-point Likert scale, ranging from 1 (*never true*) to 5 (*always true*). Example items are "My mother accepts me as I am" and "I like to get my mother's point of view on things I'm concerned about". The values were averaged to create a total score, with higher values indicating more trust/communication. See Appendix C for full scale.

Mother-child Anger/alienation (*a* = .66). This scale measures anger/alienation between the adolescent and the mother using adolescent report. The scale consists of six items, and is measured using a Likert scale, ranging from 1 (*never true*) to 5 (*always true*). Example items are "Talking over my problems with my mother makes me feel ashamed or foolish" and "My mother expects too much of me". The values were averaged to create a total score, with higher values indicating more trust/communication. The details on the scale it was adapted from are described in the father-child relationship scale section. See Appendix C for full scale.

Parental monitoring (*a* = .66). This scale measures the degree to which parents monitor their child's activities. The scale is composed of seven items, with sample questions including "caregiver knows about your friends" and "caregiver knows where you go at night". Each item was measured on a 3-point Likert scale, ranging from 1 (*Doesn't Know*) to 3 (*Knows a lot*). A total composite score was calculated by taking the mean of all the items, with higher values indicating greater parental monitoring. See Appendix D for full scale.

Harsh Parenting Style (*a* = .78). This scale assessed the level of harsh parenting displayed by the mother. It consisted of two items "I think that a good spanking is sometimes needed to make [CHILD] understand" and "I spank [CHILD] when [he/she] has done something really wrong", which the parent was asked to rate how true each item was. Each item was measured on a 4 point Likert scale, with values ranging from 1 (*definitely true*) to 4 (*definitely false*). The harsh parenting score was calculated by taking the mean of the two items. Higher scores indicate less harsh parenting.

The harsh parenting scale was adapted from the Raising Children Checklist (Shumow, Vandell & Posner, 1998), which was a 30 item checklist developed to assess harsh, firm, and permissive parenting among low income families. The scale was validated on a sample of 3rd (n = 216) and 5th (n = 194) graders, and the reading level was lowered to be more appropriate for the low income sample. A three factor solution was confirmed, with poor – acceptable reliabilities (harsh, *a* = .70; firm, *a* = .73; permissive, *a* = .61).

Parental Illegal Activities (*a* = .72). This inventory measured the primary caregiver's engagement in illegal activities, with a subscale existing that focused on substance use. The substance use subscale consisted of four items, with sample items including "in the past 12 months, how often have you smoked marijuana or hashish?". The full scale consisted of 11 items, with sample items including "in the past 12 months, other than a store, how often have you taken something no belonging to you?". Each item was measured using a 4-point Likert scale, with values ranging from 1 (*never*) to 4 (*often*). Higher values indicated more illegal activities and substance use.

Outcome Variables

Total Delinquency (*a* = .71). This overall measure of delinquency consists of two subscales: Serious Delinquency (six items, α = .65) and Alcohol/Drug Use (five items, α = .57), as well as one individual item not tied to either subscale: "FC ran away from home". Each item was measured on a 4-poitn Likert scale, ranging from 1 (*never*) to 4 (*often*), and each item loaded strongly on the single "total delinquency" factor. Serious delinquency measures criminal behavior, and example items are "In the past 12 months, how often have you stolen something from a store or another person" and "In the past 12 months, how often have you gotten in trouble with the police". Alcohol/drug use measures alcohol and drug use, and example items are "In the past 12 months, how often have you smoked cigarettes or used chewing tobacco" and "In the past 12 months, how often have you gotten drunk". The items that made up the delinquency measure were recoded such that a score of 1 = 0, indicating the individual had never done the act, and 2 through 4 = 1, indicating that all frequencies of offending (except for no offending) were combined to simply indicate the presence of the delinquent behavior. The 12 items were then summed, and scores were only calculated if the individual answered 12 out of the 12 items. Higher scores indicate more delinquent acts being committed. The items were adapted from the National Longitudinal Survey of Youth (NLSY). As can be seen, the reliability of the total delinquency item is acceptable, but bordering questionable. See Appendix E for full scale.

Father-Child Trust/communication (*a* = .90). This scale measures trust/communication between the adolescent and the father using adolescent report. The scale consisted of six items and is measured using a 5-point Likert scale, ranging from 1 (*never true*) to 5 (*always true*). Example items are "My father accepts me as I am" and "I like to get my father's point of view on things I'm concerned about". The values were averaged to create a total score, with higher values

indicating more trust/communication. Scores were only calculated if four out of the six items were answered.

Father-Child Anger/alienation (*a* = .66). This scale measures anger/alienation between the adolescent and the father, and example items are "Talking over my problems with my father makes me feel ashamed or foolish" and "My father expects too much of me" using adolescent report. The scale consisted of six items and is measured using a 5-point Likert scale, ranging from 1 (*never true*) to 5 (*always true*). Example items are "Talking over my problems with my father makes me feel ashamed or foolish" and "My father expects too much of me". The values were averaged to create a total score, with higher values indicating more trust/communication. Scores were only calculated if four out of the six items were answered.

The two subscales mentioned above were adapted from the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1983). This scale, rooted in Bowlby's theory of attachment, was originally created as a way to measure the feelings adolescent had toward an individual they were attached to. More specifically, it assessed feelings of mutual trust, understanding and respect, the accessibility, responsitivity, and predictability of parent/peers, consistency of parent/peer expectations, as well as experiences of isolation, anxiety, anger, resentment and detachment towards parents and peers. The original measure was validated using a sample of 17-20 year old undergraduates *(M* = 18.6), and measured the individual's attachment to both parents and peers. The parent items loaded on three factors: trust, communication, and alienation, which all correlated with each other (Trust with communication, *r* = .68; trust with alienation, *r* = -.55; communication with alienation, *r* = -.59). This scale was adapted for the Three City study, in which items that assessed trust/communication were combined into one scale, and items that assessed anger and alienation were combined into one scale. As can be seen

above, while the trust/communication subscale demonstrated acceptable reliability, the anger/alienation demonstrated poor reliability.

Analytic Strategy

In Kazemian's (2007) review of desistance literature, she recommended that when studying delinquency researchers ought to focus on within-individual change, between-individual change, and factors that come into to play during the process of desistance. Thus, while cross sectional data may operationalize desistance as a period where the adolescent abstains from delinquent activity, longitudinal data may benefit more by operationalizing desistance as a dynamic process. This poses numerous benefits, primarily in that it allows researchers to identify sensitive periods in which factors may play more of a role in delinquency than other periods. Given these recommendations, and the dynamic nature of both delinquency and paternal attachment, the current study will utilize a dual latent growth curve model (See Figures 1 and 2) of delinquency and paternal attachment using Mplus - a statistical program regarded as flexible (Mcardle, 2009). This analytic procedure has numerous strengths that address both recommended research goals, along with shortcomings of the dataset being utilized (Mcardle, 2009).

The first portion of the analysis is a latent growth curve model (LGCM), a specialized version of a structural equation model (SEM). Considering a key goal of the research is to use longitudinal data to understand changes in delinquency and attachments across adolescence, the ability of LGCMs to map within and between-individual trajectories on multiple factors makes it a desirable analytic procedure (Mcardle, 2009; Byrne, 2013). Strengths of this concept are that it allows testing of not only interindividual and intraindividual change through means and

covariance structures, but it is also able to incorporate measurement error into the model. While classic variable centered techniques are frequently used, the assumption that people change at similar rates is generally incorrect. Rather, person centered techniques that assume differential rates of change are more appropriate when taken in the context of one's environment. Furthermore, considering that this technique incorporates individual differences into the analysis, rather than treating it as a form of error it allows for the homogeneity of variance to be violated.

LGCM is a desirable technique when using large scale, longitudinal, developmental data, because the use of robust maximum likelihood estimators allows for researchers to work effectively with missing and non-normal data (Mcardle, 2009; Byrne, 2012; Preacher, Wichman, MacCallum, & Briggs, 2008). The Mplus program has numerous estimators at its disposal that are capable of dealing with missing and non-normal data. The one used in this study is the Robust Maximum Likelihood Estimator (MLR). This estimator maximizes the likelihood that the data was drawn from the intended population (Kline, 2011). This is an iterative process that creates parameter estimates which minimize the difference between observed and predicted covariances and are robust to non-normality and missing data. As such, it is able to estimate causal pathways. It is considered an acceptable alternative to transforming non-normal variables. It is preferable to using a standard maximum likelihood (ML) estimator because the standard ML estimator requires normally distributed data and no missing data – characteristics not observed in the current sample. Additionally, using a standard ML estimator may result in an increase in type I error rates, as well as inappropriate rejection of adequately-fitting models.

In Mplus, there are seven measures used to assess model fit: chi square, Akaike's Information Criterion (AIC), Baye's Information Criterion (BIC), Comparative fit index (CFI), Tucker-Lewis Fit Index (TLI), Root Mean Square Error of Approximation (RMSEA), and the

Standardized Root Mean Square Residual (SRMR). Each measure of model fit has both strengths and limitations (Byrne, 2012) which will be discussed below. First, the chi square statistic represents the difference between the unrestricted and restricted covariance matrix. Essentially, it tests the likelihood that the model came from the sample, with significant *p* values indicating an unlikely event, and thus an inappropriately fitting model. This test statistic, however, is overly sensitive to large samples and non-normal data, and appears to be a very conservative estimate. However, it is used in the calculations of the other model fit indices. Two of these indices are the CFI and TLI, which compare the structured to the unstructured model. While both fit indices are representative of good model fit when their statistic exceeds .95, the TLI does penalize models that are not parsimonious (Byrne, 2012). The AIC and BIC also assess model fit and parsimony, however are done so by comparing a series of proposed models rather than a structured to an unstructured model. The smallest value of these indices reflect the best fitting model (Byrne, 2012). The RMSEA and SRMR are absolute fit indices, meaning they assess the model fit to the data rather than other models. The RMSEA incorporates parameter estimate error into the calculation, and does not appear to be sensitive to large sample sizes. Finally, the SRMR compares the standardized residuals of the model covariance matrix to the sample. Both the RMSEA and SRMR are considered representative of good model fit when their statistic is less than .05 (Byrne, 2012). Considering each measure of model fit is calculated differently and has a unique set of strengths and weaknesses, model fit will be considered acceptable if all indices are within their acceptable, respective range.

Model Specifications

The analysis is based on means and covariances, which provide information on group and individual effects. Although this model does require at least three time points, the time points do

not need to be equally spaced, thus making it a desirable strategy for the current data set (Byrne, 2012). The dual growth model fits two individual growth curves to the data, and then assesses covariance between their intercepts and slopes. There are two important components to the model: measurement and structure.

The measurement component of the model measures within-person changes through analysis of covariances and regression paths. Specifically, the measurement model assesses the direction and magnitude of individual change in the target variables (i.e., delinquency and attachment) over the time period in which the data was collected. This change is represented by two latent variables (or growth factors), the intercept and slope, and change can either be linear or curvilinear depending how the model is specified. The intercept necessarily represents the score for the target variable at the first time point, while the slope represents the change from time one to time three (Byrne, 2012). Each latent variable is necessarily defined by the observed means of the outcome variable (i.e., delinquency scale score, attachment scale score). In turning to Figure 2, the single-headed arrows leading from the latent towards the observed variables represent the regression of each observed mean at each time point onto the respect growth factor. Furthermore, the number associated with each regression path reflects a parameter constraint, indicating it is not freely estimated in the model. For example, all three regression paths from the intercept to their respective scale score are constrained at one. This reflects the fact that the baseline score does not vary with time. Furthermore, the regression paths from the latent slope to the observed means are 0, 1, and 2 for time points 1, 2, and 3, respectively. These parameters are fixed, and not invariant, so that they may define the slope (Byrne, 2012). As indicated in Figure 2, the parameter constraints for the slope regression paths for delinquency and

trust/communication are no longer 0, 1, and 2 for time points 1, 2, and 3, respectively. This is because both variables did not have a linear rate of change. Results revealed that delinquency had a positive, nonlinear growth, and thus the first time point was constrained at 0, the third at 1, and the second was freely estimated. This method allows the regression paths to still represent the slope growth factor, however assumes the nonlinear change occurs between the first and third time points. Similarly, trust/communication (see Figure 1) had a significant decrease over time, thus the first time point was constrained at 0, the third at -1, and the second freely estimated for the same reasons as discussed previously. More detail is included in the results section.

The second portion of the measurement model is the latent factor variances and co-variances, which are represented by double-headed arrows. The variances, auto-covariances, and cross-domain covariances are not fixed, thus are freely estimated. The single-headed arrows terminating at the observed means, with no origin point, are residuals and reflect the incorporation of measurement error into the model (Byrne, 2012). Compared to the measurement model which measures individual change, the structural model assumes that both intercepts and slopes will vary in the sample, with the average intercept and slope assessed through averages of the two growth factors, and the presence of individual differences in intercept and slope are assessed through variances of the two growth factors.

Dataset

Dataset creation

The first step in the dataset creation process was to merge the original focal child and caregiver interviews, based on household identifications, for wave 2. This process was repeated

for the focal child and caregiver interviews for wave 3, however was not done for the focal child and caregiver interviews for the first wave, as they were already combined.

The second step involved editing the delinquency variables. First, the items that made up the delinquency measure were recoded such that a score of 1 = 0, indicating the individual had never done the act, and 2 through 4 = 1, indicating that all frequencies of offending (except for no offending) were combined to simply indicate the presence of the delinquent behavior. This is called a Poisson distribution, and is the recommended strategy for analyzing variables that naturally have a high frequency of absence of the behavior. A dummy variable was then created that recoded all of the delinquency items used in the composite to indicate whether they were answered or not, and then summed the dummy variables to create a variable indicating the number of delinquency items answered for each case. From here, all cases that had less than 12 out of the 12 delinquency items answered were excluded so that the scores being analyzed reflected full information. This reduced the sample for the first wave from 2402 to 1104, the second wave from 2199 to 1025, and the third wave from 1990 to 918.

The next step involved deleting any participant that had a dead or residential father in each respective dataset. This reduced the sample for the first wave from 1104 to 877, for the second wave from 1025 to 759, and the third wave from 918 to 632. This was done because the goal of the study was to examine the effect of non-residential biological fathers, thus those cases would not be representative of the sample. Due to some adolescents having resident or deceased fathers in different waves (i.e. a non-residential father in wave one may have become residential in wave 2), as well as varying in the number of delinquency items they answered in each wave (i.e. n out of 12), some adolescents that were excluded in the first wave may not have been

excluded in the second or third wave. Thus, the final sample after this exclusion criteria resulted in a sample of 1003, less than half of the original sample.

The final step involved saving all three waves of data into new datasets with only the variables of interest, and then merging them all based on household identification. In this final dataset, the delinquency composite scores were recoded into a dummy variable such that any answer indicated a presence of a score, and anything else indicated an absence. This process was repeated for the father-child relationship subscales. Any cases that did not have at least one wave of data for each of the three waves were excluded, which reduced the sample from1003 to 946.

Data screening/cleaning

The first portion of this process involved screening for univariate outliers. This was done by converting each variable to z-scores to search for values that exceeded three standard deviations. The inherent limitation to this method of outlier detection is that the presence of outliers will bias the z-score, such that extreme outliers may mask other, less extreme outliers. However, it is a more conservative estimate of outliers, and in the interest of retaining a large sample size to satisfy the requirements for the model, it was chosen as an appropriate course of action. When a univariate outlier was detected, it was recoded as missing. Some outliers were detected in the delinquency variables, however these persons were deemed as cases of interest and thus recoding their scores did not reflect the goals of the current study. In the interest of consistency, extreme outliers for parental illegal activities were also not recoded as missing.

The second step involved assessing normality. Analysis of probability plots, as well as values of skewness and kurtosis indicated univariate non-normality in some of the variables (see Table 28). Although this does violate the assumption of normality, the large sample size and robust estimator that will be used were deemed acceptable corrections, thus no transformations

were performed. Furthermore, although previous research has used the original transformed score of the delinquency variable, this hindered interpretability of change in delinquency. Considering the skewness and kurtosis of the Poisson-distributed delinquency (See Figures 20, 21, and 22) variables were similar to the statistics for the transformed variables, retaining the Poisson distribution was deemed an acceptable course of action.

To assess multivariate normality, nine regressions were run (three for each wave). Each regression involved either delinquency, anger/alienation, or trust/communication as the outcome variable for their respective wave, with every other variable predicting it. This is a crude method, considering the final model is a dual growth model, however it was at least an initial attempt at assessing multivariate normality. Results of the regressions indicated that maternal, paternal, and child race were almost perfectly correlated and responsible for collinearity. Thus the regressions were run again with only maternal race as the indicator, as this variable had the least missing data. No singularity, collinearity (correlation matrix < .9, VIF < 10, tolerance >.10), or multicollinearity (any condition index over 30 did not have at least two correlations of .5 or more) were observed in the new regressions. Furthermore, the residual probability plots for each attachment subscale for each wave were normally distributed, however the delinquency regressions were not. Although each regression had heterogenic residuals, this is not an issue in latent growth curve modeling.

The regression also provided Mahalanobis distance statistics for each case, in each regression. Any case that had a probability of $p < .001$ was excluded from the dataset, which resulted in a reduction of 15 cases. Thus, the final sample size was 931 adolescent with non-resident, biological fathers. Of this final sample, 398 participants were female (424 male), and the majority were being taken care of by their biological mother (n = 755). Furthermore, the

majority of the biological mothers (n = 602) were neither married nor cohabitating, however many were separated (n = 119) at wave 1. The average focal child age was 148.87 months (M_{years} = 12.41, SD_{months} = 17.51, SD_{years} = 1.46) and the average caregiver age was 37.62 years. The sample was very diverse, with Black (n = 354) and Hispanic (n = 365) participants being the most common, followed by White (n = 89), and American Indians (n = 4). Furthermore, 10 participants did not identify as a listed race. Although no participant had a residential or dead biological father, a large portion had a substitute father figure (n = 335). For full demographic information, see Table 43.

Results

Individual growth curves

Anger/alienation. The first growth curve model was completed for anger/alienation (n = 931). There were seven data patterns in this model (see Table 1), with the largest number of participants (n = 335) having no missing data. The estimated means (see Table 2, see Figure 5) suggest very little fluctuation in anger/alienation over adolescence, and the covariance (see Table 3) indicates that the most variability occurred during the second wave of data collection. This suggests that if change occurs, it seems to be occurring between the second and third time points. Furthermore, auto-correlations (see Table 4) reveal that the strongest relationship exists between the first and second wave of data, and the weakest between the first and third. The values of the chi square statistic (2.58, 1 *df*, *p* =. 11), AIC (5272.26), BIC (5310.95), RMSEA (0.04, 95%CI [0.00, 0.11]), CFI (0.99), TLI (0.97), and SRMR (0.02) suggest excellent model fit, and the lack of modification indices indicate that no changes need to be made to the model. Model results and standardized model estimates are reported in Tables 5 and 6, respectively. The results of the model indicate that while the average intercept was 2.43 (*SE* = 0.03, $p < .001$), there was no

significant average change over time (b = -0.004, SE = 0.02, p = 0.87). However, there were significant individual differences in both intercepts (σ^2 = 0.61, SE = 0.08, p < 0.001), and slopes (σ^2 = 0.13, SE = 0.04, p < 0.01) such that individuals with intercepts deviating from the mean naturally regressed to the mean (see Figure 3) with the steepness of the slope increasing as deviations increased (b = -0.18, SE = 0.05, p < .001). Considering there was no average change over time, interpretation of the relationship between intercept and slope is difficult, however as indicated by Figure 3, as intercepts increased, the slope became more negative. Thus, this model revealed that while baseline anger/alienation scores fell close to the middle of the scale, there was negligible average change over time. Yet, individuals did vary in both their baseline scores and subsequent changes, such that individuals who began high in anger/alienation decreased towards the mean, and individuals who began low in anger/alienation increased towards the mean. The significant residual variances (see Table 5) suggests that the addition of covariates into the model may help explain some of the variance.

Trust/communication. The second individual, linear growth model was done for trust/communication (n = 931). Again, there were seven data patterns (see Table 7), with the highest frequency occurring in individuals with no missing data (n = 341). The estimated means (see Table 8, see Figure 6) indicate relative stability for the first two waves, with a drop-off in trust/communication occurring after the second wave, however the covariance (see Table 9) indicate that there was comparable variability in all three waves. Similar to anger/alienation, auto-correlations (see Table 10) revealed that the strongest correlation occurred between waves one and two, and the weakest between waves one and three. The values of the chi square statistic (11.81, 1 *df*, p < 0.001), AIC (6191.51), BIC (6230.20), RMSEA (0.11, 95%CI [0.06, 0.17]), CFI (0.97), TLI (0.90), and SRMR (0.03) suggest poor model fit. Modification indices suggested

removing all constraints from the intercepts and slopes, and the estimated/sample means suggest that a linear model is not appropriately estimating the data. Although covariance was comparable across waves, wave two seemed to have the objectively highest variability. Furthermore, the average slope estimate was negative (M = -0.267, SE = 0.027, $p < 0.001$), indicating a decrease in trust/communication over time.

Thus, the model was modified such that the change from the first to third wave was freely estimated, indicating a negative nonlinear trend (see Figure 7). This new model, however, had zero degrees of freedom, and inspection of the output revealed that the residual variance for the third wave was not significant, therefore it was constrained at zero, and a degree of freedom was gained. The new model values of the chi square statistic (0.82, 1 *df*, p = 0.37), AIC (6180.43), BIC (6219.12), RMSEA (0.00, 95%CI [0.00, 0.08]), CFI (1.00), TLI (1.00), and SRMR (0.01) suggest much better, and acceptable, model fit. Model results and standardized model estimates are reported in Tables 11 and 12, respectively. Model results revealed that while the average trust/communication intercept was 3.35 (SE = 0.044, $p < 0.001$), the scores changed on average by 0.57 (SE = 0.056, $p < 0.001$) from the first to third wave of data collection. Again, there were significant individual differences in both intercept (σ^2 = 1.16, SE = 0.09, $p < 0.001$) and slope (σ^2 = 1.27, SE = 0.14, $p < 0.001$), such that individuals with higher baseline scores displayed steeper change than individuals with a lower baseline score (b = 0.40, SE = 0.10, $p < 0.001$; see figure 4). Thus, this model indicates that on average, trust/communication is not stable, but rather decreased across adolescence. Similar to anger/alienation there were individual differences in both baseline scores and rates of change; individuals with higher baseline scores saw steeper changes than those with lower. In fact, those that had intercepts that exceeded the mean steeply decreased over time, however those that started below the mean displayed relatively little

change. Again, the significant residual variances (see Table 11) differences suggest that covariates are needed to further explain the trends in the data.

Delinquency. The final individual linear model run was on delinquency (n = 931). Again, there were seven data patterns (see table 13), with the highest frequency occurring in individuals with no missing data (n = 430). The estimated means indicate an increasing trend in delinquency over adolescence (see Table 14; see Figure 8), and the covariance (see Table 15) suggest that the most variability occurred at the third time point. Similar to anger/alienation and trust/communication, the strongest auto-correlation (see Table 16) occurred between the first and second waves, and the weakest between the first and third waves. The values of the chi square statistic (11.82, 1 *df*, $p < 0.001$), AIC (8447.07), BIC (8485.76), RMSEA (0.11, 95%CI [0.06, 0.17]), CFI (0.94), TLI (0.82), and SRMR (0.04) suggest poor model fit. As with trust communication, modification indices suggested removing all constraints from the intercepts and slopes, and the estimated/sample means suggest that a linear model was not appropriately estimating the data. Furthermore, the average slope estimate was positive ($M = 0.35$, $SE = 0.04$, $p < 0.001$), indicating an increase in delinquency over time.

Thus, the model was modified such that the change from the first to third wave was freely estimated, indicating a positive nonlinear trend (see Figure 9). This new model, however, had zero degrees of freedom, and inspection of the output revealed that the residual variance for the third wave was not significant, therefore it was constrained at zero, and a degree of freedom was gained. The new model values of the chi square statistic (0.09, 1 *df*, $p = 0.76$), AIC (8432.88), BIC (8471.57), RMSEA (0.00, 95%CI [0.00, 0.06]), CFI (1.00), TLI (1.01), and SRMR (0.003) suggest much better, and acceptable, model fit. Model results and standardized model estimates are reported in Tables 17 and 18, respectively. Model results indicate that while the average

intercept was 1.20 (*SE* = 0.05, $p < 0.001$), there was an average change of 0.84 (*SE* = 0.10, $p < 0.001$) from the first to third wave. Furthermore, there were individual differences in both intercept ($\sigma^2 = 1.56$, *SE* = 0.24, $p < 0.001$) and slope ($\sigma^2 = 5.15$, *SE* = 0.50, $p < 0.001$), however unlike anger/alienation and trust/communication, the differences in change over time were not significantly related to the baseline score. The significant residual variances, however, do still indicate that more predictors are needed in the model to explain the variance.

Dual Growth Models

Delinquency and anger/alienation. The first dual growth model consisted of delinquency and anger/alienation (n = 931). There were 19 data patterns in this model (see Table 19), with the highest frequency occurring in individuals with no missing data (n = 335). The mean estimates were comparable to the individual models (see Table 20), as were the covariances (see Table 21) and auto-correlations (see Table 22). The strongest cross-domain correlation was observed between the second wave of anger/alienation and the second wave of delinquency, and the weakest between the first wave of delinquency and the third wave of anger/alienation. The values of the chi square statistic (22.48, 7 *df*, $p < 0.01$), AIC (13681.85), BIC (13778.57), RMSEA (0.05), CFI (0.97), TLI (0.93), and SRMR (0.03) suggest that the model fit can be improved. Inspection of the modification indices revealed that the fit would be improved if the second wave of delinquency and anger/alienation were told to co-vary, and the results revealed that there was no significant relationship between the anger/alienation intercept and the delinquency slope, the delinquency intercept and the delinquency slope, or the delinquency intercept with the anger/alienation slope (see Table 23), indicating that the fourth and sixth hypotheses was not supported.

Thus, the second model allowed the second wave of delinquency and anger/alienation to co-vary, and fixed anger/alienation intercept and the delinquency slope, the delinquency intercept and the delinquency slope, and the delinquency intercept with the anger/alienation slope factor covariances to zero. The values of the chi square statistic (14.33, 9 *df*, $p = .11$), AIC (13670.70), BIC (13757.75), RMSEA (0.02), CFI (0.99), TLI (0.98), and SRMR (0.03) suggest a much better and acceptable model fit. Model results and standardized model estimates are reported in tables 23 and 24, respectively. Cross-domain factor covariances revealed interesting trends. First, the intercept and slope of anger/alienation were significantly related ($b = -0.16$, $SE = 0.05$, $p < .01$) as expected. Secondly, the intercept of anger/alienation and delinquency were significantly related ($b = 0.15$, $SE = 0.04$, $p < 0.001$), such that individuals with higher anger/alienation intercepts also displayed higher delinquency intercepts. Furthermore, the slopes of delinquency and anger/alienation were significantly related ($b = 0.15$, $SE = 0.05$, $p < 0.01$), such that as steepness of anger/alienation slopes increased, so too did the steepness of delinquency slopes. The significant relationship between the second wave of delinquency and anger/alienation ($b = 0.19$, $SE = 0.06$, $p < 0.01$) suggest that this may be a critical period during adolescence where attachment and delinquency become entwined. As with the individual models, the significant residual variances require further covariates to explain the variance, thus the final model includes covariates.

The third model (n = 735) revealed 13 data patterns (see Table 25), with the highest frequency of participants having no missing data on any trust/communication variables or covariates (n = 316). The means for all variables in this model are reported in Table 28, the co-variances in Table 26, and the correlations in Table 27. The values of the chi square statistic (51.36, 43 *df*, $p = .18$), AIC (11093.72), BIC (11489.31), RMSEA (0.02), CFI (0.99), TLI (0.97),

and SRMR (0.02) indicate excellent model fit. Model results and standardized model estimates are reported in tables 29 and 30, respectively. As reported in Table 29, child age (b = 0.01, SE = 0.002, $p < 0.01$), financial strain (b = 0.10, SE = .05, $p < 0.05$), parental illegal activities (b = -0.25, SE = 0.11, $p < 0.05$), mother-child anger/alienation (b = -0.37, SE = .05, $p < 0.001$), and father-child trust/communication (b = -0.08, SE = 0.03, $p < 0.05$) significantly predicted the anger/alienation intercept (see Figure 10). However, only child age (b = -0.003, SE = 0.002, $p < 0.05$), parental illegal activities (b = 0.19, SE = 0.09, $p < 0.05$), and mother-child anger/alienation (b = 0.17, SE = 0.03, $p < 0.001$) predicted change over time (see Figure 11). Thus, older children had more anger/alienation with their biological father, and anger/alienation intercepts seemed to increase with financial strain. In contrast, as parental illegal activity, mother-child anger/alienation, and father-child trust/communication increased, baseline feelings of anger/alienation towards the biological father seemed to decrease. Furthermore, as children got older and as parental monitoring increased, the change in anger/alienation became less steep. In contrast, as parental illegal activities, as well as mother-child anger/alienation, increased, the change in feelings of anger/alienation towards the biological father became steeper.

As for delinquency, child age (b = 0.01, SE = 0.003, $p < 0.001$), academic achievement (b = 0.067, SE = 0.03, $p < 0.05$), parental illegal activities (b = .53, SE = 0.20, $p < 0.01$), mother-child anger/alienation (b = -0.33, SE = 0.06, $p < 0.001$), parental monitoring (b = -3.45, SE = .53, $p < 0.001$), and mother race/ethnicity (b = -0.06, SE = 0.02, $p < 0.05$) significantly predicted delinquency intercepts (See Figure 12). However, only child age (b = -.015, SE = .007, $p < .05$), financial strain (b = -0.39, SE = 0.15, $p < 0.01$), and parental illegal activities (b = 0.90, SE = 0.45, $p < 0.05$) significantly predicted change in delinquency (see Figure 13). Thus, as child age, academic achievement, and parental illegal activities increased, so too did baseline scores of

delinquency. However, as mother-child anger/alienation and parental monitoring increased, baseline delinquency scores decreased. Furthermore, as child age and financial strain increased, the change in delinquency over time became less steep, whereas increase in parental illegal activities predicted a steeper change in delinquency over time. Of note, sex did significantly predict the anger/alienation intercept (b = 0.18, SE = 0.06, $p < 0.01$) such that girls had higher levels of anger/alienation than boys at baseline, providing partial support for hypothesis seven.

After the inclusion of these covariates, the slopes, intercepts and variances of anger/alienation and delinquency were the same as model two. The relationship between the anger/alienation and delinquency intercepts was no longer significant, meaning the covariates fully accounted for the variance in that relationship and that the first hypothesis was not supported. The relationship between anger/alienation intercept and slope remained significant (b = -0.13, SE = 0.05, $p < 0.05$), however the significance and estimates decreased, suggesting the covariates explained some of the variance. The relationship between the anger/alienation and delinquency slopes also remained significant and similar (b = 0.16, SE = 0.05, $p < 0.01$), indicating that the covariates do not appear to influence the relationship between the two. Finally, the relationship between the second wave of delinquency and anger/alienation remained significant (b = 0.18, SE = 0.05, $p < 0.001$), although the estimate decreased, suggesting that the covariates explain some, but not all of the variance between the two (See Figure 18). Thus, in the context of a larger ecological model of delinquency risk factors, individuals with higher baseline anger alienation scores display less change over time, individuals with steeper anger/alienation also display steeper changes in delinquency, and a critical period in the relationship between the two seems to occur between 11-16 years old. However, of note is the amount of variance explained in the latent variables from the final model. First, the third model explained 26%, 22%,

39%, and 7% of anger/alienation intercept, anger/alienation slope, delinquency intercept, and delinquency slope respectively. Furthermore, while trust communication was a significant predictor of anger/alienation intercept, it was not a significant predictor of delinquency intercept or slope.

Delinquency and trust/communication. The first dual growth model consisted of delinquency and trust/communication (n = 931). There were 19 data patterns in this model (see Table 31), with the highest frequency occurring in individuals with no missing data (n = 341). The mean estimates were comparable to the individual models (see Table 32), as were the covariance (see Table 33) and auto-correlations (see Table 34). The strongest cross-domain correlation was observed between the second wave of trust/communication and the second wave of delinquency, and the weakest between the third wave of delinquency and the second wave of trust/communication. The values of the chi square statistic (12.71, 7 *df*, $p = .08$), AIC (14601.01), BIC (14697.73), RMSEA (0.03), CFI (0.99), TLI (0.98), and SRMR (0.02) suggest excellent model fit. Model results and standardized model estimates are reported in Tables 35 and 36, respectively. The model results revealed that the means and variances of the growth factors for delinquency and trust/communication were comparable to the individual growth curves. The factor covariances revealed a significant relationship between the trust/communication intercept and slope ($b = 0.40$, $SE = 0.10$, $p < 0.001$) and the trust/communication intercept and delinquency intercept ($b = -0.28$, $SE = 0.06$, $p < 0.001$). This indicates that individuals who scored high in trust /communication displayed a steeper change from time one to time three than those who scored low, and that individuals with higher baseline trust/communication scores displayed lower baseline delinquency scores. However, covariances between trust/communication intercept and delinquency slope, delinquency intercept and delinquency

slope, delinquency intercept and trust/communication slope, and trust/communication and delinquency slopes were not significant. Thus, hypotheses three and five were not supported. As with the other models, the significant residual variances justify the inclusion of covariates.

Thus, the second model included covariates, as well as constrained the previously mentioned non-significant factor co-variances to zero. This model had 11 data patterns (see Table 37), with the highest frequency of participants having no missing data (n = 318). Means (see Table 38), covariances (see table 39), and correlations (see Table 40) were comparable to individual growth curves. The values of the chi square statistic (78.74, 45 *df*, $p < 0.01$), AIC (11524.76), BIC (11910.35), RMSEA (0.03), CFI (0.97), TLI (0.92), and SRMR (0.02) suggest questionable model fit. The chi square statistic rejected the model, however as discussed above, this may be due to sensitivity to large samples. Furthermore, the TLI statistic is not desirable, however as discussed above, it penalizes for overly complex models. Thus, it is likely that the addition of non-significant covariates produced the TLI penalty observed. However, the results of the RMSEA, CFI, and SRMR instill at least some confidence in the model. Model results and standardized model estimates are reported in tables 41 and 42, respectively. The model results revealed that the child's relationship to the caregiver ($b = 0.01$, $SE = 0.005$, $p < 0.05$), child age ($b = -0.01$, $SE = 0.002$, $p < 0.01$), father involvement ($b = 0.55$, $SE = 0.05$, $p < 0.001$), mother-child trust/communication ($b = 0.36$, $SE = 0.07$, $p < 0.001$), parental monitoring ($b = 0.98$, $SE = 0.41$, $p < 0.05$), father-child anger/alienation($b = -0.17$, $SE = 0.05$, $p < 0.01$), and maternal race ($b = 0.04$, $SE = 0.02$, $p < 0.05$) predicted intercept values of trust/communication (see Figure 14). However, only financial strain ($b = -0.19$, $SE = 0.08$, $p < 0.05$), mother-child trust/communication ($b = 0.34$, $SE = 0.10$, $p = 0.001$), and parental monitoring ($b = 1.58$, $SE = 0.62$, $p < 0.05$) predicted change in trust/communication (see Figure 15). The predictors for the

delinquency slope and intercept in this model were the same as model three for anger/alienation (see Figure 16 and 17). Thus, older children had lower baseline levels of trust/communication, and as father involvement, mother-child trust/communication, and parental monitoring increased, so too did baseline levels of trust/communication. However, higher levels of father-child anger/alienation predicted lower baseline levels of trust/communication. Furthermore, as financial strain increased, the rate of change in trust/communication became less steep, whereas increases in mother-child trust/communication and parental monitoring were associated with a steeper slope. Finally, child sex did appear to predict the trust/communication intercept (b = -0.33, SE = 0.08, $p < 0.001$), such that girls had lower baseline levels of trust/communication than boys, providing partial support for hypothesis seven.

After the addition of covariates (see Figure 19), the trust/communication intercept was 3.38 (SE = .05, $p < 0.001$) and delinquency intercept was 1.23 (SE = 0.06, $p < 0.001$). Furthermore, the average trust communication slope (b = 0.56, SE = 0.06, $p < 0.001$) and delinquency slope (b = 0.93, SE = 0.11, $p < 0.001$) remained significant, as did the variances for each. This indicates that the covariates did not fully account for the individual differences in intercepts and change. However, the covariance between trust/communication and delinquency intercepts was no longer significant after the addition of the covariates, indicating that the covariates fully explained the relationship. Thus, hypothesis two was not supported. The relationship between trust/communication intercept and slope, however, did remain significant (b = 0.20, SE = 0.09, $p < 0.05$). The final model explained 44%, 17%, 40%, and 7% of trust/communication intercept, trust/communication slope, delinquency intercept, and delinquency slope respectively. Furthermore, despite the findings of the anger/alienation and delinquency dual growth model, the inclusion of anger/alienation baseline measure as a predictor

did not seem to explain any additional variance in delinquency, although it did significantly predict trust/communication.

Discussion

The current study only provided support for hypotheses six and seven. After the addition of covariates into the model, there was no significant relationship between baseline measures of delinquency and attachment, thus hypotheses one and two were not supported. Furthermore, after the inclusion of covariates, neither the anger/alienation intercept, nor the trust/communication intercept significantly predicted delinquency trajectories, thus hypotheses three and four were not supported. While the trust/communication trajectories had no significand relationship with the delinquency trajectories, the anger/alienation trajectories did have a significant relationship with the delinquency trajectories, providing support for hypothesis six but not hypothesis five. Finally, while gender did significantly predict attachment intercepts, it did not significantly predict delinquency intercepts, indicating that hypothesis seven was only partially supported. Interestingly, the relationship between gender and attachment in the current study contradicted previous research. Specifically, while previous research has indicated that girls generally display more secure paternal attachments than boys (Allen et al., 2003), girls in the current study displayed lower levels of trust and communication, as well as higher levels of anger and alienation than boys.

The results provide minimal support for GST. As indicated in the introduction, in theory both threats to a positive paternal relationship, as well as increases in a negative paternal relationship would be strains that would result in delinquent behavior (Agnew, 1992; Hoeve et al., 2009; Vivona, 2000). Trust/communication had no significant relationship with delinquency, either at baseline as over time. Thus, it does not appear that decreases in feelings of trust and

communication between an adolescent and their non-resident father, particularly in high-minority, low income communities. Furthermore, while individuals who were changing in feelings of anger and alienation were also changing in levels of delinquency, the relationship is not clear enough to indicate support for GST. As mentioned in the results, while the individual trajectories of anger/alienation were dependent on the intercept value and could be interpreted, the delinquency trajectories were not and could not. Therefore, although it is clear that individuals who were changing in feelings of anger and alienation were also changing in levels of delinquency, it is unclear whether individuals increasing in anger/alienation were also increasing in delinquency, or vice a versa.

Finally, the current study also revealed that adolescents in low income, high-minority communities appear to display a unique set of attachment and delinquency patterns. While on average feelings of anger/alienation did not change, individuals who had higher starting levels anger/alienation seemed to decrease towards middle levels of anger/alienation at the end of adolescence, while those who began with lower levels of anger/alienation increased towards the middle. Furthermore, on average, levels of trust/communication decreased over time in the sample. Individuals who began with higher levels of trust/communication rapidly decreased after the second wave of data collection, while individuals who began with lower levels appeared to remain relatively stable. These patterns appear to be unique and unobserved in previous literature (Higgens et al., 2010). Delinquency increased during adolescence as well. The current sample seemed to generally increase and peak at the end of adolescence/young adulthood, however the specific individual trajectories could not be estimated with the parameters in the study. Therefore, whether the trends were more similar to the child-persistent or adolescent onset

described by Moffit and Caspi (2001), to the trends observed by the Pittsburgh Youth Study (1988), or to the trends observed by Higgens et al., (2010) are unknown.

Limitations

There were multiple limitations to the current study. First, due to the sampling strategy in which multiple individual were sampled from the same household, and multiple households from the same neighborhoods, independence of errors could not be assumed. Although SEM does incorporate measurement error into the model, the bias was not fully addressed. Furthermore, while a particular strength of SEM is the ability to model measurement error, the measurement model was not specified, thus error was not fully accounted for. Secondly, SEM requires large sample sizes to produce accurate estimates, especially with complex models that have many parameter estimates. In order to meet this assumption, robust maximum likelihood estimation was used to estimate large amounts of missing data across the three waves of data collection. The trade-off to meeting this sample requirement was that a considerable portion of the data (particularly in the third wave) was estimated, thus the results may be a more perfect fit to the model than is actually reflected in the population. Future studies should aim to investigate samples with minimal missing data, or use statistical analyses that do not require large sample sizes. Thirdly, as all parameters were estimated, there was naturally variation in the same parameter estimates across models. While these were generally ignorable, there were instances in which standardized parameter estimates were significant when unstandardized estimates were not. In the first round of model building, the researcher did not request standardized parameter estimates, thus in order to obtain these each model had to be re-estimated. This may explain variability in estimates, increase error rates, and decreases confidence in some of the varying parameter estimates. Fourthly, in the interest of retaining data, there were inherent biases in the

data cleaning process. Primarily, as described in the data cleaning section, outliers were assessed through standardized values, where the values are already inherently biased by the presence of outliers. This may have served to over-estimate the nature of relationships in the model.

Fifth, there were only three time points of data collection, and they were not equally spaced. Although the model used does not require the points to be equally spaced, it makes interpretability difficult as change occurs over varying timer intervals. Thus, it became difficult to make inferences about critical periods in adolescence for delinquency and attachment. Furthermore, as indicated in the results, trust/communication and delinquency did not display linear rates of change. Normally this would be addressed by including a quadratic term into the model, however that was not a possibility with only three time points. This was at least partly addressed by allowing the middle wave of data collection to be freely estimated, however does not produce the same sensitivity to detect effects and changes as a quadratic term and more points of data collection would have. Future research should refrain from investigating change in these constructs in samples with less than four time points. Sixth, as noted in the results, the second dual growth model for trust/communication and delinquency did not have unanimous indicators of good model fit among the fit indices. It is likely that this was due to a large amount of non-significant predictors in the model, as the TLI fit index penalized models for non-parsimonious structures, although the rejection of the model from the chi-square index in this model and not in the third dual growth model for anger/alienation and delinquency suggests the model simply was not an acceptable fit for the data. This indicates that parameter estimates in the model may not be reliable and may also explain why the trends in trust/communication and delinquency observed by Yoder et al., (2016) were not observed in the current study. Future

research should use results from the current study to include a more parsimonious set of predictors into the model.

Seventh, due to limitations in both time and ability, only baseline measures of covariates were included in the models. Due to the first and third waves of the main outcome variables consistently displaying the weakest correlations, the lack of multiple waves of the predictors may explain why there was a large and significant amount of variance left to be explained in the model, why later waves of the main outcome variables seemed to have larger amounts of variance left to be explained than earlier waves, and why the slopes had the least amount of variance explained in each model. Related to this, many of the covariates did not significantly predict either the intercepts or slopes of the outcome variables, which indicates two possibilities. Firstly, it may be that attachment and delinquency are affected by a relatively narrow, ecological model that primarily includes interpersonal connections (i.e., variables related to maternal and paternal influences). However, it may also indicate that there are simply other predictors not included in the model that explain more variance. It is difficult to ascertain which reality is more likely without the inclusion of multiple waves of predictors. Future research should include time-varying covariates to ensure that variance in growth is accurately captured by environmental factors.

Lastly, the sample and model used in the study differed greatly from Yoder et al., (2016) The current study was more restrictive in that any participant with a dead or residential father at any time point was excluded, however less restrictive in that participants were only excluded if they had less than one wave of data for the outcome variables.

Strengths

Despite the numerous limitations, there were also numerous strengths to the study and attempts to minimize bias. Firstly, the model allowed for the assessment of average and individual change. Had only average change been assessed, the relationship between delinquency and anger/alienation slopes would not have been discerned. Thus, in this sample not only does attachment appear to fluctuate for certain people, but there are unique individual trajectories for both anger/alienation and trust/communication. Although the relationship between attachment and delinquency is questionable, future researchers studying attachment in the current sample should keep this dynamic quality in mind. It also provided an initial attempt to assess critical periods in which attachment and delinquency are related, which appears to occur in the middle of adolescence. Furthermore, while Yoder et al., (2016) only tracked delinquency trajectories, the current study tracked delinquency trajectories and attachment trajectories. This seemed to provide novel information in relation to anger/alienation and delinquency, in that baseline measures of anger/alienation did not predict delinquency trajectories (consistent with Yoder et al., 2016), however individual trajectories in the two variables did co-vary. This suggests that the two are linked and should be studied in conjunction. Thus, cross sectional relationships between attachment and delinquency may not necessarily reflect the full range of essential information, and that tracking change over time may provide increased sensitivity to discerning the nature of the relationships.

Secondly, the current study assessed the relationship between attachment and delinquency in an ecological setting of risk and protective factors (for full list of relationships, see Table 44). This provided a clearer view of what environmental factors (measured at baseline) actually seem to affect delinquency and attachment trajectories in low income communities. It appears that interpersonal variables relating to the individual's parents are particularly important

predictors. This poses numerous potential implications for applied work. For example, community interventions aimed at reducing delinquency would likely be more effective if they focused on the adolescent's relationship quality with the primary caregiver, the ability of the parent to monitor their child, the illegal behavior being committed by the parent. and the financial strain of the family. This is primarily based on the findings that attachment did not seem to exert many effects above and beyond these covariates.

Lastly, the conservative restriction of participants with dead or residential fathers ensured that the results applied directly to the population of interest, and the liberal inclusion of participants with one or more waves of data for the outcome measures maximized the sample and parameter estimates. Despite the non-normality of the delinquency variables, the robustness of the estimator should have produced reliable parameter estimates.

In sum, attachment between adolescents and their non-resident fathers in low income communities is not a particularly influential predictor of delinquency above and beyond the effect of other ecological risk factors. Despite this, low-income, minority adolescents do appear to display unique attachment trajectories, and this is a valuable addition to future studies on attachment in similar samples. Furthermore, although attachment does not appear to be a particularly influential risk factor for delinquency, attachment, monitoring, and behavior of the primary caregiver is. Thus, interventions targeting delinquency in similar samples should consider the adolescent's immediate environment.

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Appendix A

Neighborhood Problems Scale

For the next questions, please tell me how much of a problem each of the following is in your neighborhood.

1. How much of a problem is high unemployment in your neighborhood?
2. How much of a problem are abandoned houses in your neighborhood?
3. How much of a problem are burglaries and thefts in your neighborhood?
4. How much of a problem are assaults and muggings in your neighborhood?
5. How much of a problem are gangs in your neighborhood?
6. In your neighborhood, how much of a problem is drug dealing in the open?
7. How much of a problem are unsupervised children in your neighborhood?
8. How much of a problem is teenage pregnancy in your neighborhood?
9. In your neighborhood, how much of a problem are unsafe streets during the day?
10. How much of a problem is police not being available in your neighborhood?
11. How much of a problem are children in the neighborhood that you don't want your [child/children] to associate with?

Appendix B

Financial Strain Scale

1. How often does your household have to borrow money to pay bills?
2. How often does your household put off buying something you need because you don't have money?
3. How often can your household afford to do things just for fun like going to the movies or eating out?
4. During the past 12 months, how much difficulty did your household have paying bills?
5. Does your household have enough money to afford the kind of housing, food and clothing you feel you should have?

Appendix C

Mother-Child attachment scale

The following statements ask about your feelings about your [RELATIVE] or the person who is most like a mother (or father) to you. For each item, please tell me how true that statement is for you.

1. My [RELATIVE] accepts me as I am
2. I like to get my [RELATIVE]'s point of view on things I'm concerned about.
3. Talking over my problems with my [RELATIVE] makes me feel ashamed or foolish.
4. My [RELATIVE] expects too much from me
5. I get upset a lot more than my [RELATIVE] knows about.
6. When we discuss things, my [RELATIVE] cares about my point of view
7. My [RELATIVE] has her own problems, so I don't bother her with mine.
8. I tell my [RELATIVE] about my problems and troubles.
9. I feel angry with my [RELATIVE
10. I get a lot of attention from my [RELATIVE]
11. I trust my [RELATIVE].
12. My [RELATIVE] doesn't understand what I'm going through these days.

Appendix D

Parental Monitoring Scale

The following questions ask about the rules your [RELATIVE] sets and the decisions she makes with you.

1. How much does your [RELATIVE] know about who your friends are?
2. How much does your [RELATIVE] know about where you are most afternoons after school?
3. How much does your [RELATIVE] know about where you go at night?
4. How much does your [RELATIVE] know about what you do with your free time?
5. How much does your [RELATIVE] know about how you spend your money?

Appendix E

Delinquency Scale

These next questions are about things you may or may not have done in the past 12 months.

1. In the past 12 months, how often have you smoked cigarettes or used chewing tobacco?
2. In the past 12 months, how often have you stolen something from a store or another person?
3. In the past 12 months, how often have you gotten in trouble with the police?
4. In the past 12 months, how often have you carried a weapon?
5. In the past 12 months, how often have you used a phony ID?
6. In the past 12 months, how often have you gotten drunk?
7. In the past 12 months, how often have you run away from home?
8. In the past 12 months, how often have you purposely damaged or destroyed property that did not belong to you?
9. In the past 12 months, how often have you gotten into a physical fight?
10. In the past 12 months, how often have you attacked someone with the idea of seriously hurting or killing them?
11. In the past 12 months, how often have you smoked marijuana or hashish
12. In the past 12 months, how often have you used hard drugs such as heroin, cocaine, or LSD?

Table 1

Data patterns for Anger/Alienation growth model

	1 (n = 335)	***2 (n = 211)***	***3 (n = 92)***	***4 (n = 126)***	***5 (n = 53)***	***6 (n = 71)***	***7 (n = 43)***
Anger/Alienation Wave 1	x	x	x	x			
Anger/Alienation Wave 2	x	x			x	x	
Anger/Alienation Wave 3	x		x		x		x

Note. "x" denotes presence of data

Table 2

Variable characteristics for Anger/Alienation growth model

	n	***M (SD)***	***Skewness (Kurtosis)***
Anger/Alienation Wave 1	764	2.43 (.93)	.45 (-.25)
Anger/Alienation Wave 2	670	2.47 (1.00)	.40 (-.53)
Anger/Alienation Wave 3	523	2.40 (1.00)	.35 (-.72)

Table 3
Covariance matrix for Anger/Alienation growth model

	1	2	3
Anger/Alienation Wave 1	0.86		
Anger/Alienation Wave 2	0.43	1.01	
Anger/Alienation Wave 3	0.25	0.33	1.00

Table 4
Correlation matrix for Anger/Alienation growth model

	1	2	3
Anger/Alienation Wave 1	1		
Anger/Alienation Wave 2	0.46	1	
Anger/Alienation Wave 3	0.25	0.33	1

Table 5
Model results for Anger/Alienation growth model

	M (SE)	***Variance (SE)***	***Residual Variance (SE)***	***b (SE)***
Anger/Alienation Wave 1			0.25 (0.07)**	
Anger/Alienation Wave 2			0.62 (0.04)***	
Anger/Alienation Wave 3			0.58 (0.08)***	
Anger/Alienation Intercept	2.43 (0.03)***	0.60 (0.08)***		
Anger/Alienation Slope	-0.004 (0.02)	0.13 (0.04)**		
Anger/Alienation Intercept-Slope Covariance				-.17 (.05)**

Note. *p, .05, **$p < .01$, ***$p < .001$

Table 6

Standardized model results for Anger/Alienation growth model

Parameter	*M (SE)*	*Residual Variance (SE)*	*β(SE)*	R^2
Anger/Alienation Wave 1		.29(.09)**		.71 (.09)***
Anger/Alienation Wave 2		.62 (.03)***		.38 (.03)***
Anger/Alienation Wave 3		.58 (.08)***		.41 (.08)***
Anger/Alienation Intercept				
Anger/Alienation Slope	3.12 (0.21)***			
Anger/Alienation Intercept-Slope Covariance	-0.01 (0.07)		-0.63 (0.08)***	

Note. *p, .05, **p < .01, ***p< .001

Table 7

Data patterns for Trust/Communication growth models 1 and 2

	1 (n = 341)	*2 (n = 211)*	*3 (n = 94)*	*4 (n = 126)*	*5 (n = 52)*	*6 (n = 65)*	*7 (n = 42)*
Trust/Communication Wave 1	x	x	x	x			
Trust/Communication Wave 2	x	x			x	x	
Trust/Communication Wave 3	x		x		x		x

Note. "x" denotes presence of data

Table 8

Variable characteristics for Trust/Communication growth models 1 and 2

		Model 1		Model 2	
	n	***M (SD)***	***Skewness (Kurtosis)***	***M (SD)***	***Skewness (Kurtosis)***
Trust/Communication Wave 1	772	3.36 (1.30)	-0.47 (-1.04)	3.36 (1.30)	-0.47 (-1.04)
Trust/Communication Wave 2	669	3.22 (1.30)	-0.35 (-1.16)	3.22 (1.30)	-0.35 (-1.16)
Trust/Communication Wave 3	529	2.79 (1.27)	0.09(-1.20)	2.79 (1.27)	0.09(-1.20)

Table 9

Covariance matrix for Trust/Communication growth models 1 and 2

	1	2	3
1. Trust/Communication Wave 1	1.69		
2. Trust/Communication Wave 2	0.63	1.72	
3. Trust/Communication Wave 3	0.47	0.91	1.63

Table 10

Correlation matrix for Trust/Communication growth models 1 and 2

	1	**2**	**3**
Trust/Communication Wave 1	1		
Trust/Communication Wave 2	0.63	1	
Trust/Communication Wave 3	0.47	0.55	1

Table 11

Model results for Trust/Communication growth models 1 and 2

Parameter	*M (SE)*	*Variance (SE)*	*Residual Variance (SE)*	*b (SE)*
Model 1				
Trust/Communication Wave 1			0.32 (0.12)**	
Trust/Communication Wave 2			0.74 (0.05)***	
Trust/Communication Wave 3			0.57 (0.11)	
Trust/Communication Intercept	3.38 (0.04)***	1.37 (0.13)***		
Trust/Communication Slope	-0.27 (0.03)***	0.22 (0.06)**		
Trust/Communication Intercept-Slope Covariance				-0.30 (0.08)***
Model 2				
Trust/Communication Wave 1			0.52 (0.08)***	
Trust/Communication Wave 2			0.69 (0.05)***	
Trust/Communication Intercept	3.35 (0.04)***	1.16 (0.09)***		
Trust/Communication Slope	0.57 (0.03)***	1.27 (0.14)***		
Trust/Communication Slope Loading (Wave 2)				-.21 (.05)***
Trust/Communication Intercept-Slope Covariance				.4 (.10)***

*Note. *p, .05, **p* < .01, ****p*< .001

Table 12

Standardized model results for Trust/Communication growth models 1 and 2

Parameter	*M (SE)*	*Residual Variance (SE)*	*β (SE)*	*R²*
Model 1				
Trust/Communication Wave 1		.19 (.07)**		.81 (.07)***
Trust/Communication Wave 2		.43 (.03)***		.57 (.03)***
Trust/Communication Wave 3		.35 (.07)***		.65 (.07)***
Trust/Communication Intercept				
Trust/Communication Slope				
Trust/Communication Intercept-Slope Covariance			-.55 (.07)***	
Model 2				
Trust/Communication Wave 1		.31 (.05)***		.69 (.05)***
Trust/Communication Wave 2		.34 (.03)***		.60 (.03)***
Trust/Communication Intercept	3.11 (.13)***			
Trust/Communication Slope	.50 (.05)***			
Trust/Communication Slope Loading (Wave 2)			-.18 (.05)***	
Trust/Communication Intercept-Slope Covariance			.33 (.06)***	

Note. *p, .05, **p < .01, ***p< .001

Table 13

Data patterns for Delinquency growth models 1 and 2

	1 (n = 430)	***2 (n = 209)***	***3 (n = 91)***	***4 (n = 92)***	***5 (n = 47)***	***6 (n = 35)***	***7 (n = 27)***
Delinquency Wave 1	x	x	x	x			
Delinquency Wave 2	x	x			x	x	
Delinquency Wave 3	x		x		x		x

Note. "x" denotes presence of data

Table 14

Variable characteristics for Delinquency growth models 1 and 2

		Model 1		Model 2	
	n	***M (SD)***	***Skewness (Kurtosis)***	***M (SD)***	***Skewness (Kurtosis)***
Delinquency Wave 1	772	1.21 (1.52)	1.72(3.52)	1.21 (1.52)	1.72(3.52)
Delinquency Wave 2	669	1.38 (1.88)	2.4 (4.86)	1.38 (1.88)	2.4 (4.86)
Delinquency Wave 3	529	2.04 (2.40)	1.35(1.38)	2.04 (2.40)	1.35(1.38)

Table 15

Covariance matrix for Delinquency growth models 1 and 2

	1	**2**	**3**
Delinquency Wave 1	2.32		
Delinquency Wave 2	1.45	3.63	
Delinquency Wave 3	1.07	2.12	5.74

Table 16

Correlation matrix for Delinquency growth models 1 and 2

	1	**2**	**3**
Delinquency Wave 1	1		
Delinquency Wave 2	0.5	1	
Delinquency Wave 3	0.29	0.46	1

Table 17

Model results for Delinquency growth models 1 and 2

Parameter	*M (SE)*	*Variance (SE)*	*Residual Variance (SE)*	*b (SE)*
Model 1				
Delinquency Wave 1			.46(.28)	
Delinquency Wave 2			1.89 (.23)***	
Delinquency Wave 3			2.64 (0.52)***	
Delinquency Intercept	1.19 (0.05)***	1.86 (0.34)***		
Delinquency Slope	.35 (0.04)***	0.71 (0.18)***		
Delinquency Intercept-Slope Covariance				-.40 (0.2)*
Model 2				
Delinquency Wave 1			.76 (.19)***	
Delinquency Wave 2			2.02 (.24)***	
Delinquency Intercept	1.20 (0.05)***	1.56 (0.24)***		
Delinquency Slope	.84 (0.10)***	5.15 (0.50)***		
Delinquency Slope Loading (Wave 2)				-.48 (0.26)***
Delinquency Intercept-Slope Covariance				.22 (.04)***

Note. *p, .05, **p < .01, ***p< .001

Table 18

Standardized model results for Delinquency growth models 1 and 2

Parameter	*M (SE)*	*Residual Variance (SE)*	*β (SE)*	*R²*
Model 1				
Delinquency Wave 1		.20 (.12)***		.80 (.12)***
Delinquency Wave 2		.51 (.04)***		.48 (.04)***
Delinquency Wave 3		.46 (.08)		.54 (.08)***
Delinquency Intercept	.87 (.07)***			
Delinquency Slope	.41 (.07)***			
Delinquency Intercept-Slope Covariance			-.35 (.11)**	
Model 2				
Delinquency Wave 1		.33 (.08)***		.67 (.08)***
Delinquency Wave 2		.56 (.04)***		.44 (.04)***
Delinquency Intercept	.96 (.06)***			
Delinquency Slope	.37 (.04)***			
Delinquency Slope Loading (Wave 2)			.26 (.05)***	
Delinquency Intercept-Slope Covariance			-.17 (.08)*	

Note. *p, .05, **p < .01, ***p< .001

Table 19

Data Patterns for Anger/Alienation and Delinquency dual growth models 1 and 2

	1 (n = 335)	*2 (n = 32)*	*3 (n = 179)*	*4 n = 22)*	*5 (n = 70)*	*6 (n = 7)*	*7 (n = 12)*	*8 (n = 15)*	*9 (n = 92)*	*10 (n = 21)*	*11 (n = 32)*	*12 (n = 8)*	*13 (n = 18)*	*14 (n = 10)*	*15 (n = 35)*	*16 (n = 5)*	*17 (n = 6)*	*18 (n = 5)*	*19 (n = 27)*
Anger/Alienation Wave 1	x	x	x	x	x	x	x	x	x										
Anger/Alienation Wave 2	x	x	x							x	x	x	x	x	x				
Anger/Alienation Wave 3	x			x	x					x	x					x	x	x	x
Delinquency Wave 1	x	x	x	x	x	x	x	x	x	x		x	x			x	x		
Delinquency Wave 2	x	x	x	x		x	x			x	x	x	x	x	x	x		x	
Delinquency Wave 3	x	x		x	x	x		x		x	x	x		x		x	x	x	x

Note. "x" denotes presence of data

Table 20

Variable characteristics for Anger/Alienation and Delinquency dual growth models 1 and 2

		Model 1		Model 2	
	n	***M (SD)***	***Skewness (kurtosis)***	***M (SD)***	***Skewness (kurtosis)***
Anger/Alienation Wave 1	764	2.42 (0.93)	.45(-0.25)	2.42 (0.93)	.45(-0.25)
Anger/Alienation Wave 2	670	2.47 (1.00)	.37(-0.53)	2.47 (1.00)	.37(-0.53)
Anger/Alienation Wave 3	523	2.40 (1.00)	.35(-0.72)	2.40 (1.00)	.35(-0.72)
Delinquency Wave 1	822	1.21 (1.52)	1.72(3.52)	1.21 (1.52)	1.72(3.52)
Delinquency Wave 2	721	1.37 (1.88)	2.4 (4.86)	1.37 (1.88)	2.4 (4.86)
Delinquency Wave 3	595	2.40 (2.40)	1.35(1.38)	2.40 (2.40)	1.35(1.38)

Table 21

Covariance matrix for Anger/Alienation and Delinquency dual growth models 1 and 2

	1	2	3	4	5	6
Anger/Alienation Wave 1	0.86					
Anger/Alienation Wave 2	0.43	1.01				
Anger/Alienation Wave 3	0.25	0.34	1.00			
Delinquency Wave 1	0.13	0.22	0.03	2.32		
Delinquency Wave 2	0.20	0.44	0.22	1.46	3.63	
Delinquency Wave 3	0.08	0.33	0.37	1.08	2.13	5.74

Table 22

Correlation matrix for Anger/Alienation and Delinquency dual growth models 1 and 2

	1	2	3	4	5	6
Anger/Alienation Wave 1	1.00					
Anger/Alienation Wave 2	0.46	1.00				
Anger/Alienation Wave 3	0.27	0.34	1.00			
Delinquency Wave 1	0.09	0.14	0.02	1.00		
Delinquency Wave 2	0.11	0.23	0.12	0.50	1.00	
Delinquency Wave 3	0.04	0.14	0.16	0.30	0.47	1

Table 23

Model results for Anger/Alienation and Delinquency dual growth models 1 and 2

Parameter	M (SE)	Variance (SE)	Residual Variance (SE)	b (SE)
Model 1				
Anger/Alienation Wave 1			0.28(0.08)***	
Anger/Alienation Wave 2			0.61(0.04)***	
Anger/Alienation Wave 3			0.6(0.09)***	
Delinquency Wave 1			0.8(0.13) ***	
Delinquency Wave 2			1.99(0.24)***	
Delinquency Wave 3				
Anger/Alienation Intercept	2.43(0.03)***	0.59 (0.08)***		
Anger/Alienation Slope	-0.00(0.02)	0.12(0.04)**		
Delinquency Intercept	1.20(0.05)***	1.53 (0.24)***		
Delinquency Slope	0.84(0.2)***	5.11 (0.49)***		
Factor Covariances				
Anger/Alienationv Intercept with Slope				-0.16(0.05)**
Anger/Alienation Intercept with Delinquency Intercept				0.17 (0.05)***
Anger/Alienation Intercept with Delinquency Slope				-0.06(0.09)
Delinquency Intercept with Delinquency Slope				-0.44(0.26)
Delinquency Intercept with Anger/Alienation Slope				-0.01(0.04)
Delinquency Slope with Anger/Alienation Slope				0.17(0.06)**
Model 2				
Anger/Alienation Wave 1			0.28 (0.08)***	
Anger/Alienation Wave 2			0.62 (0.04)***	
Anger/Alienation Wave 3			0.61(0.08)***	
Delinquency Wave 1			0.97 (0.13) ***	
Delinquency Wave 2			2.01 (0.24)***	
Delinquency Wave 3			-	
Anger/Alienation Intercept	2.43(0.03)***	0.58(0.08)***		
Anger/Alienation Slope	-0.00(0.02)	0.12 (0.04)**		
Delinquency Intercept	1.21(0.05)***	1.35(0.24)***		
Delinquency Slope	0.85 (0.2)***	4.68(0.49)***		
Delinquency Slope Loading (Wave 2)				0.18(0.04)***
Factor Covariances				
Delinquency (wave 2) with Anger/Alienation (wave 2)				.19 (.06)**
Anger/Alienation Intercept with Slope				-0.16 (0.05)**
Anger/Alienation Intercept with Delinquency Intercept				0.15(0.04)***
Anger/Alienation Intercept with Delinquency Slope				
Delinquency Intercept with Delinquency Slope				
Delinquency Intercept with Anger/Alienation Slope				
Delinquency Slope with Anger/Alienation Slope				0.15 (0.05)**

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 24

Standardized model results for Anger/Alienation and Delinquency dual growth models 1 and 2

Parameter	M (SE)	Residual Variance (SE)	B(SE)	R²
Model 1				
Anger/Alienation Wave 1		.32 (.03)***		.68 (.03)***
Anger/Alienation Wave 2		.62 (.03)***		.38 (.03)***
Anger/Alienation Wave 3		.59 (.08)***		.40 (.08)***
Delinquency Wave 1		.34 (.08)***		.66 (.08)***
Delinquency Wave 2		.56 (.04)***		.44 (.04)***
Delinquency Wave 3				
Anger/Alienation Intercept	3.18 (.23)***			
Anger/Alienation Slope	-.01 (.07)			
Delinquency Intercept	.37 (.07)***			
Delinquency Slope	.37 (.04)***			
Factor Covariances				
Anger/Alienation Intercept with Slope			-.62(.09)***	
Anger/Alienation Intercept with Delinquency Intercept			.18 (.05)**	
Anger/Alienation Intercept with Delinquency Slope			-.03 (.08)	
Delinquency Intercept with Delinquency Slope			-.16 (.08)	
Delinquency Intercept with Anger/Alienation Slope			-.02 (.08)	
Delinquency Slope with Anger/Alienation Slope			.22 (.08)**	
Model 2				
Anger/Alienation Wave 1		.33 (.03)***		.67 (.03)***
Anger/Alienation Wave 2		.62 (.03)***		.38 (.03)***
Anger/Alienation Wave 3		.60 (.08)***		.40 (.08)***
Delinquency Wave 1		.42 (.05)***		.58 (.05)***
Delinquency Wave 2		.57 (.04)***		.43 (.04)***
Delinquency Wave 3		-		-
Anger/Alienation Intercept	3.20 (.23)***			
Anger/Alienation Slope	-.001 (.07)			
Delinquency Intercept	1.04 (.06)***			
Delinquency Slope	.39 (.04)***			
Delinquency Slope Loading (Wave 2)				
Factor Covariances				
Delinquency (wave 2) with Anger/Alienation (wave 2)			.17 (.05)**	
Anger/Alienation Intercept with Slope			-.61 (.09)***	
Anger/Alienation Intercept with Delinquency Intercept			.17 (.05)***	
Anger/Alienation Intercept with Delinquency Slope			-	
Delinquency Intercept with Delinquency Slope			-	
Delinquency Intercept with Anger/Alienation Slope			-	
Delinquency Slope with Anger/Alienation Slope			.201 (.07)**	

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 25

Data Patterns for Anger/Alienation and Delinquency dual growth model 3

	1 (n = 316)	*2 (n = 31)*	*3 (n = 169)*	*4 (n = 22)*	*'n = 6*	*(n = (7 (n = 12)*	*8 (n = 14)*	*9 (n = 89)*	*10 (n = 6)*	*11 (n = 1*	*12 (n = 2)*	*13 (n = 1)*
Anger/Alienation Wave 1	x	x	x	x	x	x	x	x	x			
Anger/Alienation Wave 2	x	x	x							x	x	x	
Anger/Alienation Wave 3	x			x	x					x			x
Delinquency Wave 1	x	x	x	x	x	x	x	x	x	x	x	x	x
Delinquency Wave 2	x	x	x	x		x	x			x	x	x	
Delinquency Wave 3	x	x		x	x	x		x		x	x		x
Focal child: sex	x	x	x	x	x	x	x	x	x	x	x	x	x
Caregiver: age	x	x	x	x	x	x	x	x	x	x	x	x	x
Focal Child Relationship to Primary Caregiver	x	x	x	x	x	x	x	x	x	x	x	x	x
Adult respondent's current marital/cohabitation status	x	x	x	x	x	x	x	x	x	x	x	x	x
Child's age in months	x	x	x	x	x	x	x	x	x	x	x	x	x
Focal Child's grades on last report card	x	x	x	x	x	x	x	x	x	x	x	x	x
Neighborhood problems	x	x	x	x	x	x	x	x	x	x	x	x	x
Harsh Parenting Score	x	x	x	x	x	x	x	x	x	x	x	x	x
Presence of Substitute Father Figure	x	x	x	x	x	x	x	x	x	x	x	x	x
Father involvement	x	x	x	x	x	x	x	x	x	x	x	x	x
Financial Strain	x	x	x	x	x	x	x	x	x	x	x	x	x
Parental Illegal activities	x	x	x	x	x	x	x	x	x	x	x	x	x
Mother-Child Trust/Communication	x	x	x	x	x	x	x	x	x	x	x	x	x
Mother-Child Anger/Alienation	x	x	x	x	x	x	x	x	x	x	x	x	x
Parental Monitoring	x	x	x	x	x	x	x	x	x	x	x	x	x
Father-Child Trust/Communication	x	x	x	x	x	x	x	x	x	x	x	x	x
Maternal Race	x	x	x	x	x	x	x	x	x	x	x	x	x

Note. "x" denotes presence of data

Table 26

Covariance matrix for Anger/Alienation and Delinquency dual growth model 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.Anger/Alienation Wave 1	0.87																						
2.Anger/Alienation Wave 2	0.45	1.02																					
3.Anger/Alienation Wave 3	0.25	0.37	1.06																				
4.Delinquency Wave 1	0.14	0.19	0.12	2.36																			
5.Delinquency Wave 2	0.23	0.46	0.39	1.40	3.57																		
6.Delinquency Wave 3	0.07	0.28	0.50	1.19	2.03	5.95																	
7.Focal child: sex	0.06	0.08	0.06	-0.08	-0.02	-0.19	0.3																
8.Caregiver: age	0.00	0.06	-0.39	0.11	1.42	0.80	0.1	63.03															
9.Focal Child Relationship to Primary Caregiver	-0.25	-0.49	-0.92	0.64	0.83	0.22	0.1	34.46	80.3														
10.Adult respondent's current marital/cohabitation status	0.01	-0.05	-0.08	0.01	0.00	-0.10	0.0	-0.08	-0.8	2.25													
11.Child's age in months	2.30	2.43	0.13	6.10	6.50	2.53	0.5	26.08	4.8	1.20	302.50												
12.Focal Child's grades on last report card	0.06	0.13	-0.02	0.50	0.61	0.72	-0.1	0.55	0.0	-0.06	5.90	3.48											
13.Neighborhood problems	0.42	0.51	0.49	0.25	0.79	0.35	0.1	-3.09	-0.2	0.26	0.99	0.92	35.99										
14.Harsh Parenting Score	-0.01	0.01	-0.08	-0.02	0.05	0.08	0.0	-0.44	0.2	-0.07	-1.75	0.01	0.41	1.22									
15.Presence of Substitute Father Figure	-0.01	-0.04	0.01	-0.05	-0.05	-0.03	0.0	0.45	-0.3	0.01	-0.08	0.01	-0.09	-0.03	0.24								
16.Father involvement	-0.04	-0.08	0.04	-0.03	-0.09	0.07	0.0	0.24	-0.2	0.07	-0.53	0.02	-0.16	-0.03	0.10	0.58							
17.Financial Strain	0.05	0.08	0.01	0.00	0.07	-0.15	0.0	0.48	-0.1	-0.06	0.24	0.04	0.81	0.02	0.00	-0.04	0.53						
18.Parental Illegal activities	-0.01	0.01	0.02	0.08	0.07	0.15	0.0	-0.34	-0.2	-0.03	0.01	0.04	0.24	0.06	-0.01	-0.01	0.04	0.10					
19.Mother-Child Trust/Communication	-0.11	-0.09	-0.04	-0.25	-0.21	-0.19	0.0	0.13	0.3	0.01	-2.25	-0.16	0.02	0.00	-0.01	0.04	0.02	-0.01	0.53				
20.Mother-Child Anger/Alienation	-0.27	-0.18	-0.05	-0.33	-0.28	-0.24	0.0	0.04	0.2	-0.05	-0.84	-0.08	-0.29	-0.07	0.02	0.08	-0.01	-0.01	0.20	0.66			
21.Parental Monitoring	-0.01	-0.02	-0.01	-0.07	-0.06	-0.07	0.0	-0.04	0.0	0.01	-0.55	-0.03	0.04	0.00	0.00	0.01	0.00	0.00	0.04	0.03	0.01		
22.Father-Child Trust/Communication	-0.23	-0.38	-0.17	-0.27	-0.37	-0.33	-0.1	-0.31	0.4	0.13	-3.96	-0.13	-0.34	0.00	0.08	0.39	-0.08	-0.02	0.31	0.23	0.03	1.68	
23. Maternal Race	0.09	0.02	-0.02	-0.17	-0.31	-0.07	0.0	-1.13	-1.9	0.19	0.25	-0.32	-1.04	-0.17	0.04	-0.18	-0.19	-0.07	-0.10	-0.24	-0.02	-0.04	4.42

Table 27

Correlation matrix for Anger/Alienation and Delinquency dual growth model 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.Anger/Alienation Wave 1	1.00																						
2.Anger/Alienation Wave 2	0.48	1.00																					
3.Anger/Alienation Wave 3	0.26	0.36	1																				
4.Delinquency Wave 1	0.10	0.13	0.07	1																			
5.Delinquency Wave 2	0.13	0.24	0.20	0.48	1																		
6.Delinquency Wave 3	0.03	0.11	0.20	0.32	0.44	1																	
7.Focal child: sex	0.14	0.16	0.11	-0.11	-0.02	-0.16	1																
8.Caregiver: age	0.00	0.01	-0.05	0.01	0.10	0.04	0.03	1															
9.Focal Child Relationship to Primary Caregiver	-0.03	-0.05	-0.10	0.05	0.05	0.01	0.03	0.48	1														
10.Adult respondent's current marital/cohabitation status	0.01	-0.03	-0.05	0.01	0.00	-0.03	0.04	-0.01	-0.06	1													
11.Child's age in months	0.14	0.14	0.01	0.23	0.20	0.06	0.06	0.19	0.03	0.05	1												
12.Focal Child's grades on last report card	0.03	0.07	-0.01	0.17	0.17	0.16	-0.14	0.04	0.00	-0.02	0.18	1											
13.Neighborhood problems	0.08	0.09	0.08	0.03	0.07	0.02	0.04	-0.07	0.00	0.03	0.01	0.08	1										
14.Harsh Parenting Score	-0.01	0.01	-0.07	-0.01	0.02	0.03	0.00	-0.05	0.02	-0.04	-0.09	0.00	0.06	1									
15.Presence of Substitute Father Figure	-0.03	-0.08	0.03	-0.06	-0.05	-0.03	0.04	0.12	-0.07	0.01	-0.01	0.01	-0.03	-0.06	1								
16.Father involvement	-0.06	-0.10	0.05	-0.03	-0.06	0.04	-0.08	0.04	-0.03	0.06	-0.04	0.01	-0.04	-0.04	0.28	1							
17.Financial Strain	0.08	0.11	0.01	0.00	0.05	-0.08	0.04	0.08	-0.02	-0.06	0.02	0.03	0.19	0.02	-0.01	-0.08	1						
18.Parental Illegal activities	-0.05	0.02	0.05	0.17	0.11	0.20	-0.05	-0.14	-0.08	-0.06	0.00	0.07	0.12	0.17	-0.03	-0.02	0.18	1					
19.Mother-Child Trust/Communication	-0.16	-0.13	-0.06	-0.23	-0.16	-0.11	0.00	0.02	0.04	0.01	-0.18	-0.12	0.00	0.00	-0.02	0.07	0.03	-0.04	1				
20.Mother-Child Anger/Alienation	-0.36	-0.22	-0.06	-0.27	-0.18	-0.12	-0.06	0.01	0.03	-0.04	-0.06	-0.05	-0.06	-0.08	0.06	0.13	-0.02	-0.05	0.33	1			
21.Parental Monitoring	-0.12	-0.14	-0.09	-0.39	-0.27	-0.25	0.10	-0.04	-0.04	0.04	-0.28	-0.14	0.06	0.04	0.02	0.06	0.05	-0.10	0.42	0.29	1		
22.Father-Child Trust/Communication	-0.19	-0.29	-0.13	-0.14	-0.15	-0.11	-0.15	-0.03	0.03	0.07	-0.18	-0.05	-0.04	0.00	0.13	0.40	-0.08	-0.05	0.33	0.22	0.22	1	
23. Maternal Race	0.05	0.01	-0.01	-0.05	-0.08	-0.01	0.02	-0.07	-0.10	0.06	0.01	-0.08	-0.08	-0.07	0.03	-0.11	-0.12	-0.10	-0.07	-0.14	-0.07	-0.02	1

Table 28

Variable characteristics for Anger/Alienation and Delinquency dual growth model 3

	n	*M (SD)*	*Skewness/kurtosis*
Anger/Alienation Wave 1	725	2.44 (.93)	.44 (-.27)
Anger/Alienation Wave 2	525	2.50 (1.01)	.37 (-.57)
Anger/Alienation Wave 3	411	2.45 (1.02)	.27 (-.83)
Delinquency Wave 1	735	1.23 (1.53)	1.72 (3.57)
Delinquency Wave 2	565	1.40 (1.86)	1.85 (3.69)
Delinquency Wave 3	463	2.16 (2.42)	1.39 (1.61)
Focal child: sex	735	1.51 (0.50)	-0.05(-2)
Caregiver: age	735	37.65 (7.94)	1.31 (2.77)
Focal Child Relationship to Primary Caregiver	735	23.34 (8.96)	3.71 (12.17)
Adult respondent's current marital/cohabitation stat	735	1.82 (1.50)	1.48 (.49)
Child's age in months	735	149.15	.08 (-1.11_
Focal Child's grades on last report card	735	3.57 (1.86)	.71 (-.18)
Neighborhood problems	735	20.43 (6.00)	.24 (-.96)
Harsh Parenting Score	735	2.27 (1.10)	.23 (-1.37)
Presence of Substitute Father Figure	735	1.60 (0.49)	-.38 (-1.85)
Father involvement	735	-0.31 (0.76)	.24 (-1.05)
Financial Strain	735	0.14 (0.73)	.27 (-.54)
Parental Illegal activities	735	-0.10 (0.32)	1.9 (3.58)
Mother-Child Trust/Communication	735	4.21 (0.73)	-1.05 (.75)
Mother-Child Anger/Alienation	735	3.53 (0.81)	-.13 (-.46)
Parental Monitoring	735	0.81 (0.11)	-1.02 (1.28)
Father-Child Trust/Communication	735	3.37 (1.30)	-.46(-1.04)
Maternal Race	735	3.73 (2.10)	.09(-1.9)

Table 23

Model results for Anger/Alienation and Delinquency dual growth model 3

Parameter	M (SE)	Residual Variance (SE)	b (SE)			
			IA	SA	ID	SD
Anger/Alienation Wave 1		0.26 (0.07)***				
Anger/Alienation Wave 2		0.58 (0.04)***				
Anger/Alienation Wave 3		0.63 (0.1)***				
Delinquency Wave 1		0.37 (0.12) ***				
Delinquency Wave 2		2.1 (0.26)***				
Delinquency Wave 3						
Predictors						
Focal child: sex			0.18 (0.06)**	0.04 (0.05)	-0.19 (0.09)	-0.38 (0.22)
Caregiver: age			-0.00 (0.01)	0.00 (0.00)	-0.00 (0.01)	0.03 (0.02)
Focal Child Relationship to Primary Caregiver			-0.00 (0.00)	-0.00 (0.00)	0.01 (0.01)	-0.01 (0.02)
Adult respondent's current marital/cohabitation status			-0.01 (0.02)	-0.01 (0.02)	0.022 (0.03)	-0.03 (0.08)
Child's age in months			0.01 (0.00)**	-0.00 (0.00)*	0.01 (0.00)***	-0.01 (0.01)*
Focal Child's grades on last report card			0.01 (0.02)	0.00 (0.01)	0.07 (0.03)*	0.07 (0.05)
Neighborhood problems			0.01 (0.01)	0.00 (0.00)	0.01 (0.01)	0.01 (0.02)
Harsh Parenting Score			-0.01(0.03)	-0.02 (0.02)	-0.04 (0.05)	0.04 (0.09)
Presence of Substitute Father Figure			-0.03 (0.07)	0.00 (0.05)	-0.1 (0.1)	-0.04 (0.22)
Father involvement			0.05 (0.04)	0.04 (0.04)	0.03 (0.08)	0.22 (0.15)
Financial Strain			0.1 (0.05)*	-0.04 (0.04)	-0.01 (0.06)	-0.39 (0.15)**
Parental Illegal activities			-0.25 (0.11)*	0.19 (0.09)*	0.53 (0.2)**	0.90 (0.45)*
Mother-Child Trust/Communication			-0.01(0.05)	0.03 (0.04)	-0.04 (0.09)	0.16 (0.18)
Mother-Child Anger/Alienation			-0.37 (0.05) ***	0.17 (0.03)***	-0.33 (0.06)***	0.15 (0.13)
Parental Monitoring			0.04 (0.32)	-0.51 (0.26)	-3.45 (0.53)***	-0.36 (1.15)
Father-Child Trust/Communication			-0.08 (0.03)*	-0.04 (0.02)	-0.03 (0.04)	-0.18 (0.1)
Maternal Race			0.00 (0.02)	-0.00 (0.01)	-0.06 (0.02)*	0.06 (0.05)
Latent Variables						
Anger/Alienation Intercept	2.45(0.03)***	.46 (.08)***				
Anger/Alienation Slope	-0.01(0.03)	.1(.04)*				
Delinquency Intercept	1.24 (0.05)***	.82(.15)***				
Delinquency Slope	0.93 (0.11)***	4.41(.40)***				
Delinquency Slope Loading (Wave 2)			0.15 (.04)***			
Factor Covariances						
Delinquency (wave 2) with Anger/Alienation (wave 2)			.18 (.05)**			
Anger/Alienation Intercept with Slope			-0.13 (0.05)**			
Anger/Alienation Intercept with Delinquency Intercept			.047 (0.04)			
Anger/Alienation Intercept with Delinquency Slope						
Delinquency Intercept with Delinquency Slope						
Delinquency Intercept with Anger/Alienation Slope						
Delinquency Slope with Anger/Alienation Slope			0.16 (0.05)**			

*Note. *p, .05; **p <.01; ***p<.001. "IA" denotes Anger/Alienation intercept, "SA" denotes Anger/Alienation Slope, "ID" denotes Delinquency Intercept, "SD" denotes Delinquency Slope*

Table 30

Standardized model results for Anger/Alienation and Delinquency dual growth model 3

Parameter	M (SE)	Residual Variance (SE)	B(SE) IA	SA	ID	SD	R^2
Anger/Alienation Wave 1		.30 (.08)***					.70 (.08)***
Anger/Alienation Wave 2		.60 (.03)***					.40 (.03)***
Anger/Alienation Wave 3		.59 (.09)***					.41 (.04)***
Delinquency Wave 1		.42 (.05)***					.58 (.05)***
Delinquency Wave 2		.59 (.04)***					.41 (.04)***
Delinquency Wave 3		-					
Predictors							
Focal child: sex			.11 (.04)**	.05 (.07)	-.08 (.04)*	-.09 (.05)	
Caregiver: age			-.04 (.06)	.04 (.08)	-.03 (.05)	.12 (.07)	
Focal Child Relationship to Primary Caregiver			-.02 (.06)	-.11 (.08)	.07 (.06)	-.06 (.07)	
Adult respondent's current marital/cohabitation status			-.02 (.04)	-.05 (.07)	.03 (.04)	;-.02 (.05)	
Child's age in months			.13 (.05)**	-.17 (.08)*	.18 (.04)***	-.12 (.05)*	
Focal Child's grades on last report card			.01 (.04)	0 .00 (.07)	.10 (.05)*	.06 (.05)	
Neighborhood problems			.05 (.04)	.05 (.07)	.02 (.04)	.03 (.05)	
Harsh Parenting Score			-.01 (.04)	-.07 (.07)	-.03 (.04)	.02 (.05)	
Presence of Substitute Father Figure			-.02 (.04)	0.00 (.07)	-.04 (.04)	-.01 (.05)	
Father involvement			.05 (.04)	.09 (.08)	.02 (.05)	.08 (.05)	
Financial Strain			.09 (.04)*	-.09 (.07)	0 (.04)	-.13 (.05)**	
Parental Illegal activities			-.10 (.05)*	.16 (.08)*	.15 (.05)**	.13 (.06)*	
Mother-Child Trust/Communication			-.01 (.05)	.06 (.09)	-.02 (.05)	.05 (.06)	
Mother-Child Anger/Alienation			-.38 (.05)***	.39 (.09)***	-.23 (.04)***	.06 (.05)	
Parental Monitoring			.01 (.05)	-.16 (.08)	-.33 (.05)***	-.02 (.06)	
Father-Child Trust/Communication			-.13 (.06)*	-.13 (.09)	-.03 (.05)	-.11 (.06)	
Maternal Race			.00 (.04)	-.02 (.07)	-.11 (.04)*	.06 (.05)	
Latent Variables							
Anger/Alienation Intercept	2.45(0.03)***	.74 (.05)***					.26 (.05)***
Anger/Alienation Slope	-0.01 (0.03)	.78 (.09)***					.22 (.09)*
Delinquency Intercept	1.24 (0.05)***	.61 (.05)***					.39 (.05)***
Delinquency Slope	0.33 (0.11)***	.93 (.03)***					.07 (.03)**
Delinquency Slope Loading (Wave 2)			.176 (.04)***				
Factor Covariances							
Delinquency (wave 2) with Anger/Alienation (wave 2)			.16 (.05)**				
Anger/Alienation Intercept with Slope			-.60 (.11)***				
Anger/Alienation Intercept with Delinquency Intercept			.08 (.06)				
Anger/Alienation Intercept with Delinquency Slope							
Delinquency Intercept with Delinquency Slope							
Delinquency Intercept with Anger/Alienation Slope							
Delinquency Slope with Anger/Alienation Slope			.25 (.03)**				

*Note. *p, .05; **p <.01; ***p<.001. "IA" denotes Anger/Alienation Intercept, "SA" denotes Anger/Alienation Slope, "ID" denotes Delinquency Intercept, "SD" denotes Delinquency Slope*

Table 31

Data patterns for Trust/Communication and Delinquency dual growth model 1

	1 (n = 341)	*2 (n = 29)*	*3 (n = 182)*	*4 (n = 24)*	*5 (n = 70)*	*6 (n = 7)*	*7 (n = 12)*	*8 (n = 15)*	*9 (n = 92)*	*10 (n = 17)*	*11 (n = 35)*	*12 (n = 7)*	*13 (n = 15)*	*14 (n = 8)*	*15 (n = 35)*	*16 (n = 5)*	*17 (n = 6)*	*18 (n = 4)*	*19 (n = 27)*
Trust/Communication Wave 1	x	x	x	x	x	x	x	x	x										
Trust/Communication Wave 2	x	x	x							x	x	x	x	x	x				
Trust/Communication Wave 3	x			x	x					x	x					x	x	x	x
Delinquency Wave 1	x	x	x	x	x	x	x	x	x	x		x	x			x	x		
Delinquency Wave 2	x	x	x	x		x	x			x	x	x	x	x	x	x		x	
Delinquency Wave 3	x	x		x	x	x		x		x	x	x		x		x	x	x	x

Note. "x" denotes presence of data

Table 32

Variable characteristics for Trust/Communication and Delinquency dual growth model 1

	n	***M (SD)***	***Skewness (kurtosis)***
Trust/Communication Wave 1	772	3.36 (1.30)	-.48 (-1.00)
Trust/Communication Wave 2	669	3.22 (1.30)	-.37 (-1.13)
Trust/Communication Wave 3	529	2.79 (1.27)	.10 (-1.20)
Delinquency Wave 1	822	1.21 (1.52)	1.72(3.52)
Delinquency Wave 2	721	1.37 (1.88)	2.4 (4.86)
Delinquency Wave 3	595	2.40 (2.40)	1.35(1.38)

Table 33

Covariance matrix for Trust & Communication and Delinquency dual growth model 1

	1	2	3	4	5	6
1.Trust/Communication Wave 1	1.69					
2.Trust/Communication Wave 2	1.07	1.71				
3.Trust/Communication Wave 3	0.77	0.91	1.63			
4.Delinquency Wave 1	-0.24	-0.23	-0.11	2.32		
5.Delinquency Wave 2	-0.31	-0.41	-0.21	1.46	3.6	
6.Delinquency Wave 3	0.29	-0.07	-0.14	1.09	2.1	5.78

Table 34

Correlation matrix for Trust & Communication and Delinquency dual growth model 1

	1	2	3	4	5	6
1.Trust/Communication Wave 1	1.00					
2.Trust/Communication Wave 2	0.63	1.00				
3.Trust/Communication Wave 3	0.46	0.54	1.00			
4.Delinquency Wave 1	-0.12	-0.12	-0.05	1.00		
5.Delinquency Wave 2	-0.12	-0.17	-0.09	0.50	1.00	
6.Delinquency Wave 3	-0.09	-0.02	-0.04	0.30	0.47	1

Table 35

Model Results for Trust/Communication and Delinquency dual growth model 1

Parameter	*M (SE)*	*Variance*	*Residual Variance (SE)*	*b (SE)*
Model 1				
Trust/Communication Wave 1			0.53 (0.08)***	
Trust/Communication Wave 2			0.69 (0.06)***	
Trust/Communication Wave 3			-	
Delinquency Wave 1			0.79 (0.18)***	
Delinquency Wave 2			2.01 (0.24)***	
Delinquency Wave 3			-	
Trust/Communication Intercept	3.53 (0.04)***	1.16 (0.09)***		
Trust/Communication Slope	0.57 (0.06)***	1.28 (0.14)***		
Delinquency Intercept	1.20 (0.05)***	1.54 (0.24)***		
Delinquency Slope	0.84 (0.10)***	5.12 (0.49)***		
Trust/Communication Slope Loading (wave 2)				-0.21 (0.05)***
Delinquency Slope Loading (wave 2)				0.22 (0.04)***
Factor Covariances				
Trust/Communication Intercept with Slope				0.40 0(.10)***
Trust/Communication Intercept with Delinquency Intercept				-0.28 (0.06)***
Trust/Communication Intercept with Delinquency Slope				0.03 (0.12)
Delinquency Intercept with Delinquency Slope				-0.46 (0.26)
Delinquency Intercept with Trust/Communication Slope				-0.15 (0.08)
Delinquency Slope with Trust/Communication Slope				0.05 (0.15)

Note. *p, .05, **p < .01, ***p< .001

Table 36

Standardized model Results for Trust/Communication and Delinquency dual growth model 1

Parameter	*M (SE)*	*Residual Variance (SE)*	*β(SE)*	*R²*
Model 1				
Trust/Communication Wave 1		0.31 (.05)***		.69 (.05)***
Trust/Communication Wave 2		0.40 (.03)***		0.60 (0.03)***
Trust/Communication Wave 3		-		-
Delinquency Wave 1		0.34 (.08)***		0.66 (0.08)***
Delinquency Wave 2		0.56 (.04)***		0.44 (0.04)***
Delinquency Wave 3		-		-
Trust/Communication Intercept	3.18 (0.23)***			
Trust/Communication Slope	0.50 (0.05)***			
Delinquency Intercept	0.97 (0.06)***			
Delinquency Slope	0.37 (0.04)***			
Trust/Communication Slope Loading (wave 2)			-0.18 (0.05)***	
Delinquency Slope Loading (wave 2)			0.26 (0.05)***	
Factor Covariances				
Trust/Communication Intercept with Slope			0.33 (0.06)***	
Trust/Communication Intercept with Delinquency Intercept			-0.21 (0.05)***	
Trust/Communication Intercept with Delinquency Slope			0.01 (0.05)	
Delinquency Intercept with Delinquency Slope			-0.16 (0.08)*	
Delinquency Intercept with Trust/Communication Slope			-0.11 (0.06)	
Delinquency Slope with Trust/Communication Slope			0.02 (0.04)	

*Note. *p, .05, **p < .01, ***p< .001*

Table 37

Data patterns for Trust/Communication and Delinquency dual growth model 2

	1 (n = 318)	*2 (n = 27)*	*3 (n = 169)*	*4 (n = 24)*	*5 (n = 66)*	*6 (n = 6)*	*7 (n = 12)*	*8 (n = 14)*	*9 (n = 89)*	*10 (n = 6)*	*11 (n = 1)*
Trust/Communication Wave 1	x	x	x	x	x	x	x	x	x		
Trust/Communication Wave 2	x	x	x							x	
Trust/Communication Wave 3	x			x	x					x	x
Delinquency Wave 1	x	x	x	x	x	x	x	x	x	x	x
Delinquency Wave 2	x	x	x	x		x	x			x	
Delinquency Wave 3	x	x		x	x	x		x		x	x
Focal child: sex	x	x	x	x	x	x	x	x	x	x	x
Caregiver: age	x	x	x	x	x	x	x	x	x	x	x
Focal Child Relationship to Primary Caregiver	x	x	x	x	x	x	x	x	x	x	x
Adult respondent's current marital/cohabitation status	x	x	x	x	x	x	x	x	x	x	x
Child's age in months	x	x	x	x	x	x	x	x	x	x	x
Focal Child's grades on last report card	x	x	x	x	x	x	x	x	x	x	x
Neighborhood problems	x	x	x	x	x	x	x	x	x	x	x
Harsh Parenting Score	x	x	x	x	x	x	x	x	x	x	x
Presence of Substitute Father Figure	x	x	x	x	x	x	x	x	x	x	x
Father involvement	x	x	x	x	x	x	x	x	x	x	x
Financial Strain	x	x	x	x	x	x	x	x	x	x	x
Parental Illegal activities	x	x	x	x	x	x	x	x	x	x	x
Mother-Child Trust/Communication	x	x	x	x	x	x	x	x	x	x	x
Mother-Child Anger/Alienation	x	x	x	x	x	x	x	x	x	x	x
Parental Monitoring	x	x	x	x	x	x	x	x	x	x	x
Father-Child Anger/Alienation	x	x	x	x	x	x	x	x	x	x	x
Maternal Race	x	x	x	x	x	x	x	x	x	x	x

Note. "x" denotes presence of data

Table 38

Variable characteristics for Trust/Communication and Delinquency dual growth model 2

	n	*M (SD)*	*Skewness/kurtosis*
Trust/Communication Wave 1	725	3.85 (1.29)	-.48 (-1.00)
Trust/Communication Wave 2	525	3.27 (1.28)	-.37 (-1.13)
Trust/Communication Wave 3	411	2.80 (1.26)	.10 (-1.20)
Delinquency Wave 1	735	1.23 (1.53)	1.72 (3.57)
Delinquency Wave 2	565	1.40 (1.86)	1.85 (3.69)
Delinquency Wave 3	463	2.06 (2.41)	1.39 (1.61)
Focal child: sex	735	1.51 (0.50)	-0.05(-2)
Caregiver: age	735	37.65 (7.94)	1.31 (2.77)
Focal Child Relationship to Primary Caregiver	735	23.34 (8.96)	3.71 (12.17)
Adult respondent's current marital/cohabitation status	735	1.82 (1.50)	1.48 (.49)
Child's age in months	735	149.18	.08 (-1.11_
Focal Child's grades on last report card	735	3.58 (1.86)	.71 (-.18)
Neighborhood problems	735	20.41 (6.00)	.24 (-.96)
Harsh Parenting Score	735	2.26 (1.10)	.23 (-1.37)
Presence of Substitute Father Figure	735	1.60 (0.49)	-.38 (-1.85)
Father involvement	735	-0.30 (0.76)	.24 (-1.05)
Financial Strain	735	0.14 (0.73)	.27 (-.54)
Parental Illegal activities	735	-0.10 (0.32)	1.9 (3.58)
Mother-Child Trust/Communication	735	4.21 (0.73)	-1.05 (.75)
Mother-Child Anger/Alienation	735	3.53 (0.81)	-.13 (-.46)
Parental Monitoring	735	0.81 (0.11)	-1.02 (1.28)
Father-Child Anger/Alienation	735	2.44 (.87)	.44 (-.23)
Maternal Race	735	3.72 (2.10)	.09(-1.9)

Table 39

Covariance matrix for Trust/Communication and Delinquency dual growth model 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.Trust/Communication Wave 1	1.66																						
2.Trust/Communication Wave 2	1.04	1.65																					
3.Trust/Communication Wave 3	0.79	0.92	1.63																				
4.Delinquency Wave 1	-0.27	-0.27	-0.16	2.36																			
5.Delinquency Wave 2	-0.38	-0.50	-0.35	1.40	3.57																		
6.Delinquency Wave 3	-0.30	-0.10	-0.21	1.19	2.03	5.95																	
7.Focal child: sex	-0.09	-0.12	-0.07	-0.08	-0.02	-0.19	0.3																
8.Caregiver: age	-0.27	0.05	0.25	0.11	1.42	0.80	0.1	63.03															
9.Focal Child Relationship to Primary Caregiver	0.36	0.68	0.86	0.64	0.83	0.22	0.1	34.46	80.3														
10.Adult respondent's current marital/cohabitation status	0.13	0.03	0.16	0.01	0.00	-0.10	0.0	-0.08	-0.8	2.25													
11.Child's age in months	-4.15	-5.18	-1.37	6.10	6.50	2.53	0.5	26.08	4.8	1.20	302.50												
12.Focal Child's grades on last report card	-0.16	-0.16	-0.24	0.50	0.61	0.72	-0.1	0.55	0.0	-0.06	5.90	3.48											
13.Neighborhood problems	-0.35	-0.72	-0.91	0.25	0.79	0.35	0.1	-3.09	-0.2	0.26	0.99	0.92	35.99										
14.Harsh Parenting Score	0.00	-0.04	-0.07	-0.02	0.05	0.08	0.0	-0.44	0.2	-0.07	-1.75	0.01	0.41	1.22									
15.Presence of Substitute Father Figure	0.08	0.08	0.09	-0.05	-0.05	-0.03	0.0	0.45	-0.3	0.01	-0.08	0.01	-0.09	-0.03	0.24								
16.Father involvement	0.38	0.33	0.36	-0.03	-0.09	0.07	0.0	0.24	-0.2	0.07	-0.53	0.02	-0.16	-0.03	0.10	0.58							
17.Financial Strain	-0.08	-0.10	-0.01	0.00	0.07	-0.15	0.0	0.48	-0.1	-0.06	0.24	0.04	0.81	0.02	0.00	-0.04	0.53						
18.Parental Illegal activities	-0.02	-0.01	0.00	0.08	0.07	0.15	0.0	-0.34	-0.2	-0.03	0.01	0.04	0.24	0.06	-0.01	-0.01	0.04	0.10					
19.Mother-Child Trust/Communication	0.31	0.18	0.06	-0.25	-0.21	-0.19	0.0	0.13	0.3	0.01	-2.25	-0.16	0.02	0.00	-0.01	0.04	0.02	-0.01	0.53				
20.Mother-Child Anger/Alienation	0.23	0.20	0.11	-0.33	-0.28	-0.24	0.0	0.04	0.2	-0.05	-0.84	-0.08	-0.29	-0.07	0.02	0.08	-0.01	-0.01	0.20	0.66			
21.Parental Monitoring	0.03	0.03	0.00	-0.07	-0.06	-0.07	0.0	-0.04	0.0	0.01	-0.55	-0.03	0.04	0.00	0.00	0.01	0.00	0.00	0.04	0.03	0.01		
22.Father-Child Anger/Alienation	-0.24	-0.38	-0.27	-0.27	-0.37	-0.33	-0.1	-0.31	0.4	0.13	-3.96	-0.13	-0.34	0.00	0.08	0.39	-0.08	-0.02	0.31	0.23	0.03	1.68	
23. Maternal Race	-0.02	0.12	0.09	-0.17	-0.31	-0.07	0.0	-1.13	-1.9	0.19	0.25	-0.32	-1.04	-0.17	0.04	-0.18	-0.19	-0.07	-0.10	-0.24	-0.02	-0.04	4.42

Table 40

Correlation matrix for Trust/Communication and Delinquency dual growth model 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.Trust/Communication Wave 1	1.00																					
2.Trust/Communication Wave 2	0.63	1.00																				
3.Trust/Communication Wave 3	0.48	0.56	1																			
4.Delinquency Wave 1	-0.13	-0.14	-0.08	1																		
5.Delinquency Wave 2	-0.15	-0.21	-0.14	0.48	1																	
6.Delinquency Wave 3	-0.09	-0.03	-0.07	0.32	0.44	1																
7.Focal child: sex	-0.14	-0.03	-0.11	-0.11	-0.02	-0.16	1															
8.Caregiver: age	-0.03	-0.20	0.02	0.01	0.10	0.04	0.03	1														
9.Focal Child Relationship to Primary Caregiver	0.03	0.00	0.07	0.05	0.05	0.01	0.03	0.48	1													
10.Adult respondent's current marital/cohabitation status	0.06	0.06	0.08	0.01	0.00	-0.03	0.04	-0.01	-0.06	1												
11.Child's age in months	-0.18	0.02	-0.06	0.23	0.20	0.06	0.06	0.19	0.03	0.05	1											
12.Focal Child's grades on last report card	-0.07	-0.23	-0.10	0.17	0.17	0.16	-0.14	0.04	0.00	-0.02	0.18	1										
13.Neighborhood problems	-0.04	-0.07	-0.12	0.03	0.07	0.02	0.04	-0.07	0.00	0.03	0.01	0.08	1									
14.Harsh Parenting Score	0.00	-0.09	-0.05	-0.01	0.02	0.03	0.00	-0.05	0.02	-0.04	-0.09	0.00	0.06	1								
15.Presence of Substitute Father Figure	0.12	-0.03	0.15	-0.06	-0.05	-0.03	0.04	0.12	-0.07	0.01	-0.01	0.01	-0.03	-0.06	1							
16.Father involvement	0.39	0.13	0.37	-0.03	-0.06	0.04	-0.08	0.04	-0.03	0.06	-0.04	0.01	-0.04	-0.04	0.28	1						
17.Financial Strain	-0.08	0.34	-0.01	0.00	0.05	-0.08	0.04	0.08	-0.02	-0.06	0.02	0.03	0.19	0.02	-0.01	-0.08	1					
18.Parental Illegal activities	-0.05	-0.11	0.00	0.17	0.11	0.20	-0.05	-0.14	-0.08	-0.06	0.00	0.07	0.12	0.17	-0.03	-0.02	0.18	1				
19.Mother-Child Trust/Communication	0.33	0.20	0.07	-0.23	-0.16	-0.11	0.00	0.02	0.04	0.01	-0.18	-0.12	0.00	0.00	-0.02	0.07	0.03	-0.04	1			
20.Mother-Child Anger/Alienation	0.22	0.18	0.11	-0.27	-0.18	-0.12	-0.06	0.01	0.03	-0.04	-0.06	-0.05	-0.06	-0.08	0.06	0.13	-0.02	-0.05	0.33	1		
21.Parental Monitoring	0.22	0.18	0.00	-0.39	-0.27	-0.25	0.10	-0.04	-0.04	0.04	-0.28	-0.14	0.06	0.04	0.02	0.06	0.05	-0.10	0.42	0.29	1	
22.Father-Child Anger/Alienation	-0.20	-0.32	-0.22	-0.14	-0.15	-0.11	-0.15	-0.03	0.03	0.07	-0.18	-0.05	-0.04	0.00	0.13	0.40	-0.08	-0.05	0.33	0.22	0.22	1
23. Maternal Race	-0.01	0.04	0.03	-0.05	-0.08	-0.01	0.02	-0.07	-0.10	0.06	0.01	-0.08	-0.08	-0.07	0.03	-0.11	-0.12	-0.10	-0.07	-0.14	-0.07	-0.02

Table 41

Model results for Trust/Communication and Delinquency dual growth model 2

Parameter	M (SE)	Residual Variance (S.	b (SE)			
			IT	ST	ID	SD
Trust/Communication Wave 1		.53 (.08)***				
Trust/Communication Wave 2		.65 (.05)***				
Trust/Communication Wave 3		-				
Delinquency Wave 1		.98 (.12)***				
Delinquency Wave 2		2.03 (.26)***				
Delinquency Wave 3		-				
Predictors						
Focal child: sex			-.33 (.08)***	-.12 (.11)	-0.19 (0.09)	-0.38 (0.22)
Caregiver: age			-.01 (.01)	0 (.01)	-0.00 (0.01)	0.03 (0.02)
Focal Child Relationship to Primary Caregiver			.01 (0)*	-.01 (.01)	0.01 (0.01)	-0.01 (0.02)
Adult respondent's current marital/cohabitation status			.03 (.02)	-.03 (.04)	0.022 (0.03)	-0.03 (0.08)
Child's age in months			-.01 (0)**	-.01 (0)	0.01 (0.00)***	-0.01 (0.01)*
Focal Child's grades on last report card			-.01 (.02)	.06 (.03)	0.07 (0.03)*	0.07 (0.05)
Neighborhood problems			0 (.01)	.01 (.01)	0.01 (0.01)	0.01 (0.02)
Harsh Parenting Score			0 (.04)	.04 (.05)	-0.04 (0.05)	0.04 (0.09)
Presence of Substitute Father Figure			.11 (.08)	-.05 (.12)	-0.1 (0.1)	-0.04 (0.22)
Father involvement			.55 (.05)***	-.02 (.07)	0.03 (0.08)	0.22 (0.15)
Financial Strain			-.08 (.05)	-.19 (.07)*	-0.01 (0.06)	-0.39 (0.15)**
Parental Illegal activities			-.05 (.14)	-.15 (.19)	0.53 (0.2)*	0.90 (0.45)*
Mother-Child Trust/Communication			.36 (.07)***	.34 (.10)**	-0.04 (0.09)	0.16 (0.18)
Mother-Child Anger/Alienation			.06 (.06)	.06 (.08)	-0.33 (0.06)***	0.15 (0.13)
Parental Monitoring			.98 (.41)*	1.58 (.62)*	-3.45 (0.53)***	-0.36 (1.15)
Father-Child Anger/Alienation			-.17 (.05)**	.10 (.06)	0.02 (0.06)	0.04 (0.13)
Maternal Race			.04 (.02)*	-.01 (.03)	-0.06 (0.02)**	0.06 (0.05)
Latent Variables						
Trust/Communication Intercept	3.38 (.05)***	.64 (.08)***				
Trust/Communication Slope	.56 (.06)***	1.01 (.12)***				
Delinquency Intercept	1.23 (.06)***	.82 (.15)***				
Delinquency Slope	0.93 (0.11)***	4.40 (.41)***				
Delinquency Slope Loading (Wave 2)			-.21 (.05)***			
Trust/Communication Slope Loading (wave 2)			-0.21 (0.05)***			
Factor Covariances						
Trust/Communication Intercept with Slope			.20 (.09)*			
Trust/Communication Intercept with Delinquency Intercept			-.08 (.04)			
Trust/Communication Intercept with Delinquency Slope						
Delinquency Intercept with Delinquency Slope						
Delinquency Intercept with Trust/Communication Slope						
Delinquency Slope with Trust/Communication Slope						

*Note. *p ,.05, **p <.01, ***p<.001. "IT" denotes Trust/Communication Intercept, "ST" denotes Trust/Communication Slope, "ID" denotes Delinquency Intercept, "SD" denotes Delinquency Slope*

Table 42

Standardized model results for Trust/Communication and Delinquency dual growth model 2

Parameter	M (SE)	Residual Variance (S.E.)	B(SE)				R2
			IT	ST	ID	SD	
Trust/Communication Wave 1		.32 (.05)***					.68 (.05)***
Trust/Communication Wave 2		.38 (.03)***					.61 (.03)***
Trust/Communication Wave 3		-					-
Delinquency Wave 1		.42 (.05)***					.58 (.05)***
Delinquency Wave 2		.59 (.04)***					.41 (.04)***
Delinquency Wave 3		-					
Predictors							
Focal child: sex			-.15 (.04)***	-0.05 (0.05	-.08 (.04)*	-.09 (.05)	
Caregiver: age			-.06 (.04)	0.01 (0.06)	-.03 (.05)	.12 (.07)	
Focal Child Relationship to Primary Caregiver			.09 (.04)*	-0.07 (0.06	.07 (.06)	-.06 (.07)	
Adult respondent's current marital/cohabitation status			.04 (.03)	-0.04 (0.05	.03 (.04)	;-.02 (.05)	
Child's age in months			-.12 (.04)**	-0.10 (0.06	.18 (.04)***	-.12 (.05)*	
Focal Child's grades on last report card			-0.02 (0.04)	0.10 (0.05)	.10 (.05)*	.06 (.05)	
Neighborhood problems			-0.02 (0.04)	0.08 (0.05)	.02 (.04)	.03 (.05)	
Harsh Parenting Score			0.00 (0.04)	0.04 (0.05)	-.03 (.04)	.02 (.05)	
Presence of Substitute Father Figure			0.05 (0.04)	-0.02 (0.05	-.04 (.04)	-.01 (.05)	
Father involvement			0.39 (0.04)***	-0.01 (0.05	.02 (.05)	.08 (.05)	
Financial Strain			-0.05 (0.04)	0.12 (0.05)	0 (.04)	-.13 (.05)**	
Parental Illegal activities			-0.01 (0.04)	0.04 (0.05	.15 (.05)**	.13 (.06)*	
Mother-Child Trust/Communication			0.24 (0.04)***	.23 (0.06)*	-.02 (.05)	.05 (.06)	
Mother-Child Anger/Alienation			0.04 (0.05)	0.04 (0.06	-.23 (.04)***	.06 (.05)	
Parental Monitoring			0.10 (0.04)*	0.16 (0.06)	-.33 (.05)***	-.02 (.06)	
Father-Child Anger/Alienation			-0.15 (0.05)**	0.08 (0.05)	0.02 (0.05)	0.02 (0.05)	
Maternal Race			0.07 (0.04)*	-0.02 (0.05	-.11 (.04)*	.06 (.05)	
Latent Variables							
Trust/Communication Intercept	.56 (.04)***						.44 (.04)***
Trust/Communication Slope	.83 (.04)***						.17 (.04)***
Delinquency Intercept	.60 (.05)***						.40 (.05)***
Delinquency Slope	.33 (.03)***						.07 (.03)*
Delinquency Slope Loading (Wave 2)			.18 (.04)***				
Trust/Communication slope loading (wave 2)			-0.18 (0.05)***				
Factor Covariances							
Trust/Communication Intercept with Slope			.24 (.08)**				
Trust/Communication Intercept with Delinquency Intercept			-.12 (.06)				
Trust/Communication Intercept with Delinquency Slope							
Delinquency Intercept with Delinquency Slope							
Delinquency Intercept with Trust/Communication Slope							
Delinquency Slope with Trust/Communication Slope							

*Note. *p ,.05, **p <.01, ***p<.001. "IT" denotes Trust/Communication intercept, "ST" denotes Trust/CommunicationSlope, "ID" denotes Delinquency Intercept, "SD" denotes Delinquency Slope*

Table 43
Demographics

	n (%)	*M (SD)*
Focal child: sex		1.52 (0.50)
Male	398 (42.70)	
Female	424 (45.5)	
Caregiver: age		37.62 (7.94)
Focal Child Relationship to Primary Caregiver		23.42 (9.11)
Biological Child	755 (81.10)	
Grandchild	40 (4.30)	
Other	25 (2.9)	
Adult respondent's current marital/cohabitation status		1.82 (1.50)
Not married or cohabiting	602 (64.70)	
Cohabiting, not married	27 (2.90)	
Married, spouse in house	42 (4.50)	
Married, spouse not in house	22 (2.40)	
Separated	119 (12.80)	
Separated, cohabiting	2 (0.20)	
Unknown	1 (0.10)	
Child's age in months		148.87 (17.48)
Presence of Substitute Father Figure		1.59 (0.49)
Yes	335 (36)	
No	481 (51.70)	
Mother race/ethnicity		3.71 (2.10)
Non-Hispanic White	89 (9.60)	
Non-Hispanic Black	354 (38.0)	
Non-Hispanic American Indian	4 (0.40)	
Hispanic	365 (39.20)	
Other	10 (1.10)	

Table 44

Correlation matrix for all study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. Sex of Focal Child	1.00																								
2. Age of Primary Caregiver	0.03	1.00																							
3. Focal Child Relationship to Primary Caregiver	0.03	0.47	1																						
4. Adult respondent's current marital/cohabitation status	0.03	0.02	-0.05	1.00																					
5. Child's age in months	0.04	0.18	0.02	0.03	1																				
6. Focal Child's grades on last report card	-0.14	0.04	-0.01	-0.02	0.2	1																			
7. Neighborhood problems	0.04	-0.07	0.02	0.02	0	0.05	1																		
8. Harsh Parenting Score	-0.01	-0.03	0.02	-0.03	-0.09	-0.01	0.07	1																	
9. Presence of Substitute Father Figure	0.04	0.11	-0.07	0.02	-0.02	0	-0.03	-0.04	1																
10. Father involvement	-0.06	0.06	-0.01	0.07	-0.05	-0.01	-0.04	-0.02	0.28	1															
11. Financial Strain	0.04	0.04	-0.02	-0.05	0.00	0.02	0.17	0.03	-0.03	-0.06	1														
12. Parental Illegal activities	-0.03	-0.15	-0.09	-0.05	0.00	0.06	0.12	0.16	-0.03	-0.01	0.19	1													
13. Mother-Child Trust/Communication	0.01	0.01	0.04	-0.01	-0.16	-0.12	0	-0.02	-0.03	0.06	0.04	-0.03	1												
14. Mother-Child Anger/Alienation	-0.06	-0.01	0.02	-0.04	-0.05	-0.04	-0.05	-0.07	0.05	0.11	-0.02	-0.05	0.31	1											
15. Parental Monitoring	0.10	-0.05	-0.04	0.03	-0.27	-0.14	0.06	0.01	0.03	0.04	0.04	-0.1	0.39	0.29	1										
16. Father-Child Trust/Communication Wave 1	-0.12	-0.03	0.03	0.06	-0.18	-0.08	-0.04	-0.01	0.14	0.41	-0.07	-0.04	0.32	0.21	0.21	1									
17. Father-Child Trust/Communication Wave 2	-0.16	0.04	0.08	0.02	-0.23	-0.10	-0.08	0.02	0.13	0.34	-0.11	-0.01	0.16	0.14	0.16	0.62	1								
18. Father-Child Trust/Communication Wave 3	-0.10	0.05	0.09	0.07	-0.07	-0.05	-0.11	-0.02	0.13	0.36	0.01	0.06	0.04	0.13	0.01	0.45	0.52	1							
19. Father-Child Anger/Alienation Wave 1	0.13	0.01	-0.03	0.01	0.13	0.03	0.07	0.00	-0.02	-0.06	0.07	-0.06	-0.15	-0.35	-0.12	-0.19	-0.34	-0.24	1						
20. Father-Child Anger/Alienation Wave 2	0.16	0.00	-0.04	-0.03	0.15	0.08	0.06	-0.01	-0.08	-0.08	0.09	0.02	-0.10	-0.23	-0.14	-0.29	-0.36	-0.26	0.47	1					
21. Father-Child Anger/Alienation Wave 3	0.09	-0.05	-0.06	-0.06	0.03	0.00	0.07	-0.05	0.03	0.04	0.01	0.03	-0.03	-0.07	-0.09	-0.13	-0.22	-0.23	0.28	0.35	1				
22. Delinquency Wave 1	-0.13	0.00	0.03	-0.01	0.21	0.17	0.02	0.01	-0.08	-0.02	0.01	0.16	-0.23	-0.25	-0.38	-0.14	-0.10	-0.06	0.09	0.14	0.05	1			
23. Delinquency Wave 2	-0.04	0.08	0.05	0.01	0.20	0.16	0.04	0.01	-0.06	-0.02	0.06	0.10	-0.12	-0.15	-0.26	-0.12	-0.15	-0.12	0.12	0.24	0.11	0.48	1		
24. Delinquency Wave 3	-0.16	0.05	0.03	-0.01	0.10	0.16	-0.01	0.02	-0.05	0.04	-0.03	0.19	-0.06	-0.13	-0.26	-0.12	-0.01	-0.05	0.04	0.13	0.15	0.29	0.45	1	
25. Maternal Race	0.01	-0.06	-0.11	0.07	0.00	0.05	-0.09	-0.05	0.05	-0.09	-0.11	-0.08	-0.07	-0.13	-0.06	-0.03	0.05	0.03	0.05	0.01	0.02	-0.04	-0.08	0.01	1.00

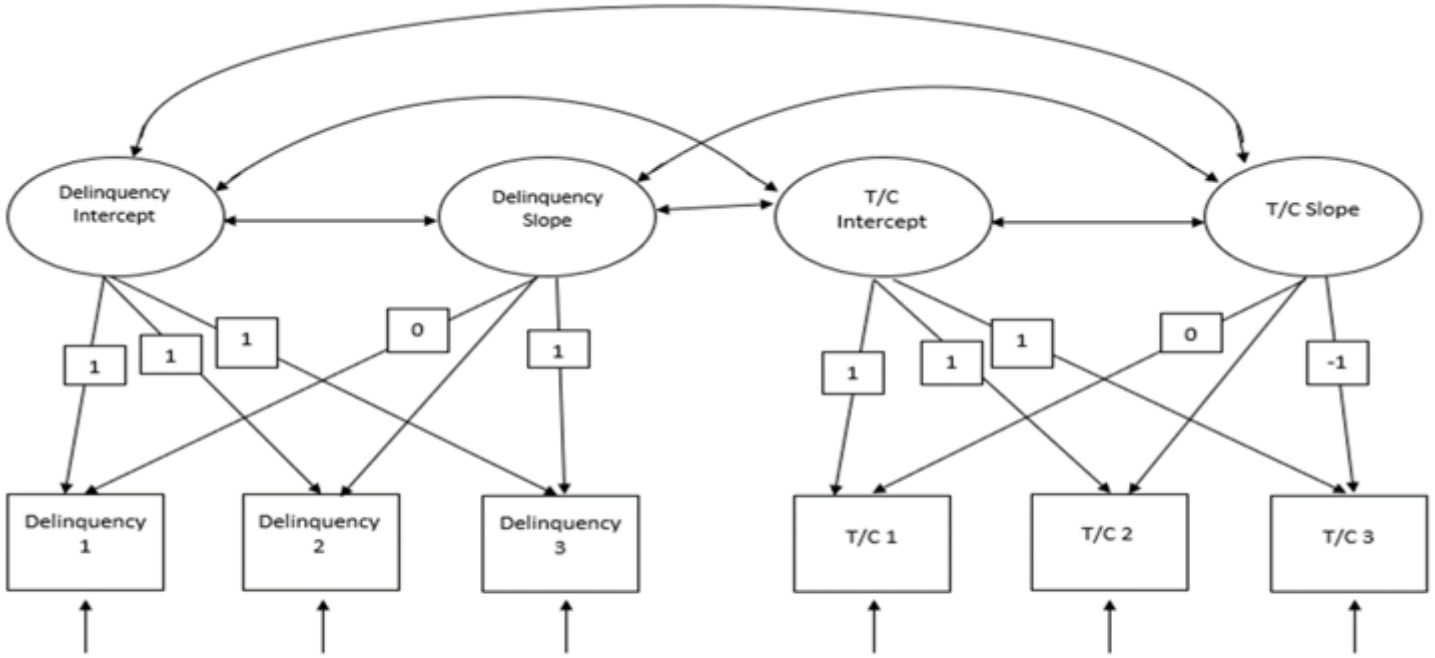

Figure 1. Trust and Communication and Delinquency dual growth model. Circles denote latent variables, while square denote observed variables. Double headed arrows denote factor covariances, single headed arrows originating from latent factors denote regression paths, and single headed arrow with no point of origin denote measurement error. The numbers in each regression path reflect parameter constraints, and the numbers following observed means denote the respective wave of collection.

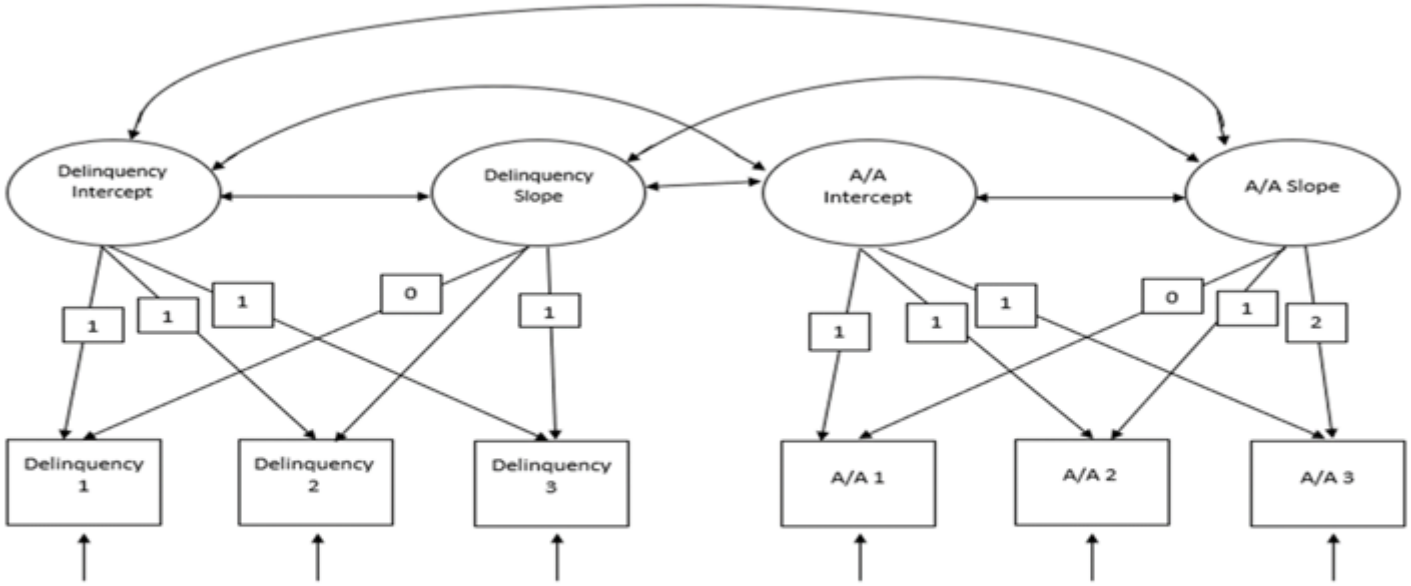

Figure 2. Anger and Alienation and Delinquency dual growth model. Circles denote latent variables, while square denote observed variables. Double headed arrows denote factor covariances, single headed arrows originating from latent factors denote regression paths, and single headed arrow with no point of origin denote measurement error. The numbers in each regression path reflect parameter constraints, and the numbers following observed means denote the respective wave of collection.

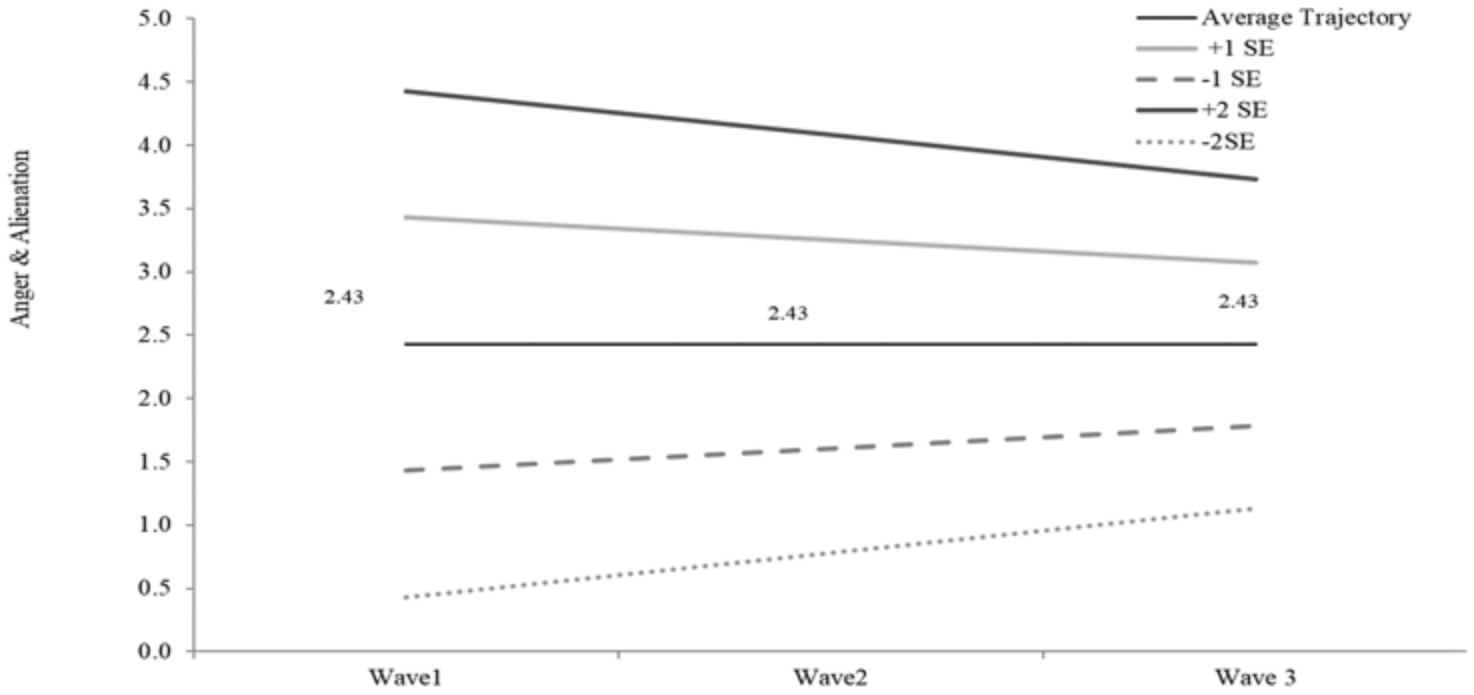

Figure 3. This figure reflects the average rate of change for Anger and Alienation from time 1 to time 3, as well as individual differences in slopes as a function of baseline measures (i.e. an intercept 1 standard error (SE) above the mean would have a less steep slope than an intercept 2 SE's above the mean). Further, as Intercept level increased, the slope became more negative.

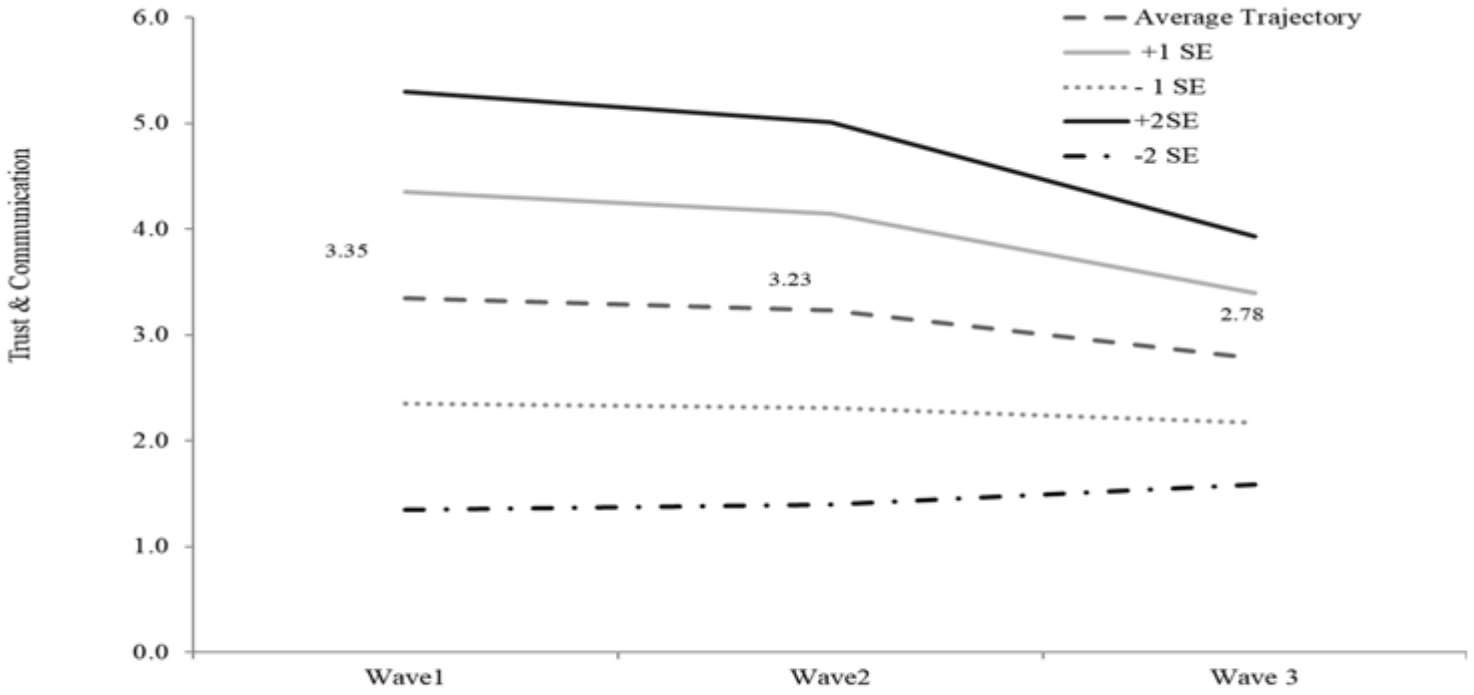

Figure 4. This figure reflects the average rate of change for Trust and Communication from time 1 to time 3, as well as individual differences in slopes as a function of baseline measures (i.e. an intercept 1 standard error (SE) above the mean would have a less steep slope than an intercept 2 SE's above the mean). Further, as intercept level increased, slopes decreased more.

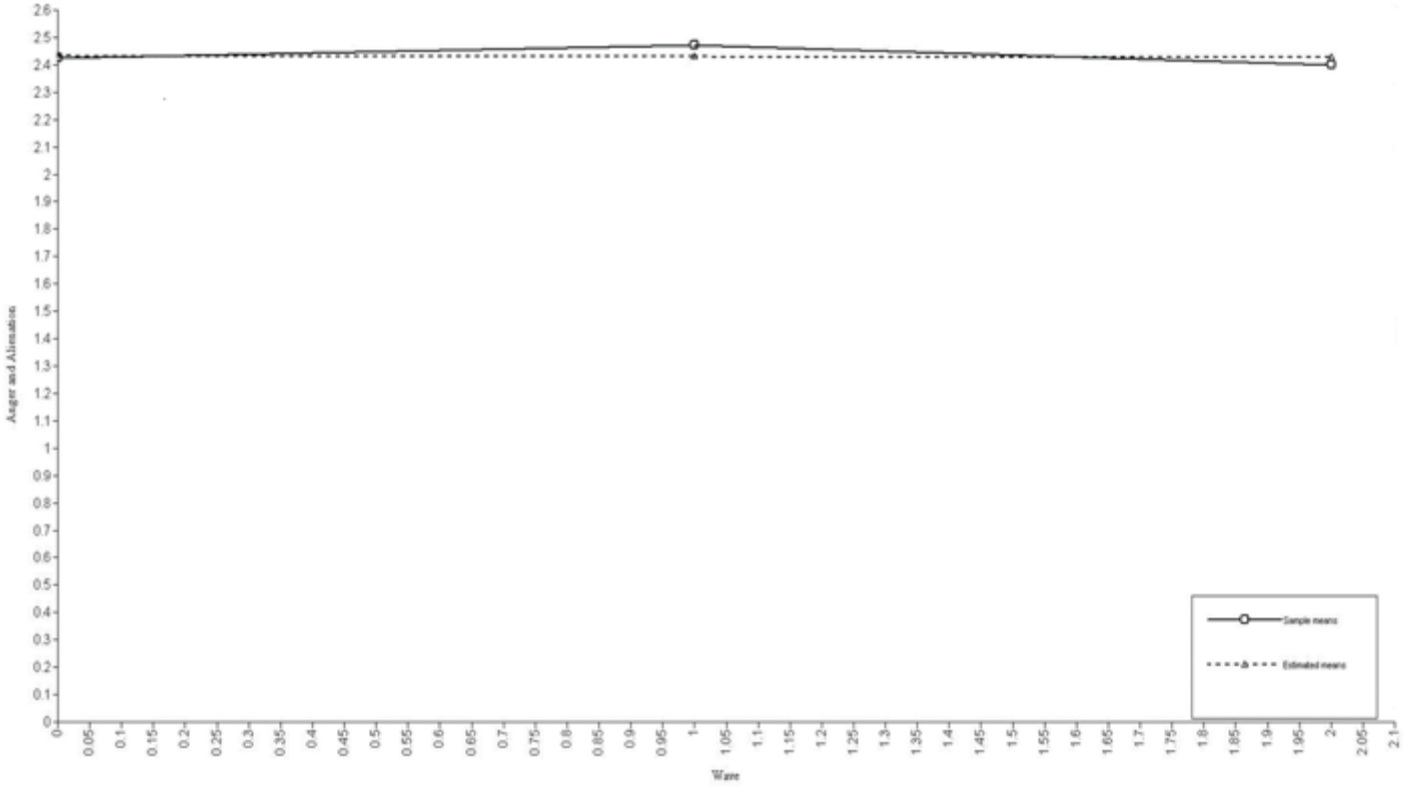

Figure 5. Estimated and sample means for the individual growth curve of Anger and Alienation.

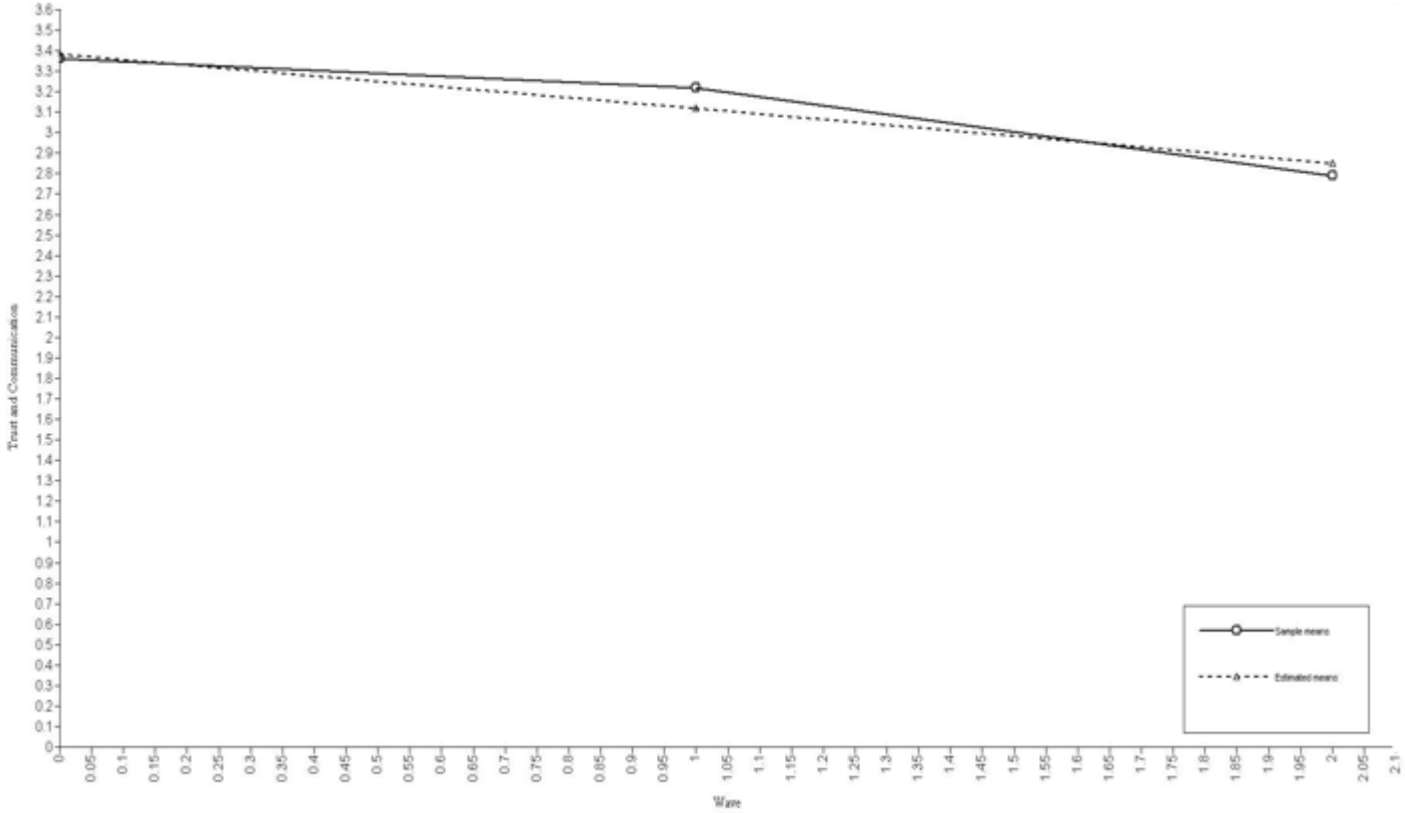

Figure 6. Estimated and sample means for the linear individual growth curve of Trust and Communication.

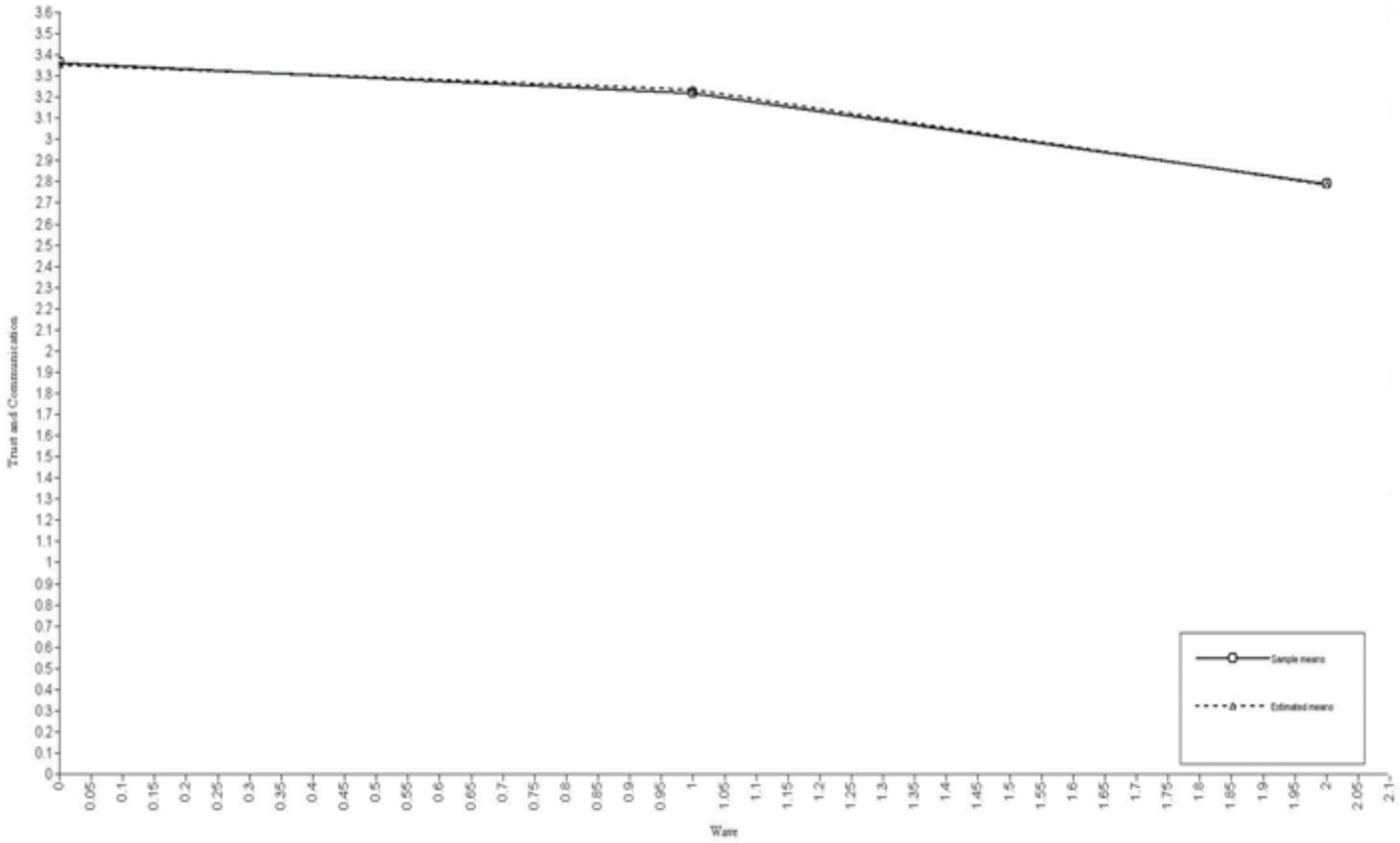

Figure 7. Estimated and sample means for the non-linear individual growth curve of Trust and Communication.

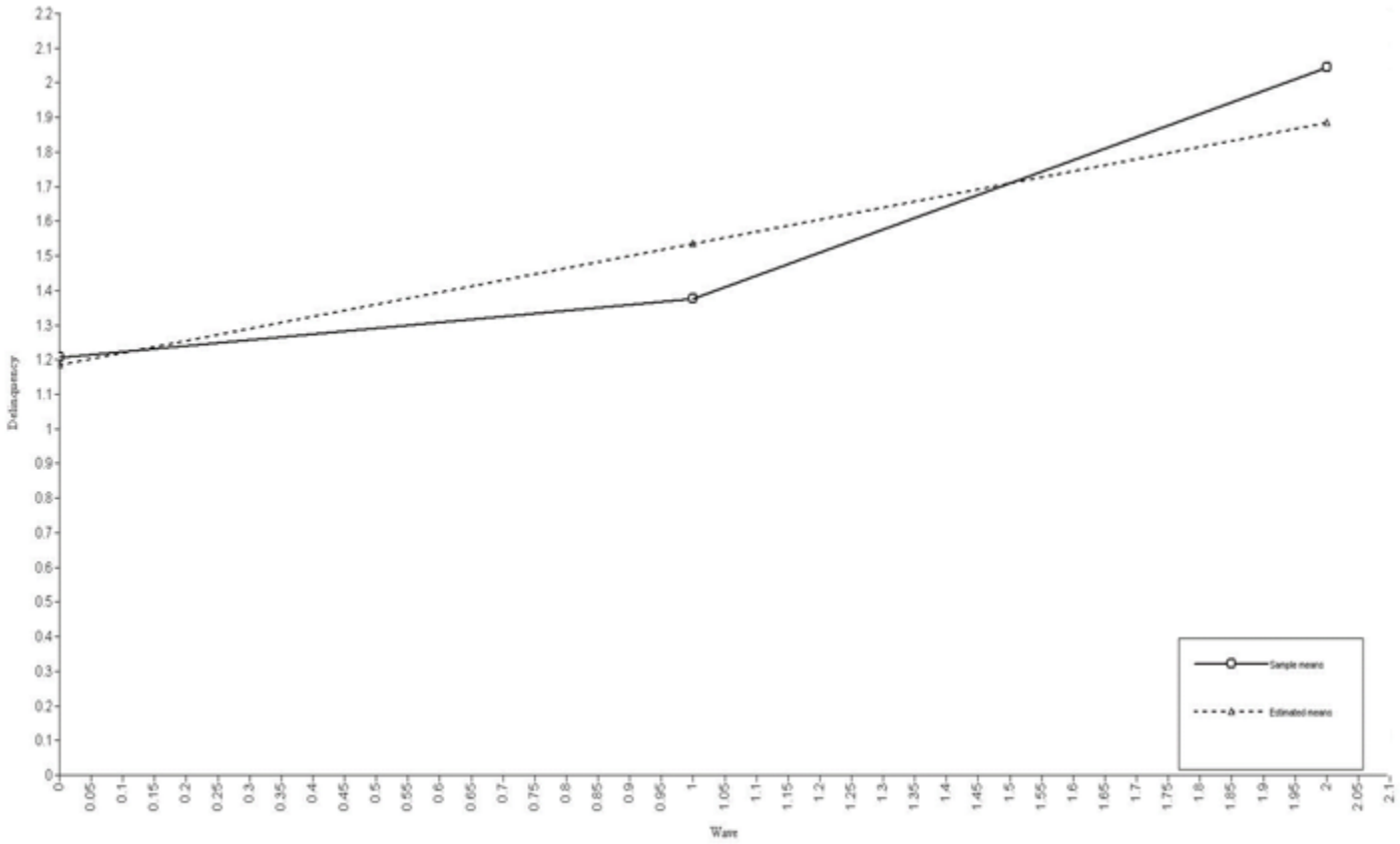

Figure 8. Estimated and sample means for the linear individual growth curve of Delinquency.

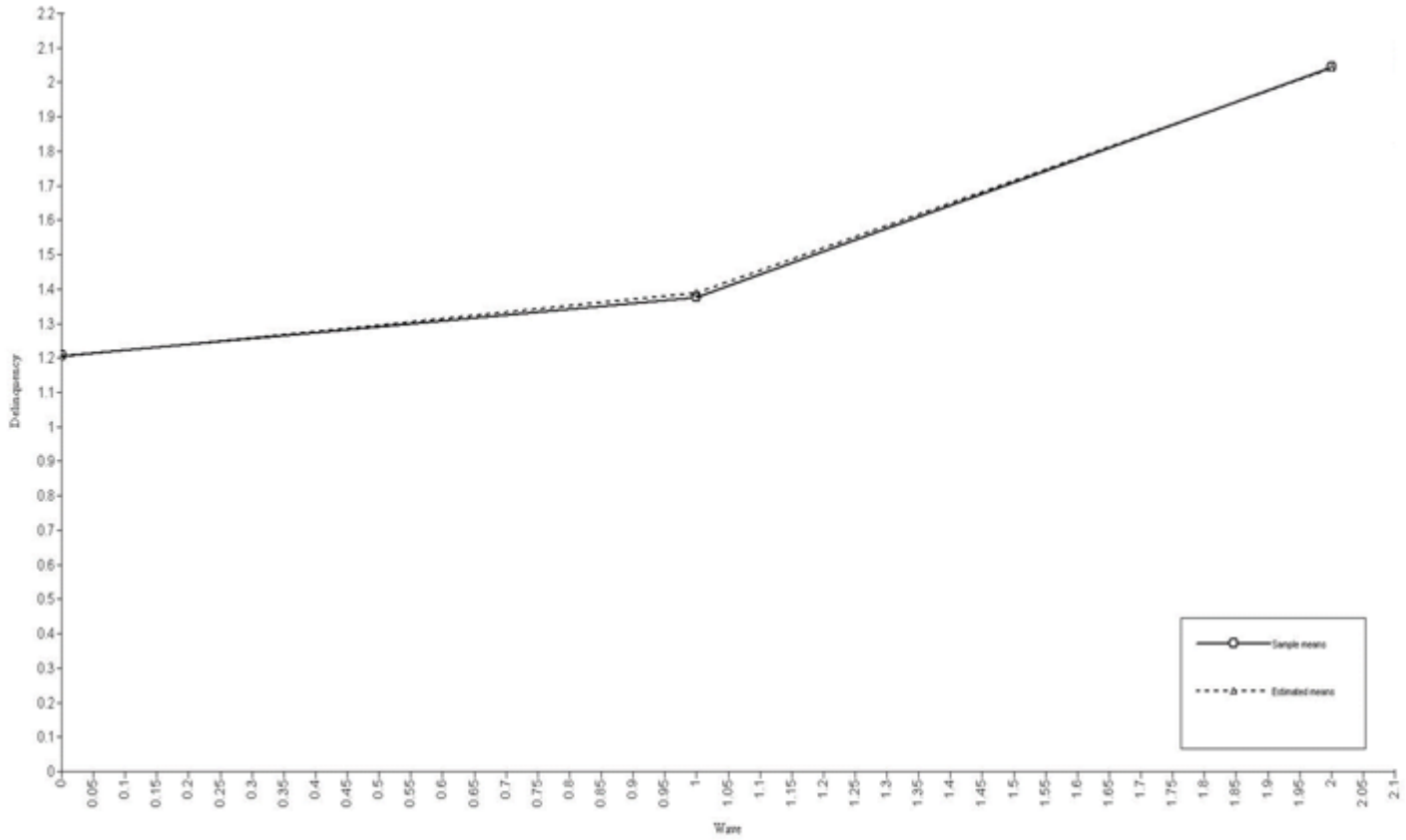

Figure 9. Estimated and sample means for the non-linear individual growth curve of Delinquency.

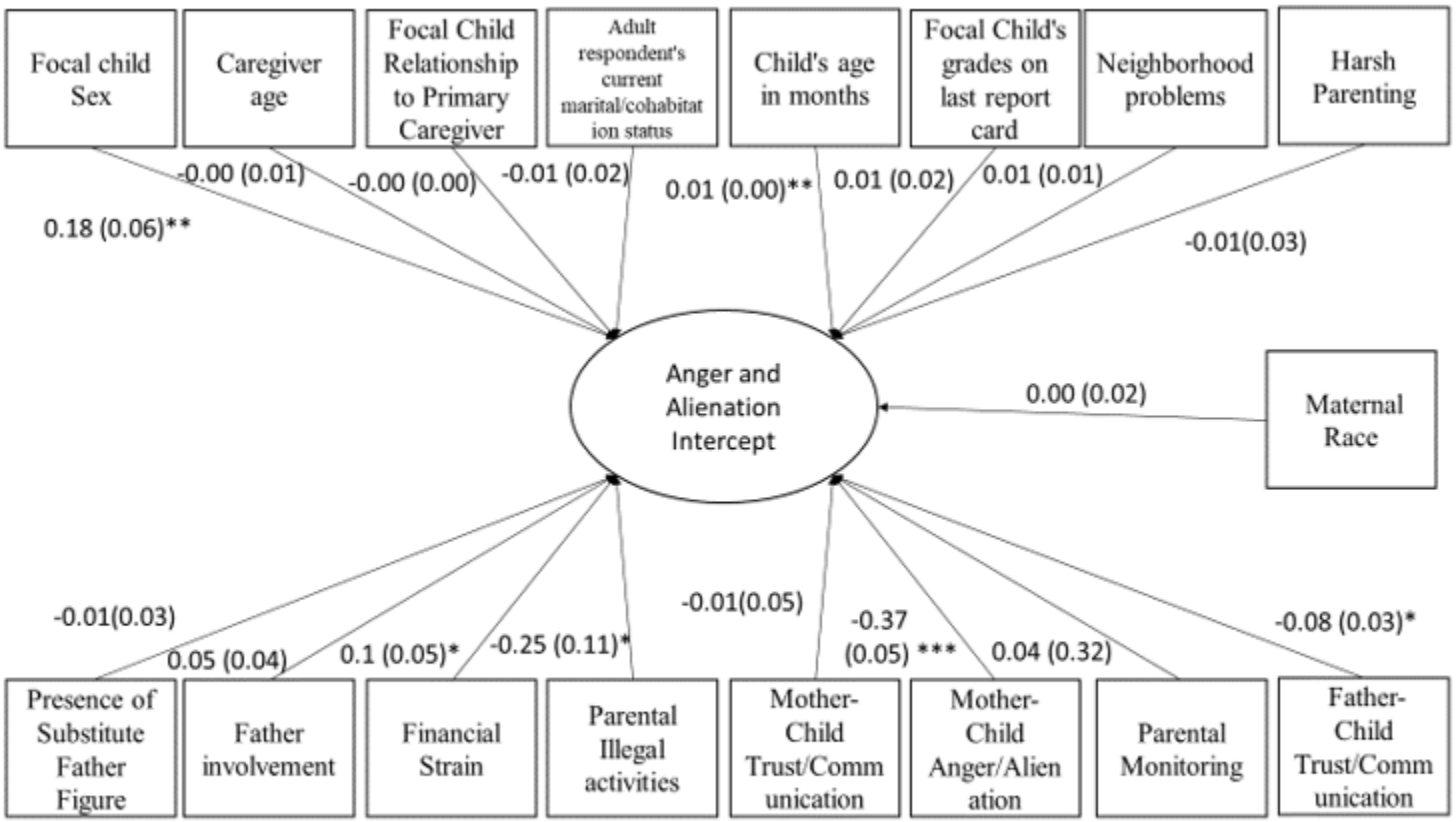

Figure 10. Covariates regressed on Anger and Alienation intercept, for the Anger and Alienation and Delinquency Dual growth model 3. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

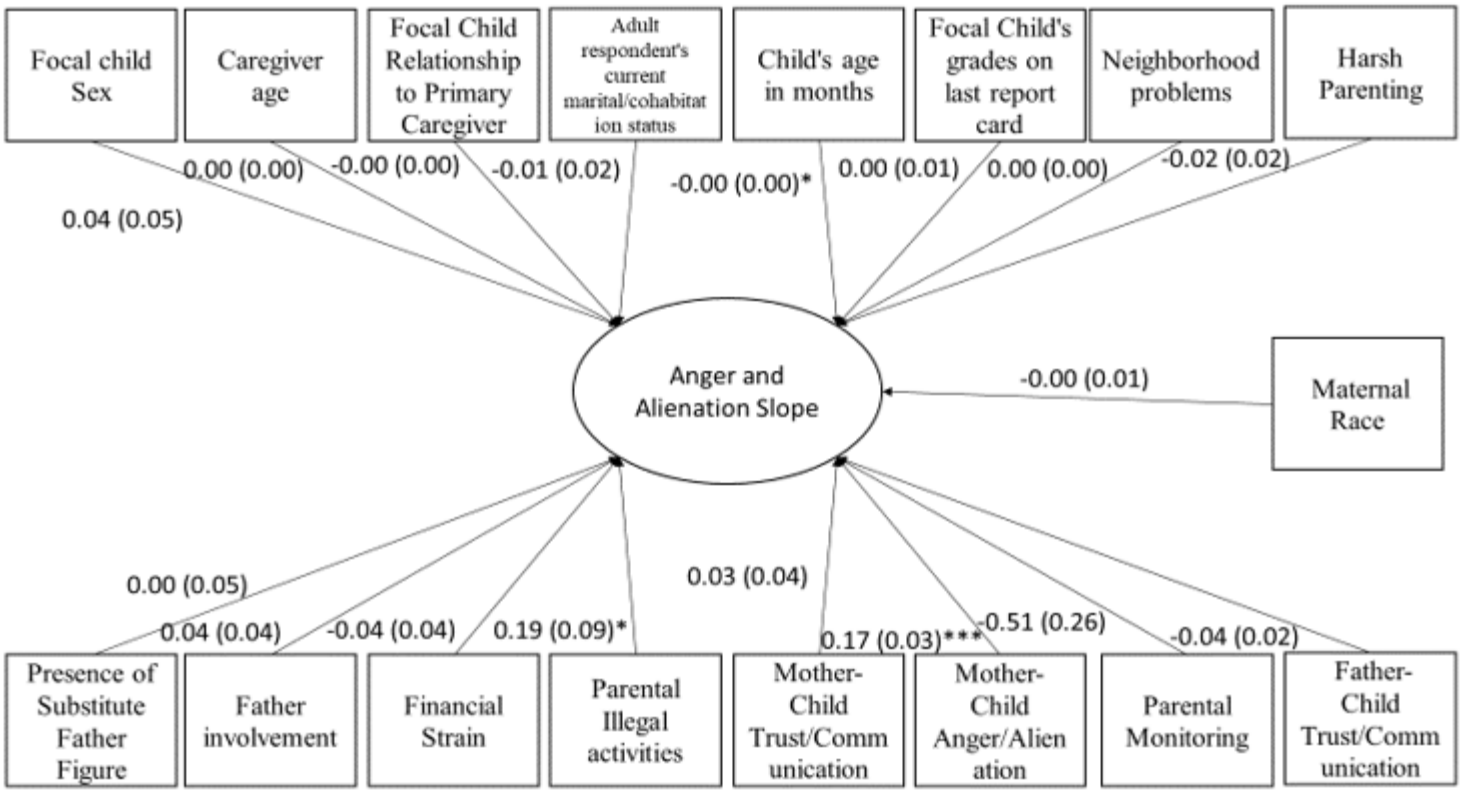

Figure 11. Covariates regressed on Anger and Alienation slope, for the Anger and Alienation and Delinquency Dual growth model 3. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

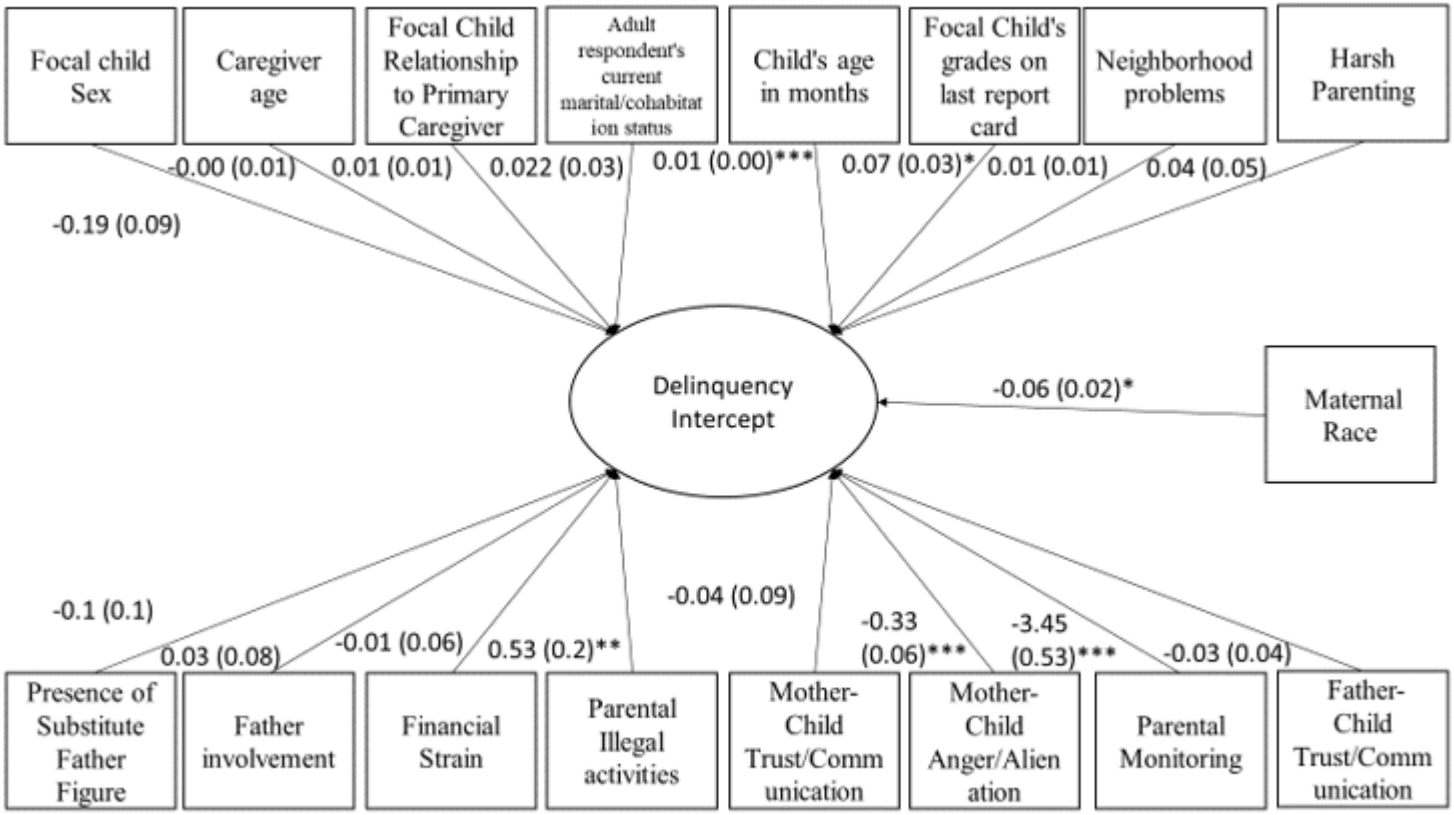

Figure 12. Covariates regressed on Delinquency intercept, for the Anger and Alienation and Delinquency Dual growth model 3. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

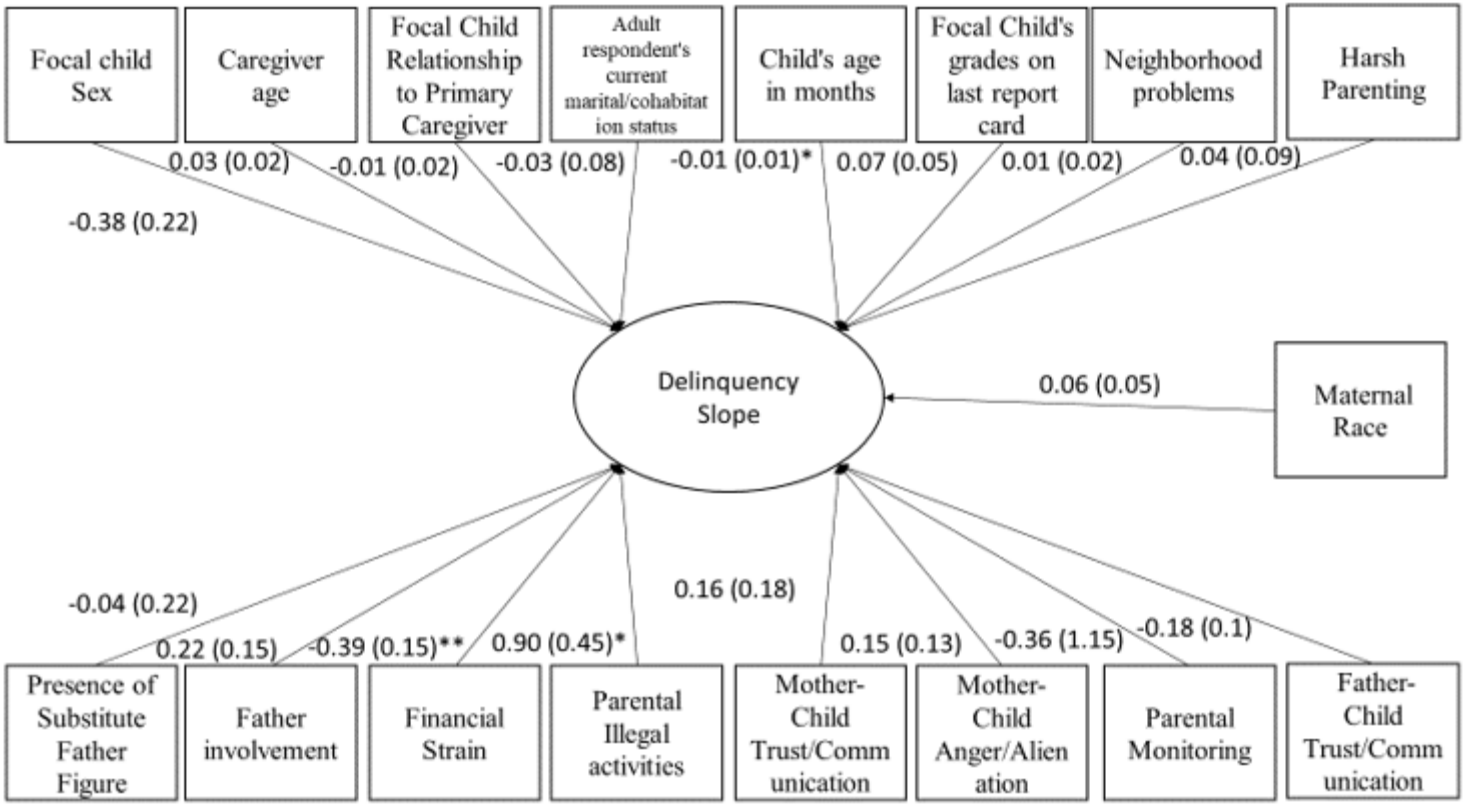

Figure 13. Covariates regressed on Delinquency slope, for the Anger and Alienation and Delinquency Dual growth model 3. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

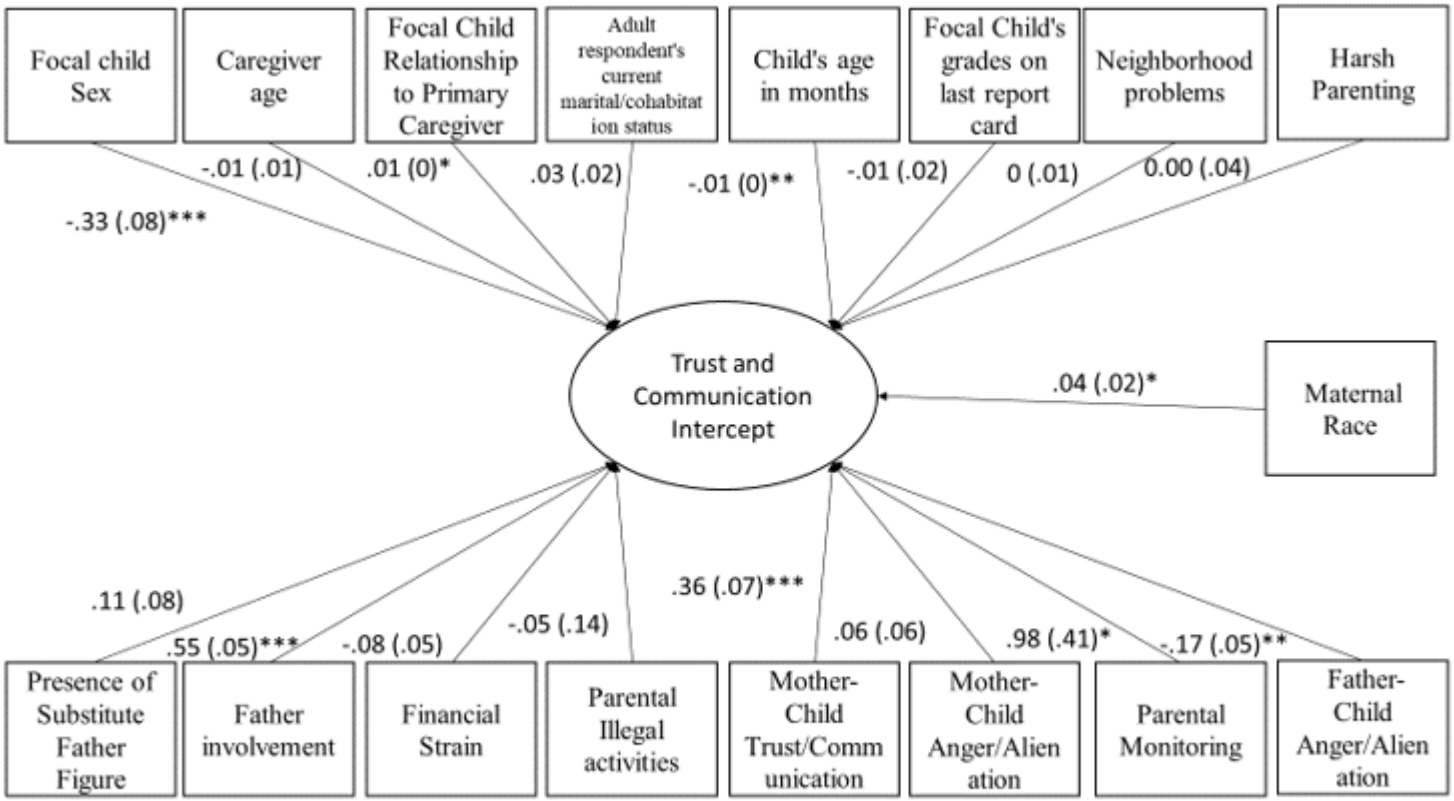

Figure 14. Covariates regressed on Trust and Communication intercept, for the Trust and Communication and Delinquency Dual growth model 2. Statistics are reported as *b (SE)*, and are positioned to the left of their respective regression path.

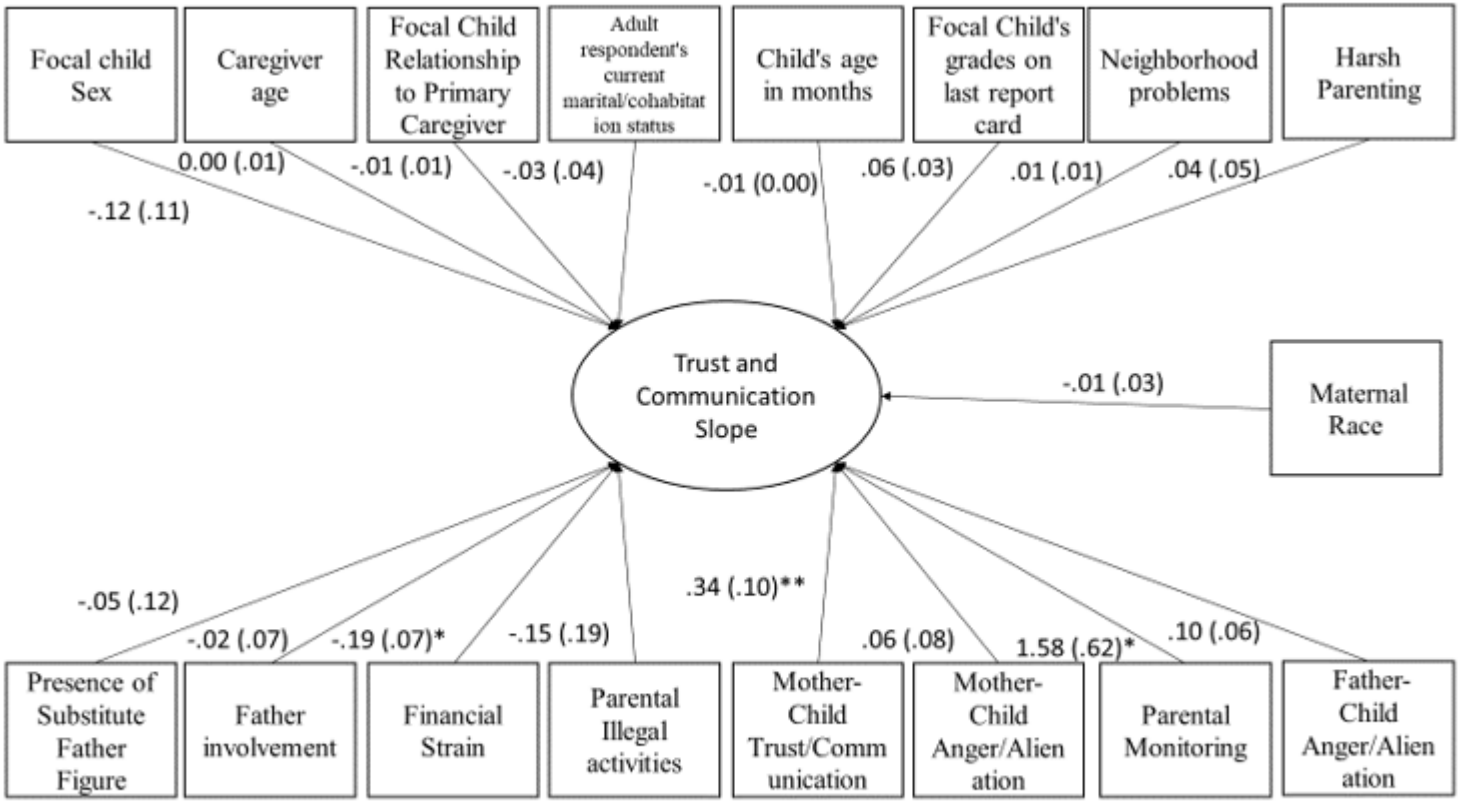

Figure 15. Covariates regressed on Trust and Communication slope, for the Trust and Communication and Delinquency Dual growth model 2. Statistics are reported as *b (SE),* and are positioned to the left of their respective regression path.

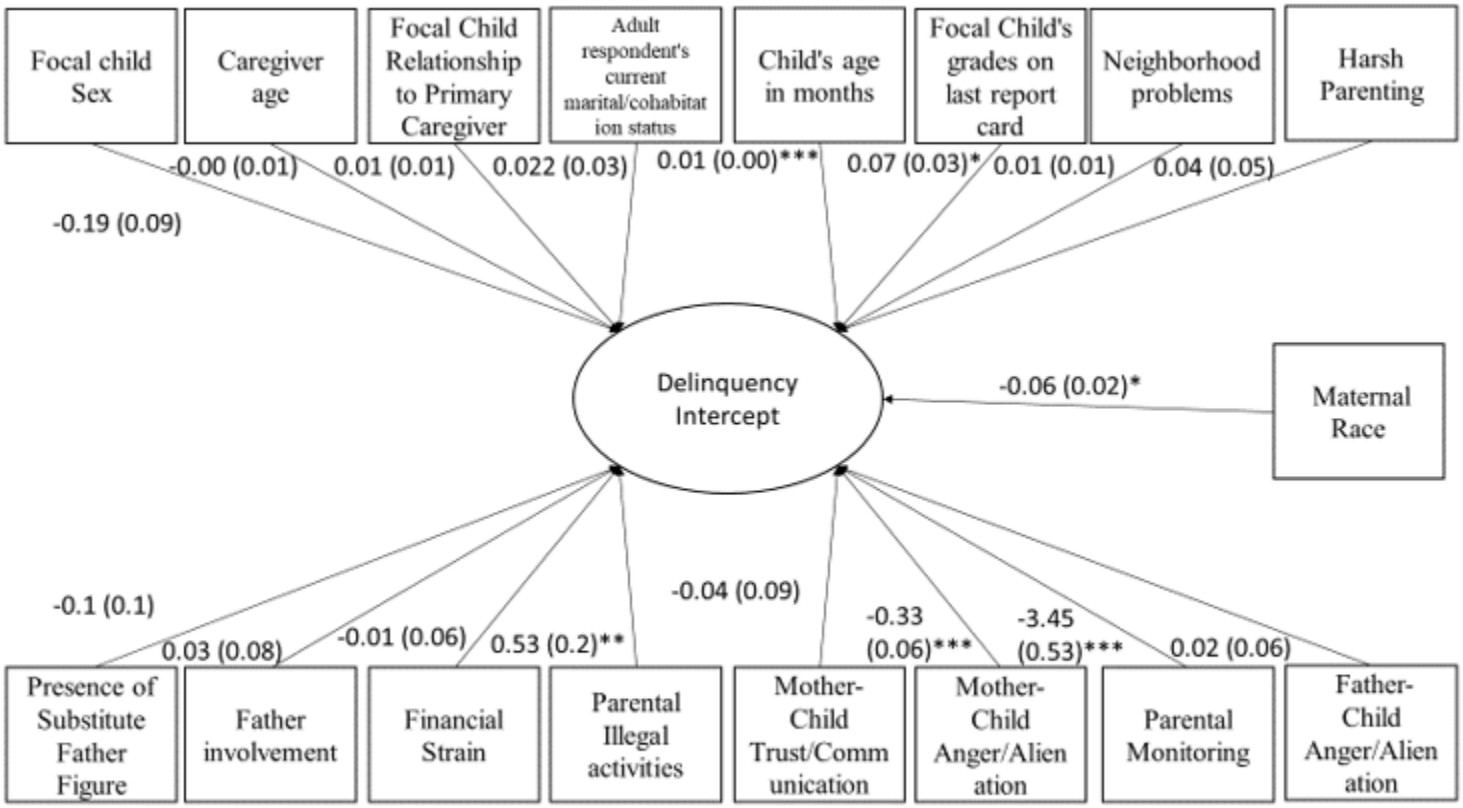

Figure 16. Covariates regressed on Delinquency intercept, for the Trust and Communication and Delinquency Dual growth model 2. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

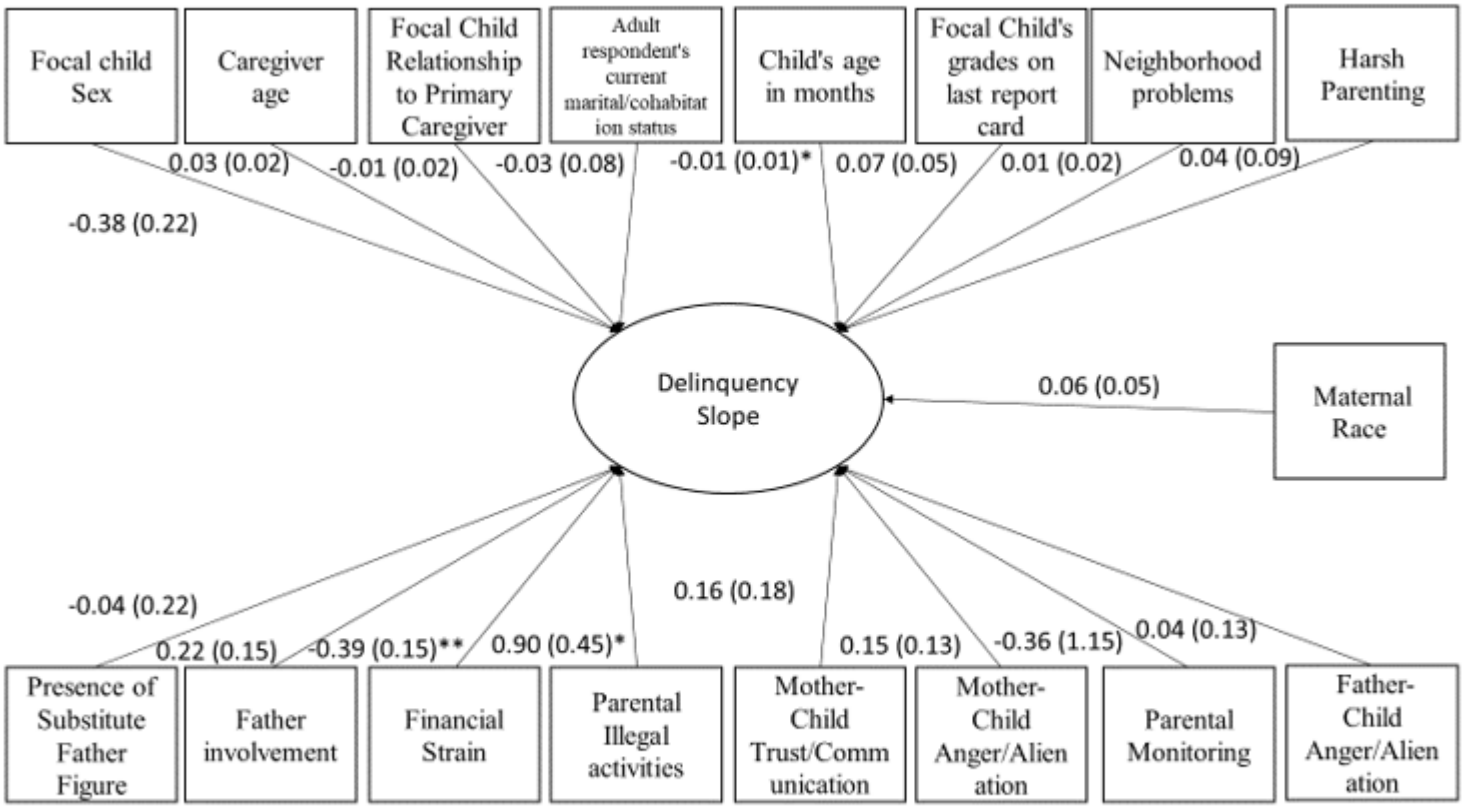

Figure 17. Covariates regressed on Delinquency slope, for the Trust and Communication and Delinquency Dual growth model 2. Statistics are reported as *b* (*SE*), and are positioned to the left of their respective regression path.

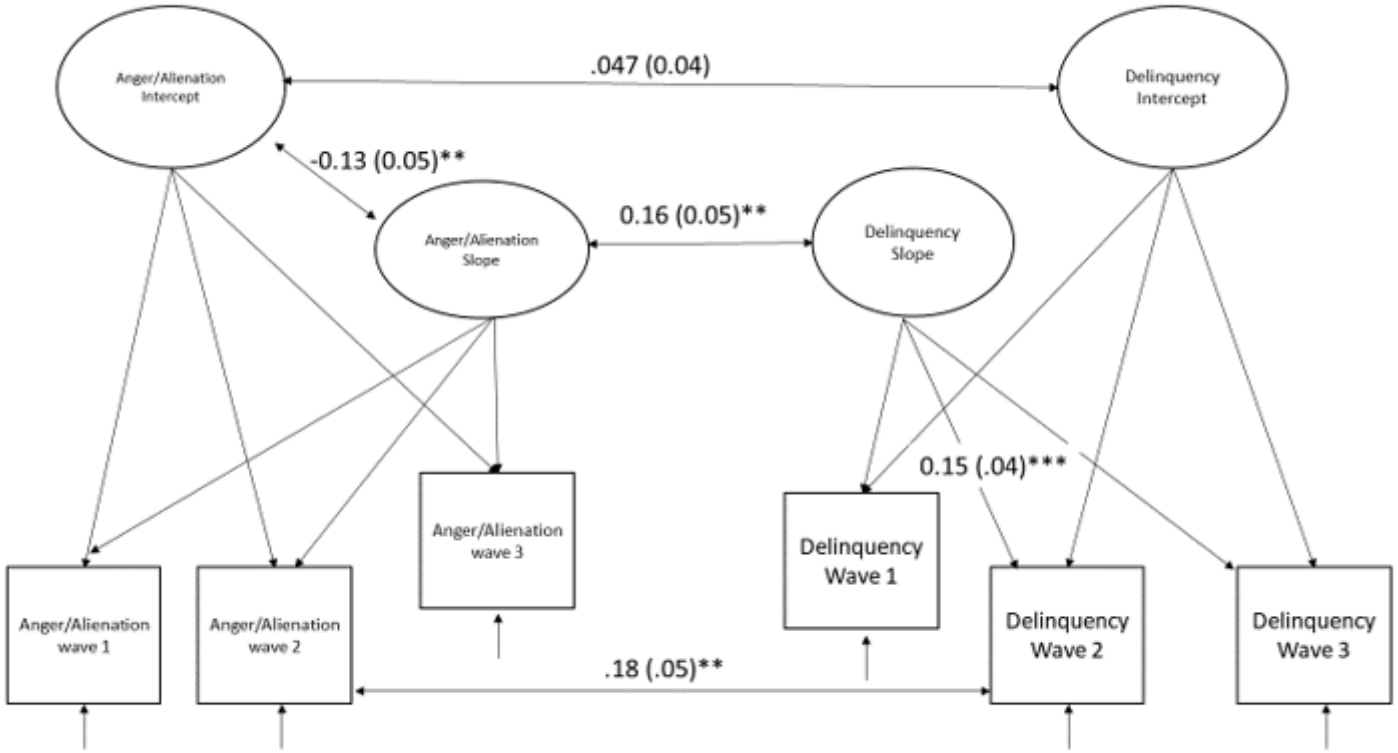

Figure 18. Factor covariances for the Anger and Alienation and Delinquency dual growth model 3. Statistics are reported as *b* (*SE*).

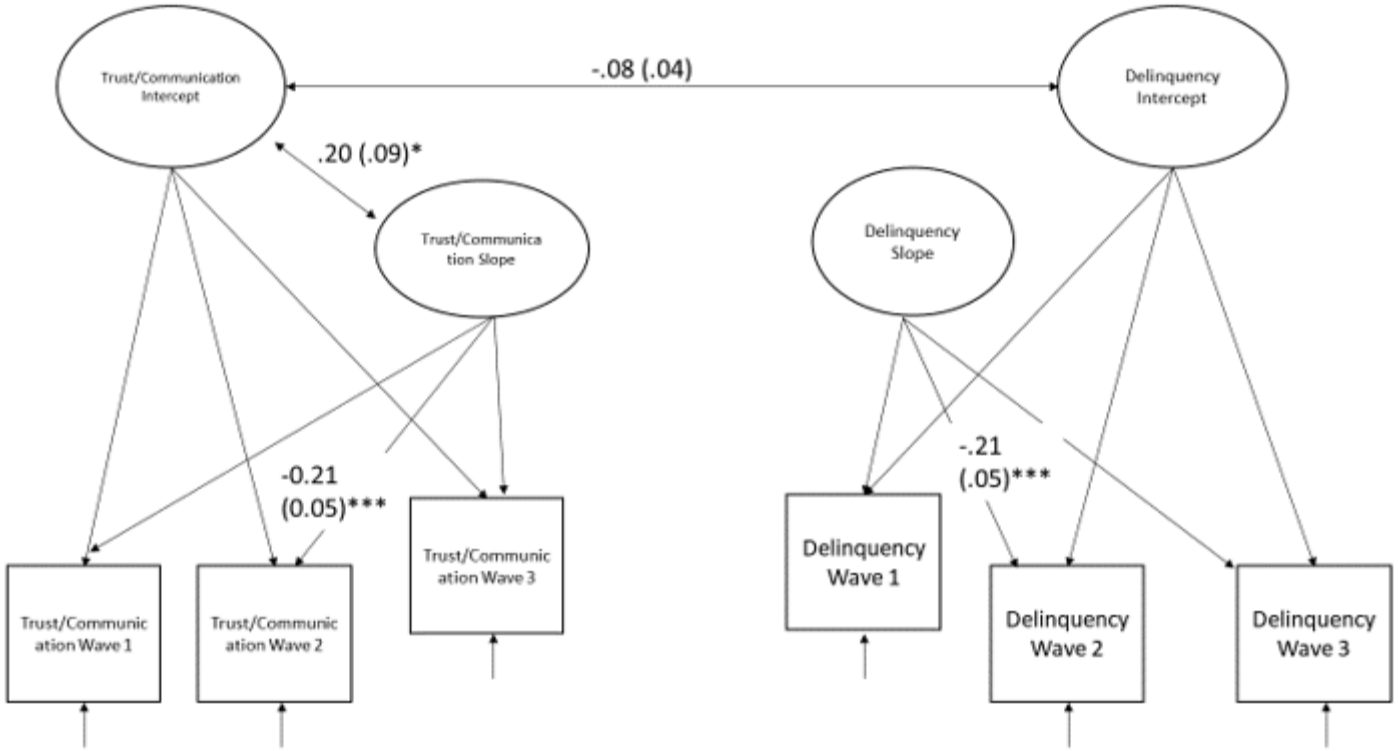

Figure 19. Factor covariances for the Trust and Communication and Delinquency dual growth model 2. Statistics are reported as *b* (*SE*).

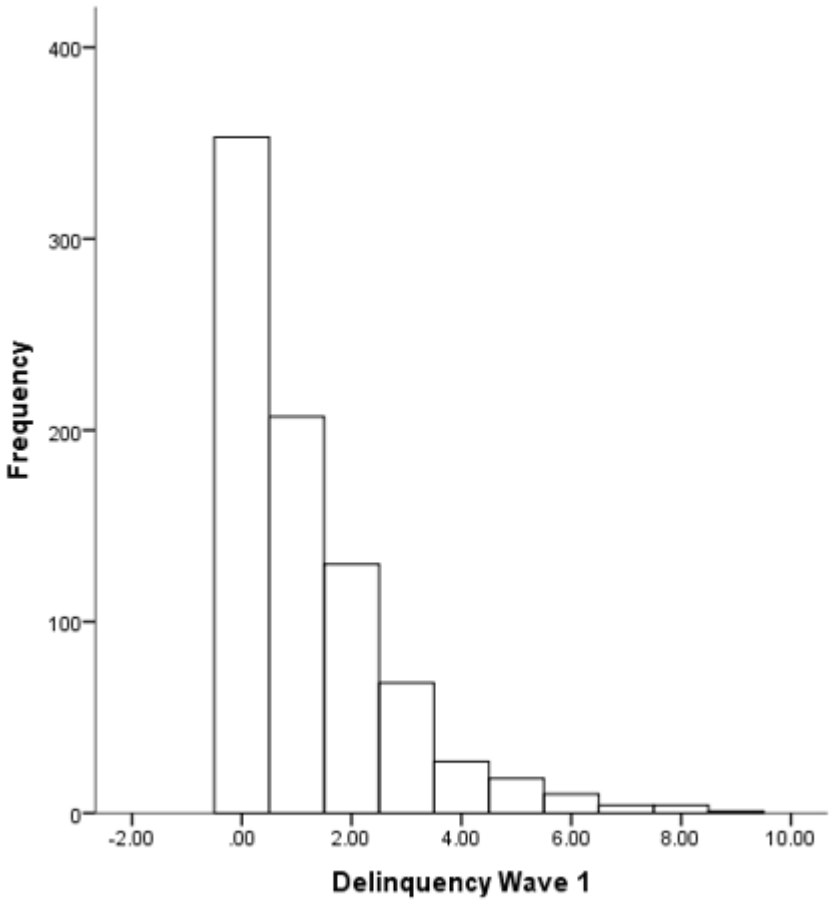

Figure 20. Histogram for the first wave of delinquency.

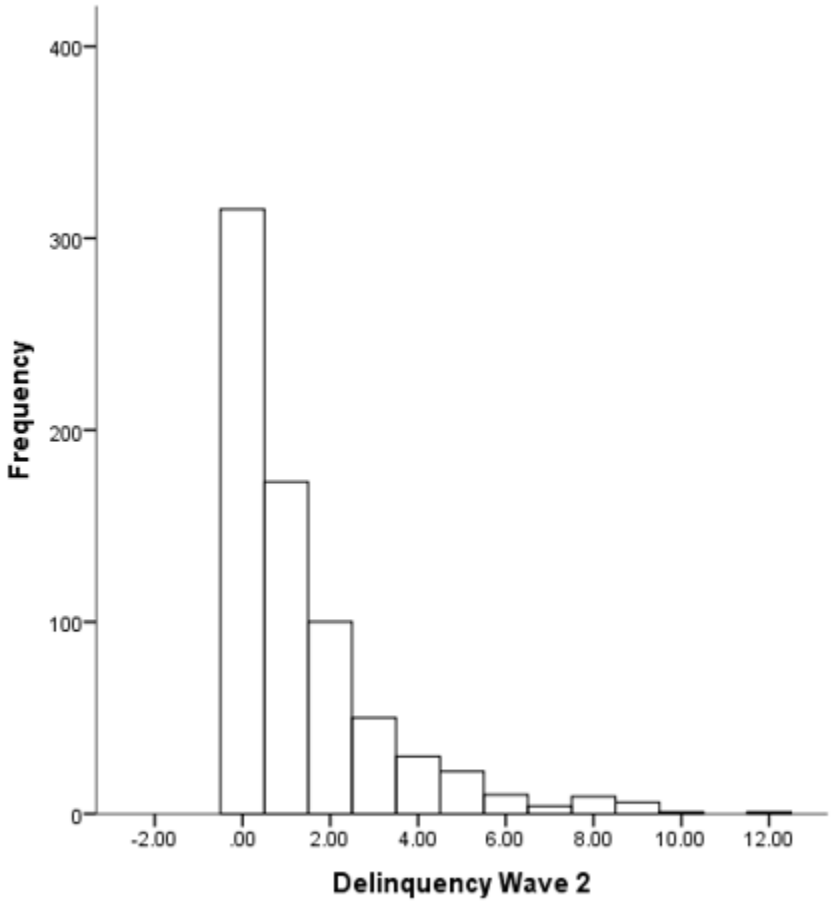

Figure 21. Histogram for the second wave of delinquency.

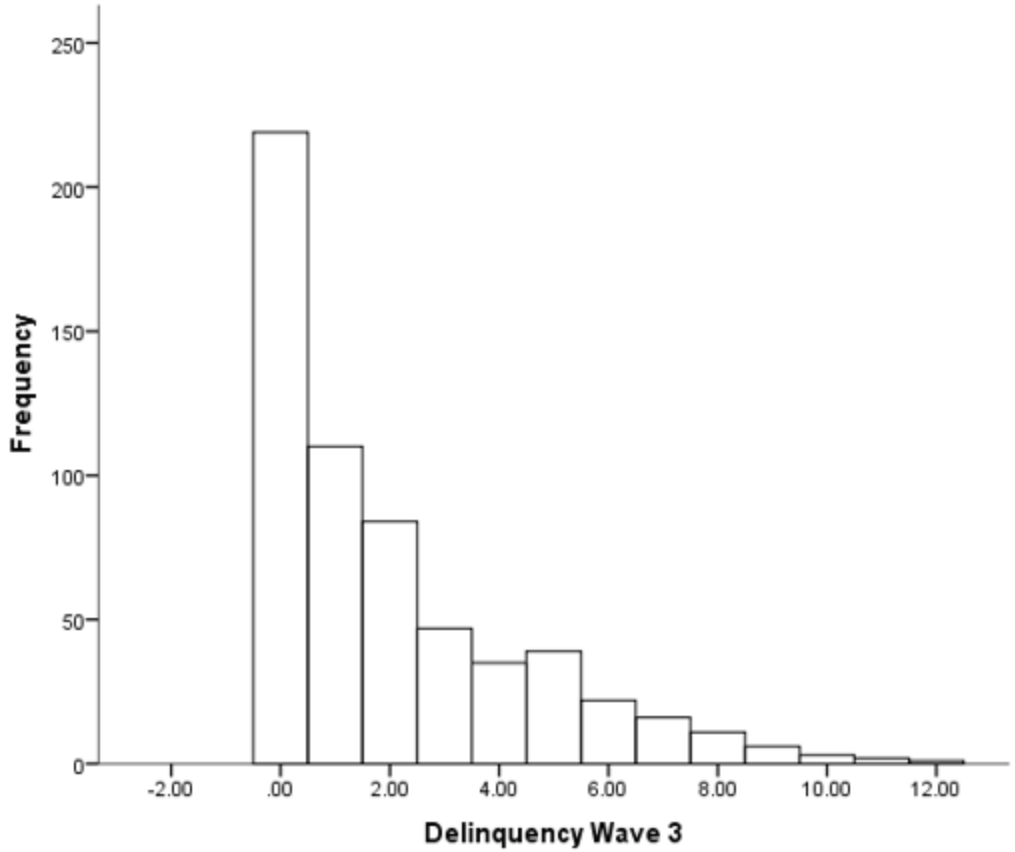

Figure 22. Histogram for the third wave of delinquency.