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Peer Rejection, Affiliation with Deviant Peers, Delinquency, and Risky Sexual Behavior

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Abstract

Risky sexual behavior poses significant health risks by increasing sexually transmitted infections and unintended pregnancies. Previous research has documented many factors related to risky sexual behavior. This study adds to the literature by proposing a prospective, developmental model of peer factors related to risky sexual behavior. Developmental pathways to risky sexual behavior were examined in a sample of 517 individuals (51% female; 82% European American, 16% African American, 2% other) followed from age 5 to 27. Structural equation models examined direct and indirect effects of peer rejection (assessed via peer nominations at ages 5, 6, 7, and 8), affiliation with deviant peers (assessed via self-report at ages 11 and 12), and delinquency (assessed via maternal report at ages 10 and 16) on risky sexual behavior (assessed via self-report at age 27). More peer rejection during childhood, affiliation with deviant peers during pre- adolescence, and delinquency in childhood and adolescence predicted more risky sexual behavior through age 27, although delinquency at age 16 was the only risk factor that had a significant direct effect on risky sexual behavior through age 27 above and beyond the other risk factors. Peer rejection was related to subsequent risk factors for girls but not boys. Peer risk factors as early as age 5 shape developmental pathways through childhood and adolescence and have implications for risky sexual behavior into adulthood.

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Authors' Contributions

JEL conceived of the study, participated in its design and coordination, and drafted the manuscript; KAD, RGF, JEB, and GSP participated in the design and coordination of the study and provided constructive feedback on drafts of the manuscript. All authors read and approved the final manuscript.

Keywords

delinquency; deviant peers; peer rejection; risky sexual behavior

Introduction

Each year in the United States alone, 19 million new cases of sexually transmitted infections (STIs) are diagnosed (Centers for Disease Control and Prevention, 2011); 50% of new cases of STIs are diagnosed in young people ages 15 to 24 (Weinstock, Berman, & Cates, 2004). Furthermore, 37% of pregnancies are reported as being unplanned (Mosher, Jones, & Abma, 2012), and 10% of births are to teenage mothers (U.S. National Center for Health Statistics, 2010). Worldwide, 1 million people acquire a sexually transmitted infection (STI) every day (World Health Organization, 2013), and 41% of pregnancies are unintentional (World Health Organization, 2005). Risky sexual behaviors, including having multiple sexual partners and initiating sexual activity at a young age, increase the odds of STIs and unintended pregnancies (Centers for Disease Control and Prevention, 2008). Understanding developmental pathways to risky sexual behaviors, the focus of this paper, is important from a public health standpoint as it holds the potential to inform prevention and intervention efforts to reduce such behaviors.

A large body of research has examined developmental precursors of risky sexual behavior (see Kotchick, Shaffer, Forehand, & Miller, 2001; Miller, Benson, & Galbraith, 2001; Taylor-Seehafer & Rew, 2000 for reviews). In general, both cross-sectional and longitudinal research findings link more risky sexual behavior with individual characteristics of children and adolescents (e.g., earlier pubertal development, Koo, Rose, Bhaskar, & Walker, 2011), family characteristics (e.g., low parental monitoring, Wight, Williamson, & Henderson, 2006), and sociodemographic contexts (e.g., low SES, Miller et al., 2001). In one longitudinal investigation of a number of risk factors, Zimmer-Gembeck, Siebenbruner, and Collins (2004) found that more sociability at 30 months and high-quality friendships at 12–13 years predicted early entry into romantic relationships and more alcohol use at age 16, which predicted having more sexual partners by age 19. Using the same longitudinal sample used in the present study, Lansford et al. (2010) found that reporting more sexual partners at age 16 was related to being African American, having earlier pubertal development, less parental monitoring knowledge, more association with deviant peers, and lower grade point average in early adolescence. In addition, growth from age 16 to 22 in numbers of partners was predicted by being European American, lower child IQ, higher parental monitoring knowledge, and fewer early adolescent internalizing problems.

The goal of the present study was to test a long-term developmental model of pathways from peer relationships to risky sexual behavior. We operationalized risky sexual behavior as a multi-faceted construct comprising age of first intercourse, number of sexual partners in the last year, lifetime number of sexual partners, and STI diagnoses. Findings sometimes differ depending on the operationalization of risky sexual behavior, so we specify how previous studies operationalized this construct as well. A strength of the present study was the availability of risky sexual behavior data through age 27, making it possible to examine

much longer-term outcomes than has been possible in the literature to date. In the literature review below, we highlight the designs of previous studies to indicate whether the findings are based on cross-sectional or longitudinal data and, if longitudinal, at which ages. Our overarching conceptual framework hinges on a developmental model of both direct effects of risk factors on subsequent risky sexual behavior as well as developmental mechanisms with peer rejection during childhood, affiliation with deviant peers in early adolescence, and delinquency in both childhood and adolescence exerting indirect effects on risky sexual behavior through developmentally intervening processes. The sections that follow review previous research on each of these mechanisms.

Peer Relationships and Risky Sexual Behavior

During adolescence, most romantic partnerships develop in the context of mixed-gender peer groups (Connolly, Craig, Goldberg, & Pepler, 2004). Peer group norms differ with respect to a number of prosocial and antisocial behaviors. The process of deviant peer contagion, whereby the peer group perpetuates, encourages, and normalizes antisocial behaviors through reinforcement, has been found in behaviors ranging from substance use (Dishion, Capaldi, Spracklen, & Li, 1995) to crime (Bayer, Pintoff, & Pozen, 2004). Prinstein, Boergers, and Spirito (2001), for example, found in a cross-sectional study that adolescents who reported more substance use, violent behavior, and suicidality also reported more substance use, violent behavior, and suicidality, respectively, for their friends.

It seems reasonable to anticipate that affiliating with deviant peers would promote risky sexual behavior as well as these other risky behaviors, as problem behaviors tend to cluster across risk domains (Jessor, Donovan, & Costa, 1991). Indeed, in a longitudinal study that followed a sample of girls who were virgins at Time 1, Cavanagh (2004) found that friendship groups high in problem behaviors increased the odds and friendship groups high in academic achievement decreased the odds that a European American adolescent girl would transition into sexual activity (i.e., report having sexual intercourse) by Time 2 one year later; structure of friendship groups (especially the presence of older boys in the group) played a similar role for Latina girls' first reported intercourse. Likewise, Prinstein, Meade, and Cohen (2003) found that, cross-sectionally, adolescents' reported engagement in oral sex as well as reported number of oral sex partners were positively correlated with adolescents' perceptions of their best friends' sexual behaviors in these same domains (but were not related to reported sexual intercourse). Similarly, Walter et al. (1992) found that 10^{th} graders who reported having unprotected intercourse and a past year history of an STI reported that their friends also had intercourse and never or inconsistently used condoms. Therefore, in building a conceptual model of the genesis of risky sexual behavior, affiliation with high-risk peers would appear to be a proximal predictor. The present study examines affiliation with deviant peers as a predictor of risky sexual behavior, as well as examining whether this influence is direct or operates via adolescents' delinquent behavior.

Although some antisocial behaviors have adolescent onset without problematic trajectories during childhood (Moffitt, 1993), risk factors during childhood increase the likelihood that adolescents will affiliate with deviant peers and engage in delinquent behavior during adolescence (Fergusson & Horwood, 1999). Early peer rejection has been identified as one

developmental precursor to affiliation with deviant peers (Dishion, Patterson, Stoolmiller, & Skinner, 1991). Children who are rejected by their mainstream peers may gravitate toward deviant peers because they have few other options for peers with whom to affiliate. Another possibility is that children who engage in problem behaviors such as aggression are more likely to be rejected by their peers and, through homophily, affiliate with others who have similar proclivities to problem behaviors. The present study will test early peer rejection as a distal peer risk factor for the development of subsequent risky sexual behavior, with delinquency in childhood as well as deviant peer affiliation and delinquency during adolescence serving as intervening proximal developmental risk factors.

The Role of Gender

Compared to females, males report earlier ages at first intercourse and more sexual partners (Brewer et al., 2000; Grunbaum et al., 2004). One question has been whether males and females differ just in mean levels of reported risky sexual behavior or whether they differ in developmental pathways to those behaviors. Several studies suggest that peer factors are more predictive of girls' than boys' risky sexual behavior. Brendgen, Wanner, and Vitaro (2007) followed a sample of Canadian children from kindergarten through 7th grade and found that for girls, but not boys, peer rejection during elementary school was related indirectly to self-reported initiation of sexual intercourse by age 13 via low self-esteem, suggesting gender differences in developmental pathways. Billy and Udry (1985) found that European American girls who were virgins in 7th, 8th, or 9th grade but had a best female friend and best male friend at that time who were nonvirgins were likely to be nonvirgins two years later; males' and African American girls' first intercourse during this two year period was unrelated to the sexual behavior of their friends. Smith, Udry, and Morris (1985) found in a cross-sectional analysis that 12- to 15-year-old girls' reports of their sexual behavior (on a 7-point scale ranging from kissing to intercourse) were related positively to their best friend's report of her own sexual behavior (on the same scale), particularly when girls were more physically mature; the relation between boys' reports of their own sexual behavior and their best friend's report of his own sexual behavior was not contingent on the boys' level of physical maturity.

Other studies, however, have found that peer predictors of risky sexual behavior are largely the same for girls and boys. For example, in a longitudinal study of a number of factors predicting risky sexual behavior (operationalized as a scale ranging from 0 = never had sex to 4 = first intercourse before age 15, two or more sexual partners in the last year, and no condom use at last intercourse), Crockett, Raffaelli, and Shen (2006) found that peer pressure to engage in misconduct at ages 12–13 was related to more risky sexual behavior for both girls and boys at ages 16–17. Thus, previous research on whether specific risk factors as well as developmental pathways to risky sexual behavior differ for boys and girls has been inconclusive and appears to depend on the specific constructs included in the models and methodological features of the studies. The present study is unique in extending the examination of gender differences in developmental pathways from childhood and adolescent peer relationships to risky sexual behavior during adulthood.

Hypotheses—We addressed three primary research hypotheses. First, we hypothesized that more peer rejection during childhood (ages 5–8), affiliation with deviant peers during pre- adolescence (ages 11–12), and delinquency in childhood and adolescence (ages 10 and 16) would predict more risky sexual behavior through age 27. Second, we hypothesized that risk factors earlier in development would have indirect effects on risky sexual behavior via developmentally later risk factors. Therefore, we anticipated that more peer rejection during childhood would predict riskier sexual behavior by age 27 via more delinquency and more affiliation with deviant peers, that more delinquency in childhood would predict riskier sexual behavior by age 27 via more affiliation with deviant peers and delinquency in adolescence, and that deviant peer affiliation in early adolescence would predict riskier sexual behavior by age 27 via more delinquency in mid-adolescence. Third, given that previous research has been inconclusive yet suggestive of gender differences in peer pathways to risky sexual behavior, we hypothesized that peer rejection would be a stronger predictor of risky sexual behavior for girls than boys.

Method

Participants

The families in the current investigation were participants in an ongoing, multisite longitudinal study of child development (Dodge, Bates, & Pettit, 1990). We recruited participants when the children entered kindergarten in 1987 or 1988 at three sites: Knoxville and Nashville, TN and Bloomington, IN. The researchers approached parents at random during kindergarten pre-registration and asked if they would participate in a longitudinal study of child development. Of those asked, approximately 75% agreed to participate. About 15% of children at the targeted schools did not pre-register. We recruited late enrolling families, 15% of our sample, on the first day of school or by subsequent contact. The sample consisted of 585 families at the first assessment. Males comprised 52% of the sample. Eighty-one percent (81%) of the sample were European American, 17% were African American, and 2% were from other ethnic groups. The sample reflected a wide range of socioeconomic backgrounds, ranging from 8 to 66 on the Hollingshead index (M = 39.53, SD = 14.01). Participants completed follow-up assessments annually through age 27. Parents provided written informed consent each year until participants reached age 18, when they began providing their own written informed consent. Institutional review boards at the universities involved in this study approved the research protocols in relation to ethical treatment of participants. The sample for the present study included 517 individuals (88% of the original sample) who provided data on risky sexual behaviors in any combination of years from age 16 to 27. Compared to the 68 original participants who did not provide sexual risk data, the 517 participants with sexual risk data were more likely to be female, $\chi^2(1) = 4.28$, $p < .05$, but did not differ on ethnicity or SES in kindergarten.

Procedures and Measures

Peer rejection—Sociometric interviews following the protocol described by Coie, Dodge, and Coppotelli (1982) were conducted in all classrooms when children were in kindergarten and grades 1–3 (ages 5–8). Interviews were conducted individually and orally. Children viewed a class roster, either of pictures or names depending on age, and named up to three

peers they especially liked and up to three peers they especially disliked. A social preference score was created by taking the standardized difference between the standardized like most nomination score and the standardized dislike most nomination score. Children met criteria for being rejected by peers if their social preference score was less than 1, standardized like most score was less than 0, and standardized like least score was greater than 0. Based on these criteria, 37 children, 21 children, 26 children, and 31 children were socially rejected in kindergarten, first, second, and third grade, respectively. We constructed a variable reflecting the number of years a child was rejected by peers (range = 0–4); 76.4% of the sample was never rejected, 14.5% was rejected in one year, 6.5% was rejected in two years, 2.4% was rejected in three years, and .2% was rejected in all four years.

Delinquency—When children were 10 and 16 years old, mothers completed the Child Behavior Checklist (Achenbach, 1991). Mothers reported on 13 items about delinquency (e.g., stealing, truancy, vandalism) using a 3-point scale with 0 = *not true*, 1 = *somewhat or sometimes true*, and 2 = *very or often true*. Items were summed to compute a delinquency scale at each time point (α = .60 at age 10 and .76 at age 16).

Deviant peer affiliation—When participants were in grade 6 (age 11), they reported on the deviant behavior of two of their friends using items adapted from Dishion et al. (1991). For each of the two friends, participants rated how frequently (1 = never/hardly ever, 2 = occasionally/sometimes, 3 = very often/always) the friend engaged in 14 types of deviant behavior (e.g., drinking, smoking, getting in fights, cheating, vandalizing). The items were averaged to create a scale reflecting peer deviance at age 11 (α = .80). When participants were in grade 7 (age 12), they reported on the deviant behavior of their peer group as a whole using the same 14 items that had been asked of individual friends' behavior at age 11. The items were averaged to create a scale reflecting peer group deviance at age 12 (α = .82). At age 12, participants also reported on the deviant behavior of their best friend, using a subset of 5 of the 14 items that asked about the peer group as a whole. Items were rated on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true). The five items were averaged to create a scale reflecting best friend deviance at age 12 (α = .69).

Risky sexual behaviors—At age 27, participants answered four questions used in the present study as indicators of risky sexual behavior: 1) the age at which they first had any kind of sexual intercourse (reported in years); 2) whether they had ever been diagnosed with a sexually transmitted infection (0 = no, 1 = yes); 3) with how many different persons they had sexual intercourse in the last 12 months (reported range = 0 to 20); 4) with how many different persons they had sexual intercourse in their lifetime (using a response scale of 1 = 0, 2 = 1–2, 3 = 3–5, 4 = 6–10, 5 = 11–15, 6 = 16–20, 7 = 21–50, 8 = 51–100, 9 = more than 100). If participants were missing data on the age at first intercourse variable from age 27, we used annual reports from ages 16 to 22 regarding whether they had sexual intercourse in the last year to determine whether sexual intercourse first occurred during that time frame.

Analysis Plan

We used structural equation modeling techniques in AMOS 22.0 to test our hypotheses. Number of years of peer rejection from age 5 to 8, delinquency at age 10, and delinquency at

age 16 were treated as observed variables. Deviant peer affiliation at ages 11 to 12 was a latent variable with three indicators. Risky sexual behavior by age 27 was a latent variable with four indicators. We first present descriptive analyses and preliminary analyses testing for SES and ethnicity effects to determine whether SES, ethnicity, or both should be controlled in subsequent analyses. We then test the main model with the full sample and as a multi-group (males versus females) model. We use the percentile bootstrap to establish confidence intervals for the indirect effects as recommended by MacKinnon (2008). AMOS cannot perform these tests with missing data, so tests of the indirect effects were limited to cases that had complete data on all variables.

Missing data were handled using full information maximum likelihood estimation (FIML), which results in unbiased parameter estimates and appropriate standard errors when data are missing at random (MAR). FIML estimates are generally superior to those obtained with listwise deletion or other ad hoc methods, even when the MAR assumption is not fully met (Schafer & Graham, 2002). Table 1 shows the number of participants who provided data on each variable. To assess model fit, we examined the χ^2, the Comparative Fit Index (CFI; Bentler, 1990), and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). Good model fit is reflected in nonsignificant χ^2, CFI values ≥ .90 (Bentler, 1990; Bollen, 1990; Kline, 1998), and RMSEA values ≤ .06 (Hu & Bentler, 1999), but we gave greater weight to the incremental/approximate fit indices than to the significance of the χ^2 because the χ^2 value is sensitive to sample size (Cheung & Rensvold, 2002).

Results

Descriptive and Preliminary Analyses

Table 1 depicts descriptive statistics and bivariate correlations. The median age at first intercourse was 17, 11% of the sample reported having been diagnosed with an STI, the average number of sexual partners in the last year was 1.73, and the average lifetime number of sexual partners was in the 6–10 range. Bivariate correlations were in expected directions.

Preliminary analyses examined the role of SES and ethnicity in the models. Higher SES in kindergarten was significantly related to less peer rejection (β = −.20, $p < .001$), less delinquency at age 10 (β = −.22, $p < .001$), and less affiliation with deviant peers (β = −.22, $p < .001$) but was not significantly related to delinquency at age 16 (β = −.04, *ns*) or risky sexual behavior (β = .04, *ns*). Being African American was related to more delinquency at age 10 (β = .11, $p < .05$), affiliation with deviant peers (β = .17, $p < .01$), and to more risky sexual behavior (β = .10, $p < .05$) but was unrelated to peer rejection (β = .05, *ns*) and delinquency at age 16 (β = .02, *ns*). Including kindergarten SES or ethnicity as control variables predicting the other variables in the model revealed no substantive changes in the relations among the other variables; therefore, the models presented below are the simpler versions that do not include the SES and ethnicity controls.

Effects of Peer Rejection, Deviant Peer Affiliation, and Delinquency on Risky Sexual Behavior

We tested a model that included direct effects of peer rejection at ages 5 to 8, delinquency at age 10, deviant peer affiliation at ages 11 to 12, and delinquency at age 16 on risky sexual behavior up to age 27, as well as indirect effects of developmentally prior risk factors on risky sexual behavior through developmentally subsequent risk factors (see Figure 1). Model fit was acceptable, $\chi^2(28) = 68.99$, $p < .001$, CFI = .94, RMSEA = .053 [.038, .069]. All three indicators loaded significantly on the deviant peer affiliation latent factor, and all four indicators loaded significantly on the risky sexual behavior latent factor. As shown in Figure 1, peer rejection from ages 5 to 8 significantly predicted more delinquency at age 10, more affiliation with deviant peers at ages 11 to 12, and more delinquency at age 16. Delinquency at age 10 significantly predicted more affiliation with deviant peers at ages 11 to 12 and more delinquency at age 16. Affiliation with deviant peers at ages 11 to 12 predicted significantly more delinquency at age 16. Delinquency at age 16 was the only predictor with a significant direct effect on risky sexual behavior and predicted significantly more risky sexual behavior by age 27.

Indirect effects were tested using the bias-corrected percentile bootstrap method. Ten tests were conducted to capture the indirect effect of each developmentally prior variable on each developmentally subsequent variable via each developmentally intervening variable. Five of these tests revealed significant indirect effects. First, peer rejection at ages 5 to 8 had a significant indirect effect on delinquency at age 16 via delinquency at age 10, standardized estimate = .079 [95% confidence interval = .012, .184], $p = .027$. Second, peer rejection at ages 5 to 8 had a significant indirect effect on risky sexual behavior by age 27 via delinquency at age 10, standardized estimate = .036 [95% confidence interval = .009, .126], $p = .007$. Third, peer rejection at ages 5 to 8 had a significant indirect effect on risky sexual behavior by age 27 via delinquency at age 16, standardized estimate = .080 [95% confidence interval = .026, .169], $p = .011$. Fourth, delinquency at age 10 had a significant indirect effect on risky sexual behavior by age 27 via delinquency at age 16, standardized estimate = .155 [95% confidence interval = .064, .312], $p = .009$. Fifth, deviant peer affiliation at ages 11 to 12 had a significant indirect effect on risky sexual behavior by age 27 via delinquency at age 16, standardized estimate = .092 [95% confidence interval = .025, .195], $p = .004$.

Multi-Group Model by Gender for Effects of Peer Rejection, Deviant Peer Affiliation, and Delinquency on Risky Sexual Behavior

To examine whether the relations among peer rejection, deviant peer affiliation, delinquency, and risky sexual behavior differed for males and females, we conducted a multigroup analysis in which we compared the fit of a model in which the structural paths were constrained to be equal with the fit of a model in which the structural paths were free to vary across gender. The model in which paths were constrained to be equal across gender fit significantly worse than did a model in which structural paths were free to vary across gender, $\Delta\chi^2(18) = 78.52$, $p < .001$. As shown in Figure 1, the paths that were substantively different for boys and girls were those related to peer rejection, which predicted more delinquency at age 10, more affiliation with deviant peers at ages 11 to 12, and more delinquency at age 16 for girls but was unrelated to any of these constructs for boys.

Discussion

Although previous research has documented many risk factors for risky behavior during adolescence (see Kotchick et al., 2001; Miller et al., 2001; Taylor-Seehafer & Rew, 2000), many of these studies are limited by the use of cross-sectional or short-term longitudinal designs (for an exception see Zimmer-Gembeck et al., 2004). Peer factors during adolescence, including peers' risky sexual behavior, have been found to be related to adolescents' risky sexual behavior (e.g., Cavanagh, 2004; Prinstein et al., 2003). However, the extant research had not traced peer risk factors back to childhood or from childhood through intervening developmental periods in relation to risky sexual behaviors from adolescence into adulthood. Using prospective longitudinal data collected from age 5 to age 27, we examined pathways to risky sexual behavior via peer rejection in childhood, affiliation with deviant peers in early adolescence, and delinquency in childhood and adolescence. The findings supported our primary hypotheses. Namely, more peer rejection during childhood, affiliation with deviant peers during pre-adolescence, and delinquency in childhood and adolescence predicted more risky sexual behavior through age 27, although delinquency at age 16 was the only risk factor that had a significant direct effect on risky sexual behavior through age 27 above and beyond the other risk factors. Support was found for many of the hypothesized indirect effects of early risk factors on risky sexual behavior through developmentally later risk factors. Finally, as expected, peer rejection played a greater role in the development of girls' than boys' risky sexual behavior.

The main contribution of our findings to the literature on the development of risky sexual behavior derives from the strength of the long-term prospective design spanning 23 years, making it possible to look at risk factors earlier in development and risky sexual behavior farther into adulthood than has been possible in most previous research. Using this long-term prospective design, we were able to suggest (and find evidence for) developmental pathways from early peer risk factors to risky sexual behavior. Probing deeper into mechanisms that could account for children's progression from peer rejection to risky sexual behavior, some scholars have suggested that children who are marginalized by the peer group adapt by organizing into deviant peer groups which then create social contexts for early and risky sexual behavior (Dishion, Ha, & Véronneau, 2012). This progression was supported using data from our whole sample, but the mechanisms appeared to differ by gender. For boys, peer rejection during childhood did not predict deviant peer affiliation during adolescence or delinquency during childhood or adolescence, paths that were significant for girls. Since Rodkin, Farmer, Pearl, and Van Acker (2000) described popular antisocial boys, researchers have increasingly recognized that although some boys are both antisocial and marginalized by the peer group, other boys are antisocial but also socially well-connected (Wargo Aikins & Litwack, 2011). Thus, although deviant peer affiliation in early adolescence predicts subsequent risky sexual behavior for both boys and girls via delinquency in mid adolescence, the pathways from peer rejection are significant only for girls, perhaps because peer rejection and antisocial behavior are relatively uncoupled for boys.

It is possible that peer rejection may link to risky sexual behavior through processes independent of affiliation with deviant peers and delinquent behavior. Particularly if peer

rejection engenders feelings of loneliness and social disconnectedness (Boivin, Hymel, & Bukowski, 1995), individuals who were rejected by peers during childhood may try to connect with others in any way possible, including through early sexual intercourse and multiple sexual partners. However, Parkes et al. (2014) found that children whose mothers reported that they had more peer relationship problems at ages 6–8 and 10–11 years were less likely to have early sexual involvement (defined as adolescents' reports of engaging in oral sex or sexual intercourse within the last year, reported at age 15). Therefore, it is possible that peer rejection during childhood may protect against risky sexual behavior if rejected children have less social interaction in general and therefore less opportunity to develop relationships that would lead to sexual behavior.

The findings should be considered in light of the study's limitations. A limitation with self-reported data on risky sexual behavior is that of respondent bias and social desirability. Males tend to over-report their sexual activity, whereas women tend to under-report their sexual activity (Dinkelman & Lam, 2009), which may be related to different social standards and expectations regarding sexuality for men and women. A clear strength of this study is the availability of long-term longitudinal data collected over a period of 23 years, yet this also presents a challenge. At the time the peer nomination data were collected (starting in 1987), the distinction between sociometric popularity and peer-perceived popularity had not yet been introduced in the literature, and we did not collect nominations that would enable us to make that distinction using the present data. Doing so in the future would be fruitful to help especially in understanding pathways of risk for males who are deviant yet also popular. In addition, future research could expand to examine how a wider array of family and individual predictors of risky sexual behavior such as alcohol use work in conjunction with peer factors. Finally, unprotected sex (e.g., not using condoms) was not included in our operationalization of risky sexual behavior but would be useful to include in future research.

Despite these limitations, the study also has several strengths, particularly the multi-informant and long-term prospective design following developmental trajectories from age 5 to age 27. Because romantic partnerships generally arise in the context of mixed-gender peer groups during adolescence (Connolly et al., 2004), and peers' risky behaviors are among the best predictors of adolescents' own risky sexual behaviors (French & Dishion, 2003), it makes sense that peer relationships would play an important role in the developmental pathway to risky sexual behavior. These peer and individual risk factors can be regarded as part of a developmental pathway toward risky sexual behavior that begins early in life and cumulates with additional peer and individual risks.

The pathways to risky sexual behavior through childhood peer rejection and adolescents' perceptions of their peers' antisocial behavior suggest directions for interventions designed to reduce risky sexual behaviors. First, interventions could attempt to change adolescents' perceptions regarding other adolescents' risky behaviors. Previous research has demonstrated that teaching adolescents about individuals' tendency to misperceive others' behavior reduces adolescents' own risky behavior (Schroeder & Prentice, 1998). Furthermore, interventions can attempt to change perceptions by providing accurate information to dispel myths about peers' risky behavior and by promoting the normativeness of safer sex (Agha & Van Rossem, 2004). Because peer rejection during elementary school

occurs well before the initiation of sexual activity, intervening early with girls who are rejected by their peers holds the promise of interrupting a developmental pathway that could lead to a variety of negative outcomes, including risky sexual behavior. Finally, because delinquency during adolescence was a developmentally proximal risk factor for the development of risky sexual behavior through age 27, interventions designed to prevent problem behaviors during adolescence have the potential to reduce sexual risk-taking, even if the interventions do not focus on risky sexual behavior per se.

Conclusion

Adolescence is the developmental period during which romantic relationships typically first emerge (Connolly, Furman, & Konarski, 2000), and romantic relationships are centrally connected to adolescents' emerging sexuality during this time (Furman & Shaffer, 2003). Parents, policymakers, and researchers have devoted a great deal of attention to adolescents' sexuality, in large part because early sexual intercourse, unprotected sex, and a large number of sexual partners pose risks of unintended pregnancies and STIs that have negative health implications into adulthood. The present study is important to the study of adolescence because it uses a 23-year prospective longitudinal design to test developmental pathways from peer rejection, affiliation with deviant peers, and delinquency toward risky sexual behaviors that begin in adolescence and extend to age 27. We found that peer rejection in childhood was a risk factor for girls' risky sexual behavior, via delinquency and affiliation with deviant peers. Affiliation with deviant peers was a risk factor for both girls' and boys' risky sexual behavior, via promoting adolescents' own delinquency. The key contribution of this work is in documenting peer risk factors as early as age 5 that shape developmental pathways through childhood and adolescence and have implications for risky sexual behavior into adulthood.

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Biographies

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Kenneth A. Dodge is a Professor at Duke University. He received his doctorate in clinical psychology from Duke University. His research is directed toward understanding how problem behaviors such as delinquency, substance use, school dropout, and child abuse develop across the lifespan, how programs can be developed to prevent these problems, and how public policy can be shaped to improve the public health of communities.

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Gregory S. Pettit is a Professor at Auburn University. He received his doctorate in the interdisciplinary doctoral program on young children at Indiana University. His research focuses on the development of social competence across childhood, adolescence, and early adulthood, with a particular focus on the mechanisms through which family and peer experiences exert an impact on important developmental outcomes and on the risk and protective factors that moderate these linkages.

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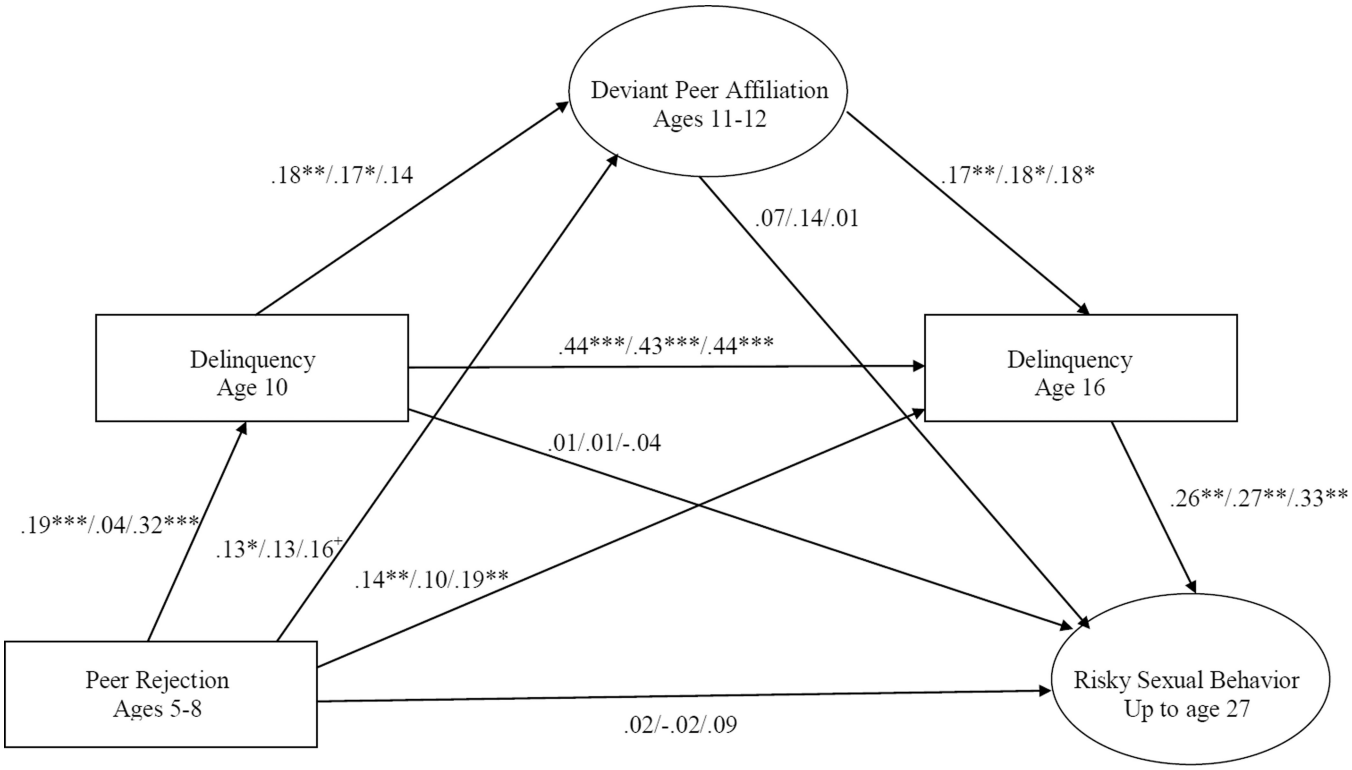

Figure 1.

Standardized estimates of paths in structural equation model (full sample/boys/girls). *p < .05. **p < .01. ***p < .001. ^{+}p = .054. Peer rejection and delinquency were observed variables. Deviant peer affiliation was a latent variable with three indicators (peer deviance at age 11 set to 1, peer group deviance at age 12 standardized loadings = .77/.72/.80, best friend deviance at age 12 standardized loadings = .73/.78/.73 for full sample/boys/girls, all p < .001). Risky sexual behavior was a latent variable with four indicators (lifetime number of partners set to 1, number of partners in the last year standardized loadings = .46/.52/.61, STI diagnosis standardized loadings = .31/.33/.12, age at first intercourse standardized loadings = .58/.70/.36 for full/sample/boys/girls, all p < .001). Error terms are not shown but were included in the models.

Table 1

Means, Standard Deviations, and Correlations among Variables

	1	2	3	4	5	6	7	8	9	10
1. Number of years rejected ages 5–8	--	.03	.01	.08	.15*	.17*	.09	−.01	−.04	.01
2. Delinquency age 10	.36***	--	.03	.22**	.08	.54***	.21**	−.09	−.03	.12
3. Peer deviance age 11	.25***	.16*	--	.40***	.30***	.20**	.18*	.02	.00	−.02
4. Peer group deviance age 12	.09	.13	.34***	--	.51***	.30***	.28***	.02	.15	.15
5. Friend deviance age 12	.23**	.19*	.35***	.62***	--	.20**	.25***	−.12	−.05	.02
6. Delinquency age 16	.32***	.48***	.14	.16*	.22**	--	.30***	.15*	−.01	.25**
7. Age first intercourse (reversed)	.14*	.24**	.03	.20**	.11	.31***	--	.19**	.20**	.58***
8. STI diagnosis by age 27	.11	−.04	.08	.08	−.01	.08	.21**	--	.17*	.23**
9. Number partners last year age 27	.11	.02	−.01	−.01	.08	.06	.12	.20**	--	.47***
10. Number partners lifetime by age 27[a]	.15*	.17*	.07	.04	.02	.28***	.59***	.39***	.38***	--
Males *M* (*SD*) or %	.42 (.77)	1.64 (1.78)	1.13 (.13)	1.39 (.34)	.35 (.35)	2.15 (2.32)	17.20 (3.33)	7%	2.19 (2.84)	4.39 (2.01)
Females *M* (*SD*) or %	.29 (.68)	1.38 (1.74)	1.10 (.14)	1.35 (.40)	.24 (.31)	2.19 (2.85)	17.22 (3.16)	13%	1.33 (1.04)	3.74 (1.70)
n	495	374	408	405	405	433	504	457	401	446

* $p < .05$.

** $p < .01$.

*** $p < .001$.

[a] Mean of 3 corresponds to response of 3–5 partners; Mean of 4 corresponds to response of 6–10 partners. Correlations for males are above the diagonal; correlations for females are below the diagonal.