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The Unique and Interactive Effects of Parent and School Bonds on Adolescent Delinquency

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Abstract

Parent and school bonds are protective against delinquency. This study used longitudinal data and multilevel Poisson regression models (MLM) to examine unique and interactive associations of parent and school bonds on youth delinquency in a sample of rural adolescents ($n = 945$; 84% White). We investigated whether youth sex or transitioning to a new middle school moderated the linkages between parent and school bonds and later delinquency. Results indicated reduced delinquency was associated with positive parent and school relationships. Parent and school bonds interacted such that linkages between parent bonding and youth delinquency were stronger when youth also had high school bonding – suggesting an additive effect. However, interactive effects were only found when youth remained in the same school and became nonsignificant if they transitioned to a new school. Findings support prior evidence that parent and school bonds – and their interaction – play a unique role in reducing delinquency.

Keywords

parent bonding; school bonding; delinquency; transition; adolescence

Introduction

Adolescence is a developmental period when youth are at risk for engaging in risky behaviors, such as delinquency. Unfortunately, for a number of youth, early engagement in delinquency can cement maladaptive trajectories toward future criminal behavior (Tolan, 1987). In conjunction with the social, emotional and physical changes associated with adolescence, environmental shifts (most prominently, the transition into middle school) may introduce additional stress that put youth at risk for academic underperformance, substance use and delinquent behavior (Gutman & Eccles, 2007). Positive adult relationships, such as those adolescents form with parents and teachers, may help to buffer against this stress and have been associated with reduced risky behavior, including delinquency (Cernkovich & Giordano, 1987; Demuth & Brown, 2004; Ingram et al, 2007; Kierkus & Baer, 2002; Liljeberg, Eklund, Fritz & Klinteberg, 2011; Maddox & Prinz, 2003; Sokol-Katz, Dunham, & Zimmerman, 1997; Wang & Eccles, 2012). Though parent and school bonds have been

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studied extensively independently of each other, less is known about how these parent and school relationships work together to influence adolescent behavior, whether they affect boys and girls differently and whether they are especially imperative during school transitions. As adolescence is a common time (and middle school a frequent target) for intervention, understanding the influence and interaction of parent and school bonds on youth delinquency over time is critical for best addressing youth development.

Social Control Theory

Rooted in social control theory (Hirschi, 1969), considerable research has emphasized the importance of close emotional bonds and has sought to explain how bonds shape adolescents' engagement with delinquent behavior. Relationships with adults socialize adolescents to conform to prosocial norms, reveal expectations for acceptable behavior and serve as a deterrent against delinquency (Maddox & Prinz, 2003). Children learn that deviant behaviors can threaten relationships with adults, and adolescents who have formed strong bonds may feel that this risk to their relationships outweighs their interest in delinquent behavior (Wade & Brannigan, 1998). In contrast, youth who do not have strong bonds with adults may fail to learn the value of caring for others and may not understand how conventional behaviors engender social relationships (Conger, 1976). According to social control theory, without a commitment to others and to the behaviors that maintain these commitments, adolescents would have little restraint in pursuing delinquent behaviors (Hirschi, 1969). As proposed by Nye (1958), strong social bonds to at least one adult can be protective for youth development. In this paper, we examine the associations between adolescents' delinquency and their bonds to adults, both at home and at school. In particular, we examine the unique and interactive influences of bonding on adolescent adjustment and potential moderators of their influence (i.e., adolescent sex, transition to a new school).

Parent Bonding as a Protective Factor

Highlighted in social control theory, parent-child relationships play a key role in the development and internalization of norms, which may act as deterrents of delinquent behavior. As early as toddlerhood, the strength of children's relationships with their parents is related to their developing conscience: Children become more receptive to socialization toward prosocial intentions when they share a strong bond with sensitive and responsive caregivers (Kochanska, Aksan, Knaack, & Rhines, 2004). Through strong relationships with their parents, children learn that subscribing to conventional behavior norms (e.g., sharing, turn-taking) fosters emotional bonds and conveys concern for others. Children also learn that violating norms communicates a lack of regard for others that can strain important relationships. When strong bonds develop or are maintained between youth and their parents, adolescents may also be more likely to trust their parents and believe that compliance to these norms is in their own best interest (Grusec & Davidov, 2010). As a result, strong parent-child bonds have been linked to lower risk for a number of negative youth outcomes including substance use, academic underachievement and delinquent behavior (Bao, Haas, Chen & Pi, 2012; Duncan, Duncan, & Stryker, 2000; Simons, Whitbeck, Conger & Conger, 1991).

The linkages between parent-child relationships and youth outcomes are significant, even when controlling for other parental characteristics and behaviors. Prior work in delinquency prevention indicates that the emotional component of parent-child relationships may be more strongly linked to youth outcomes than parental monitoring, supervision and control (Loeber & Stouthamer-Loeber, 1986; Mack, Leiber, Featherstone, Monserud, & 2007) and other consistent correlates of delinquency, like family structure (i.e., parents' marital status) and parent education (Davis-Kean, 2005; Kristensen, Gravseth & Bjerkedal, 2009; Mack et al., 2007). These findings are also supported by Demuth and Brown (2004) who found that, when all of these factors are studied in concert, strong bonds remain significantly associated with reduced levels of delinquent behavior after controlling for parent monitoring, supervision, education and marital status. Several other studies have produced similar findings (Cernkovich & Giordano, 1987; Ingram et al, 2007; Kierkus & Baer, 2002; Sokol-Katz, Dunham, & Zimmerman, 1997). By controlling for other family and parent-level variables, these studies strengthen the assertion that adolescents' close relationships with parents in and of themselves serve as protective factors against negative outcomes. Bonding is not simply a marker of other adaptive parent characteristics that may affect adolescent outcomes. Thus, children who have strong parent bonds would more likely be socialized toward positive behavior norms and less likely to engage in delinquent behavior, regardless of other family factors.

School Bonding as a Protective Factor

Correspondingly, children can form strong school bonds that deter negative outcomes. As defined by Maddox and Prinz (2003), the construct of school bonding is a broad term that encompasses not only student-teacher bonds but also factors that are unique to the school relationship, specifically school involvement and school commitment. In addition to emotional closeness and respect for teachers, school bonding also encompasses students' sense of pride and belonging in the school. Though operationalizations of school bonding have varied between studies, at its core, the construct reflects the strength of students' relationships with school staff and the degree to which they endorse their school's values (Maddox & Prinz, 2003; Oelsner, Lippold & Greenberg, 2011). Similar to parent bonding, strong school bonding represents an attachment to an institution that guides adolescents toward internalizing prosocial norms and behavioral control (Catalano & Hawkins, 1996). School climate also focuses on relationships among staff and students; however, it focuses on school-level characteristics of overall school support rather than individual student's relationships. School bonding is a distinct construct because it emphasizes student and teacher feelings of physical and emotional safety, academic and behavioral expectations and the school's emphasis on teaching and learning (Durlak, 2015; Halpin & Croft, 1963).

School bonding - and teacher-student bonding in particular - has been examined as an important factor in children's likelihood to experience a number of maladaptive behaviors, such as academic underachievement, delinquency and substance use - with students who have closer bonds to their schools showing fewer maladaptive behaviors (Liljeberg et al., 2011; Maddox & Prinz, 2003; Wang & Eccles, 2012). Using longitudinal data, Liljeberg and colleagues (2011) found that school bonding at age 14 (especially, relationships and security with teachers) was associated with reduced delinquency among adolescents at age 16. Early

delinquency has been associated with low school bonding at the entrance of middle school, as well as steeper decreases in school bonding over time (Oelsner, Lippold, & Greenberg, 2010).

Interventions to increase school bonding, such as the Child Development Project, have shown promise in reducing delinquent behavior. Battistich, Schaps and Wilson (2004) conducted a follow-up assessment of over 700 students who participated in the Child Development Project, a whole-school elementary-level intervention designed to foster a caring school environment and supportive teacher-student relationships (Battistich, Schaps, Watson, Solomon, & Lewis, 2000). By middle school, participating students felt more bonded and connected to their schools, showed fewer behavior problems, reported higher academic achievement and lower levels of antisocial behaviors, including delinquency. Such studies indicate that school bonding is both malleable and influential on youth outcomes, supporting the need to examine how school bonding operates in the context of other protective factors, like parent bonding.

Sex Differences in School Bonding

Importantly, sex differences have been noted regarding school bonding. On average, school bonding is higher among female students than it is among males, although bonding decreases among both sexes each year that they are in middle school (Simons-Morton, Crump, Haynie, & Saylor, 1999). A recent study (Liljeberg et al., 2011) found that teacher bonds were associated with reduced delinquency two years later for both boys and girls. However, a comparison of the standardized coefficients shows that this relationship was stronger for males. In qualitative interviews, male students have reported that their masculinity is at odds with high school bonding, and boys may disengage from school as a way to preserve their social status (Morris, 2008). One explanation is that it may be more socially acceptable for female students to bond with teachers, work hard in class and maintain high involvement in school activities. In contrast, male students may face the opposite social pressure to do little to no work, to devalue academic success or to make it appear that academic success is effortless (Cohen, 1998; Legewie, & DiPrete, 2012). However, when teachers are able to foster a strong classroom culture, where effort and commitment to school are socially acceptable, boys disproportionately benefit (Legewie & DiPrete, 2012). Given the evidence that boys are more likely than girls to engage in delinquent behavior, the protective benefits of close bonds with adults on reducing delinquency may be particularly pronounced among male youth (Bongers, Koot, Van der Ende, & Verhulst, 2004).

Interactive Effects of Parent and School Bonds

Yet, though theoretical and empirical work exists to support the importance of both parent and school bonding in adolescence, few studies have examined the interaction between parent and school bonds and their influence on delinquency. Ravis and colleagues (2015) found that school bonding affects the relationship between family relationships and risky behavior. Individual differences in school bonding were not predictive of risky behavior, but students' individual family relationships interacted with the average level of bonding at the adolescents' school in reducing risky behavior. Comparisons of students grouped by median

splits along family relationships and school-level reports of bonding demonstrated that students with adverse family environments who attended schools with high mean levels of bonding showed significantly fewer risky behaviors than students with similarly adverse family environments who had poor school bonding. Similarly, Wade and Brannigan (1998) tested a school bonding by parent bonding interaction that indicated that students with high school bonding and low parent bonding exhibited better outcomes than those with poor bonding in both domains, who were the most at risk for delinquent behavior. Three-way interaction analyses indicated that the relationship between parent bonding and school bonding did not vary with the sex of the adolescent. Such research suggests that school bonding may partially compensate for poor family bonding, though it does little to clarify whether boys and girls differ in their response to parent and school bonds.

Yet, despite these studies, parent and school bonds are frequently studied in isolation. Little is known about their unique influences on youth outcomes. In other words, how much does one factor matter in predicting youth delinquency when accounting for the other? Also, few studies examine the interaction between school and parent bonds on youth outcomes. The tendency to focus on either parent *or* school bonding as the key protective factor may fail to capture a critical interplay between the home and school domains on youth behavior. It is possible that one of these factors compensates for the other. For example, when youth do not have close relationships with their parents, school bonding may play a compensatory role, where parent relationships may be less strongly linked to youth delinquency when school bonds are high. If so, interventions to prevent delinquent behavior could target malleable school characteristics that could be leveraged for positive youth development. Programming to increase school bonding may be protective for all adolescents and could provide a particular benefit for students who are at increased risk due to poor parental relationships.

Transition in Adolescence

Investigating risk and protective factors in adolescence is especially critical because it is a period characterized by frequent change – both in youth’s cognitive, social and emotional development and also in their roles in the family and school contexts. According to Eccles’s theory of stage-environment fit, when adolescents’ environments fail to meet their developmental needs, they may respond negatively in ways that have lasting consequences on their life trajectories (Eccles & Midgley, 1989; Eccles et al., 1993). Adolescents’ relationships with their parents and school can provide environmental supports to meet their changing cognitive, social and emotional needs, but those who cannot rely on these bonds may experience difficulty navigating a turbulent developmental period. As a result, many youth begin to engage in risky behavior, such as delinquency, and those who demonstrate early involvement during this sensitive time are at the greatest risk for negative outcomes later in life (Tolan, 1987; Loeber, 1996).

Students’ matriculation into a new middle school building represents a large transition in their social environments that may exacerbate the stress of adolescence if their needs are not well supported (Gutman & Eccles, 2007). School transitions may be particularly sensitive times where adolescents are more vulnerable to experiencing negative outcomes, such as delinquency (Alspaugh, 1998). As such, it may be the case that, during these times of

transition, the protective effects of parent and school relationships – and their interaction – become particularly important, though little research has examined this possibility. For example, in the absence of parent bonds, school bonds may become a key avenue through which youth internalize prosocial norms. Internalized norms may become especially important for preventing delinquency during periods of high risk, such as when students transition to a new school.

The Current Study

This study examines how longitudinal changes in adolescent delinquency are associated with parent bonds, school bonds and the interaction between parent and school bonds. In addition, this study examines how these bonds and the interaction between them may be moderated by student characteristics (i.e., sex) and environmental changes (i.e., the transition into middle school). This paper aims to fill several gaps in the literature by addressing the following research questions in a sample of young adolescents: (1) what are the unique relations between parent and school bonds on youth delinquency, (2) do parent and school bonds interact in their relation with youth delinquency, (3) do these processes differ by student sex, and (4) do these processes differ depending on whether youth transition into a new school? Our hypotheses are as follows:

1. Both parent bonding and school bonding will have unique, direct effects in reducing adolescents' delinquent behavior.
2. School bonding will moderate the effects of parental bonding on delinquency and have a compensatory effect, such that the negative association between parental bonding and delinquent behavior will be stronger when school bonding is low.
3. The interactive relationships between school bonding, parent bonding, and delinquency will be stronger for male students relative to female students.
4. The interaction between school and parent bonding will be stronger for youth who transition into a new middle school relative to those who remain in the same school.

Methods

Sample

This study uses data from the PROSPER project (PROmoting School-Community-University Partnerships to Enhance Resilience), a large-scale effectiveness trial of preventive interventions aimed at reducing substance use initiation among adolescents in 28 rural communities and small towns in Iowa and Pennsylvania (see Spoth, Greenberg, Bierman, & Redmond, 2004). Communities were blocked by district size and geographic location and were randomized to receive either the PROSPER partnership intervention or standard programming services. Intervention and control groups did not differ at baseline in terms of demographics or youth outcomes (Spoth, Redmond, Shin, Greenberg, Clair, & Feinberg, 2007). The PROSPER intervention was associated with decreased substance use at 18 month and 4.5 and 6.5 year follow-ups (Spoth et al., 2007; Spoth, Redmond, Clair, Shin,

Greenberg, & Feinberg, 2011; Spoth, Redmond, Shin, Greenberg, Feinberg, Schainker, 2013).

Schools in intervention communities ($N = 14$) implemented two evidence-based programs designed to reduce adolescent substance use: a school-based curriculum (delivered to all students in seventh grade) and a family-based program (offered to all families of sixth graders). Schools selected programs from a menu of evidence-based interventions. In addition, districts were supported by community-based prevention teams. Schools in control communities ($N = 14$) did not receive the PROSPER intervention. The PROSPER project was implemented with two cohorts of students in both intervention and control communities. The first cohort of students started Grade 6 in 2002 and the second cohort of students started Grade 6 in 2003. Students in both conditions completed questionnaires in school. On average, 88% of all eligible students completed in-school questionnaires.

This study uses data from a subsample of youth in the second cohort of PROSPER who were randomly selected and recruited for participation on an in-home assessment with their Grade 6 youth. A total of 2,267 families were recruited for in-home family assessments; of these, 979 (43%) completed the assessments. Family recruitment included mail and telephone contacts followed by an in-person recruitment visit. The in-home assessments included a family interview and written questionnaires completed independently by the youth, mother, and, if present, father. In-home data collection occurred over 5 waves. Pretest assessments were collected in the fall semester of students' 6th grade year (Wave 1). Follow-up in-home data were collected in the spring semester of students' 6th grade year (Wave 2), as well as the spring semesters of their 7th (Wave 3), 8th (Wave 4) and 9th (Wave 5) grade years. Retention rates were moderate at all waves: Wave 2 = 83%, Wave 3 = 82%, Wave 4 = 80%, and Wave 5 = 76%.

In this study, we further restricted the in-home sample: We used data from youth who participated in the in-home subsample data from Waves 2–5 and who also transitioned to a new middle school in Grade 6 or 7 ($n = 945$). Wave 1 was not included in these analyses because it spans only the length of time between the fall and spring semesters of students' Grade 6 year. Our aim was to capture changes between grades to highlight periods of transition when school and parent bonding may become increasingly important. Because we were also interested in examining how school transitions may affect the associations between parent and school bonds on delinquency, we limited our analytic sample to youth who changed to a new middle school in Grade 6 or Grade 7. Thirty-four students in the in-home subsample who attended K-8 elementary schools were omitted from the final analytic sample.

The demographics of the final analytic sample at Wave 2 (spring, Grade 6) are as follows. Youth (52% female) resided in Iowa (61%) and Pennsylvania (39%), and were, on average, 11.3 years old ($SD = .38$). The mean age of mothers was 39.46 years ($SD = 5.95$) and of fathers was 41.87 years ($SD = 7.07$). Average household income was \$53,000 (in 2003) and 67% of parents had some post-secondary education. The average number of youth per home was three ($SD = 1.56$). Most youth were living in two-parent homes; 80% were living with married parents and 53% were living with both biological parents. Most youth identified as

Caucasian (84%), 7% as Hispanic, 3% as Black/African American, 2% as Native American/American Indian, 1% as Asian and 3% as other.

Differential Attrition

Given that some participants in our analytic sample did not participate in all 5 waves of data collection, we conducted differential attrition analyses to test whether youth who remained in the study at Grade 9 (Wave 5) were substantively different from those who dropped out of the study before Grade 9. We assessed differential attrition by conducting independent sample t-tests of delinquency, parent bonding and school bonding in Grade 6 by survivorship in the sample by Grade 9. Students who dropped out of the sample by Grade 9 endorsed higher delinquency in Grade 6 ($t = -1.92, p < .05$) and lower school bonding ($t = 2.69, p < .01$), but did not differ in parent bonding ($t = 1.12, p = .12$) at the outset of the study from those who remained in the study at Grade 9. Chi-square analyses indicated that attrition did not differ by students' sex ($\chi^2 = .41, p = .49$).

We also conducted sensitivity tests of our results that compared study results between our full analytic sample (which included all youth with available data at each wave) and a subsample of youth who participated in data collection at all study waves (e.g., did not drop out by Grade 9). As substantive findings did not differ between these two samples, we present the results of the full analytic sample here. Together, these analyses suggest that differential attrition likely had little influence on our results.

Measures

Measures were adapted from the Iowa Youth and Families Project (Conger, 1989; McMahon, & Metzler, 1998; Spoth, Redmond, & Shin, 1998) and the National Youth Survey (Elliott, Ageton, & Huizinga, 1982). We used in-school assessments of school bonding and delinquency (administered within months of the home visit), as evidence suggests adolescents may disclose problem behavior more readily in school settings as opposed to at home (Redmond, Schainker, Shin, & Spoth, 2007). All psychometric properties reported in the following section were calculated based on the data collected for the in-home sample.

Delinquent Behavior—At each wave, students completed a 12-item questionnaire assessing whether students had ever engaged in certain delinquent behaviors over the past 12 months (e.g., taken something worth \$25 or more that didn't belong to you, purposely damaged or destroyed property that did not belong to you, been picked up by the police for breaking the law; Elliott, Ageton, & Huizinga, 1982). Response options used a dichotomy (0 = *never*, 1 = *once or more*) that was then summed into a total count of delinquent behaviors ($\alpha = .85-.90$ across waves).

School Bonding—School bonding was measured through a 10-item scale that assessed students' liking of school, effort in school, feelings of belonging in school and bonding with teachers (Oelsner, Lippold, & Greenberg, 2011). Items were worded generally (e.g., "I don't feel like I really belong in school," "I feel very close to at least one of my teachers")

Responses were captured using a 5-point Likert scale (1 = *never true* to 5 = *always true*; $\alpha = .73-.76$).

Parent Bonding—To assess parent bonding, students completed a 7-item scale for both mother-child and father-child affective quality in the past month (Spoth, Redmond, & Shin, 1998), including items assessing the frequency of positive affective quality (e.g., “lets you know he/she cares about you,” “acts loving and affectionate toward you”) and negative affective quality (e.g., “gets angry at you,” “insults or swears at you,” “shouts or yells at you because he/she was mad at you”). Responses were captured using a 7-point Likert scale (1 = *always* to 7 = *never*), and all responses were coded so that higher values indicated stronger parent bonding. Parent bonding was calculated as the average of affective quality for mother- and father-youth relationships, rather than used individually by parent, to capture the average affective quality of the child’s home environment ($\alpha = .77-.90$). Across all waves, youth reports of maternal and paternal affective quality were strongly correlated ($r = .65 - .70$). If an adolescent lived in a single parent home, the affective quality score reflected the adolescents’ relationship with one parent only.

Middle School Transition—We created a variable to indicate whether youth transitioned to middle school starting in Grade 6 or Grade 7. The purpose of this indicator variable was to support tests of whether the interactive relations among bonding and delinquency differed between youth who remained in the same school and those who transitioned to a new school. The transition variable was coded as 0 if students started middle school in Grade 6 or 1 if students started middle school in Grade 7. The majority of the sample ($n = 682, 72\%$) transitioned into middle school in Grade 6, while a smaller percentage of students ($n = 263, 28\%$) transitioned into middle school in Grade 7.

Covariates—For each analysis, we controlled for prior delinquent behavior using the child’s report of delinquent behavior from the previous wave. The child’s reported biological sex (0 = female, 1 = male), experimental condition (0 = control condition, 1 = intervention condition), dual biological marital status (0 = not living with both biological parents, 1 = living with both biological parents), and parents’ level of education (ranging from 0–20 indicating years of school) were also included as covariates.

Data Analysis Plan

First, we used multilevel, Poisson regression models to assess the main effects of parent and school bonding on counts of youth delinquency. Poisson regression is a generalized linear modeling technique appropriate for count outcomes. We conducted the Poisson regressions in SAS V 9.4 and incorporated random intercepts to adjust for the nesting of students within schools (Raudenbush & Bryk, 2002). The reduced form equation for the base model was:

$$\log(\text{Delinquency}_{ij}) = \beta_{0j} + \beta_1(\text{Parent Bonding})_{ij} + \beta_2(\text{School Bonding})_{ij} + \beta_3(\text{Sex})_{ij} + u_j$$

The logarithmic transformation of youth i ’s counts of delinquency in school j were modeled as a function of the school intercept (β_{0j}), the student’s parent bonding value (β_{1j}), the student’s school bonding value (β_{2j}), student sex (β_{3j}), and a random effect for each school

intercept (u_j). Our analyses examined separate patterns across grades, using data from the spring semester of the prior year to predict adolescents' behavior the spring semester of the following year. Specifically, we conducted separate analyses to examine these relationships between Grade 6–7, Grade 7–8 and Grade 8–9. Models were run separately to allow us to examine different effects across this period. Our models also included additional covariates not represented in this equation: parent education, dual biological marital status, intervention condition, and prior wave levels of delinquency. All predictor and control variables were mean centered prior to analysis.

Second, to test whether school bonding moderated the linkages between parent bonds and delinquency, we added a school bonding \times parent bonding interaction term to our original model. When the school bonding \times parent bonding interaction terms were significant, we used a test of the simple slopes to evaluate the association of parent bonding and delinquency at one standard deviation above and below mean levels of school bonding.

Third, we examined whether the interaction between school and parent bonds on youth delinquency differed depending on youth characteristics (youth sex) or environmental factors (school transition year). To test for moderation by youth sex, we added three-way interaction terms to the models (i.e., school bonding \times parent bonding \times sex). We also examined whether the interaction between Grade 6 parent and school bonds and Grade 7 delinquency differed for youth depending on whether or not they experienced a middle school transition between Grade 6–7 by adding a three-way interaction term (i.e., school bonding \times parent bonding \times transition). We tested for moderation by school transition and gender in separate models. When three-way interaction terms were significant, we conducted follow-up tests with a simple slopes approach, assessing the relationship between parent bonding and delinquency at one standard deviation above and below mean levels of school bonding in separate subsamples by gender or by middle school transition year. We did not calculate eta-squared effect sizes because in a multilevel framework, especially with a log transformed outcome variable, eta-squared calculations can reduce rather than improve interpretability (Hedges, 2007; Preacher, Curran, & Bauer, 2006; Rooney & Murray, 1996).

Results

Descriptive Analyses

Descriptive statistics are reported in Tables 1 and 2. In general, reported levels of delinquency were low, but were slightly higher for boys than for girls across all years (see Table 1). Average levels of delinquency increased over time for both boys and girls. School bonding was low among all youth, with girls reporting slightly higher levels of bonding than boys. Both sexes reported declines in school bonding over time. School bonding and parent bonding were positively correlated with each other in the same year and between prior and future years (see Table 2). Between all years, both parent and school bonding were consistently negatively correlated with subsequent delinquency. School bonding was also negatively correlated with adolescent sex, with male students reporting lower levels of bonding across all years. Whether youth experienced a middle school transition in Grade 7 was not significantly correlated with either type of bonding or adolescent delinquency.

Main Effects

In Table 3, each model tests the unique effects of school bonding and parent bonding on adolescent delinquency, controlling for prior delinquent behavior and other covariates. As hypothesized, even after controlling for parent bonding, school bonding was significantly related to a reduction in delinquent behavior across all models ($B = -.28$ to $-.39$, $p < .001$). Parent bonding was also associated with reductions in delinquent behavior across all models, even when controlling for school bonding ($B = -.17$ to $-.20$, $p < .001$). Thus, our first hypothesis that both parent and school bonds would be uniquely associated with delinquency was confirmed.

Interactive Effects Between School and Parent Bonds

Two-way interaction analyses were conducted by adding a parent bonding \times school bonding interaction term to our models (see Table 4). The parent by school bonding interaction term was significant in Models 4 and 5, between Grades 6–7 ($B = -.41$, $p < .001$) and Grades 7–8 ($B = -.16$, $p < .01$). Using a simple slopes approach, we calculated the regression coefficient for parent bonding at high (> 1 standard deviation) and low (< 1 standard deviation) levels of school bonding using the ESTIMATE statement in SAS. Results indicated that the associations between parent bonding in Grade 6 and youth delinquency in Grade 7 were significant when school bonding was high ($B = -.26$, $p < .001$). However, parent bonding in Grade 6 was not significantly associated with delinquency in Grade 7 when school bonding was low ($B = .02$, $p > .05$). Similarly, results indicated that parent bonding in Grade 7 was associated with reduced delinquency in Grade 8 when school bonding was high ($B = -.38$, $p < .001$). However, parent bonding had a significant, but weaker association with delinquency when school bonding was low ($B = -.17$, $p < .001$).

Moderation by Youth Sex

No interactions by sex were significantly associated with delinquency in any model ($p > .05$) and thus are not discussed further here.

Moderation by School Transition

Grade 6 to Grade 7—Next, we tested whether the interaction between parent and school bonds and their effects on youth delinquency between Grade 6 and 7 differed depending on whether youth transitioned to a new middle school during that time. A three-way interaction term (school bonding \times parent bonding \times transition) was added to Model 7 (see Model 8 in Table 5). We found a significant three-way interaction by transition between Grade 6–7 ($B = .33$, $p < .05$). To probe these findings, we split the sample into two groups based on their transition timing. Estimate statements were used to examine the relationship between parent bonding and delinquency when school bonding was high (> 1 standard deviation) and low (< -1 standard deviation) for youth who did or did not transition to a new school between Grade 6–7. The interaction between parent and school bonding was significant for youth who did not transition to a new school in Grade 7 (i.e., had already transitioned to middle school in Grade 6; $B = -.58$, $p < .001$). Follow up tests of the simple slopes revealed that for youth who did not transition to middle school in Grade 7 (i.e., had transitioned into middle school in Grade 6), the relationship between parent bonding and delinquency was significant

at high levels of school bonding ($B = -.80, p < .001$) but was not significant at low levels of school bonding ($B = -.02, p = .76$). Examination of the means revealed that for youth who did not transition to a new school, delinquency was higher when school bonding was low, among youth with high and low parent bonds. However, when school bonding was high, key differences emerged: Youth with low parent bonds showed high delinquency, but youth with high parent bonds showed low delinquency. Youth with the lowest levels of delinquency had both high parent bonds and high school bonds (see Figure 1). In contrast, for youth who transitioned into middle school in Grade 7, there were no significant interactions between parent bonding and school bonding between Grade 6–7 ($B = -.26, p > .05$).

Discussion

Both theory and prior empirical work indicate that strong bonds to parents and schools can help youth internalize prosocial norms and play a key role in the prevention of youth delinquency (Cernkovich & Giordano, 1987; Demuth & Brown, 2004; Hirschi, 1969; Ingram et al., 2007; Kierkus & Baer, 2002; Liljeberg et al., 2011; Maddox & Prinz, 2003; Nye, 1958; Sokol-Katz, Dunham, & Zimmerman, 1997; Wang & Eccles, 2012). This study aimed to make several contributions to this literature by investigating further how these bonds work to prevent negative behavior and whether they work differently for youth based on individual and environmental factors. In this study, we sought to determine the unique contributions of parent and school bonds in preventing delinquency and whether parent and school bonding interact in their relationship with delinquency. We also tested whether the effects of school and parent bonds on adolescent delinquency operate differently for boys and girls and depending on whether youth transition to a new middle school. Overall, this study provides evidence that parent and school bonds have both separate and interactive protective effects against adolescent delinquency across early adolescence.

The Importance of Both School and Parent Bonds

First, our results suggest that both parent and school bonding matter in preventing adolescent delinquency. Students with higher parent and school bonds reported less dramatic increases in delinquent behavior the following school year, and, importantly, both variables remain significant when accounting for the other. Our findings suggest that bonds with adults at both school and at home may be important for the internalization of prosocial norms that may prevent youth from engaging in delinquency. As outlined in social control theory (Hirschi, 1969), the mechanism of bonding as a protective factor is similar across types of relationships, which may explain why students are able to benefit from bonds in both domains. Our findings support other research that has separately found that both parent and school bonds matter in preventing negative adolescent behaviors (Battistich, Schaps, & Wilson, 2004; Demuth & Brown, 2004; Liljeberg et al., 2011; Mack et al., 2007). However, it extends this research by showing that both bonds have a unique influence when controlling for the other. This evidence suggests that both bonds should be studied in concert, and studies that only include one type of bond may mispecify the predictive value of either type of bond without including the other.

In practice, both parents and schools remain a critical influence in youth's delinquency throughout middle school, and schools are associated with delinquency above and beyond parent bonds. Importantly, youth's connections to their schools continue to matter across adolescence, and schools may best support youth by focusing on building strong school bonds with all students – even those who may also have strong parent bonds at home. Especially because adolescents' sense of school bonding wanes throughout middle school, schools may need to place particular emphasis on building strong bonds between teachers and students in order to reduce delinquent behavior.

Another contribution of this study is that it analyzes longitudinal changes and examines the effects of parent and school bonds while controlling for baseline levels of delinquency. Longitudinal analysis is particularly important because there is some evidence of child effects – that is, youth delinquency can lead to reductions in the strength of parent or school bonds (Crouter & Booth, 2003). Although there are longitudinal studies that analyze both parent and youth bonds separately (Craig, 2015; Liljeberg et al., 2011), few have looked at the relationships among parent bonds, school bonds and delinquency over time. Studies that have examined the interaction between parent bonds, school bonds and behavior have been cross-sectional (Rovis et al., 2015; Wade & Brannigan, 1998), which cannot determine the direction of effects. In this study, the use of longitudinal data while controlling for adolescents' past delinquency allows us to predict increases in delinquent behavior over time and how these increases are attenuated by parent and school bonds (Collins, 2006). Longitudinal analysis is particularly important because it increases our confidence that our findings are not driven by pre-existing child behaviors.

The Interactive Effects of School and Parent Bonds on Youth Delinquency

Further, in contrast to our hypothesis, we found evidence that school bonding had an additive rather than compensatory effect on youth delinquency. We hypothesized that school and parent bonding would interact to affect youth delinquency and anticipated that school bonds would have a compensatory effect; for example, students with low parent bonds would exhibit less delinquent behavior if they had high school bonds. Our findings instead point to an additive effect: Parent bonding was more strongly linked to delinquency when school bonding was high. The students with the lowest delinquency were those who had high bonds to both parents and schools. Our results are in contrast with prior work that suggests that school bonding can have a compensatory effect for low parent bonding (Rovis et al., 2015; Wade & Brannigan, 1998). However, these prior studies use cross-sectional samples. It may be that strong school bonds do have an immediate compensatory effect, but that these effects do not last over time. Our results suggest that both strong parent and school bonds may be important for the prevention of delinquency over a one-year period. Because youth are more likely to experience impermanence with adults in their school environment than with their parents (i.e., new classroom teachers each year), school staff may need to maintain a proactive focus on establishing strong bonds with each group of new students.

It is possible that bonds with multiple adults, and especially when those adults work in partnership, allow youth to more fully internalize the prosocial norms and behavioral expectations that can be protective against delinquency (Spoth, Randall, & Shin, 2008).

Studies have found that parental involvement in school may be related to higher school bonding as well as more positive youth outcomes (Perkins et al., 2016). Further, youth with both high parent and school bonds may have greater concern over the possible negative effects of delinquency on multiple relationships in their lives (Zins, Bloodworth, Weissberg, & Walberg, 2007) —especially if parents and teachers have regular, open communication about youth behavior. Future research to investigate this question would be helpful to determine whether the moderating effect of school bonds is different within and between school years. Nonetheless, our findings suggest that school bonds matter in addition to parent bonds and that fostering both types of bonds is beneficial for promoting optimal behavior.

The Moderating Effects of School Transition and Youth Biological Sex

In addition, we also did not find support for our fourth hypothesis, that the interaction between parent and school bonding would be stronger for those students who were experiencing a school transition. Instead, for the adolescents in our sample, the interaction between parent and school bonds on delinquency was significant between Grade 6–7 for only those students who were *not* transitioning into a new school. The interaction between parent and school bonds was significant for all students during the Grade 7–8 transition, when no students were changing schools. A significant parent bonding by school bonding interaction was not found between Grades 8 and 9 – when all students in the sample experienced another transition into high school. We hypothesized that the interaction between parent and school bonds would benefit students' future outcomes by buffering against a stressful transition to a new school, but our results suggest that this is not the case. Instead, our findings suggest that the additive benefit of school bonding in addition to parent bonding does not occur during periods of school transition. Perhaps substantial time is needed before school and parent bonds can work together to influence behavior. It is possible that in a new school, parents and teachers have not yet established clear communication patterns that may together have particularly important effects on the internalization of prosocial norms and the deterrence of youth delinquency (Perkins et al., 2016). However, it is important to note that school bonding does still have main effects on youth delinquency. Therefore, even though school bonding does not interact with parent bonds during transition years, it still has positive effects on youth delinquency. Given these findings, future work should focus on how and why promoting bonding to a new school and parental involvement with teachers as early and as strongly as possible may be beneficial when adolescents are vulnerable to initiation of delinquency, as well as other risky behaviors (Eccles et al., 1993).

One of the surprising results of this study are the lack of findings for adolescent sex. These results are consistent with Wade and Brannigan (1998), who also did not find significant three-way parent and school bonding interaction effects on delinquency by sex. Though the literature indicates that sex differences in school bonding and delinquency are common, such that boys exhibit lower levels of school bonding and higher rates of delinquency (Bongers et al., 2004; Liljeberg et al., 2011), in our sample we did not find significant main or interactive effects of school bonding by sex on youth delinquency. It is possible that in this sample, where rates of delinquency were generally low, there may not have been sufficient variation

in our outcome variable to detect sex differences. However, it's also possible that, while boys report lower rates of school bonding (Simons-Morton, Crump, Haynie, & Saylor, 1999), they benefit via the same mechanism as girls when their school bonds are strong. Indeed, our findings suggest that the effects of school bonding may be the same for boys and girls, and it is possible that the underlying protective process is similar (Wade and Brannigan, 1998). Interventions that target school bonds, and the interactive effects of school and parent bonds, may have equal effects for both boys and girls.

Limitations

There are limitations to our study that should be considered when interpreting our findings. Our findings are limited by the use of a predominantly White, rural sample. The relationships between parent and school bonds and delinquency may be different among non-White children or those who live in urban communities. Children who live and go to school in different environmental contexts may face additional risk factors (e.g., community level crime, higher concentrations of delinquent peers) that affect their propensity to engage in delinquent behavior and that are unrelated or are less responsive to strong bonds (Deutsch, Crockett, Wolff, & Russell, 2012; Sciandra et al., 2013). In addition, our measure of delinquency summed each type of delinquent behavior equally. For example, skipping school weighed proportionately as much as breaking and entering or being picked up by the police. Such a measure may mask key variations in delinquency because these behaviors are not equally severe. Especially during early adolescence, a child who reports an incident of delinquent behavior that involved an arrest may be substantially different from a child whose delinquency involved skipping school. In future analyses, it may be fruitful to categorize or use latent variables for delinquency to determine whether protective factors such as bonding affect children differently, depending on the severity or type of delinquent behavior.

Our sample is also subject to differential attrition, and it should be noted that the students who dropped out of the study reported higher levels of delinquency and lower levels of school bonding at the study's outset. Thus, our results at later waves may not reflect processes for youth who dropped out of the study, who may be at higher risk for delinquency. Additionally, we operationalized school bonding to be consistent with the dimensions outlined by Maddox and Prinz (2003), including the domains of school involvement and school commitment and student-teacher bonds. Future analyses would benefit from extracting the subcomponents of school bonding to compare parent-child and teacher-child relationships more directly and to compare domains of school bonding to one another. In tandem, to address measurement error, future work may benefit from using structural models with latent variables for all predictors and outcomes rather than using single scale scores (Byrne, 2012).

Conclusions

Nonetheless, this study provides important knowledge regarding protective influences on adolescent development. This study supports a focus on both parent and school bonds as critical protective factors against negative youth outcomes, such as delinquency. Although both bonds are important for preventing delinquency, they may be most powerful when they occur together: our study found that parent and school bonds have an additive effect and that

having both bonds may be most protective against delinquency. However, these interactive effects may be most apparent when youth remain in the same school. Finally, the influence of parent and school bonds did not differ by sex, suggesting that interventions to increase bonding in either domain may be beneficial for all youth.

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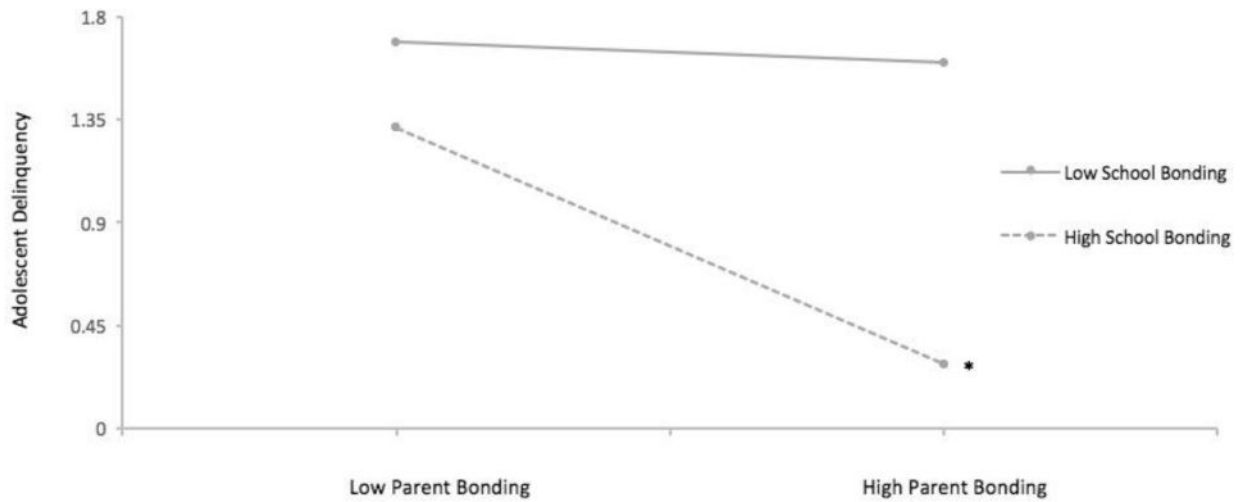


Figure 1.

The interactive effects of school and parent bonds on delinquency for youth who did not transition to a new school in Grade 7. Follow up tests of the simple slopes revealed that for youth who did not transition to middle school in Grade 7, the association between parent bonding and delinquency was significant at high levels of school bonding but was not significant at low levels of school bonding. Youth with the lowest levels of delinquency had both high parent bonds and high school bonds. * $p < .05$

Table 1

Descriptive Statistics

	Grade 6		Grade 7		Grade 8		Grade 9	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total								
School bonding	3.95	.66	3.79	.66	3.75	.65	-	-
Parent bonding	5.87	.96	5.70	1.07	5.57	1.06	-	-
Delinquency	.57	1.28	.69	1.48	.92	1.77	1.01	2.12
Girls								
School bonding	4.06	.61	3.86	.66	3.83	.63	-	-
Parent bonding	5.93	.94	5.86	1.07	5.60	1.06	-	-
Delinquency	.41	1.14	.68	1.62	.81	1.61	.89	1.86
Boys								
School Bonding	3.81	.69	3.71	.65	3.66	.66	-	-
Parent Bonding	5.80	.97	5.63	1.07	5.55	1.05	-	-
Delinquency	.76	1.40	.70	1.31	1.05	1.94	1.15	2.38
Transition in Grade 6								
School Bonding	3.96	.65	3.89	.67	3.75	.66	-	-
Parent Bonding	5.85	.98	5.73	1.05	5.60	1.04	-	-
Delinquency	.53	1.15	.69	1.47	.92	1.75	1.01	2.10
Transition in Grade 7								
School Bonding	3.92	.66	3.77	.64	3.75	.65	-	-
Parent Bonding	5.90	.92	5.70	1.13	5.52	1.10	-	-
Delinquency	.68	1.53	.69	1.48	.93	1.85	1.01	2.12

Table 2
Correlations Between Parent Bonding, School Bonding, Delinquency and Covariates

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. School bonding (Grade 6)	1.00	-	-	-	-	-	-	-	-	-	-	-	-
2. Parent bonding (Grade 6)	.39***	1.00	-	-	-	-	-	-	-	-	-	-	-
3. Delinquency (Grade 7)	-.30***	-.23***	1.00	-	-	-	-	-	-	-	-	-	-
4. School bonding (Grade 7)	.65***	.36***	-.34***	1.00	-	-	-	-	-	-	-	-	-
5. Parent bonding (Grade 7)	.37***	.71***	-.30***	.42***	1.00	-	-	-	-	-	-	-	-
6. Delinquency (Grade 8)	-.29***	-.21***	.52***	-.31***	-.30***	1.00	-	-	-	-	-	-	-
7. School bonding (Grade 8)	.54***	.31***	-.28***	.71***	.36***	-.33***	1.00	-	-	-	-	-	-
8. Parent bonding (Grade 8)	.28***	.62***	-.27***	.33***	.74***	-.27***	.38***	1.00	-	-	-	-	-
9. Delinquency (Grade 9)	-.22***	-.14***	.46***	-.28***	-.20***	.55***	-.25***	-.22***	1.00	-	-	-	-
10. Sex	-.19***	-.04	.01	-.13**	-.06	.08	-.12**	-.02	.06	1.00	-	-	-
11. Transition(in Grade 7)	-.03	.03	.05	-.02	-.04	-.01	-.01	-.04	.01	.00	1.00	-	-
12. Dual Bio Parent	.13***	.15***	-.13***	.17***	.12**	-.30***	.33***	.72***	-.07	-.06	-.04	1.00	-
13. Parent Education	.08*	.05	-.08*	.14***	.10*	-.10**	.14***	.11**	-.07	.04	.03	.18***	1.00
14. Condition	.02	.04	-.03	.05	.08*	-.10**	.06	.11**	-.03	-.04	-.03	.03	-.02

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

Note: Adolescent sex (0=female, 1=male) and transition (0 = no transition in Grade 7, 1 = transition in Grade 7) were coded as binary variables.

Table 3
Main Effects of School and Parent Bonds on Changes in Youth Delinquency

Variable	Model 1 Grade 6-7		Model 2 Grade 7-8		Model 3 Grade 8-9	
	B	SE	B	SE	B	SE
School Bonding	-.28 ^{**}	.09	-.39 ^{***}	.08	-.38 ^{***}	.07
Parent Bonding	-.20 ^{***}	.05	-.20 ^{***}	.04	-.17 ^{***}	.04
Sex	-.11	.10	.28	.10	-.06	.10
Prior Delinquency	.29 ^{***}	.03	.24 ^{***}	.02	.25 ^{***}	.02
Dual Bio Parent	-.17	.11	-.20	.10	-.34	.10
Parent Education	-.03	.03	-.06	.03	.03	.03
Condition	-.14	.11	-.16	.10	.12	.10

* = $p < .05$,

** = $p < .01$,

*** = $p < .001$

Note: all variables were mean centered. Adolescent sex (0=female, 1=male) was coded as a binary variable.

Table 4
Interactive Effects of School and Parent Bonds on Changes in Youth Delinquency

Variable	Model 4 Grade 6-7		Model 5 Grade 7-8		Model 6 Grade 8-9	
	B	SE	B	SE	B	SE
School Bonding	-.48 ^{***}	.09	-.52 ^{***}	.08	-.44 ^{***}	.08
Parent Bonding	-.36 ^{***}	.06	-.27 ^{***}	.05	-.18 ^{***}	.04
Sex	-.08	.11	.29 ^{**}	.10	-.06	.10
Prior Delinquency	.30 ^{***}	.03	.24 ^{***}	.02	.24 ^{***}	.02
Dual Bio Parent	-.11	.11	-.17	.10	-.30 ^{**}	.10
Parent Education	-.03	.03	-.06 [*]	.03	.03	.03
Condition	-.15	.11	-.17	.10	.08	.10
Parent Bonding × School Bonding	-.41 ^{***}	.07	-.16 ^{**}	.05	-.08	.05

* = $p < .05$,

** = $p < .01$,

*** = $p < .001$

Note: all variables were mean centered. Adolescent sex (0=female, 1=male) was coded as a binary variable.

Table 5

School Transition as a Moderator of the Interactive Links Between School and Parent Bonds

Variable	Model 7	
	Grade 6-7	
	<i>B</i>	<i>SE</i>
School Bonding	-.74***	.11
Parent Bonding	-.41***	.07
Sex	-.11	.11
Transition	-.30*	.14
Prior Delinquency	.34***	.03
Dual Bio Parent	-.12	.11
Parent Education	-.02	.03
Condition	-.20	.11
Parent Bonding × School Bonding	-.57***	.08
Transition × Parent Bonding	.30*	.14
Transition × School Bonding	.50**	.17
Transition × Parent Bonding × School Bonding	.33*	.16

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

Note: all variables were mean centered. Adolescent sex (0=female, 1=male) and transition (0 = no transition in Grade 7, 1 = transition in Grade 7) were coded as binary variables.