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The Consequences of Antisocial Behavior in Older Male
Siblings for Younger Brothers and Sisters

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Abstract

The contribution of younger male and female siblings' conflict and involvement in deviant activities with their older brothers to younger siblings' adolescent adjustment problems was examined in the context of parenting. Ineffective parenting during younger siblings' childhood had no direct effects on adjustment, but facilitated their exposure to older brothers' deviant peers and activities. The effect of sibling conflict on adjustment was mediated by younger siblings' co-participation in deviant activities with their older brothers during adolescence. Early sibling conflict and co-participation in deviant activities synergistically increased risk for younger siblings' adolescent adjustment problems. These empirical relations held in the context of parental discipline of younger siblings during adolescence. Sibling relationships entail a set of iterative social processes that strongly influence risk for adolescent antisocial behavior, drug use, sexual behavior and traumatic experience. Variations in sibling influence were observed conditional on the gender combination of the sibling pair and on sibling age differences.

Keywords: Sibling conflict, sibling deviancy training, parenting, antisocial behavior, drug use, trauma

The Consequences of Antisocial Behavior in Older Male Siblings for Younger Brothers and Sisters

Research on siblings provides a number of unique opportunities to ascertain the linkage of developmental processes and outcomes (Scarr & Grajek, 1982). First, the relative similarity of siblings' developmental trajectories is a phenomenon that requires explanation (Kellam & Rebok, 1992). Second, the study of siblings permits the analysis of total family effects on individual child development, including both shared genetic, and shared and unshared environmental influences (Hetherington, Henderson, & Reiss, 1999; Rowe, Rodgers, & Meseck-Bushey, 1992). Third, the simultaneous operation of multiple intra-familial as well as extra-familial environmental influences can be assessed; relationships with siblings as well as with parents and peers serve as powerful vehicles for socialization (Bank, Burraston, & Snyder, 2004; Slomkowski, Rende, Conger, Simons, & Conger, 2001). The goal of this report is to describe the social processes by which sibling relationships during childhood and adolescence contribute to the development of antisocial behavior.

Bank, Patterson and Reid (1996) and Slomkowski et al. (2001) have described two social processes by which siblings may contribute to risk for antisocial behavior. The first process entails training in coercion resulting from children's exposure to and imitation of siblings' coercive interactions with parents and from direct practice in coercive behavior during sibling conflict. The second process involves siblings' collusion and co-participation in deviant activities during adolescence. Bank, Slomkowski and their colleagues suggest that these developmentally sequential social processes are compatible and operate in a complementary fashion to increase risk. Coercive sibling interaction provides basic training in aggression. Once these coercive tactics are acquired, siblings who are similarly aggressive co-participate in and mutually reinforce a wider variety of

deviant activities that facilitate increasingly serious and diverse forms of antisocial behavior.

Previous research indicates that boys' coercive interaction and conflict with siblings during childhood increment risk for poor peer relationships, antisocial behavior, arrests during adolescence and adulthood, and aggression toward adult partners (Bank et al., 1996). Research also suggests that the contribution of sibling conflict to antisocial development may be unique and complements risk due to parent-child conflict (Bank et al., 2004). Pike, McGuire, Hetherington, Reiss and Plomin (1996) reported that sibling negativity is reliably associated with concurrent antisocial behavior during adolescence, and primarily reflects shared environmental influences. Sibling relationships of children with diagnosed oppositional defiant and conduct disorders are characterized by 4 to 5 times as much aversive social exchange, and with lower levels of positive social exchange relative to the sibling relationships of children with other psychiatric disorders (Slomkowski, Cohen, & Brook, 1997).

Extensive sibling conflict also involves victimization, especially of younger by older siblings. Inter-sibling aggression is very common and includes very serious forms such as punching, hitting with an object, and threats to use and actual use of weapons (Roscoe, Goodwin, & Kennedy, 1987; Strauss, Gelles, & Steinmetz, 1980). Victimization, in turn, increases risk for a variety of later problems, including violence, drug use, and early high-risk sexual behavior (Gully, Dengerink, Pepping, & Berstrom, 1981; Widom & Kuhns, 1996; Widom, Weiler, & Cottler, 1999).

Research indicates the collusion and co-participation of siblings in deviant activities also increment risk for antisocial behavior. Collusion refers to mutually reinforced talk about deviant activities including aggression, stealing, alcohol and drug use. Collusion has been observed during the interaction of siblings (Bullock & Dishion, 2002) and may be associated with subsequent risk for deviant behavior (Shortt, Capaldi, Dishion, Bank, & Owen, 2003). Siblings spend a good deal of time

together in late childhood and early adolescence, and parental supervision of siblings' time together decreases with age (Larson & Richards, 1991). Given an older sibling is relatively antisocial, uses drugs and associates with a deviant peer group, younger siblings are likely to be systematically exposed to antisocial talk and its reinforcement and to be invited to co-participate in deviant behavior and criminal activities (Reiss & Farrington, 1991), especially if parental monitoring is limited.

Siblings also share peer networks. Involvement with and exposure to an older sibling's deviant peers may exacerbate a younger sibling's early initiation and progression into antisocial behavior and drug use, and may increase a younger sibling's risk for victimization by those peers. In support of this notion, Rowe and Gulley (1992) found that siblings' sharing of mutual friends was a strong predictor of same-sex younger siblings' delinquency and drug use, after controlling for older siblings' delinquency and drug use. The synergistic effects of sharing friends and high levels of older sibling deviancy added to prediction after accounting for main effects. Exposure to older siblings' deviant peers may provide early experience with sophisticated forms of deviant talk and activities beyond those available in younger siblings' same-aged peer group, even if that group is highly deviant.

The manner in which these social processes operate in same versus opposite gender sibling relationships is less clear. Correlation coefficients for same-gender sibling similarity in antisocial behavior, drug use, and other disruptive behavior problems (i.e., among brothers and among sisters) are comparable in magnitude (Slomkowski et al., 2001) even though males relative to females show more behavior problems (Goodman & Kohlsdorf, 1994), evidence higher rates of arrests (Giordano & Cernkovich, 1997), and are more frequently diagnosed with disruptive behavior disorders (Zoccolillo, 1993). In contrast, intra-class correlations indexing the concordance for disruptive behavior problems in opposite gender siblings is typically less than that of same gender sibling pairs, and occasionally not

different from zero.

The social processes that increment risk may be different according to the gender combination of the sibling pair. Slomkowski et al. (2001), for example, found that younger siblings who were more involved with older delinquent siblings evidenced increasing risk for delinquency during adolescence, but only for male-male and not female-female sibling pairs. The social processes by which risk for antisocial behavior is transmitted in male-female sibling pairs is typically not addressed because of the low resemblance of opposite gender sibling pairs. However, the reduced resemblance in specific antisocial outcomes in opposite gender sibling pairs does not necessarily indicate an absence of sibling influence. Behavioral influence may not be isomorphic. For example, the antisocial behavior of an older male sibling may be associated with victimization/trauma or with precocious sexual activity rather than (or in addition to) the antisocial behavior of his younger female sibling.

In summary, extant research indicates that siblings may play important and potentially unique roles in the development of antisocial behavior, drug use and other problems. Attempts to replicate and elaborate previous findings would be optimized by several tactics: collection of data from samples of siblings who represent the full range of antisocial behavior; the use of a longitudinal design that adequately represents multiple sibling processes as they are sequenced in development; and assaying the role of sibling influence in models that include other family and peer social processes.

The focal children in this study are the younger sisters and brothers of young men who participated in the Oregon Youth Study (OYS, Capaldi & Patterson, 1987; Patterson, Reid, & Dishion, 1992). As adolescents, these young men evidenced high levels of antisocial behavior and other adjustment problems, and associated with a variety of deviant male peers. In order to test the scope and isomorphism of sibling influence, an array of adolescent adjustment outcomes for younger

siblings of the OYS males was assessed, including drug use, arrests, antisocial behavior, precocious sexual activity, association with same-aged deviant peers, and trauma/victimization. A series of models were tested that reflect the multiple mechanisms by which older siblings may contribute to the adjustment of younger siblings, and that examine sibling mechanisms in the context of parent influence. These models were applied to both older brother-younger brother and older brother-younger sister dyads.

The following hypotheses were tested: (a) The negative adolescent adjustment of younger sisters and brothers would be associated with coercion training during interaction with their older brothers during preadolescence, and with involvement in and exposure to the deviant activities and deviant peer associates of their older brothers during adolescence. (b) Involvement with older male siblings' deviant activities and peers would be more strongly associated with trauma and victimization in younger female siblings, and with antisocial behavior and arrests in younger male siblings. (c) The relationship of ineffective parenting and sibling coercion training to adjustment problems in adolescence would be mediated through younger brothers' and sisters' exposure to and involvement in the deviant activities of their older brothers and their older brothers' peers. (d) The relationship of younger siblings' involvement with the deviant activities and deviant peer associates of their older brothers to younger siblings' adjustment in adolescence would be maintained when controlling for concurrent parenting practices for the younger siblings.

Method

Sample. The Oregon Youth Study (OYS; Capaldi & Patterson, 1987; Patterson et al., 1992) sample consists of 206 boys and their families. The current study is an extension of the longitudinal OYS to include 155 younger sisters and brothers. Of the 206 OYS families, 105 had at

least one *younger* sibling living in the same household at the first assessment wave when the OYS (older) brothers were 10 years old. From these 105 families, 82 younger sisters (from 68 families) and 73 younger brothers (from 57 families) provided data. For all analyses in this report, only one younger sibling per family was included who was closest in age to the OYS boy, regardless of the sibling's gender. At Wave 11 (10 years later), the mean age for the younger sisters was 16.4 and for the younger brothers, 16.1 years. The research protocol was approved by the institutional IRB. Signed, informed consent was obtained from participating parents and older and younger siblings prior to involvement in the research at appropriate points in this longitudinal project.

At wave 1, approximately one-third of the families consisted of 2-biological parents, one-third consisted of 1-biological parent with a stepparent (almost all step-fathers), and one-third consisted of single biological parents (90% mothers). Juvenile court records indicate the high-risk nature of the sample. By age 18, 53% of the OYS boys had been arrested at least once, and 33% had multiple arrests. The families were predominately lower income, lower or working class, and white. In the first year of the study, one-fifth of the families had no employed parent and one-third received welfare. The families were highly mobile: 50% moved in the first two years of the study. The average family income in the fifth year of the study (1988-89) was \$20,000 per year.

Procedures

A multi-agent and -method approach to data gathering was used. The agents included the younger siblings and their OYS older brothers, parents, teachers, interviewers and observers. The methods included face-to-face and telephone interviews, questionnaires, home observations, laboratory interaction tasks, staff ratings, and official records. Parents and OYS older brothers were interviewed separately at waves 1, 3, and 5, and younger siblings and parents were

interviewed at wave 11. Staff completed rating scales concerning parent and child behavior after each assessment contact. Parents, teachers, OYS brothers, and younger siblings completed questionnaires.

Instruments and Constructs

Patterson and Bank (1986; 1989) provide a detailed description of the general approach to construct building used in this study. Ideally, each construct was defined by multiple methods and agents. The process of building constructs involved a series of steps. The first step entailed theoretical definition of the construct, which was used to create a priori scales. Scales with alphas of less than .60 were excluded from further analysis. Individual items that generated item-total correlations less than .20 were dropped from scales, as were items with zero or near zero variance. Scales were tested for convergent validity by exploratory factor analysis. Scales with factor loadings of less than .30 were excluded. Technical reports that provide the details of each construct (see Table 1 for a summary) are available from the Oregon Social Learning Center.

Predictor constructs measured during waves 1 and 3 include *Sibling Conflict* and *Ineffective Parenting*. During waves 1 and 3, OYS older brothers were in the 4th and 6th grades and an average age of 9.5 and 11.5 years, and younger siblings were an average age of 6.3 and 8.3 years. Association with deviant peers was measured at wave 5 for the OYS older brothers when they were 13.5 years of age. Parenting data that specifically targeted the younger siblings and the younger siblings' reports of time spent with their OYS older brother and his peers were collected at wave 11 when the OYS older brothers averaged 19.5 and their younger siblings averaged 16.3 years of age. The criterion construct is a higher order *Poor Adjustment* factor composed of the younger siblings' scores for antisocial behavior, arrests, substance use, deviant peer association,

early sexual activity, and exposure to trauma, all measured at wave 11 when the younger siblings averaged 16.3 years of age. Each construct is now described in more detail. Bank et al. (2004) provide additional information about the *Sibling Conflict* and *Ineffective Parenting* constructs.

Sibling Conflict (SC). The *SC* construct measures overt (e.g., hitting and fighting) and covert (e.g., stealing and cheating) coercive exchanges between the siblings. It is defined by four measures: two observational measures, the rate per minute of conflict bouts between the OYS older brother and his sibling(s), and observers' global ratings of how well the siblings got along during interaction; the two other indicators were parents' and OYS older brothers' reports of sibling conflict (see Table 1).

Ineffective Parenting (IP). *IP* is a higher order construct that draws from three parenting construct indicators: poor problem solving, poor supervision, and parent conflict bouts. Problem solving was assessed in the laboratory during which two family problems were discussed for 10 minutes each, one selected by the OYS older brother and the other by the parents (Patterson & Capaldi, 1990). Problem solving interaction was videotaped and then scored using the Solving Problems in Family Interactions coding system (Forgatch, Fetrow, & Lathrop, 1985). Two elements comprise the parent supervision construct: parental rules and expectations concerning the type and amount of information they require from their child, and how much time the child is with his parents and the number of hours the child is unsupervised by an adult. Parents' and OYS older brothers' reports and staff ratings were used to define these elements. The Parent Conflict construct was defined as rate per minute conflict observed in the home, designated as conflict between the parents or between a parent and one child without any involvement of siblings.

Older Brother Deviant Peer Association (OB Deviant Peers). Association with deviant

peers by the OYS older brother at age 15 is a higher order construct defined by four first order constructs described by Patterson, Dishion and Yoerger (2000). The first construct is derived from the Peer Interaction Task (PIT; Dishion, Spraklen, Andrews, & Patterson, 1996). The PIT entails coding the content of the discourse of the older brother and his close friend. Indicators from the PIT included: the duration of rule-breaking talk, the proportion of rule-breaking to total talk, the proportion reinforcement of rule-breaking talk to total reinforcement, interviewer's rating of the friend's encouragement of antisocial behavior, and observer ratings of the friend's antisocial behavior during the PIT task.

The second construct is comprised of teacher and parent reports about the OYS boys' association with peers who get into trouble. The third construct, the antisocial behavior of the OYS older brother's peers, is defined by parent and child reports of friends who have a bad influence, and by coder ratings of association with antisocial friends. The fourth construct, amount of time the OYS older brother spends with peers, is derived from parent and child reports, and child telephone interview about the extent of unsupervised time with peers.

Hanging Out with Older Brother (Hanging Out). This composite is designed to measure the deviant behavior of the younger sibling that was performed in the company of the older brother. It is derived from the younger sibling's report on the Sibling Interaction Scale (Bank et al., 1996) and contains four indicators of co-participation in deviant activities with an older sibling, including substance use, illegal acts, arrests, time spent with the OYS older brother and his peers, and threats by older brother's peers.

Younger Sibling Poor Adjustment. This construct is a higher order factor composed of early sexual activity, arrests, antisocial behavior, deviant peer association, substance use, and traumatic

stress. The Early Sexual Activity variable assesses younger siblings' self-reported engagement in kissing and petting as reported during a structured interview. Younger siblings' Arrests were obtained from police records of arrests from each county in which the child had lived.

The Younger Sibling Antisocial Behavior composite measured both overt (e.g., hitting, threats, disorderly conduct, and gang involvement) and clandestine (e.g., stealing, lying, cheating and trafficking in stolen goods) behaviors occurring in and out of the home, from the perspectives of parents, children, and the child's interviewer. Parents' reports were based on the Elliot Behavior Checklist (Elliot, Ageton, Huizinga, Knowles, & Canter, 1983), the Child Behavior Checklist (Achenbach, 1993) and an interview. Information from the child was based on the Elliot Behavior Checklist (Elliot et al., 1983), a telephone interview and a face-to-face interview with the child. The interviewer rating data are derived from the Interviewer Impressions Checklist.

The Younger Sibling Deviant Peer Association composite assesses deviant behavior of the younger siblings' peer associates, including drug use, stealing, fighting, and vandalism, from the perspective of parents and children. Parent report is based on the Child Behavior Checklist (Achenbach, 1993). The child's report is based on the child interview and the Describing Friends scale. Correlation between the parent and child report is .46 ($p < .001$).

The Younger Sibling Substance Use composite measured the frequency and pattern of substance use based on parent and child report. The parent report is based on one item from the Child Behavior Checklist (Achenbach, 1993) and one item from the parent interview (both reflecting general substance use). Younger siblings' self-reports focus on the frequency and patterns of use of tobacco, alcohol, marijuana, and illicit drugs, assessed during a child interview. Correlation between the parent and child report is .47 ($p < .001$).

Younger Sibling Traumatic Stress gauges the occurrence of specific traumatic events and the impact of the event on the respondent. The indicator is based on three items from the younger sibling's interview. Exposure to traumatic events inquires about the siblings' experience of the following events over the previous year: robbed or mugged; assaulted or raped; in a motor vehicle accident; unexpected death of a loved one; injury or property damage; forced to evacuate home; a shocking or terrifying experience; change in job, residence, or relationships. The second component, memories of the trauma, inquires about: the frequency of memories and sudden reminders of the event, intrusive thoughts, nightmares about the event, and avoidance of situational reminders of the event. The final component, reaction to traumatic stress, inquires about the frequency over the previous month of: feeling numb; reduced enjoyment of people and activities that were formerly pleasurable, feeling jumpy or easily startled, being unusually forgetful or having trouble concentrating, and having trouble sleeping.

Parental Discipline of Younger Siblings. This composite variable was designed to assess discipline applied to the younger siblings during the wave 11 assessments when these younger siblings 16.3 years. Multiple items concerning discipline were derived from three sources: parent report, sibling report, and interviewer ratings. Items for the various sources were similar and focused on parent consistency, effectiveness, fairness, strictness, and agreement on discipline.

Results

Analysis Strategy

The hypotheses were tested in two steps. The first step entailed fitting measurement models to the data to assess the relation of the observed measures to their underlying constructs, with the constructs allowed to intercorrelate freely. This step establishes the confirmatory assessment of

construct validity (Anderson & Gerbing, 1988). The second step ascertained the fit of a series of nested structural models that directly tested hypotheses (a) through (d). It should be noted that previous confirmatory factor analyses (Bank et al., 2004) have already established that the two key constructs operationally defining early family processes at Waves 1 and 3, Sibling Conflict and Ineffective Parenting, each provide unique information (i.e., represent two separate rather than one common factor). As in most longitudinal studies, there were missing data and using listwise deletion would have reduced sample size considerably. We used SPSS to determine the missing value patterns for SEM. For calculating the measurement and structural equation models, we used Amos to compute full information maximum likelihood estimates in the presence of missing data (Arbuckle, 1996).

Measurement Model and Construct Intercorrelations

One critical aspect of the measurement model involves specification of the construct for younger siblings' adjustment at age 16. All of the indicators for the *Younger Sibling Poor Adjustment* construct loaded significantly. As expected, Deviant Peer Association (Standardized Coefficient, or S.C. = .92; Critical Ratio or C.R. = 10.95), Antisocial Behavior (S.C. = .84; fixed for scaling) and Substance Use (S.C. = .72; C.R. = 8.47) most powerfully defined the construct while Arrests (S.C. = .42; C.R. = 4.19), Early Sexual Activity (S.C. = .55; C.R. = 5.07), and Traumatic Stress (S.C. = .52; C.R. = 5.38) loaded significantly but somewhat less powerfully.

Three indicators of *Younger Sibling Poor Adjustment* were significantly related to the age difference between the older and younger sibling, with younger siblings closer in age to their older brothers at greater risk: Early Sexual Activity (S.C. = -.36; C.R. = -3.64), Traumatic Stress (S.C. =

-.22; C.R. = -2.57), and Substance Use (S.C. = -.19; C.R. = -2.68). Younger sisters were also more likely to have experienced Traumatic Stress (S.C. = .19; C.R. = 2.27) than were younger brothers.

Table 2 provides the correlations among the predictors and *Younger Sibling Poor Adjustment*. *Sibling Conflict (SC)* and *Older Brother Deviant Peer Association (OB Deviant Peers)* were both at least marginally correlated with all of the major constructs (excluding younger sibling gender and age difference) in the model. *Ineffective Parenting* was highly related to concurrent *SC* and *OB Deviant Peers* 2 to 4 years later, but not reliably related to *Younger Sibling Poor Adjustment* in adolescence about eight years later. *OB Deviant Peers* was significantly correlated with *Younger Sibling Poor Adjustment* about six years later.

Tests of Hypothesized Models

Table 3 provides the standardized path coefficients, critical ratios, and the goodness of fit indexes for a series of models that represent iterative refinements of the fit of the data to relationships posited in hypotheses (a) through (d). The five models shown in Table 3 are nested and each adequately fits the data. In Model 1 all of the paths from the prospective predictor variables to *Younger Sibling Poor Adjustment* were estimated. As hypothesized, *Ineffective Parenting (IP)* has a significant effect on *OB Deviant Peers* (S.C. = .49; C.R. = 5.22). Contrary to our hypothesis, *Sibling Conflict (SC)* did not predict *OB Deviant Peers* (SC = .05; C.R. = 0.50). *IP* accounted for most of the 26 percent of the explained variance in *OB Deviant Peers*. As anticipated, *OB Deviant Peers* (S.C. = .22; C.R. = 1.95) had the strongest effect (relative to *IP* and *SC*) on *Younger Sibling Poor Adjustment*, followed by *SC* (S.C. = .18; C.R. = 1.70). In the context of *OB Deviant Peers* and *SC*, *IP* had no direct effect on *Younger Sibling Poor Adjustment* (S.C. = .00; C.R. = -0.01). This lack of effect does not indicate a mediator effect as the correlation of *IP*

and *Younger Sibling Poor Adjustment* was also not significant in the measurement model. Younger sisters were less likely to experience adjustment problems than younger brothers (S.C. = -.24; C.R. = -2.42). *Younger Sibling Poor Adjustment* did not significantly vary with the age differences between the siblings (S.C. = -.14; C.R. = -1.43). *OB Deviant Peers*, *SC*, and *Gender* together explained 18 percent of the variance in *Younger Sibling Poor Adjustment*.

A series of models were used to further estimate the relative influence of the prospective predictors under various conditions. Model 2 set the non-significant path from *IP* to *Younger Sibling Poor Adjustment* to 0. The paths from *OB Deviant Peers* and *SC* did not change nor did the fit of the model to the data. The path from *IP* to *Poor Adjustment* was not necessary to fit the model to the data, and Model 2 was more parsimonious than Model 1. In Model 3, the path from *SC* to *Poor Adjustment* was also set to 0. The chi-square statistic indicated an acceptable fit, but there was a marginally significant decrement in the fit of Model 3 relative to model 2 ($\Delta X^2 = 3.09$, $\Delta df = 1$, $p < .08$), suggesting the importance of the *SC* to *Poor Adjustment* path. Model 4 set the path from *SC* to *Younger Sibling Poor Adjustment* to 0, and again freely estimated the path from *IP* to *Poor Adjustment*; this path remained non-significant (S.C. = .07; C.R. = 0.59). Model 5 set the path from *OB Deviant Peers* to *Poor Adjustment* to 0. The path from *SC* (S.C. = .20; C.R. = 1.84) to *Poor Adjustment* was marginally significant, but the path from *Ineffective Parenting* (S.C. = .11; C.R. = 0.98) to *Poor Adjustment* remained non-significant. The change in the chi-square fit statistic between Models 1 and 5 is marginally significant, indicating that Model 1 fits the data better than Model 5 ($\Delta X^2 = 2.71$, $\Delta df = 1$, $p < .10$) and suggesting the importance of the *OB Deviant Peers* to *Poor Adjustment* path.

In summary, younger siblings who evidenced poor adjustment in adolescence (at average

age 16) were more likely to have engaged in frequent conflict (at ages 6 to 8) with their older brothers and to have older brothers who associated with deviant peers when the younger siblings were children (at average age 10). Conflictual sibling relationships and exposure to older siblings with deviant peers each significantly increased younger siblings' risk for antisocial behavior, drug use, arrest, early sexual activity and traumatic experiences some 6 to 10 years later. This increased risk was apparent even after controlling for ineffective parental discipline, problem solving and monitoring during the younger siblings' childhood. Ineffective parenting when younger siblings were 6 to 8 years of age did not have a direct impact on the younger siblings' adjustment in adolescence, but rather incremented risk for poor adjustment as a result of failures to manage early sibling conflict and older brothers' association with deviant peers.

The predictors in the previous models clearly have a prospective relationship to younger siblings' adolescent adjustment. A more complex model to predict *Younger Sibling Poor Adjustment* was tested, adding a measured variable indicating the degree to which younger siblings are *Hanging Out With Older Brothers (Hanging Out; measured concurrently with Poor Adjustment at Wave 11)*, and an *Sibling Conflict (SC, measured at waves 1 and 3) X Hanging Out (measured at wave 11)* interaction term. We hypothesized that *Hanging Out* with an older deviant sibling in adolescence (wave 11) and its accompanying opportunities for co-participation in deviant activities would mediate the relationship between the *OB Deviant Peers* association (wave 5) and *Younger Sibling Poor Adjustment*. The *SC x Hanging Out* interaction term examines whether siblings' early involvement in conflict and coercion and their later co-participation and mutual encouragement of deviant activities increment risk for poor adjustment in a synergistic as well as additive manner.

The correlations among the three latent variable *OB Deviant Peers*, *Hanging Out*, and *Poor Adjustment*, as shown in Table 2, were all statistically significant ($p < .05$). These correlations are derived from a measurement model and thus represent correlations between latent constructs. Because these correlations are disattenuated, the magnitudes of the coefficients are enhanced as compared to zero order correlations. Younger sisters relative to younger brothers were slightly less likely to evidence *Poor Adjustment* ($r = -.20$), but more likely to report traumatic experiences ($r = .19$).

This more complex model is shown in Figure 1. The results support the hypothesis that *Hanging Out* may partially mediate the relation between the *OB Deviant Peers* (at wave 5) and *Poor Adjustment* (wave 11). The path from *OB Deviant Peers* to younger siblings' *Hanging Out* was significant (S.C. = .27, C.R. = 2.65) as was the path from *Hanging Out* to *Poor Adjustment* (S.C. = .44, C.R. = 4.53). *OB Deviant Peers* has both a direct effect (S.C. = .21, C.R. = 2.26) and an indirect effect on *Younger Sibling Poor Adjustment* through *Hanging Out*. As expected, the larger the age difference between the siblings, the less likely they were to *Hang Out* together (S.C. = $-.30$, C.R. = -3.48). The *Sibling Conflict X Hanging Out* interaction term also reliably predicted *Younger Sibling Poor Adjustment* (S.C. = .19, C.R. = 2.14). The fit of this more complex model to the data was quite good: $X^2 = 65.07$, $df = 58$, $p = .244$, $NFI = .947$, $CFI = .994$. The model accounts for 38% of the variance in younger siblings' poor adjustment in adolescence.

One additional model was fit to the data, adding paths from effective *Parent Discipline* as a measured variable to younger siblings' *Hanging Out* and to *Younger Sibling Poor Adjustment*, all of which were measured concurrently at wave 11. The rationale for this model was to assess whether *Hanging Out* continued to contribute to concurrent Poor Adjustment with the inclusion of

concurrent *Parent Discipline focused on the younger sibling*. The paths from effective *Parent Discipline* to *Poor Adjustment* (S.C. = -.28, C.R. = -3.00) and to *Hanging Out* (S.C. = -.27, C.R. = -2.99) were both reliable, but all of the other paths shown in Figure 1 retained their predictive value and statistical reliability. The fit of this more complex model to the data was modest: $X^2 = 88.65$, $df = 67$, $p = .040$, $NFI = .930$, $CFI = .981$.

Older siblings' influence on younger siblings' adolescent adjustment continues to unfold over development. Younger siblings who were involved in frequent coercive interaction with their older brothers and who were exposed to older brothers' peer associates prior to adolescence were more likely to hang out and to co-participate in deviant activities with their older brothers in adolescence. Early sibling conflict appears to facilitate a later sibling compatibility, association and mutual involvement in deviant activities. Later high levels of sibling association and mutual involvement in deviant actions, in turn, promote a range of adjustment problems in younger siblings. These early and later sibling effects are sufficiently powerful to be maintained despite parents' efforts to manage younger siblings' behavior problems during adolescence. The closer the siblings are in age, the more powerful the effects on younger siblings, especially on substance use, sexual activity and exposure to traumatic experiences. Younger sisters and younger brothers are affected in different ways by their older brothers.

Discussion

There was general support for the hypothesized sibling influence model. Early sibling conflict and exposure to the deviant activities and associates of an older brother during childhood, and younger siblings' association and co-participation in deviant activities with their older brothers during adolescence reliably incremented younger sisters' and brothers' risk for a variety of serious

behavior problems in adolescence. These findings are consistent with previous research (Bank et al., 1996; Rowe & Gulley, 1992; Slomkowski et al., 1997; 2001) that documents the powerful socialization role of siblings. The data in this report provide the first test and confirmation of the dual sibling social process model offered by Bank, Slomkowski and their colleagues. The data suggest that sibling influence unfolds in an iterative fashion from early childhood through adolescence, and entails a developmental sequencing of different social processes – from conflict and disagreement in early childhood to exposure to and co-participation in deviant activities in later childhood and adolescence. The sequential influences of early sibling conflict, older brothers' association with deviant peers, and siblings' co-participation in deviant activities on younger siblings' adolescent adjustment entail indirect linkages between earlier and later sibling experiences, and combine in a cumulative and synergistic fashion to increment risk.

The substantial and unique power of sibling influence can also be inferred from the inclusion of a multi-component, multi-method measure of parenting during childhood, and the inclusion of a concurrent measure of parental discipline in adolescence. The observed substantial and multiple influences of older brothers on their younger siblings maintained their reliability and size in the context of such parenting influences. The co-occurring parent and sibling influence apparent in this analysis is consistent with previous analyses with this sample that focused on the adjustment of the older OYS boys (Bank et al., 2004).

The power of sibling influence is also apparent in the wide range of developmental outcomes used to define younger siblings' adolescent adjustment, including arrests, drug use, antisocial behavior, deviant peer association, early sexual activity and traumatic stress. The impact of siblings on a range of externalizing outcomes reported in previous research (e.g., Conger,

Conger, & Scaramella, 1997; Conger & Reuter, 1996; Rowe & Gulley, 1992; Slomkowski et al., 2001) are clearly replicated in these data.

The current research also suggests that sibling influence on antisocial development is contextually sensitive. Influence appears to be stronger for siblings who are closer in age, perhaps by affecting how much time older and younger siblings spend with one another and how much they co-participate in deviant activities. Influence also depends on the gender composition of the sibling dyad. Younger sisters relative to younger brothers, for example, were more likely to report traumatic experiences even though they evidenced lower levels of overall poor adjustment. Girls with an antisocial older brother may be exposed to and have significant contact with his antisocial peers, and as a consequence may be at increased risk for physical or sexual victimization (Capaldi & Clark, 1998). Because of their diminished strength and aggressiveness, younger sisters more than younger brothers may be perceived as more vulnerable targets by an older brother and his peers (Schrepferman, Snyder, & Bank, 2003).

The current data provide a glimpse into the processes by which older brothers affect their younger brothers' and sisters' adolescent adjustment. Early sibling conflict, especially when accompanied by ineffective parenting, may shape the use of coercive and aggressive interpersonal tactics (Snyder & Stoolmiller, 2002). As they move into later childhood and adolescence, siblings may engage in mutual discourse about deviant activities, modeling of deviant acts, and actual collusion and co-participation in drug use and other antisocial activities (Bullock & Dishion, 2002). While these processes probably entail reciprocal sibling influence as the siblings are closer in age, older siblings may exert more influence as they are, on the average, likely to have been exposed to and to have engaged in a greater variety of antisocial activities.

However, younger siblings' *hanging out* with their older brother brings another potentially pathogenic social process into play – exposure to and involvement with the deviant peers of the older brother (Larson & Richards, 1991). While antisocial younger siblings may have established their own (deviant) affiliations with same-aged peers, hanging out with an antisocial older brother and his deviant associates is likely to accelerate the deviancy training process beyond that occurring in the younger sibling's same-age peer group. Exposure to an older brother's deviant peers not only provides the opportunity for participation in an even wider variety of antisocial activities, but it may do so without the protection of familial or blood loyalty and identification. Direct involvement with an older brother's deviant peers may particularly increase risk for younger sisters' trauma, victimization and involvement in precocious sexual activity.

The seemingly powerful and developmentally persistent influence of siblings on risk for antisocial behavior suggests that the sibling relationship may provide a useful venue for preventive interventions, complementing more standard parent, peer and school intervention contexts. The data in this report suggest that preventive efforts should focus on the sibling relationship relatively early in development, before the at-risk older sibling becomes heavily involved with deviant peers. Such early sibling intervention may be implemented as an additional, systematic component of parent training (Johnston & Freeman, 1998), or delivered in its own right with or without accompanying parenting intervention (Bank, Snyder & Prescott, 2002; Kramer, 2004). In fact, sibling intervention provides a “two for the price of one” modality of service delivery, and may serve as a simultaneous clinical intervention for an older sibling with significant conduct problems and a preventive intervention for the at-risk younger sibling. While sibling relationship enhancement may be beneficial when applied to low-risk adolescent sibling dyads, the current data

suggest that sibling interventions targeting high-risk sibling dyads during adolescence may face the same obstacles and potential iatrogenic effects encountered in peer interventions for antisocial adolescents (Dishion, McCord, & Poulin, 1999).

Some methodological characteristics of this study increase the confidence that can be placed in the findings. Its design is largely though not exclusively prospective, locating constructs in development in a manner consistent with theory. Multi-method and multi-source measurement of many of the constructs reduces measurement error and mitigates shared source variance as a competing explanation for the observed relationships among the major constructs. The children in the sample represent a full range of adjustment so that the size of the relationships among constructs is likely to be reasonably well-estimated.

However, the study also has several methodological characteristics that attenuate the clarity with which the results can be interpreted and the degree to which the findings may be generalized. Measures of early sibling conflict were not specific to the focal older brother and younger sibling, but rather reflected the often multiple sibling relationships that occurred in the families in the OYS sample. Measures of ineffective parenting likely better represent the parenting experienced by the OYS boys who served as older brothers in this report than the parenting experienced by the focal younger siblings in this study. The OYS sample is atypical in several regards. The children in the sample were at considerable risk for antisocial behavior. The children and families evidenced limited variation and range in terms of socio-economic status and ethnicity, and were derived from a specific geographic location. Thus, generalization of the findings to the larger population remains tentative. Only older brother-younger sister or brother combinations were represented in the current report, and different sibling influences may occur when the older sibling is female

rather than male. Finally, the use of a correlational-longitudinal design necessarily makes inferences about causality tentative. Not all theoretically relevant constructs (e.g., peer influences for younger siblings, parental monitoring) were measured and included in the model. Stronger inferences await experimental manipulation of sibling and family relationship in randomized prevention or clinical trials. However, this as well as other empirical reports concerning the role of sibling relationships as a risk factor in the development of antisocial behavior clearly suggest that such trials are reasonable and may be efficacious.

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Table 1
Measurement of Constructs

Construct	Indicators	Sample Items	Alpha
Sibling Conflict (Waves 1 & 3)			.69
	-rpm conflict	observed rate of conflict bouts	
	-observer ratings		
	-parent ratings		
	-OYS brother's rating		
Ineffective Parenting (Waves 1 & 3)			.59
	-Problem Solving (observer ratings)		
	-Outcomes	"clear definition of problem"	
	-Solutions	"number of solutions"	
	-Child participation	"parent encouraged child"	
	-Supervision of Older Brother (Waves 1 & 3)		
	-Parent Report Scale	"number of hours child unsupervised"	
	-Child Report Scale	"clear parental rules"	
	-Observer ratings		
	-Parent-Child & Parent-Parent Conflict (Waves 1 & 3)		
	-rpm P-C conflict	observed rate of conflict bouts	
	-rpm P-P conflict	observed rate of conflict bouts	

Table 1 (Continued)

Construct	Indicators	Sample Items	Alpha
Older Brothers' Deviant Peer Association (Wave 5)			see text
	-Observed Peer Interaction Task (PIT; older brother and friend)		
	-deviant talk	-observed duration	
	-deviant talk	-observed % of all talk	
	-reinforcement	-observed % of friend's positive responses for deviant talk	
	-interviewer rating	peer involved with deviant friends	
	-observer ratings	showed aggression, threats	
	-Brother's Association with Deviant Peers		
	-teacher report	associate with misbehaving peers	
	-TRF	hangs with kids who get in trouble	
	-CBCL	hangs with kids who get in trouble	
	-Antisocial Behavior of Peers		
	-CBCL	friends are a bad influence	
	-child interview	how many friends damage things	
	-coder ratings of peer	indicated friends were antisocial	
	-Amount of Time Spent With Peers		
	-mom & dad report	son prefers to be with friends	
	-parent tel. interview	involved in unsupervised activity	
	-child self report	spend free time with friends	
Hanging Out With Older Brother (Wave 11)			.68
	-younger sibling report of co-participation with older brother	substance use, illegal acts, activity with deviant peers	

Table 1 (continued)

Construct	Indicators	Sample Items	Alpha
Younger Sibling Poor Adjustment (Wave 11)			
	-Early Sexual Activity (self report)	kissing, genitals/breast touch	.67
	-Arrests	official records	
	-Antisocial Behavior		.79
	-Elliot Checklist-Parent		
	-CBCL		
	-Parent Interview		
	-Elliot Checklist-Child		
	-Tel. Interview-Child		
	-Child Interview Rating		
	-Deviant Peer Association		see text
	-CBCL		
	-Child Interview		
	-Child Rpt-Describing Best Friends		
	-Substance Use		see text
	-CBCL	“uses drugs or alcohol”	
	-Parent Interview		
	-Child Interview	frequency and pattern of use of tobacco, alcohol, marijuana, other	
	-Traumatic Stress		.78
	-Child Interview	exposure to assault, MVA,	
	-Child Interview	freq of trauma memory	
	-Child Interview	reaction: numb, jumpy	
Parental Discipline of Younger Sibling (Wave 11)			
	-Parent Report	consistent, effective	.63
	-Child Report	fair, how discipline	
	-Interviewer Rating		

Table 2

Construct Inter-correlations From the Measurement Model

	1.	2.	3.	4.	5.	6.	7.	8.	9.	
1. Sibling Conflict	1 --									
2. Ineffective Parenting	0.40 (3.76)	1 --								
3. Older Brother Deviant Peers	0.27 (2.59)	0.48 (4.32)	1 --							
4. Hanging Out With Older Brother	0.29 (2.79)	0.12 (1.15)	0.27 (2.56)	1 --						
5. Sibling Conflict X Hanging Out With Older Brother	0.02 (0.17)	0.11 (1.09)	0.12 (1.21)	0.31 (2.94)	1 --					
6. Younger Sibling Gender	-0.09 (-0.87)	0.07 (0.71)	-0.06 (-0.58)	-0.10 (-0.98)	0.13 (1.32)	1 --				
7. Sibling Age Difference	0.05 (0.54)	0.18 (1.78)	0.14 (1.39)	-0.27 (-2.58)	-0.05 (-0.46)	-0.03 (-0.34)	1 --			
8. Parent Discipline At Wave 11	-0.19 (-1.81)	-0.07 (-0.68)	-0.08 (-0.81)	-0.38 (-3.41)	-0.18 (-1.65)	0.07 (0.65)	0.22 (2.04)	1		
9. Younger Sibling Poor Adjustment	0.22 (2.02)	0.14 (1.31)	0.35 (3.04)	0.54 (4.28)	0.30 (2.69)	-0.20 (-1.90)	-0.11 (-1.04)	-.36 (-2.95)	1 --	

Note: Measurement Model fit: $X^2 = 51.68$, $df = 49$, $p = .40$, $NFI = .96$ $CFI = 1.00$; critical ratios for the correlations are shown in parentheses.

Table 3

Path Models for the Relation of Sibling Conflict, Ineffective Parenting, Older Brother Deviant

Peers to Younger Siblings' Poor Adjustment

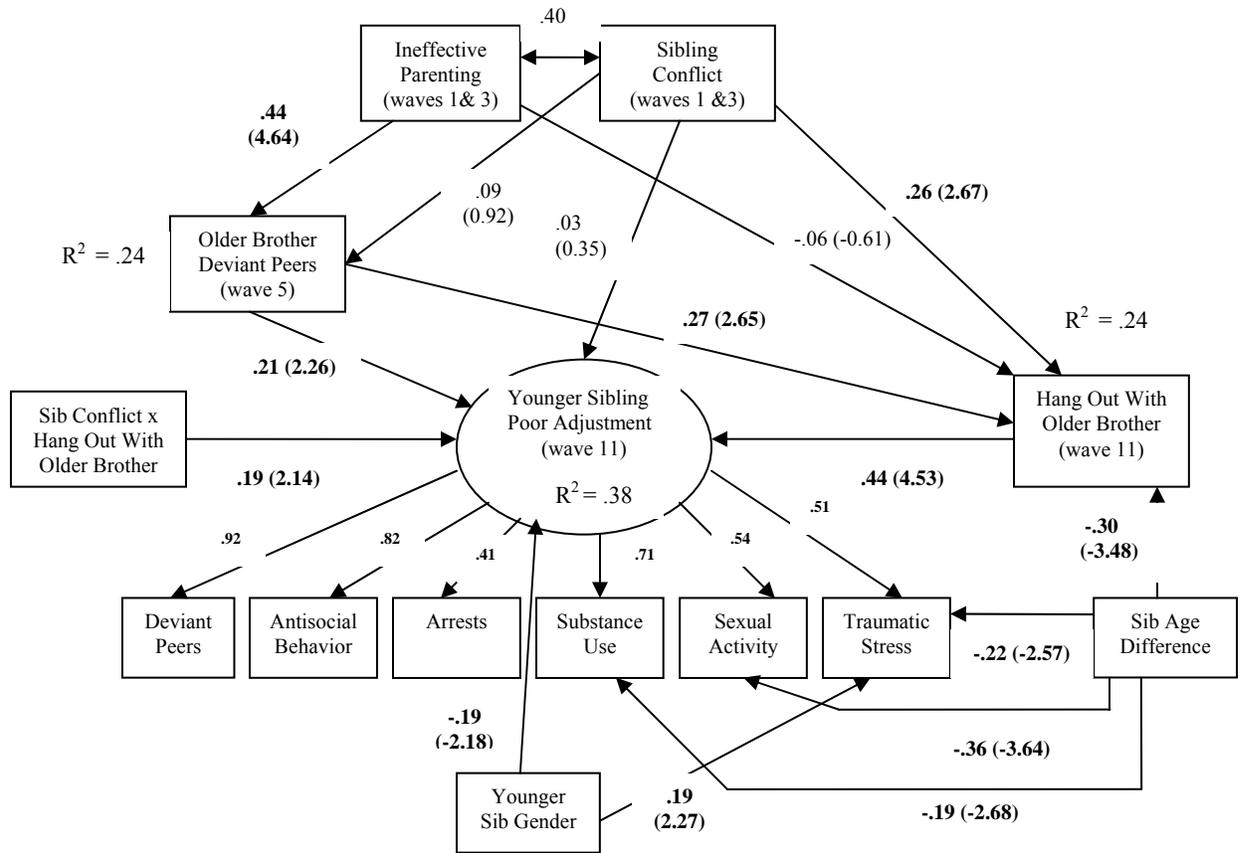
	OS Deviant Peers	YS Poor Adjustment	χ^2	df	NFI	CFI	χ^2 diff
Model 1			40.6	37	0.97	1	
Sibling Conflict Ineffective Parenting	.05 (0.50)	0.18 (1.70)					
Older Brother Deviant Peers	0.49 (5.22)	0.00 (-0.01)					
Younger Sibling Gender		0.22 (1.95)					
Sibling Age Difference		-0.24 (-2.42)					
		-0.14 (-1.43)					
Model 2			40.6	38	0.97	1	0
Sibling Conflict Ineffective Parenting	.05 (0.50)	0.18 (1.80)					
Older Brother Deviant Peers	0.49 (5.22)	0.22 (2.20)					
Younger Sibling Gender		-0.24 (-2.42)					
Sibling Age Difference		-0.14 (-1.44)					
Model 3			43.69	39	0.97	1	3.09
Sibling Conflict Ineffective Parenting	.05 (0.49)						
Older Brother Deviant Peers	0.49 (5.22)	0.27 (2.73)					
Younger Sibling Gender		-0.25 (-2.56)					
Sibling Age Difference		-0.13 (-1.36)					
Model 4			43.35	38	0.97	1	2.75
Sibling Conflict Ineffective Parenting	.05 (0.49)	0.07 (0.59)					
Older Brother Deviant Peers	0.49 (5.22)	0.24 (2.06)					
Younger Sibling Gender		-0.25 (-2.58)					
Sibling Age Difference		-0.15 (-1.48)					
(cont. next page)							
Model 5			43.31	38	0.97	1	2.71
Sibling Conflict	.05 (0.50)	0.20 (1.84)					

Ineffective Parenting	0.49 (5.21)	0.11 (0.98)
Older Brother Deviant Peers		
Younger Sibling Gender		-0.21 (-2.15)
Sibling Age Difference		-0.16 (-1.58)

Note: Critical Ratios are shown in parentheses.

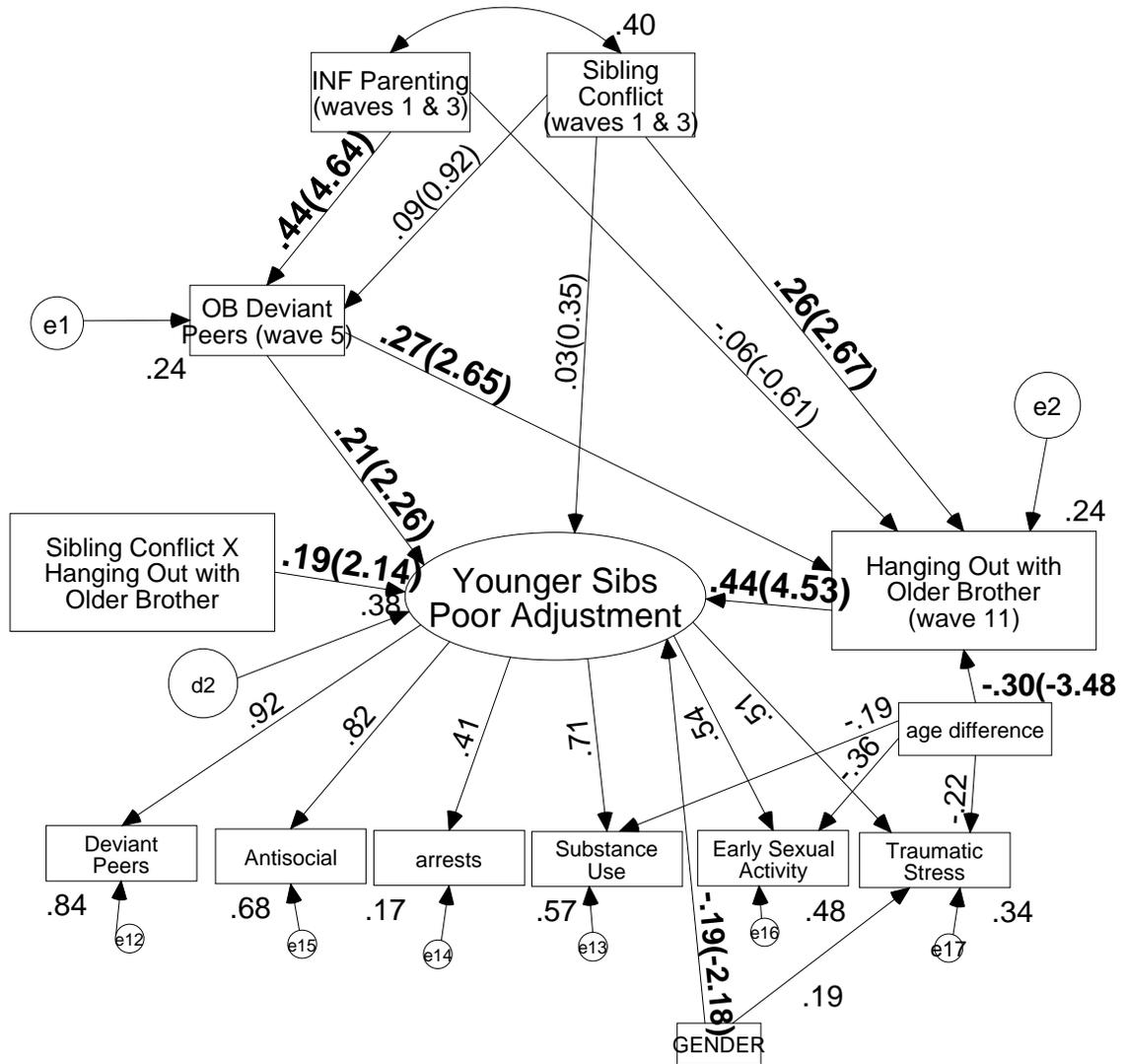
Figure 1

The contribution of sibling social relational processes during childhood and adolescence to younger siblings' adolescent adjustment.



$\chi^2 = 65.07$, $df = 58$, $p = .244$, $NFI = .947$, $CFI = .994$, $RMSEA = .035$

(Significant paths are shown in bold)



Chi-square=65.069 df=58 p=.244
 NFI=.947 CFI=.994 RMSEA=.035