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Affiliation With Antisocial Peers, Susceptibility to Peer Influence, and Antisocial Behavior During the Transition to Adulthood

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Abstract

Developmental theories suggest that affiliation with deviant peers and susceptibility to peer influence are important contributors to adolescent delinquency, but it is unclear how these variables impact antisocial behavior during the transition to adulthood, a period when most delinquent individuals decline in antisocial behavior. Using data from a longitudinal study of 1,354 antisocial youth, the present study examined how individual variation in exposure to deviant peers and resistance to peer influence affect antisocial behavior from middle adolescence into young adulthood (ages 14 to 22 years). Whereas we find evidence that antisocial individuals choose to affiliate with deviant peers, and that affiliating with deviant peers is associated with an individual's own delinquency, these complementary processes of selection and socialization operate in different developmental periods. In middle adolescence, both selection and socialization serve to make peers similar in antisocial behavior, but from ages 16 to 20 years, only socialization appears to be important. After age 20, the impact of peers on antisocial behavior disappears as individuals become increasingly resistant to peer influence, suggesting that the process of desistance from antisocial behavior may be tied to normative changes in peer relations that occur as individuals mature socially and emotionally.

Keywords

adolescence; antisocial behavior; peers; peer influence; transition to adulthood

Researchers have consistently found that there is a strong social component to antisocial behavior in adolescence (Erickson & Jensen, 1977; Shaw & McKay, 1931). Compared with antisocial acts committed by adults, for example, antisocial acts committed by teenagers are more likely to occur in groups (Warr, 2002; Zimring, 1998), and peer pressure has been hypothesized to be an important contributor to all sorts of deviant and risky behavior in adolescence, including minor delinquency, serious offending, reckless driving, and drug and alcohol use (Chassin et al., 2004; Simons-Morton, Lerner, & Singer, 2005). According to one highly influential theory of adolescent antisocial behavior, teenagers' desire to impress peers is at the heart of most of the delinquency that occurs during this developmental period (Moffitt, 1993).

The importance of peer groups in adolescent antisocial behavior is likely the product of multiple processes, including increases in the amount of time adolescents spend with peers, in the stated importance of peer relationships, and, especially, in adolescents' susceptibility to peer influence (Brown, 2004; Steinberg & Silverberg, 1986). Indeed, one recent experimental study found that the mere presence of peers doubled the amount of risk taking in which adolescents engaged; exposure to peers had no such impact on adults, however (Gardner & Steinberg, 2005). It is also the case that one of the strongest predictors of peer affiliation in adolescence is *homophily*, or peer similarity, with regard to involvement in and tolerance of antisocial behavior (Kandel, Davies, & Baydar, 1990).

Although it has been well documented that peers play an important role in antisocial behavior during adolescence, how the influence of peers on antisocial behavior changes across adolescence and the transition to adulthood is less well understood. This is an especially significant gap in our knowledge, because it is during early adulthood that most antisocial individuals desist from criminal activity (Farrington, 2004). Because virtually all research on peer influences on antisocial behavior has examined adolescence, a time during which antisocial behavior is generally on the rise, it is unknown whether the factors that influence increases in antisocial behavior are the same as those that influence declines in it. Whether declines in antisocial behavior in early adulthood result from changes in peer dynamics is an important, but unstudied, question that has potential implications for policy and practice.

In the present study, we assess the impact of two peer-related variables on changes in antisocial behavior over adolescence and young adulthood. At the interpersonal level, we examine how changes in exposure to antisocial friends over time are associated with involvement in antisocial activity and whether the impact of affiliation with deviant peers on antisocial behavior changes as youths age. At the intrapersonal level, we test whether changes in antisocial behavior over time are due to changes in susceptibility to peer influence and whether the relation between susceptibility to peer influence and antisocial behavior is altered as individuals mature into adulthood. Finally, we examine whether exposure to antisocial peers and susceptibility to peer influence interact in their association with antisocial behavior.

One of the most robust findings in the literature on adolescent antisocial behavior is that individuals with deviant peers are more likely to engage in antisocial behavior than individuals without deviant peers (Brendgen, Vitaro, & Bukowski, 2000; Elliott & Menard, 1996; Farrington, 2004; Heinze, Toro, & Urberg, 2004; Lipsey & Derzon, 1998; Patterson, Capaldi, & Bank, 1991), although it has been difficult to determine cause and effect (Matsueda & Anderson, 1998). Past research often focuses on how affiliation with deviant peers impacts antisocial behavior, but most of this research is cross-sectional, making it impossible to disentangle the bidirectional relation between affiliation with antisocial peers and antisocial behavior. In order to fully understand whether changes in antisocial behavior lead to changes in patterns of peer group affiliation (i.e., *peer selection*) or, alternatively, whether changes in patterns of affiliation lead to changes in antisocial behavior (i.e., *peer socialization*), the link between the two needs to be studied longitudinally. Furthermore, research is needed that clarifies whether and to what extent the impact of having antisocial peers influences antisocial behavior as adolescents transition into adulthood. To the extent that the peer group becomes a less influential context as individuals enter into adult work and romantic relationships (Brown, 2004), we might expect peers to exert less of an impact on individuals' behavior, including antisocial behavior, during this time. Along similar lines, to the extent that willingness to engage in antisocial behavior becomes a less attractive characteristic as individuals mature and their interest in challenging authority wanes, we might expect to see less of an impact of individuals' own antisocial inclinations on their choice of friends. Both of these processes (weakened socialization and weakened selection) would diminish the correlation between

individuals' antisocial behavior and that of their friends as individuals move from adolescence into adulthood.

Although having relatively more deviant peers is generally associated with increased risk for deviant behavior, not all adolescents are equally influenced by their friends. One possible moderating factor of the relation between individuals' antisocial behavior and their exposure to deviant peers is an individual's level of resistance to peer influence, a trait that has been shown to change with age and to vary across individuals (Berndt, 1979; Erickson, Crosnoe, & Dornbusch, 2000; Steinberg & Monahan, 2007; Steinberg & Silverberg, 1986). The developmental course of susceptibility to peer influence in early adolescence varies depending on how the construct is operationalized. When it is measured in terms of the propensity to engage specifically in antisocial acts, susceptibility to peer influence appears to increase during early adolescence, peaking around 14 years of age (Erickson, Crosnoe, & Dornbusch, 2000; Steinberg & Silverberg, 1986), but when susceptibility to peer influence is measured more globally, it appears to remain stable or to decline over this same time period (Berndt, 1979; Steinberg & Monahan, 2007). Between middle adolescence and young adulthood, however, regardless of the behavior in question, susceptibility to peer influence clearly declines (Steinberg & Monahan, 2007), a change that has been attributed to gains in behavioral autonomy and in identity development in late adolescence (see Collins & Steinberg, 2006).

Given the developmental course of susceptibility to peer influence during late adolescence, and in light of the well-documented relation between susceptibility to antisocial peer pressure and involvement in antisocial activity (e.g., Brown, Clasen, & Eicher, 1986), we expect that declines in susceptibility would be associated with diminished antisocial behavior. That is, even if individuals' degree of affiliation with antisocial peers were to remain constant during the transition to adulthood, their antisocial behavior should be less influenced by the peer group if their general susceptibility to peer pressure is waning. However, because prior studies have not examined the independent and interactive influences of susceptibility to peer influence and exposure to antisocial peers, we do not know if the widely reported decline in antisocial behavior that occurs as individuals mature into young adulthood is due to (a) changes in their level of exposure to antisocial peers, (b) changes in the importance of the peer group as an influence on antisocial behavior, (c) variation in individuals' susceptibility to peer influence, or (d) some combination of these factors.

Understanding influences on declines in antisocial activity by definition necessitates studying a sample of individuals known to have been involved in the behavior that wanes. The present study drew on 5 years of data from a longitudinal study of antisocial youths to examine changes in susceptibility to peer influence and affiliation with antisocial peers, and the relation of these factors to changes in antisocial behavior between 14 and 22 years of age. We tested whether these variables are associated with differences in antisocial behavior, and whether the impact of these variables on adolescents' antisocial behavior changes as youths transition into adulthood. Our expectation was that having deviant peers and being high in susceptibility to peer influence would be associated with higher levels of antisocial behavior. We also expected, however, that as youths age, the relation between peer deviance and antisocial behavior would weaken, both because individuals become less likely to select antisocial friends and because the impact of antisocial peers on antisocial behavior would diminish as youths become increasingly resistant to peer influence.

Method

Participants

Participants were adolescents enrolled in the Pathways to Desistance Study (see Mulvey et al., 2004), a prospective study of 1,354 serious juvenile offenders (1,170 male, 184 female) in

Phoenix, Arizona (Maricopa County; $n = 654$) and Philadelphia, PA (Philadelphia County; $n = 700$). (See Schubert et al., 2004, complete details of study methodology.) Adolescents were eligible for study participation if they were between 14 and 17 years of age at the time of their offense and had been convicted of a felony similarly serious nonfelony offense (e.g., a misdemeanor weapons offense, misdemeanor sexual assault). Three steps were taken ensure adequate sample heterogeneity in terms of criminal offending and sex. First, because a large proportion of offenses committed by adolescents are drug offenses, only 15% of the male youths at each site could be enrolled in the study as a result of a drug offense. Second, all youths whose cases were being considered trial in the adult system were eligible for enrollment (even if the offense was a drug offense). Third, all female youths meeting the age and adjudicated crime requirements were eligible for enrollment. A total of 80% of the eligible offenders whom we located and invited to participate in the research agreed to enroll in the study. Thus, all of the individuals participating in the study had been convicted of a serious crime. However, analyses of the developmental trajectories of antisocial behavior in this sample indicated that the proportion of individuals who were persistent offenders was only about 6 percent, a figure comparable to that found in community samples (Monahan, Steinberg, Cauffman, Mulvey, 2009).

To assess participation bias in the sample, we compared eligible youths who did and did not enroll in the study. Results suggested that the enrolled participants had more prior petitions (i.e., arrests leading to formal charges: 2.1 vs. 1.5 for nonparticipants), were somewhat younger at first petition (13.9 years vs. 14.2 for nonparticipants), were somewhat younger at adjudication (15.9 vs 16.1 for nonparticipants), and were somewhat more likely to non-Hispanic Caucasian (25% vs. 20% for nonparticipants). These differences were statistically significant.

The baseline interview was conducted, on average, 36.9 days ($SD = 20.6$) after participants' adjudication (for those in the juvenile system) or their decertification (i.e., waiver) hearing Philadelphia or an adult arraignment in Phoenix (if in the adult system). At the time of the baseline interview, participants were years of age ($SD = 1.14$) and of predominantly lower socioeconomic status (SES), with fewer than 6.3% of the participants' parents holding a 4-year college degree, and 33% of participants' parents having less than a high school education. Of the sample, 41.5% were African American, 33.5% were Hispanic American, 20.2% were non-Hispanic Caucasian, and 4.8% were of other ethnicities.

Procedures

The juvenile court in each locale provided the names of eligible adolescents (based on age and adjudicated charge). Interviewers then attempted to contact each eligible juvenile and his or her parent or guardian to ascertain the juvenile's interest in participation and obtain parental consent. Once the appropriate consents had been obtained, interviews were conducted in a facility (if the juvenile was confined), the juvenile's home, or a mutually agreed-upon location in the community.

The baseline interview was administered over 2 days in two 2-sessions. Interviews and participants sat side by side facing computer, and questions were read aloud to avoid comprehension problems caused by reading difficulties. Respondents could answer the questions aloud or, to maximize privacy, enter their responses on a keypad (although in some facilities, this option was not available). When interviews were conducted in participants' homes or in community settings, attempts were made to conduct them out of the earshot of other individuals. Honest reporting was encouraged, and confidentiality was reinforced by informing participants of the requirement for confidentiality placed on the study by the U.S. Department of Justice, which prohibited the disclosure of any personally identifiable information to anyone outside the research staff (youths were informed that the only exceptions

to confidentiality were cases in which the participant expressed plans to hurt himself or herself or someone else, described a specific plan to commit a crime in the future, disclosed that someone was in jail for a crime the participant committed, or where child abuse was suspected). All recruitment and assessment procedures were approved by the Institutional Review Boards of the participating universities, and adolescents were paid \$50 for their participation in the baseline interview (when allowed by facility rules). Follow-up interviews were conducted every 6 months for 3 years following the baseline interview. After the 36-month follow-up, individuals were interviewed annually. Payment for participants increased gradually at each time point in order to minimize attrition.

Given that the goal of the present study was to examine how peer delinquency and resistance to peer influence affect antisocial behavior differentially at different points between adolescence and young adulthood, we divided individuals by chronological age for purposes of analysis (e.g., 14, 15, and 16 years). Because the study followed an accelerated cohort design, the number of individuals who provided data at each age varied, with more assessments conducted during the middle of the age span than at either tail of the distribution (14 years: $n = 162$; 15 years: $n = 405$; 16 years: $n = 796$; 17 years: $n = 1,171$; 18 years: $n = 1,221$; 19 years: $n = 1,045$; 20 years: $n = 797$; 21 years: $n = 448$; 22 years: $n = 92$). Thus, missing data by age was structural in nature.

Because we were interested in studying change as a function of age, we needed to organize our data by age rather than data collection time points. The study draws on an overlapping cohort design in which individuals provided data for a given age at different times in the study, depending on their age at the baseline assessment (e.g., some individuals were 18 years at the 12-month follow-up, whereas others were 18 years at the 48-month follow-up). However, because our interview schedule varied (with 6 months between assessments during the first 3 years of the study but annually after that), for some participants, data at a given age referred to a 6-month period (e.g., an 18-year-old assessed at the 24-month time point), whereas for others at that same age, data referred to a 12-month period (e.g., an 18-year-old assessed at the 48-month time point). In order to account for this, it was necessary to create uniform spacing across the 5 years of data collection. Accordingly, semi-annual interviews were combined into annual assessments (e.g., 6 month-data were combined with 12-month data; 18- and 24-month data were combined; and 30-month data were combined with 36-month data). Individuals had to provide data at both semi-annual time points to have valid data for any annual period. Given this requirement, after data were combined into year-long intervals, among the 1,354 individuals included in the present analyses, 987 youths (73%) had data for all 5 years of data collection, 205 youths (15%) had 4 years of data, 90 youths (7%) had 3 years of data, 41 youths (3%) had 2 years of data, and 31 youths (2%) had 1 year of data. The present study covers a total of 5 annual intervals, with age spanning 14 to 22 years.

Measures

Of interest in the present report were measures of antisocial behavior, affiliation with antisocial peers, and resistance to peer influence. We also included a measure of the amount of time the adolescent spent in the community (as opposed to being incarcerated) during each interval as a covariate in the analyses, because this affected opportunity to engage in antisocial activity (see Table 1 for means and standard deviations of key variables).

Antisocial behavior—The Self-Report of Offending measure (Huizinga, Esbensen, & Weiher, 1991) was used to measure involvement in both antisocial and illegal activities. Participants reported whether they had been involved in any of 22 aggressive or income-generating acts (see Appendix A). Questions about each of the 22 offenses were asked at each time point with the qualifying phrase, “In the past X months, have you...” In semi-annual

interviews, individuals were asked about criminal activity in the past 6 months; at the baseline interview and the 48-month follow-up, they were asked about antisocial behavior in the last 12 months; data for semi-annual intervals were aggregated to create an annual measure (e.g., the number of different types of antisocial behavior was counted across both the 6- and 12-month interviews; a type of offense was counted only once if it was endorsed at both time points).

To assess antisocial behavior, the number of different types of acts endorsed within each category was summed at each time point (referred to in the criminological literature as a “variety score”) For example, if an individual admitted to five different types of offenses, he or she received a score of 5. Variety scores are commonly used to assess criminal activity (Hindelang et al., 1981) and have been found to provide a valid way of assessing antisocial behavior (Huizinga & Elliot, 1986; Piquero, MacIntosh, & Hickman, 2002). The advantage of using variety scores over simple frequency scores is that the former are less likely to be biased by faulty recollection, particularly for antisocial acts that tend to be high frequency by their nature (e.g., drug dealing). In the present sample, variety scores are highly correlated with frequency of antisocial behavior ($r = .77$, Chung & Steinberg, 2006), and self-reports of offending are significantly correlated with official arrest data provided by local authorities; this correlation is lower than that between the two self-report indices because many adolescents’ offenses go undetected (Brame, Fagan, Piquero, Schubert, & Steinberg, 2004; $r = .23$). Because antisocial behavior was skewed, the variable was corrected with a logarithmic transformation.

Peer delinquency—To assess affiliation with antisocial peers, we created a composite score using four indices: antisocial peer behavior, antisocial peer influence, the proportion of closest friends who had been arrested in the months preceding the interview, and the proportion of closest friends who had been jailed during this same time period.

The first two indexes of peer delinquency were derived from the Peer Delinquent Behavior scale (Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994), which captures two aspects of peer delinquency: antisocial peer behavior and antisocial peer influence. Participants are presented with 19 items, 12 of which pertain to antisocial peer behavior (“How many of your friends have sold drugs?”) and 7 of which pertain to antisocial peer influence (“How many of your friends have suggested that you should sell drugs?”). Participants respond on a 5-point Likert scale ranging from “None of them” to “All of them.” Scores were averaged across semi-annual time points to create annual scores.

Whereas the Peer Delinquent Behavior scale pertains to a youth’s friendships more generally, the other two indexes of peer delinquency were specific to a youth’s closest friendships. Individuals are asked to nominate up to four individuals as their closest friends. After identifying their closest friends, participants are subsequently asked “Has [name] been arrested in the past X months?” and “Has [name] been in jail in the past X months?” for each of their nominated friends (as in prior measures, the number of months referenced corresponds to whether the interview covered a semi-annual or annual period). The proportion of close friends who had been arrested and the proportion who had been jailed over the past year were calculated.

To create a composite of peer delinquency, each of the four measures was standardized, and the measures were averaged. Reliability analyses indicated that the measures fit well together at each age: at 14 years, $\alpha = .97$; at 15 years, $\alpha = .97$; at 16 years, $\alpha = .96$; at 17 years, $\alpha = .90$; at 18 years, $\alpha = .90$; at 19 years, $\alpha = .94$; at 20 years, $\alpha = .96$; at 21 years, $\alpha = .97$; and at 22 years, $\alpha = .99$).

Resistance to peer influence—All participants completed measure of resistance to peer influence (Steinberg & Monahan, 2007), which assesses the degree to which adolescents act autonomously in interactions with their peers. Following a procedure developed by Harter (1985), participants are read two conflicting scenarios (e.g., “Some people go along with their friends just to keep their friends happy” but “Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy”) and are asked to select which statement is more like them and then to assess the strength of their endorsement (*sort of true* or *really true*). Ten scenarios are presented, each examining different dimensions of possible influence, such as going along with friends, fitting in with friends, and knowingly doing something wrong. Higher scores indicate less susceptibility to peer influence. The variable was calculated at each time point. We conducted examination of the scale’s internal consistency at the baseline interview, using both Cronbach’s alpha and confirmatory factor analysis. Analyses indicated adequate internal consistency ($\alpha = .73$) and adequate fit of the scale to the data (comparative fit index [*CFI*] = .94 and root mean square error of approximation [*RMSEA*] = .04). Lower scores on the measure are correlated with higher scores on measures of impulsivity and risk taking, and, in functional magnetic resonance imaging (fMRI) studies, with less mature patterns of functional connectivity between brain regions responsible for inhibitory control and regions active in the processing of social information, associations that support the validity of the instrument (Steinberg & Monahan, 2007). Six-month scores were averaged to create annual scores.

Exposure time—Exposure time refers to the proportion of time that an adolescent was incarcerated. Individuals reported the number of days in each month that they were incarcerated. In order to control for differential opportunity to engage in antisocial behavior, we used the proportion of weeks youths spent incarcerated during the year as a time-varying covariate when estimating growth in self-reported antisocial behavior (failure to account for exposure time can lead to misspecification of the model; Piquero et al., 2001). The number of youths incarcerated at each age varied (26.4% of individuals were incarcerated between 14 and 15 years of age; 32.3% were incarcerated between 15 and 16 years of age; 44.2% were incarcerated between 16 and 17 years of age; 56.2% were incarcerated between 17 and 18 years of age; 54.1% of individuals were incarcerated between 18 and 19 years of age; 52.6% of individuals were incarcerated between 19 and 20 years of age; 52.8% of individuals were incarcerated between 20 and 21 years of age; and 49.5% of individuals were incarcerated between 21 and 22 years of age).

Results

Analytic Strategy

We were interested in four research questions: (a) how level of antisocial behavior, peer delinquency, and resistance to peer influence are related; (b) whether changes in antisocial behavior lead to changes in the level of delinquency of one’s peer group (*selection effects*); (c) whether changes in peer delinquency lead to changes in antisocial behavior (*socialization effects*); and (d) whether individuals low in resistance to peer influence are relatively more sensitive to peer socialization effects. Consequently, our analytic strategy needed to model dynamic systems that involve interrelations among change processes (e.g., relations among individually varying growth curves of developmental change) as well as time-specific levels of analyses (e.g., the relation of one variable at time t to another variable at time $t - 1$).

A number of different modeling strategies are available to examine these relations, including the latent state–trait model (Schmitt & Steyer, 1993), the state–trait error model (Kenny & Zautra, 1995), and the latent difference score model (McArdle, 2001). In the present study, we used an autoregressive latent transition (ALT; Bollen & Curran, 2004) model, which capitalizes

on the strengths of a growth model as well as autoregressive cross-lagged analyses within a structural equation modeling framework.¹ The advantage of the ALT modeling framework is that it combines a number of standard longitudinal models (growth curve and simplex models). Various competing models can be tested to identify the model that is consistent with developmental theory and that provides the best fit of the data at hand. Furthermore, the flexibility of the model is such that different models can be tested and compared, allowing a statistical test of various theoretical possibilities (Curran & Willoughby, 2003). This capacity to make comparisons across possible models over a longitudinal period is important in that it allows for enhanced capacity to assess possible causal effects (Rutter, 2007). Notably, however, the capacity of the model to inform potential causal relationships depends on the temporal ordering of the two variables and the structure of the model. To the extent that the measures in the current analyses captured actual behaviors (i.e., one's own behavior and the behavior of one's peers), the ordering is real and not just an arbitrary choice involving the timing of measurement. Yet, the model also makes the assumption that unobserved variables are uncorrelated with the predictors, including the cross-lagged variables. That is, there are a number of other variables that influence an individual's antisocial behavior as well as that of his or her peers (such as parenting, neighborhood characteristics, etc.), but these characteristics are not directly modeled. Thus, although we were examining temporally appropriate indexes of change processes (in both growth and simplex aspects of the model), statements of causality must be tempered by the nature of the model and the data. Yet, the individual-level information provided in the growth aspect of the ALT framework counterbalances this weakness by providing information about within- and between-individual differences over time. Finally, the current analytic approach is particularly well suited to the present study because it simultaneously estimates both types of change (growth and cross-lagged), which avoids potential bias in estimates that would result if the two types of models were conducted separately.

More specifically, the ALT model simultaneously estimates latent growth parameters for two sets of repeated measures while also estimating the time-specific bidirectional relations between the two constructs at the level of repeated measure indicators. The latent trajectory component focuses on patterns of change over time for each variable (e.g., antisocial behavior) across all data points. Change is examined by using all of the repeated measures to estimate a single underlying growth trajectory for each variable for each person. That is, individual patterns of development over time are allowed to vary across individuals.

In contrast, unlike the latent trajectory component of the ALT model, which was used to describe overall development over the 8-year period (from age 14 to 22 years), the autoregressive component of the ALT model describes relations among time-adjacent variables. Change in an autoregressive cross-lag framework reflects the extent to which the value of a variable depends on its prior value, on the prior value of another variable, or on a combination of both. Thus, results indicate the average effect (across all pairs of adjacent data points) of X_1 on X_2 (e.g., antisocial behavior at age 14 years on antisocial behavior at age 15 years) and of X_1 on Y_2 (antisocial behavior at age 14 years on peer delinquency at age 15 years). It is important to note that autoregressive effects are fixed to be the same for all individuals in the sample (e.g., coefficients reflect the average effect of all individuals in the sample and are not allowed to vary across individuals, as they are in the latent trajectory component of the model).

Thus, the ALT model allowed us to examine two types of change simultaneously: (a) individual trajectories of development across the different variables and (b) how, on average, change in

¹The results presented in this article were also analyzed using a latent difference score framework. The results were not substantively different than what is reported in the current article.

one variable is associated with changes in another. Specifically, we modeled antisocial behavior (AB) as a product of random intercept, linear slope, and quadratic slope in addition to the autoregressive effects of prior levels of antisocial behavior and prior levels of peer delinquency (PD). We conducted the opposite model for peer delinquency. We modeled a growth curve, without cross-lagged effects, for resistance to peer influence (RPI):

$$AB_{it} = \alpha_{ABi} + \Lambda_{ABi2} \beta_{ABi} + \Lambda_{ABi2} \beta_{ABi}^2 + \rho_{ABi,ABi-1} AB_{i,t-1} + \rho_{ABi,PDi-1} PD_{i,t-1} + \varepsilon_{ABit} \quad (1)$$

$$PD_{it} = \alpha_{PDi} + \Lambda_{PDi2} \beta_{PDi} + \Lambda_{PDi2} \beta_{PDi}^2 + \rho_{PDi,PDi-1} PD_{i,t-1} + \rho_{PDi,ABi-1} AB_{i,t-1} + \varepsilon_{PDit} \quad (2)$$

$$RPI_{it} = \alpha_{RPIi} + \Lambda_{RPIi2} \beta_{RPIi} + \Lambda_{RPIi2} \beta_{RPIi}^2 + \varepsilon_{RPIit} \quad (3)$$

where i refers to an individual, t refers to time, α is the average level of the dependent variable, Λ refers to the change in growth (β) between two time points for an individual, ρ is the average autoregressive or cross-lagged effect for a given time and ε is error. We assumed that the means of the error terms (a) have a mean of zero, (b) are normally distributed, (c) are not autocorrelated, and (d) are not correlated with other effects in the model. As recommend by Bollen and Curran (2004), the intercept and slope of antisocial behavior and peer delinquency were based on $t + 1$, such that the baseline observed variables were not used to estimate intercept or slope. The baseline measures were included in the cross-lagged aspect of the model as well as for the purpose of examining growth in resistance to peer influence.² Moreover, we treated the baseline levels of the antisocial behavior and peer delinquency as predetermined such that:

$$AB_{i1} = v_{ABi} + \varepsilon_{ABi1} \quad (4)$$

$$PD_{i1} = v_{PDi} + \varepsilon_{PDi1}, \quad (5)$$

where v is the average level of the variable at Time 1.

In addition, we modeled the random effects of the intercepts and slopes for antisocial behavior, peer delinquency, and resistance to peer influence:³

$$\alpha_{ABi} = \mu_{AB\alpha} + \zeta_{AB\alpha i} \quad (6)$$

$$\beta_{ABi} = \mu_{AB\beta} + \zeta_{AB\beta i} \quad (7)$$

²The baseline measure was included when estimating the resistance to peer influence intercept and the slope because resistance to peer influence was not simultaneously modeled with cross-lagged effects.

³Note that quadratic slope terms are not modeled as random effects. This is because analyses described subsequently found that there was not significant variance in the quadratic slope terms for antisocial behavior, peer delinquency, or resistance to peer influence. Furthermore, although peer delinquency did have significant heterogeneity around the linear slope when estimated alone, when estimated in the context of the larger ALT framework, this parameter was no longer significant; consequently in the final model, it is not modeled as a random effect.

$$\alpha_{PDi} = \mu_{PD\alpha} + \zeta_{PD\alpha i} \quad (8)$$

$$\beta_{PDi} = \mu_{PD\beta} + \zeta_{PD\beta i} \quad (9)$$

$$\alpha_{RPIi} = \mu_{RPI\alpha} + \zeta_{RPI\alpha i} \quad (10)$$

$$\beta_{RPIi} = \mu_{RPI\beta} + \zeta_{RPI\beta i}, \quad (11)$$

where μ refers to the average estimate of the random effect, and ζ refers to the error in estimating that mean, and the disturbances for all intercepts and slopes were presumed to be zero. Finally, we accounted for the proportion of time that a youth is incarcerated when estimating antisocial behavior, such that at Time 1:

$$AB_{it} = \gamma_{ABi} + \gamma_{ABi} EXP_{it} \varepsilon_{ABit}, \quad (12)$$

where EXP is the time the youth spent in the community as opposed to being incarcerated at time t impacting antisocial behavior at time t .

We estimated ALT models in Mplus Version 5 software (Múthen & Múthen, 2008). To identify the best fitting model, we used two indexes of model fit. First, in order to determine acceptable absolute fit of the models, we used the CFI and the $RMSEA$. To be acceptable in fit, for each model, the $RMSEA$ had to be less than .08, and the CFI had to be greater than .90 in the same model. Although these are somewhat arbitrary values, they are the cut-offs that are generally used within the field (Hu & Bentler, 1998, 1999). Second, to identify which of the models provided a better fit, we used the chi-square test to determine relative fit (Satorra, 2000).

Assuming that multiple models meet the absolute fit standards, the chi-square difference test, $[\chi^2_{Model 2} - \chi^2_{Model 1} (df_{Model 2} - df_{Model 1})]$, is used to determine which model provides a better fit of the data. The more parsimonious model is compared with the most complex model, and the difference between the chi-square statistics is calculated. If significant, the more complex model is selected. If nonsignificant, the more parsimonious model is accepted.

First, we simultaneously estimated trajectories of antisocial behavior, peer delinquency, and resistance to peer influence as well as cross-lagged effects between antisocial behavior and peer delinquency and vice versa. The first step in our analyses was to examine whether peer selection and peer socialization effects varied as a function of age. To conduct this evaluation, we compared two models. In Model 1, we constrained all cross-lagged paths to be equal to one another (e.g., peer selection and peer socialization effects could not differ from age 14 to age 22 years). In the second model, we allowed these paths to vary from age 14 to age 22. In both Model 1 and Model 2, all other parameters (i.e., slopes, intercepts, correlations, and error terms) were fixed to be equal. Thus, the only parameters allowed to vary across time in Model 2 were the selection and socialization cross lags. Both Model 1 and Model 2 showed good absolute fit to the data ($CFI > .95$; $RMSEA < .05$). Examination of the relative fit of the two models suggested that Model 2 was a better fit to the data, $\chi^2(14) = 39.37, p < .01$, indicating that there were significant developmental differences in selection and socialization effects. Consequently, we examined how trajectories of antisocial behavior, peer delinquency, and

resistance to peer influence were related as well as how selection and socialization effects differed by age.

Of central importance to the present analyses was whether and how trajectories of antisocial behavior, peer delinquency, and resistance to peer influence are interrelated. All three trajectories—antisocial behavior, peer delinquency, and resistance to peer influence—showed quadratic patterns of growth over time. Antisocial behavior showed significant declines over time, with more rapid declines occurring in early adolescence than in late adolescence. Although there was significant variation in the level of antisocial behavior and the rate of linear change in antisocial behavior, there was no variation in the quadratic rate of change. Thus the quadratic term was fixed to be zero. Across adolescence and into early adulthood, peer delinquency showed a curvilinear pattern, increasing until 17 years of age and decreasing as youths moved into adulthood. Although there was variation among youths in our sample in the level of peer delinquency, there was no variation in the linear or quadratic rate of change in this variable. Consequently, both the linear and quadratic rate of change in level of peer delinquency were fixed to be zero in the model. Finally, resistance to peer influence showed increases throughout adolescence, with growth in the ability to resist peers slowing as youths reached early adulthood. Although there was variation in the rate of increase over time, all youths showed similar slowing of growth as they moved into early adulthood (the quadratic term). As such, the quadratic rate of change was fixed for resistance to peer influence.

Subsequently, we simultaneously estimated all trajectories and examined the correlations among their intercepts and slopes. Examination of the correlations among intercept coefficients showed that, as expected, individuals who reported relatively more antisocial behavior also reported having relatively more deviant peers and that individuals who were more resistant to peer influence reported less antisocial behavior and had fewer deviant peers (see Table 2 for correlations; see Figure 1 for a diagram of the ALT model). However, the slope terms were uncorrelated, suggesting that across the 8-year period overall, patterns of individual change in antisocial behavior, resistance to peer influence, and peer delinquency were unrelated. As we note in the following paragraph, however, considering the entire 8-year period as a whole obscures very different patterns of interrelations among these variables in middle adolescence, late adolescence, and early adulthood.

In the second part of the model, we examined whether change in antisocial behavior was associated with subsequent peer delinquency (one year later) and vice versa (see Figure 1), after taking into account stability and growth of each of these variables over time. As expected, antisocial behavior at one age was associated with antisocial behavior one year later, and peer delinquency at one age was associated with peer delinquency the next year. Inspection of the cross-lagged coefficients suggests that antisocial behavior and peer delinquency show different relations to each other during different developmental periods. Antisocial behavior was predictive of greater peer delinquency during middle adolescence (14–15 years) but not at later ages, suggesting that selection effects are limited to middle adolescence. In contrast, peer delinquency was predictive of greater self-reported antisocial behavior in both middle and later adolescence (15–20 years), suggesting that socialization effects are operative in both periods. In young adulthood (21–22 years), however, peer delinquency and antisocial behavior were unrelated.

Resistance to Peer Influence as a Moderator of Peer Socialization

Because we were also interested in whether some individuals were relatively more influenced by having antisocial peers, we examined whether the peer socialization effects differed among individuals as a function of their level of resistance to peer influence. For parsimony in these analyses, we examined only the autoregressive cross-lagged component of the ALT model (i.e., growth in antisocial behavior, peer delinquency, and resistance to peer influence were

omitted). As in the prior models, we controlled for proportion of time incarcerated when examining the relation between antisocial behavior and peer delinquency. To create groups of individuals with high versus low resistance to peer influence, we averaged resistance to peer influence in the entire sample at age 18 years and split the sample into two groups on the basis of whether individuals were above or below the sample median when they were 18 years old. Given the overlapping cohort design of the data, we selected age 18 because every individual was 18 at some point during the study (i.e., no one was older than 18 at the baseline interview, and everyone turned 18 during the first four years of the study). Youths who did not have complete data at age 18 ($N = 138$) were excluded from these analyses.

Using the autoregressive cross-lag framework, we conducted a multigroup analysis to test whether the effect of having deviant peers on self-reported antisocial behavior differed between youths with low versus high resistance to peer influence. In Model A, socialization effects were fixed to be equal for individuals with high versus low resistance to peer influence. In Model B, socialization effects were allowed to vary as a function of individuals' level of resistance to peer influence. Only socialization effects (the effect of peer delinquency on self-reported antisocial behavior) were allowed to vary across groups; all other parameters were fixed to be equal. Although Model A and Model B both showed adequate absolute fit ($CFI > .90$; $RMSEA < .08$), the chi-square difference, [$\chi^2_{\text{Model 2}} - \chi^2_{\text{Model 1}} (df_{\text{Model 2}} - df_{\text{Model 1}})$], suggested that Model B provided better relative fit, $\chi^2(2) = 11.14, p < .01$, indicating that socialization effects significantly differs between individuals with higher versus lower resistance to peer influence.

Specifically, results indicated that the age at which affiliation with deviant peers no longer affects subsequent antisocial behavior differs among individuals with low versus high resistance to peer influence. Recall that, in the analysis of the sample as a whole described previously, significant socialization effects (i.e., where having antisocial friends is associated with greater self-reported antisocial behavior) were found between the ages of 15 and 20 years. Among youths who are high in resistance to peer influence, socialization effects follow this pattern. However, among individuals who are relatively less resistant to peer influence, affiliation with antisocial peers is associated with greater self-reported antisocial behavior somewhat longer developmentally, until age 21 years. Thus, although the impact of having antisocial friends on individuals' antisocial behavior fades as individuals mature into adulthood, the influence of antisocial friends endures longer developmentally among youths whose capacity to resist peer influence matures more slowly.

Discussion

It is axiomatic among scholars of adolescent development that engaging in antisocial behavior and having antisocial friends go hand in hand (Brendgen et al., 2000; Elliott & Menard, 1996; Farrington, 2004; Heinze et al., 2004; Lipsey & Derzon, 1998; Patterson et al., 1991). Less clear, however, is whether this link is due mainly to the fact that individuals with antisocial inclinations choose antisocial peers to have as friends or, alternatively, whether affiliating with antisocial peers influences adolescents to engage in bad behavior. To date, most efforts to distinguish between the contributions of selection and socialization to antisocial behavior have focused on quantifying their relative importance or examining whether their contributions vary as a function of the specific antisocial behavior under consideration (e.g., smoking vs. delinquency). Studies have found, for example, that selection may be a somewhat stronger factor than socialization with respect to delinquency (Gordon et al., 2004; Haynie & Osgood, 2005), whereas selection and socialization are about equally forceful with regard to drug use (Curran, Stice, & Chassin, 1997; Dishion & Owen, 2002; Dobkin, Tremblay, Mâsse, & Vitaro, 1995; Ennett & Bauman, 1994; Kandel, 1978).

Although we, too, have found that individuals' involvement in antisocial behavior is correlated with the antisocial behavior of their friends, the results of the present investigation indicate that another parameter may be important in debates about selection versus socialization, specifically, the age of the individuals involved. According to our findings, similarity in antisocial behavior appears to be due to both selection and socialization in middle adolescence but only to socialization during late adolescence. We cannot tell from the present study whether a comparable developmental pattern exists with respect to other behaviors that historically have been the focus of research on homophily in adolescence, such as substance use, but our findings indicate that researchers interested in the broader issue of why adolescents and their friends are often alike should be careful to distinguish among teenagers of different ages.

It is not clear why selection should be relatively more powerful in middle adolescence, and socialization more powerful in later adolescence, and without knowing whether this is a pattern that generalizes to other forms of behavior, or one that is specific to antisocial behavior (and serious antisocial behavior at that), we are reluctant to offer any grand explanations of the phenomenon. It is the case, however, that the early years of middle adolescence are marked by youths sorting themselves into cliques and crowds. By later adolescence, youths have typically organized themselves into peer groups. If peer groups are better established by the time individuals have entered later adolescence, it stands to reason that selection will play a less important role in making friends similar to each other. Conversely, if adolescents have already chosen most of their close friends by the time they have reached age 16 years or so, changes in similarity among friends by age (whether increasing or decreasing) would have to be due more to the impact that friends have on each other. We caution, however, that the earliest age at which any individual was enrolled in this study was 14 years, and processes of selection and socialization were likely active prior to this. An important area of future research is the examination of these processes among younger adolescents.

As adolescents transition into young adulthood, the relation between affiliating with deviant peers and antisocial behavior weakens. That is, even among adolescents who continue to associate with antisocial peers, the influence that their peers have over their own behavior wanes. This account is consistent with research showing that individuals' ability to resist peer influence increases during late adolescence (Berndt, 1979; Erickson, Crosnoe, & Dornbusch, 2000; Steinberg & Monahan, 2007; Steinberg & Silverberg, 1986) and, in addition, is consistent with our finding that the waning influence of antisocial friends fades a bit more slowly among individuals who characterize themselves as more susceptible to the pressures of their peers. Thus, although it is true that adolescents, in general, become more resistant to peer influence as they grow older, it is also the case that some are slower to develop this capacity than others and that these individuals are at greater risk for continued involvement in problem behavior, especially when their friends are engaged in antisocial activity.

It is interesting to note that even though the measure of resistance to peer influence used here is about resistance to peer influence in general, and is not limited to resistance to antisocial peer influence, we nevertheless find that youths who score lower on this measure are more inclined to engage in antisocial activity and have antisocial friends. We suspect that low scores on the measure of resistance to peer influence are likely indicative of psychosocial immaturity more generally (recall that lower scores on the measure are correlated with higher scores on measures of impulsivity and risk taking, and, in functional magnetic resonance studies, with less mature patterns of brain structure and function; see Steinberg & Monahan, 2007). The notion that involvement in antisocial activity and antisocial peer groups during adolescence is part of a more overarching pattern of immature behavior, including excessive orientation toward peers, is consistent with Moffitt's (1993) theory of adolescence-limited delinquency.

Although the present study is strengthened by its focus on relatively more antisocial youths, use of a longitudinal design, evaluation of an ethnically diverse sample, inclusion of both intra- and inter- individual variables, and its analytic strategy, it is nonetheless limited in several respects. First, the data on adolescents' friends' deviance come from target adolescents' reports of their friends' criminal histories. We do not know whether these reports are valid, although our finding of an association between friends' deviance and individuals' antisocial behavior is consistent with a long history of work linking the two. Second, data on adolescents' susceptibility to peer influence and involvement in antisocial behavior were all obtained through self-report. Although we know that adolescents' reports of antisocial behavior are significantly correlated with official data on arrest histories in this sample (Brame et al., 2004), we do not know whether our measure of susceptibility to peer influence is similarly valid. Third, although our ability to track antisocial behavior and peer deviance over time and to examine their concurrent and lagged relations gives us more confidence in drawing inferences about the temporal relations between these constructs, nonexperimental research can never allow one to draw true causal inferences. However, in the absence of random assignment of adolescents to peer groups that differ in their antisociality, the careful analysis of nonexperimental data obtained through longitudinal investigation is probably the most reasonable approach to the problem. Finally, because our sample was based on individuals who were adjudicated of a serious crime in two cities, our findings cannot be generalized to youths who have not yet been arrested or to youths from other communities.

Taken together, the pattern of findings reported here sheds light on why antisocial behavior tends to decline as individuals transition into adulthood. Although multiple processes, many not studied here, likely play a role (including the transition into marriage and full-time work), one important influence on this process appears to be a change in the interpersonal context of adolescence. Many have noted that most adolescent antisocial behavior—as is the case with adolescent risk taking more generally—occurs with peers (Gardner & Steinberg, 2005). As we have shown here, the transition into adulthood is marked not only by a decline in antisocial activity but by drops in both affiliation with deviant peers and in susceptibility to peer influence. Adolescents may decline in antisocial behavior as they mature into adulthood both because their friends, who are going through similar processes of normative maturation, are declining in antisocial activity and because they themselves are becoming increasingly independent from the influence of others (antisocial and otherwise). Consistent with theories of adolescent-limited offending, declines in antisocial behavior during the transition to adulthood appear to be linked, at least in part, to normative developmental processes that transform individuals' relations with their peers.

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Appendix A

Self-Report of Offending

Each item was prefaced with “In the past [X] months, have you” (where X reflects the number of months in the recall period):

1. Destroyed or damaged property that did not belong to you?
2. Purposely set fire to a house, building, car, or vacant lot?
3. Entered or broken into a building to steal something?
4. Stolen something from a store?
5. Bought, received, or sold something that you knew was stolen?
6. Used checks or credit cards illegally?
7. Stolen a car or motorcycle to keep or sell?
8. Sold marijuana?
9. Sold other illegal drugs (cocaine, crack, heroine)?
10. Carjacked someone?
11. Driven while you were drunk or high?
12. Been paid by someone for having sexual relationship with them?
13. Forced someone to have sex with you?
14. Killed someone?
15. Shot someone?
16. Shot at someone where you were the one who pulled the trigger?
17. Taken something from another person by force, using a weapon?
18. Taken something from another person by force, without a weapon?
19. Beaten up or physically attacked someone so badly that they probably needed a doctor?
20. Been in a fight?
21. Beaten up, threatened, or physically attacked someone as part of a gang?
22. Carried a gun?

Note. The Self-Report of Offending measure is from Huizinga, Esbensen, and Weiher (1991).

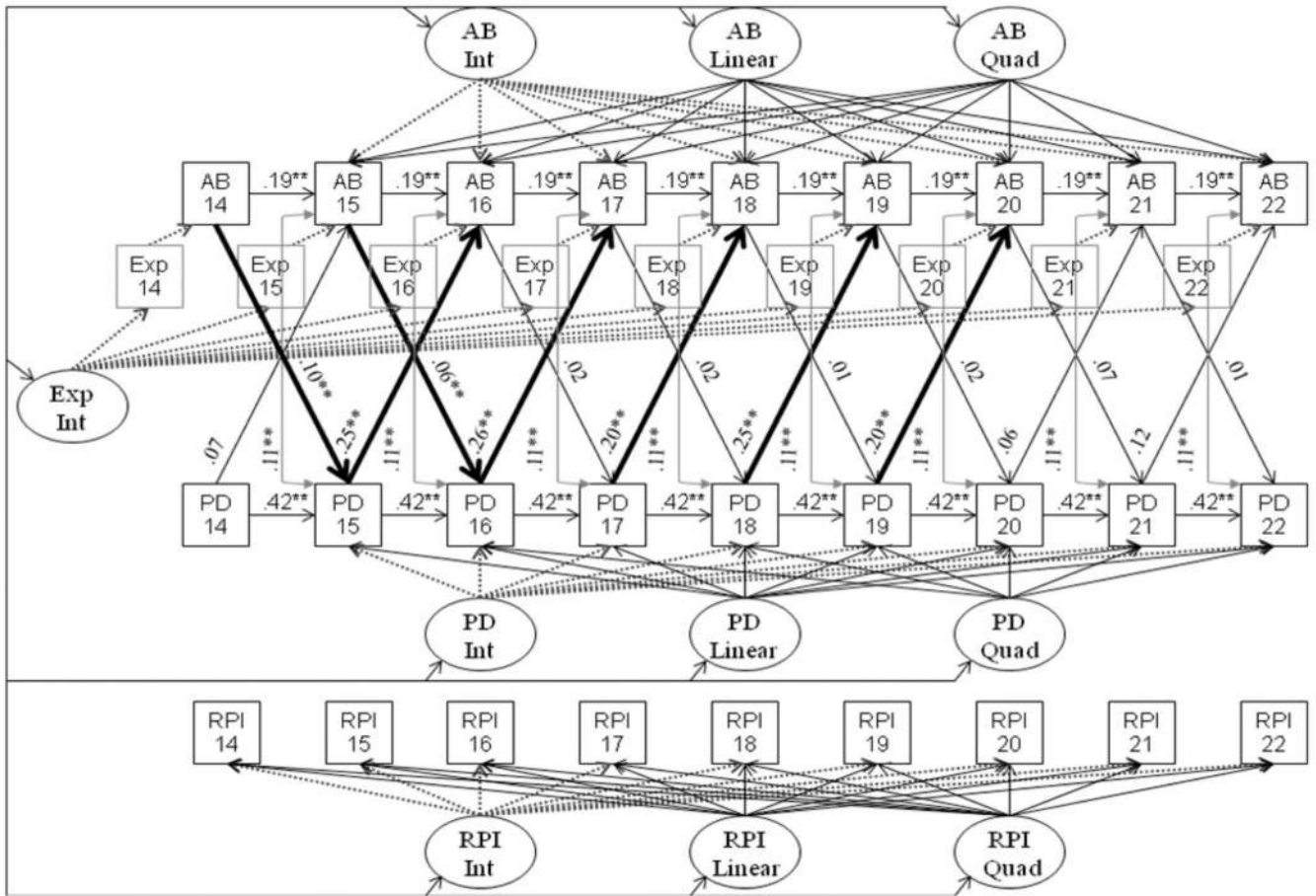


Figure 1. Autoregressive latent trajectory model. AB = antisocial behavior; PD = peer delinquency; RPI = resistance to peer influence; Exp = exposure time in the community compared with time incarcerated. Dashed line arrows are all constrained to 1. Significant cross-lag effects are shown in boldface. For all latent intercepts, items are fixed at 1. For all latent linear slopes, age 15 is fixed at 0, age 16 is fixed at 1, age 17 is fixed at 2, age 18 is fixed at 3, age 19 is fixed at 4, age 20 is fixed at 5, age 21 is fixed at 6, and age 22 is fixed at 7. For all latent quadratic slopes, age 15 is fixed at 0, age 16 is fixed at 1, age 17 is fixed at 4, age 18 is fixed at 9, age 19 is fixed at 16, age 20 is fixed at 25, age 21 is fixed at 36, and age 22 is fixed at 49. Correlations among latent intercepts and slopes are found in Table 2.

Table 1

Means and Standard Deviations of Key Variables by Age

Variable	14 years		15 years		16 years		17 years		18 years		19 years		20 years		21 years		22 years	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Antisocial behavior	4.41	(4.35)	3.88	(3.99)	3.72	(3.97)	3.34	(3.78)	2.47	(3.32)	1.91	(2.81)	1.56	(2.46)	1.35	(2.35)	1.10	(1.92)
Resistance to peer influence	2.92	(0.55)	2.94	(0.57)	3.02	(0.54)	3.09	(0.53)	3.20	(0.50)	3.28	(0.50)	3.32	(0.51)	3.36	(0.52)	3.34	(0.54)
Antisocial peer composite	0.19	(0.60)	0.19	(0.59)	0.20	(0.58)	0.23	(0.56)	0.23	(0.54)	0.22	(0.54)	0.23	(0.54)	0.23	(0.54)	0.22	(0.53)
Antisocial peer behavior ^a	2.13	(0.94)	2.06	(0.89)	2.09	(0.88)	2.05	(0.85)	1.84	(0.75)	1.70	(0.69)	1.67	(0.69)	1.66	(0.76)	1.55	(0.68)
Antisocial peer influence ^a	1.59	(0.75)	1.57	(0.74)	1.62	(0.78)	1.62	(0.73)	1.53	(0.68)	1.43	(0.61)	1.42	(0.58)	1.41	(0.63)	1.41	(0.64)
Peers arrested ^{a,b}	0.39	(0.35)	0.39	(0.36)	0.44	(0.36)	0.49	(0.36)	0.49	(0.35)	0.48	(0.36)	0.48	(0.39)	0.48	(0.41)	0.51	(0.42)
Peers jailed ^{a,c}	0.60	(0.42)	0.46	(0.41)	0.46	(0.39)	0.45	(0.39)	0.42	(0.36)	0.38	(0.35)	0.40	(0.39)	0.40	(0.40)	0.40	(0.40)

^aMeasure was used in the antisocial peer composite measure.

^bSelf-reported proportion of closest friends who were arrested.

^cSelf-reported proportion of closest friends who were jailed.

Correlations Among the Growth Parameters and Mean Growth Parameters in Autoregressive Latent Transition Models of Antisocial Behavior, Peer Delinquency, and Resistance to Peer Influence

Table 2

Variable	Coefficient	Standard error	1	2	3	4	5	6	7	8
1. I_{AB}	1.23	.06								
2. S_{AB}	-0.20	.02	-.01							
3. Q_{AB}	0.01	<.01	— ^a	— ^a						
4. I_{PD}	0.02	.06	.04**	-.01	— ^a					
5. S_{PD}	0.05	.03	— ^a	— ^a	— ^a	— ^a				
6. Q_{PD}	-0.01	<.01	— ^a	— ^a	— ^a	— ^a	— ^a			
7. I_{RPI}	2.87	.02	-.03**	.01*	— ^a	-.01*	— ^a	— ^a		
8. S_{RPI}	0.13	.01	>-.01	>-.01	— ^a	-.01	— ^a	— ^a	— ^a	-.03*
9. Q_{RPI}	-0.01	<.01	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a

Note. All coefficients were significant at $p < .05$. AB = Antisocial behavior; PD = Peer Delinquency; RPI = Resistance to Peer Influence; I = intercept; S = linear slope; Q = quadratic term.

^aCorrelations were not estimated because the parameters were fixed.