

THE IMPORTANCE OF STUDENT-TEACHER RELATIONSHIPS
CHARACTERIZED BY HIGH LEVELS OF CLOSENESS FOR CHILDREN WITH
EARLY EXTERNALIZING BEHAVIORS AND LATER RISK-TAKING

by

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The Importance of Student–teacher Relationships Characterized by High Levels of
Closeness for Children with Early Externalizing Behaviors and Later Risk–taking
A Dissertation submitted in partial fulfillment of the requirements for the degree of
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DEDICATION

This is dedicated to my loving family, who encourage and support me through all of my endeavors.

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LIST OF ABBREVIATIONS AND SYMBOLS

National Institute of Child Health and Human Development Study of Early Child Care and Youth Development	NICHD SECCYD
Structural Equation Modeling.....	SEM
Ordinary Least Squares.....	OLS
Confirmatory Factor Analysis.....	CFA
Exploratory Factor Analysis	EFA
Principal Component Analysis	PCA
Diagnostic and Statistical Manual	DSM
Sexually Transmitted Disease.....	STD
Comparative Fit Index	CFI
The Root Mean Square Error of Approximation	RMSEA
The Standardized Root Mean Square Residual	SRMR
Tucker Lewis Index	TLI
Coefficient alpha.....	α
Unstandardized coefficient beta.....	b

ABSTRACT

THE IMPORTANCE OF STUDENT–TEACHER RELATIONSHIPS CHARACTERIZED BY HIGH LEVELS OF CLOSENESS FOR CHILDREN WITH EARLY EXTERNALIZING BEHAVIORS AND LATER RISK–TAKING

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George Mason University, 2016

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The purpose of this dissertation was to investigate whether or not the presence of student–teacher relationships characterized by high levels of closeness in the elementary school years can disrupt the pathway between early externalizing behaviors and later risk-taking behaviors. Research has indicated that student–teacher relationships characterized by high levels of closeness can ameliorate the effects of externalizing behavior on later negative outcomes in general (Baker, 2006). Much less is known about the protective effect of student–teacher relationships on risk-taking behavior. The current study aimed to add to the body of research on how student–teacher relationships can act as protective factors for risk-taking behaviors such as delinquency and sexual activity. Longitudinal data was used from the NICHD Study of Early Child Care and Youth Development (SECCYD) to examine outcomes for a diverse population of 1,061 children at grades 3,

5, and then age 15. Findings indicated that early maladaptive behaviors predict later risk-taking in general, and that the student–teacher relationship is predictive of some risky behaviors. The implications of this study are in regard to how we approach intervention to reduce maladaptive behaviors.

Notes:

This study was conducted by the NICHD Early Child Care Research Network supported by NICHD through a cooperative agreement that calls for scientific collaboration between the grantees and the NICHD staff. The findings are the authors and do not constitute endorsement by the NICHD.

LITERATURE REVIEW

Adolescence is a time of great transition physically, emotionally, and cognitively. Adolescents lack cognitive maturity, and oftentimes they fail to consider the full weight of the negative consequences of their behavior. Compared to adults, adolescents tend to be impulsive and their judgments are highly dependent on their social and emotional maturity. Adolescents are prone to behaving more irrationally and to take more risks, especially when those risks lead to immediate rewards (Berk, 2013). The risks they take are varied, but they can include drug use, unprotected sex, and delinquency. Adolescents who persistently engage in risk-taking behaviors are much more likely to encounter law enforcement and to be processed in the juvenile justice system (Bartol & Bartol, 2014). Many times, risk-taking behavior is a precursor to juvenile delinquency (Hughes, Cavell, & Jackson, 1999), which can lead to life-long social problems (Bartol & Bartol, 2014; Piquero & Steinberg, 2007).

Externalizing behavior early on is associated with later risk taking (Broidy et al., 2003; Calkins & Keane, 2009). In fact, externalizing behavior, such as aggression, can appear at a very young age and if it goes untreated there are multiple pathways to negative outcomes in adolescence and into adulthood (Hughes et al., 1999). Early aggression has also been associated with academic failure, substance abuse, and later delinquency (Hughes et al., 1999), some of which are behaviors included in the definition

risk-taking. Behaviors such as delinquency and substance abuse which are characteristic of risk-taking, can lead these youth in late adolescence (15-17 years old) to have encounters with the juvenile justice system (Berk, 2013; Piquero & Steinberg, 2007). While these outcomes were not labeled as risk-taking, they all fall under the definition of risk-taking. Considering this overlap between our definition and the externalizing behavior literature, we find evidence that there is a pathway between early externalizing behavior and later risk-taking behaviors.

Given the association between early externalizing behavior and the negative outcomes associated with both constructs, the socially significant question we want to answer is: How can we buffer children with early problem behaviors against later negative outcomes, specifically risk-taking? Research suggests that the presence of a student–teacher relationship characterized by high levels of closeness may ameliorate the effects of externalizing behavior on later negative outcomes such as school problems and future externalizing behaviors (Baker, 2006). Much less is known about the protective potential of student–teacher relationships on risk-taking behavior. We do know that early negative externalizing behavior and later risky behavior are related (Calkins & Keane, 2009) and that there is some evidence that a positive student–teacher relationship can act as a protective factor against negative outcomes associated with risk-taking behaviors (Baker, 2006; Hamre & Pianta, 2001; Rudasill, Reio, Stipanovic, & Taylor, 2010).

The purpose of the present study was to investigate whether or not the presence of a positive student–teacher relationship in the elementary school years could indeed disrupt the pathway between early externalizing behaviors and later risk-taking behaviors

in adolescence. Because of its centrality to the research questions, we consider risk-taking behaviors first.

Risk-Taking Behavior

The definition of risk-taking behavior is rather broad and can include a wide variety of maladaptive behaviors including unprotected sex, binge drinking, and aggression. We define risk-taking as engaging in activities that put the youth at-risk for physical or sexual harm, or encounters with the juvenile justice system (Berk, 2013). These risk-taking behaviors may include things such as reckless driving, unprotected sex, and binge drinking (Calkins, 2010). In addition, risk-taking is also indirectly measured by measures of impulsivity, sensation seeking, and disciplinary records (e.g., truancy, the sale of drugs) (Steinberg et al., 2008; Hamre & Pianta, 2001). Another type of risk-taking is related to sexual behavior (e.g., sexual intercourse and oral sex, lack of contraception use). When it comes to risky sexual behavior, there are many negative consequences. For instance, 20% of adolescents who are sexually active do not use contraception, and approximately 20% of adolescents girls will become pregnant (Berk, 2013). For those who do become teen mothers, the outcomes are bleak with high rates of dropout, future marital problems, weak parenting skills, and economic difficulties (Berk, 2013). There are many known factors that put teens at risk for teen pregnancy – lack of contraception, low quality sex education, poverty, and lack of school involvement – and despite a declining trend in teen pregnancy, it remains a socially significant issue that should be prevented (Berk, 2013).

Adolescents are at greater risk for engaging in risk-taking behaviors compared to younger children or adults, due to heightened levels of both sensation seeking and impulsivity and, therefore, lack cognitive control over behavior. For example, Steinberg et al. (2008) studied levels of impulsivity and sensation seeking in a cross-sectional sample ranging over 20 years (from age 10 to 30) and their aim was to describe the trends in these behaviors over time. Their study examined the role of two different aspects of risk-taking: impulsivity and sensation seeking. Impulsivity is a measure of self-control and it manifests itself behaviorally as “hasty, unplanned behavior” (Steinberg et al., 2008, p. 1765). Sensation seeking is defined as “the tendency to seek out novel, varied, and highly stimulating experiences, and the willingness to take risks in order to attain them” (Steinberg et al., 2008, p. 1765). Sensation seeking, which is associated with the social–emotional centers of the brain, was found to have a curvilinear development pattern with increases and then a peak in early adolescence (around ages 12-13) and then a steady decline after age 16 until age 30. Additionally, Steinberg et al. found that levels of impulsivity followed a linear pattern, steadily decreasing from ages 10 to 30 (Steinberg et al., 2008). Each of these constructs is distinct and is associated with different cognitive systems, where impulsivity is indicative of a lack of maturity of the cognitive control system (i.e., frontal lobe), and sensation seeking is related to social–emotional maturity (i.e., the amygdala). And both of these cognitive systems are to a degree regulated by the orbitofrontal cortex.

The importance of these findings is that they provide evidence for a dual-systems model of adolescent risk-taking (Bartol & Bartol, 2014; Calkins, 2010; Steinberg, 2010;

Steinberg et al., 2008). The dual-systems model, proposed by Steinberg and colleagues (Steinberg, 2010; Steinberg et al., 2008), theorizes that impulsivity and sensation seeking function independently, following distinct trajectories across the lifespan. In this model, risk-taking behavior is described as a product of an imbalance in the timing of development within two separate neurobiological systems in the brain that is characteristic of adolescents. The social–emotional system, which is associated with sensation seeking, is part of the limbic and paralimbic system, which includes the amygdala, and it is presumed to have a great influence on reward-seeking behaviors. The cognitive control system is in the dorsolateral prefrontal and parietal cortices and is associated with self-regulation and impulse control. Studies have shown that the cognitive and the emotional control systems of the brain develop at different rates. The development of the social–emotional system peaks during puberty due to increased levels of dopamine, meaning that it is more sensitive and more easily aroused. Meanwhile, the cognitive control system develops more slowly over time and is not fully developed until young adulthood (Bartol & Bartol, 2014). The dual systems theory gives us the context with which we understand why these risk-taking behaviors are distinct and unique to adolescent populations. This is the behavior of interest because adolescents are uniquely prone to engaging in them. We view externalizing behavior as potential precursors to risk-taking and so now we will consider its development.

Externalizing Behavior

Externalizing behaviors are maladaptive behaviors such as aggression, non-compliance, disruptive behavior, hyperactivity, and delinquent or antisocial behaviors

(Arnold et al., 1999; Baker, 2006). There is a considerable amount of consensus in the literature that children who have early problem behaviors, including aggression and other externalizing behavior, are at-risk for developing later conduct disorders and delinquent behaviors (Calkins & Keane, 2009; Campbell, Shaw, & Gilliom, 2000). These externalizing behaviors, such as aggression, can be measured in individuals across the lifespan, and many studies have looked at these behaviors in children as young as kindergarten (Baker, 1999, 2006; Hamre & Pianta, 2001; Meehan, Hughes, & Cavell, 2003) or even earlier in toddlerhood (Campbell, Spieker, Burchinal, Poe, & The NICHD Early Child Care Research Network, 2006). The utility of early measurement of these behaviors is that it allows researchers to study the developmental patterns of those behaviors over time. There seem to be multiple trajectories of the development of externalizing behavior across the lifespan. Children who engage in externalizing behavior early on do not all follow the same behavioral pattern across time (Broidy et al., 2003). Many children will desist, and the externalizing behaviors reduce or disappear, whereas in others the behaviors persist into adolescence.

The most common externalizing behavior that is studied is aggression, and there are several studies regarding the patterns of change and stability in this behavior over time (Calkins & Keane, 2009; Hughes et al., 1999). For instance, in their longitudinal study of developmental trajectories of externalizing behaviors, Broidy et al. (2003) found that trends of aggression over time are relatively stable from ages 6-15, meaning that there isn't much change, and that this continuity is the strongest when it comes to physical aggression. Not only does aggression remain stable within persons, but, as

children grow into adolescence, the behavior can diversify into instances of both aggression and delinquent behavior, especially for boys. Although aggression levels have been shown to be relatively stable over time (Broidy et al., 2003), we also see that many children who may begin on an aggressive trajectory do not ultimately wind up being particularly aggressive children, and it is possible to see a reduction of these behaviors if the right protective factors are present. For instance, one study found that the quality of the student–teacher relationship made significant contributions to the reduction of childhood aggression over a two year period (3rd to 5th grade), where those students who had close student–teacher relationships in one year displayed less aggression in the next year (Hughes et al., 1999). In this study, similar to the current one, aggression was measured using the Child behavior checklist. While the subscale used in this study is labeled as aggression, the items contained on their measure are actually more indicative of externalizing behaviors (Hughes et al., 1999). The authors explain this well by stating that “a number of nonaggressive behaviors (e.g., demands attention, disobedient, stubborn) are included on the Aggressive scale, it is best characterized as a measure of conduct problems rather than aggression per se” (Hughes et al., 1999, p. 177). These findings indicate that it is possible to ameliorate externalizing behavior from one year to the next, which leads us to believe that the same effects could be possible for adolescent maladaptive behaviors.

Besides aggression, there are also findings, which indicate that non-aggressive behaviors are related to negative outcomes. For instance, Broidy et al. (2003) also found that non-aggressive behaviors related to early conduct problems and oppositional

behaviors predicted later forms of delinquency. The authors summarize by saying that “early disruptive behaviors influence later delinquency, with different patterns of early behavior problems being associated with differing delinquent outcomes” (Broidy et al., 2003, p. 235). While aggression was the most robust predictor, the findings of this study indicate that all the problem behaviors included as predictors in this study are related to future delinquency, which falls within the definition of risk-taking (Broidy et al., 2003). Now that I have described both of these constructs, I wish to return to a discussion on the pathway between early externalizing behavior and later risk-taking.

Externalizing Behavior and Risk-Taking Behavior

Externalizing behavior and risk taking behavior are similar in many respect.

Risk-taking has often been researched by different people than people who study externalizing behaviors, which may create a false dichotomy. However, risk-taking is like the evolution of externalizing behavior. It’s externalizing behavior in the context of adolescence. Meaning that the behaviors it addresses are more appropriate or unique to adolescence. The other difference is that although early externalizing behaviors are seen as a product of deficits in emotional and psychological regulation, risk taking is conceptualized as a product of the imbalance between cognitive and socioemotional development.

Table 1 similarities and differences among externalizing behavior and risk-taking behavior

Externalizing Behavior (CBCL)	Risk-Taking Behavior
Same face value	
72. Sets fires	42. Purposefully set a fire
37. Gets in many fights	29. Been in fight between kids
Developmental appropriateness	
96. Thinks about sex too much	53. Had sexual intercourse
	54. Gotten Pregnant/gotten a girl pregnant
	52. Had oral sex
39. Hangs around w/oth who get in trouble	8. Been a member of a gang
Seriousness of behavior	
63. Swearing or obscene language	9. Sold Drugs
86. Stubborn, sullen, or irritable	24. Fired a gun
95. Temper tantrums	27. Been in Juvenile Detention
43. Lying or cheating	50. Broke into a building

Table 1 provides examples of the similarities and the differences between externalizing behavior and risk-taking behavior as seen in the instruments used in the present study. In the first section, there are examples of how some items are practically identical, but there are many items that are the same on both measures.

Then, the second section demonstrates how some items address the same subject matter - sexuality for instance - but the topography of the behavior is more appropriate for an adolescent. We wouldn't expect a 3rd grader (an 8/9 year old) to actually engage in sexual activity because at that age, sexual activity would be considered abuse. However, for an adolescent, we do expect them to think about sex a lot, and this it relatively normative behavior - what becomes problematic is when adolescents actually engaging in sexual activity because it can lead to pregnancy and STDs. Lastly, we have

items that are distinct to each construct. There are behaviors that seen in an 8 year old are behaviors or concern - like swearing or being sullen/irritable - but that, again, we expect or at least aren't surprised to see in an adolescent.

We also see items emerge that address more serious, and also age appropriate behavior - like going to juvenile detention or firing a gun. These are behaviors that are going to be very maladaptive for a teenager - and are going to lead to incarceration and other negative outcomes. However, we would never expect a younger child to engage in these behaviors because they don't have the means or the physical maturity to engage in these behaviors. It's very unlikely that an 8 year old would have been arrested.

Despite their similarities, externalizing and risk-taking behavior really they are different. This is especially true in terms of the way the behaviors are measured – in the current data set, for example, there are measures of externalizing behavior for 3rd and 5th, and risk taking for age 15 – there isn't cross over. Because it would be methodologically inappropriate to give an 8 year old the risky behavior measure and expect there to be any variation.

Externalizing behavior is an umbrella term that includes both aggressive behaviors and delinquent behaviors and many measures include risky behavior, anti-social behavior, aggression, and delinquency in the same scale, but as separate constructs (Hamre & Pianta, 2001). Risky behavior includes those behaviors deemed deviant. There is an established link between early externalizing behavior and antisocial/deviant behaviors (Bartol & Bartol, 2014; Broidy et al., 2003; Campbell et al., 2000; Hamre & Pianta, 2001). In the same way, we also expect that there is an association between

externalizing behavior and later risk-taking behavior because they are closely-related constructs.

A goal of this project is to focus on those factors that would prevent this pathway from externalizing behaviors to risk-taking and subsequent interaction with the juvenile justice system. Incarceration can have negative effects on educational success as well as mental and behavioral health. There are numerous long-term negative effects associated with juvenile incarceration. First, there is a strong association between juvenile incarceration and increased rates of high school dropout. Youth who are incarcerated are less likely than peers in their community to complete high school (Piquero & Steinberg, 2007), which significantly limits their employment options and future ability to become productive members of society. In addition, these youth are also more likely than other students in their neighborhood to be incarcerated again as adults. These effects are especially strong in youth who are 15 and 16-years-old (Piquero & Steinberg, 2007).

The literature suggests that early high levels of externalizing behavior (e.g., physical aggression) lead to increased likelihood of engaging in risk-taking and delinquent behavior later on (Broidy et al., 2003; Calkins & Keane, 2009; Campbell et al., 2000). Calkins and Keane (2009) theorize that early externalizing behavior problems, especially those involving aggression, contribute to future anti-social behavior and that cognitive control plays a role in this. In their particular study, this cognitive control was conceptualized as emotional and psychological regulation, and they found that regulatory deficits were associated with early behavior problems. Essentially, it is a lack of self-regulation and control in young children that may affect developmental patterns of

behavioral adjustment; lower levels of cognitive control have been associated with antisocial behaviors in adolescents (Calkins & Keane, 2009).

Early externalizing behavior also has been found to be one of the best predictors of future adolescent and adult criminality (Bartol & Bartol, 2014; Calkins & Keane, 2009). In their study, Broidy et al. (2003) found that boys that displayed chronic aggression – as opposed to boys who displayed similarly high levels of physical aggression that decreased over time – were more likely to engage in later violent delinquency. Using trajectory estimation, this study was conducted by modeling the progression of physical aggression, nonaggressive conduct problems, opposition, and hyperactivity in children from ages 6 to 12. Further research is needed to determine why some of these children with the highest levels of externalizing behavior desist and others do not. These findings indicate that early externalizing behaviors, especially physical aggression, are predictive of future antisocial and delinquent behaviors. This leads to the question: What factors contribute to chronic levels of aggression versus a reduction in behavior over time? Student–teacher relationships may be the answer to this question and now we will discuss the protective nature of these relationships.

Student–Teacher Relationships

Teachers play a significant role in the classroom and in the lives of their students (Curby et al., 2009). They are first responsible, in part, for the academic success of students, but, beyond that, teachers provide behavioral support, regulate activity, model communication, facilitate interactions, and teach social skills (Baker, 2006). Given this, it is no surprise that teachers also play a substantial role in students' behavioral and

academic outcomes throughout school (Hamre & Pianta, 2001; Hughes et al., 1999; Meehan et al., 2003).

A relationship is defined by the ongoing connections and behavioral exchanges that are made between the student and the teacher in the classroom (Baker, 1999; Curby, Downer, & Booren, 2014). A student–teacher relationship is comprised of the dyadic interactions between a student and teacher (Curby et al., 2014). The quality of these relationships is determined through the interactions shared by each partner (Hughes et al., 1999; Pianta, 1999). In addition, the behavior of the child influences the relationships he/she form with his/her teachers (Birch & Ladd, 1998).

Student–teacher relationships play an important role in the formation of students’ self-efficacy and positive values regarding school. According to Baker (2006), when children develop within a warm and caring social context, they are more likely to adopt positive values and feelings toward school. In fact, it is through positive student–teacher relationships characterized by warmth, support, and nurturance that children are able to thrive in all aspects of their education. From an attachment perspective, a warm and supportive student–teacher relationship gives children the security they need to explore the classroom environment and fully partake in learning, socialization, and behavioral development (Pianta, 1999). Meehan et al. (2003) also found that for aggressive children who are at risk, increased teacher support predicted lower levels of problem behaviors 2 years later. The heavy involvement of teachers in the education environment lends itself to the potential positive effects that teachers can have on their students (Curby et al., 2014).

Student–teacher relationship quality is generally considered to have three dimensions in early childhood: Closeness, conflict, and dependency (Birch & Ladd, 1998; Hamre & Pianta, 2001; Pianta, 1999). Closeness and conflict are consistently used to measure student–teacher quality throughout elementary school. Closeness indicates a relationship that is positive and characterized by “trust, warmth, and low conflict” (Baker, 2006, p. 216). In relationships with high levels of closeness, the teacher and student show affection for one another, the relationship is warm, and the student feels safe to seek comfort from the teacher and to share information (Hamre & Pianta, 2001). Conflict describes relationships that are characterized by degrees of negativity and control. In these relationships, the student and teacher struggle with one another and may frequently become angry (Hamre & Pianta, 2001). Although beyond the scope of the present study, dependent relationships happen when children are overly reliant on the teacher for academic and social needs, and they may experience strong negative emotions upon separation (Hamre & Pianta, 2001). Positive student–teacher relationships are marked with high levels of closeness and low levels of conflict and dependency (Baker, 2006; Hamre & Pianta, 2001).

Correlates of Closeness

Student–teacher relationships that are warm and caring have been positively associated with school adjustment (Baker, 2006; Pianta, 1999). For example, in her study Baker (2006) found that levels of closeness had a positive association with reading grades, positive work habits, and social skills.

The effects of the student–teacher relationship can be broad, such as the child’s

general satisfaction with school. As early as third grade, low-income students who have an affinity for school endorse higher quality relationships with their teachers than those who do not like school (Baker, 1999). Baker (1999) stresses the importance of relationship quality between students and teachers. In her study, she found that children who had supportive, caring relationships with teachers were more satisfied at school in general. On the other hand, students who were dissatisfied with school cited academic activities as their least favorite part of school and they reported getting in trouble with greater frequency. Dissatisfied children were also less likely than satisfied children to endorse high levels of social support and caring classroom environments.

There is research supporting the idea that student–teacher relationships high in closeness can become protective factors, or moderators, for social-contextual factors such as negative parenting and minority status (Meehan et al., 2003). In addition, closeness may be a protective factor for future externalizing behaviors. For instance, Baker (2006) found that a close student–teacher relationship was predictive of adaptive school outcomes and ameliorated the risk of future behavioral problems. Their study highlights the potential positive effects that student–teacher relationships can have not just for all students, but specifically for vulnerable children (Baker, 2006). Baker (2006) found that of students who had behavioral and learning problems, those who also had a close student–teacher relationship had better school outcomes than those who did not have similarly positive student–teacher relationships. In a similar study, Hughes et al. (1999) also found that having a positive student–teacher relationship (i.e., more closeness) acted as a protective factor against future aggression. These relationships were associated with

lower levels of externalizing behaviors over time for students with behavioral problems, despite the fact that it is more difficult for teachers to form positive relationships with students with behavioral problems. Not only is it possible for students with behavioral problems to form positive relationships with teachers, and when they do, they benefit greatly from it.

Other studies have established the potential ameliorative power of the student–teacher relationship that are high in closeness, and low in conflict. Hamre & Pianta (2001) conducted a longitudinal study where they measured student–teacher relationships and externalizing behaviors in kindergarten and used it to predict future problem behaviors. The authors found that children with high incidence of aggressive behavior, who also had relationships with their kindergarten teachers that were low in conflict and dependency, presented with fewer disciplinary problems (risk-taking behaviors) in eighth grade. These children also received higher teacher-reported levels of good work habits through eighth grade. One of the outcomes measured was disciplinary infractions, which includes externalizing behaviors such as defiance, disruption, and fighting. Disciplinary infractions were not classified as risk-taking behaviors, but all of the items used are included in the definition (and measure) of risk-taking in the present study (Hamre & Pianta, 2001) thus establishing the potential ameliorative effect of close student–teacher relationships on early externalizing behaviors and risk-taking in adolescence.

Although it has been suggested that students’ relationships with teachers become less important as they enter adolescence, Hamre and Pianta (2001) noted that many studies indicate that close student–teacher relationships continue to serve as protective

factors even into adolescence. In addition, feelings of relatedness to school and to teachers are important to adolescents (Baker 2006), which is important because feelings of relatedness are associated with many outcomes such as school satisfaction, school attitudes, increased motivation, and academic success. In addition, there is evidence that close and supportive student–teacher relationships are important for the emotional and behavioral development and that relationships at age 13 acted as protective factors for depression and misconduct in late adolescence (Wang et al., 2013).

Conflict

Negative student–teacher relationships that are characterized by high degrees of conflict are typically associated with poor academic performance as well as inadequate social behavior (Baker, 2006; Hamre & Pianta, 2001; Pianta, 1999). In fact, according to Baker (2006), there is more evidence of the negative effects associated with conflict than positive effects associated with closeness. Unfortunately, children with externalizing behaviors tend to have student–teacher relationships marked with higher levels of conflict, and they are less likely to benefit from any of the potential positive effects that would come from a high quality student–teacher relationship (Baker, 2006; Fry, 1983; Hughes et al., 1999; Pianta, 1999). Fry (1983) found that children with problem behaviors tend to experience more teacher interactions colored by negative affect. These children also tend to receive less positive and instructional feedback from their teachers.

In the study described previously (Hamre & Pianta, 2001), analyses were also conducted to examine the role between relational negativity and behavioral outcomes. Relational negativity was defined as the composite score of conflict and dependency

levels within the student–teacher relationship. They found that for children with behavioral problems – defined by disciplinary infractions (e.g., disruption, fighting etc.) – negativity in student–teacher relationships in first grade was highly predictive of future levels of disciplinary infractions in 8th grade. Interestingly, they found that children without problem behaviors were neither hindered nor helped by levels of relational negativity. This finding clearly demonstrates that the relation between early externalizing behaviors and later risk-taking (disciplinary infractions) is moderated by the presence of relational negativity.

It is evident that the presence of a positive student–teacher relationship can ameliorate risks and disrupt the pathway between externalizing behavior and later risk-taking (Baker, 2006; Hamre & Pianta, 2001; Hughes et al., 1999); the opposite is true of student–teacher relationships that are high in conflict and dependency (Baker, 2006). Children with early externalizing behavior are at higher risk for later delinquency and engaging in risk-taking behaviors (Bartol & Bartol, 2014; Calkins & Keane, 2009). However, the quality of the student–teacher relationship has moderating power of either derailing or maintaining (and perhaps even strengthening) this pathway (Baker, 2006; Hamre & Pianta, 2001; Hughes et al., 1999).

All of these findings emphasize the importance of the student–teacher relationship and the potential these relationships have to make a difference in student outcomes. The presence of strong, positive student–teacher relationships can be beneficial to adolescents. Further it has also been established that early positive relationships can also ameliorate various risks later in life. This protection is thought to be a function of the

fact that elementary-aged students spend the full year with their one teacher, and this extensive amount of time with an adult provides ample opportunities for consistent and engaging interactions to occur. Because there is so much time spent interacting, there is great potential to form deep relationships and to influence student outcomes (Baker, 1999).

The available studies that looked at student–teacher relationships in 3rd and/or 5th grade did not focus on adolescent risk-taking behavior, or they were not longitudinal in nature (Baker, 1999; Hughes, 1999; Meehan et al., 2003). There have been many studies that have examined the influence of student–teacher relationships in early childhood (Hamre & Pianta, 2001; Rudasill et al., 2010; Birch & Ladd, 1998); however, there are very few studies that look at the importance of later student–teacher relationships. For those children who did not have close student–teacher relationships in those early years, is it still possible for later student–teacher relationships to make a difference in their behavioral pathways? In addition, does the student–teacher relationship only influence long-term effects when children are younger, or do these relationships continue to influence children across their lifetime?

THE CURRENT STUDY

The dual-systems model acknowledges the developmental reasons why adolescents are more likely to engage in risk-taking behavior but it also concedes that there is an interaction between these biological factors and the social contexts that form and shape behavioral outcomes (Bartol & Bartol, 2014; Steinberg, 2010). Essentially, adolescents are prone to engaging in these risky behaviors, but external and environmental factors can prevent them from occurring. Therefore, if the social context (such as the relationship with the teacher) can be manipulated or enhanced, it is possible to ameliorate biological influences that lead to externalizing and risk-taking behaviors.

In general, there is a paucity of studies that have examined the pathway between externalizing behavior and later risk-taking behavior. Even fewer studies have examined how student–teacher relationships influence risk-taking behavior as opposed to other adolescent outcomes. For instance, Wang et al. (2013) examined the moderation effect of student–teacher relationships but they investigated internalizing symptoms (e.g., anxiety) and the relationships were studied as an ameliorative factor for children with conflict in their parent-child interactions. In addition, Rudasill et al. (2010) used the same National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD) data to determine whether student–teacher relationships high in conflict mediated the pathway between difficult temperament and

risk-taking behaviors in the 6th grade. They found that relationships high in conflict were predictive of higher rates of risk-taking. The current study is unique because the focus is specifically on risk-taking behaviors and how relationships high in closeness may act as a protective factor for engaging in these behaviors.

Three variables will be controlled for in each of the analyses: Gender, income to needs ratio, and maternal education. Gender is an important covariate because it is well known in the literature and in crime statistics that males are more likely to be the offenders of juvenile crimes (Bartol & Bartol, 2014). In addition, youth with problem behaviors are more likely to come from disadvantaged communities (Bartol & Bartol, 2014; Berk, 2013), so it's important to control for income based factors, which is why we included income-to-needs ratios. Maternal education is related to parenting skills as well as SES (Berk, 2013), and is therefore an indicator of potential protective factors for adolescent risk-taking. Specifically, in terms of sexual risk-taking, youth with more educated mothers are more likely to receive specific support and education regarding the nature of sexual activity that supplements the information they are getting in school. Additional instruction and guidance may help youth in the decision making process, or it may mean that these youth are being monitored more diligently, therefore they lack the opportunities to become sexually active. Each of these covariates contributes to the variability seen in various kinds of risk-taking behavior, so their inclusion in the analysis will help us to determine what unique contributions the constructs of interest give to the outcome.

The purpose of this study is to determine if the presence of a close student–teacher

relationship in the elementary school years will moderate the pathway between early externalizing behaviors and later risk-taking behaviors

Research Question 1

Does the factor structure of risk-taking conform to a three-factor structure with Aggression, Delinquency, and Sexual Activity in the current sample? Based on a confirmatory factor analysis, we expect to have a factor structure with Aggression, Delinquent Acts,, and Sexual Activity factors.

Research Question 2

Are student–teacher relationships, characterized by high levels of closeness in 3rd grade, particularly important for children with high levels of externalizing behavior in 3rd grade for preventing later risk-taking behaviors at age 15? In addition, based on the factors captured in Research Question 1, are student–teacher relationships, characterized by high levels of closeness in 3rd grade, particularly important for children with high levels of externalizing behavior in 3rd grade for preventing the four factors of risk-taking behaviors at age 15? I expect that children who have high levels of externalizing behavior, but who have a closer relationship with their teacher in third grade will have disproportionately less risk-taking behavior at age 15, and for the four factors of risk-taking behaviors. I also expect that higher closeness and lower externalizing behaviors will be related to fewer risk-taking behaviors.

Research Question 3

Are student–teacher relationships, characterized by high levels of closeness in 5th grade, particularly important for children with high levels of externalizing behavior in 3rd

grade for preventing later risk-taking behaviors at age 15? In addition, based on the factors captured in Research Question 1, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with high levels of externalizing behavior in 3rd grade for preventing the four factors of risk-taking behaviors at age 15? I expect that children who have high levels of externalizing behavior in 3rd grade, but who have a closer relationship with their teacher in fifth grade will have disproportionately less risk-taking behavior at age 15 and for the four factors of risk-taking behaviors

Research Question 4

Is the combined effect of having a student–teacher relationship, characterized by high levels of closeness in 3rd and 5th grade, a moderator of the relationship between externalizing behavior and later risk–taking? In addition, based on the factors captured in Research Question 1, are student–teacher relationships characterized by high levels of closeness in 3rd and 5th grade particularly important for children with high levels of externalizing behavior in 3rd grade for preventing the four factors of risk-taking behaviors at age 15? I expect that children who have high levels of externalizing behavior in 3rd grade, but who have a closer relationship with their teacher in both third and fifth grade will have disproportionately less risk-taking behavior at age 15, and for the four factors of risk-taking behaviors, than those who either who have a student–teacher relationship characterized by low levels of closeness in one or both grades.

Research Question 5

Are student–teacher relationships, characterized by high levels of closeness in 5th grade, particularly important for children with different kinds of externalizing behavior? Specifically, are student–teacher relationships, characterized by high levels of closeness in 3rd grade, particularly important for children high levels of aggressive behavior in 3rd grade for preventing later risk-taking behaviors at age 15? In addition, based on the factors captured in Research Question 1, are student–teacher relationships, characterized by high levels of closeness in 5th grade, particularly important for children with high levels of aggressive behavior in 3rd grade for preventing the four factors of risk-taking behaviors at age 15? I expect that children who have high levels of aggressive behavior, but who have a closer relationship with their teacher in either third or both third and fifth grade will have disproportionately less risk-taking behavior at age 15, and for the four factors of risk-taking behaviors, than those who either who have a student–teacher relationship characterized by low levels of closeness in one or both grades.

Research Question 6

Are student–teacher relationships, characterized by high levels of closeness in 5th grade, particularly important for children with different kinds of externalizing behavior? Specifically, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with high levels of delinquent behavior in 3rd grade for preventing later risk-taking behaviors at age 15? In addition, based on the factors captured in Research Question 1, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with high levels of delinquent behavior in 3rd grade for preventing the four factors of risk-taking

behaviors at age 15? I expect that children who have high levels of delinquent behavior, but who have a closer relationship with their teacher in either third or both third and fifth grade will have disproportionately less risk-taking behavior at age 15, and for the four factors of risk-taking behaviors, than those who either who have a student–teacher relationship characterized by low levels of closeness in one or both grades. I also hypothesize that when the delinquent behavior subscale is used in the model it will be a stronger predictor risk-taking behavior at age 15, and for the four factors of risk-taking behaviors of since many risk-taking behaviors can be categorized as delinquent behaviors.

METHOD

Participants

The participants are from a sample of children who participated in the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). The NICHD SECCYD is a longitudinal study that followed children starting as infants until they were age 15 from 10 different sites in the U.S. This project was funded from 1991 until 2009 and followed children through 4 phases of data collection. Phase I included children aged birth through 3 years, Phase II was 54 month through 1st grade, Phase III collected data in 2nd through 6th grade, and Phase IV collected data when the children were in 7th through 9th grade. The purpose of NICHD SECCYD was to gather comprehensive data on childcare and developmental outcomes for children from infancy to adolescence. The current project used participants from Phase III while they were in 3rd and 5th grade. The original sample, from Phase I of data collection contained 1,364 children and the current sample contains 1061 children from phase III. Of those, 957 children participated in Phase IV at the age of 15, and they self-reported their risk-taking behavior. A vast majority of the sample is white (approximately 80%), followed by 13% black, 2% Hispanic, 2% Asian, and 0.3% Native American. Both maternal education and gender were only recorded in Phase One of data collection, in the early 1990's. Gender was evenly represented, with 51% males, and 49% female participants, and even more so within the current sample (50/50). At the

time of the initial data collection, 11% of mothers had less than a 12th grade education, 24% had some high school/GED, 28.5% of mothers had some college 23% had a BA level degree, and 12.5% had postgraduate work.

Procedure

Children were recruited from 10 different sites at universities across the United States in 1991 by the NICHD research team. For more information on the data collection procedure, see NICHD Early Child Care Research Network, (2002, 2005). Restricted-use access to the data for this project was granted through the University of Michigan Inter-University Consortium for Political and Social Research. The Child Behavior Checklist (CBCL) and the Student–teacher Relationship Scale: Short Form (STRS-SF) were filled out by parents in all grades during phase III. The adolescent report of risky behavior was administered to the 15year olds in phase 4.

Measures

Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001)

The CBCL is a standardized measure, which contains multiple subscales including attention problems, delinquent behavior, aggressive behavior, and externalizing behavior. There are also subscales that address internalizing behaviors such as anxiety. The parent version contains 118 items that are endorsed on a three-point Likert scale where 0= Not True, 1=somewhat or sometimes true, and 2=Very True or often true. Parents are asked if the child currently or has in the last 6 months displayed the listed behaviors. There are 8 subscales: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior.

Based on the preliminary analysis conducted on the full sample by NICHD researchers, the Delinquent Behavior subscale has moderate internal consistency ($\alpha=0.56$) and includes 13 items. The Aggressive behavior subscale displays high internal consistency ($\alpha=0.88$) and is comprised of 20 items. The externalizing scale is a composite that includes delinquent and aggressive behaviors and has a high reported internal consistency ($\alpha = 0.89$). The possible range for scores is 30 to 100 and higher scores indicate higher levels of the occurrence of externalizing behaviors. Both of the subscales will be used in the analyses for Research Questions 5 and 6.

The CBCL is widely used and validated measure (Achenbach, 1999; Achenbach & Ruffle, 2000). Studies have shown the concurrent validity of its DSM-oriented scales with clinical judgment (Dutra, Campbell, & Westen, 2004; Ebesutani et al., 2010; Garrison & Earls, 1985; Nakamura, Ebesutani, Bernstein, & Chorpita, 2009), many studies have confirmed the factor structure of the measure (Dedrick, Greenbaum, Friedman, & Wetherington, 1997; Konold, Walthall, & Pianta, 2004; Macmann et al., 1992), and the measure has been validated in numerous cultures and languages.

Things I Do” - Adolescent Reported Own Risky Behavior

This adolescent-reported risky behavior scale was developed for use in the NIHCD SECCYD study. At age 15, children were asked about the frequency with which they engage in risk-taking behavior. The measure contains 61 items that are divided into two sub scales: Any risk-taking by study child and sexual risk by study child. All of these items (1-55) are recorded using a three point response scale where 0=“Not at all”, 1=“Once or twice” and 2=“More than twice”. The remaining items (56-59) are

frequency counts for the occurrence of drug and sexually related behavior (i.e., how many sexual partners have you had in your entire life) and these counts are not included in the composite scores but they can be used separately. There are also two questions, 60a and 60b, that ask about the frequency of smoking cigarettes. The items in the total score demonstrate high internal consistency ($\alpha = 0.89$) and the 2 items making up the sexually related behavior sub-scale had good internal consistency ($\alpha = 0.73$).

Student-teacher Relationship Scale: Short Form (STRS-SF) (Pianta, 2001)

The STRS-SF is a 15-item measure of the quality of the student-teacher relationship. Teachers were asked to fill out this form when children were in first through fifth grade. The 15 items ask teachers about their relationship with the children and they can respond on a five-point Likert scale where answers range from 1 = “Definitely does not apply” to 5 = “Definitely applies.” The STRS-SF contains three subscales: teacher conflict with child (e.g., “This child and I always seem to be struggling with each other”), teacher closeness with child (e.g., “This child values his/her relationship with me”), and teacher total positive relationship with child. The current study will use the composite scores from the teacher closeness with child subscale. Teacher closeness with child is computed as a weighted sum score from items 1, 3, 4 (reflected), 5, 6, 7, 9, and 15 (e.g., “I share an affectionate, warm relationship with this child.”) There is a possible range of 8 to 40, where higher scores indicate higher levels of closeness in the student-teacher relationship. The items in this score demonstrate high internal consistency ($\alpha = 0.85$).

RESULTS

In order to answer the aforementioned research questions, a series of models in Structural Equation Modeling (SEM) were run. SEM has several advantages over traditional OLS regression techniques. First, it is possible to model theory in an explicit way. The purpose of OLS is to predict, whereas SEM tests the pathways within the model and the focus is on the structure of the data. Second, it is possible to create latent constructs, which deal with unmeasured or unseen constructs that are supposedly represented by the data. In the first step to answer my questions, I ran a series of factor analyses (both confirmatory and exploratory) to determine the factor structure of the data. Then, to answer all remaining questions, all continuous variables were mean-centered to help avoid problems with multicollinearity. Using Onyx and Mplus software, the structural models were evaluated based on the overall fit of the models in addition to the significance of the factor loadings for all the SEM models. All of the models have saturated paths. In other words, all predictors are correlated, all predictors predict the outcome, and all the outcomes are correlated. This results in no degrees of freedom available for model fit tests which is analogous to regression. Therefore, all models below are saturated and have perfect fit. Descriptive statistics were calculated for each of the predictors and covariates, and outcomes (Table 2).

Table 2 Descriptive Statistics for all variables

	N	Min.	Max	Mean	SD	Skew	S.E.
Child's Gender (1=M, 0=F)	1364	0	1	0.5	0.5	-0.1	0.07
Income-to-Needs Ratio (1 month)	1273	0	25	2.9	2.6	2.5	0.07
Income-to-Needs Ratio (grade 3)	982	0	27	4.4	3.8	2.5	0.08
Income-to-Needs Ratio (grade 5)	996	0	29	4.5	4.1	2.5	0.08
Externalizing behavior (grade 3)	1026	0	36	7.4	6.3	1.2	0.08
Delinquent behavior (grade 3)	1026	0	10	1.1	1.4	1.8	0.08
Aggressive behavior (grade 3)	1026	0	29	6.3	5.3	1.1	0.08
Externalizing behavior (grade 5)	1017	0	39	6.6	6.3	1.5	0.08
Delinquent behavior (grade 5)	1017	0	15	1.1	1.5	2.7	0.08
Aggressive behavior (grade 5)	1017	0	30	5.5	5.2	1.4	0.08
Total Risk-Taking score	957	0	55	6.1	5.7	2.2	0.08
Factor 1: Risky Behavior	956	0	31	2.3	3.4	2.6	0.08
Factor 2: Victimization	956	0	16	1.3	1.8	2.5	0.08
Factor 3: dating violence	951	0	3	0.2	0.5	2.9	0.08
Factor 4: sexual activity	947	0	4	0.3	0.8	2.8	0.08
Closeness (grade 3)	977	15	40	33.1	5.2	-1.0	0.08
Closeness (grade 5)	927	14	40	31.9	5.4	-0.7	0.08

Research Question 1

This question asked, what is the factor structure of the risk-taking behavior measure? In order to answer research question 5, a factor analysis was conducted to determine the structure of the data. Each factor analysis was run with t-scores. Although the measure contains 61 items, there were 59 items (1-59) that were transformed into t-scores because of the nature of the remaining questions, so only these 59 items were used in the analyses.

Based on the PCA that was conducted in the original data management conducted by NICHD, the risk-taking measure is currently organized into two subcategories of risk: any risk-taking, and sexual risk-taking behaviors. Essentially, there is an overall score that accounts for all items, and then it is possible to create a sub score that only accounts for sexually related behavior. My prediction was that there are more nuanced subscales of type of risk. The measure itself contains items that cover a range of risk-taking behaviors that are qualitatively distinct, and the aim was to see if there is quantitative evidence to support this.

Confirmatory Factor Analysis

The current structure of the “*Things I do*” measure contains 2 factors. Based on the content of the items, the initial hypothesis was that there is actually a 3-factor structure that includes sexual risk-taking, aggressive behavior, and delinquent acts. Using Onyx software version 1.0-937 (von Oertzen, Brandmaier, & Tsang, 2015), a confirmatory factor analysis was conducted to assess the hypothesized structure of the data. Onyx is a free, open source software program for SEM, and we decided to use it because mapping the items onto the factors creates the models, making it user friendly and visually appealing. The model that was run had three factors, and items were loaded onto each factor based on their face value (see table 3).

Table 3 Hypothesized three-factor structure of “Things I do” measure

Aggressive behavior	Delinquent behavior	Sexual activity
6. Threaten to beat someone up	8. Been a member of a gang	52. Had oral sex
7. Taken part in a gang fight	9. Sold drugs	55. Told by a doctor or nurse you had an STD
10. Threatened by someone with weapon	11. Been beaten up, mugged	53. Had sexual intercourse
12. Been injured by any weapon	21. Someone steal your property	54. Got pregnant or got a girl pregnant
13. Been shot at	26. Been on probation	56. # of partners oral sex in entire life
14. Shouted at or made fun of by a date	27. Been in juvenile detention	57. # of partners oral sex in the last 30 days
15. Physically hurt by a date	31. Been suspended from school	58. # of partners sexual intercourse in entire life
16. Forced to have sex by a date	33. Vandalized property/graffiti	59. # of partners sexual intercourse in last 30 days
17. Harassed because of race	34. Stolen something w/ out a weapon	
18. Harassed because of sex. orientation	35. Stolen something w/ a weapon	
19. Harassed because of disability	39. Been arrested	
20. Harassed because of gender	40. Skipped school w/ out permission	
22. Had friends shot at	41. Purposely set a fire	
23. Had relatives shot at	42. Hurt and animal on purpose	
24. Fired a gun	43. Smoked cigarette/used tobacco	
25. Attacked someone to hurt	44. Drunk a bottle/glass of alcohol	
28. Been injured from fight	45. Used or smoked marijuana	
29. Been in fight between kids	46. Taken something worth a lot	
30. Used weapon to threaten	47. Taken something worth a little	
32. Carried a hidden weapon	48. Gotten into a place w/ out paying	
36. Threaten attack w/ weapon	49. Run away from home	
37. Beat up someone w/ out weapon	50. Broke into a building	

38. Beat up someone w/
weapon

51. Purposely damaged property

1. Ridden car w/out seatbelt
 2. Ridden bike without helmet
 3. Driven car w/out seatbelt
 4. Ridden motorcycle w/o helmet
 5. Done something dangerous dare
-

Factor one was aggressive behavior, which included those items where students endorsed engaging in overt acts of violence or aggressions. This factor included loadings for 23 items. The second factor was sexually deviant behavior and included 8 items, which were chosen, based on content regarding sexual behavior. The third and last factor included all other items on the measure that did not fall into either of the theoretical constructs of aggressive or sexual behavior. This last factor was named delinquent behavior, since it included items that dealt with other risky or deviant behaviors (see table 3) that did not include overt aggression or sexual behaviors. A total of 28 items were loaded onto this factor.

All factor-loading paths were freed in order to estimate factor loadings. In addition, the three factors were correlated and those parameters were freed as well. The analysis of the model converged and our estimations indicated a CFI of .56 and other fit indices included a RMSEA of .07, SRMR of 0.07, and a TLI of 0.54. An acceptable model fit requires a CFI greater than or equal to 0.9 (Hu & Bentler, 1999). The fit of our model was 0.5, which is well below this standard of good fit. The ill-fitting nature of our

three-factor structure suggests that the initial hypothesis regarding the factor structure cannot be supported by the data.

Exploratory Factor Analysis

Using Exploratory Factor Analysis, models were tested to determine the appropriate number of factors and loadings for the measure. An exploratory factor analysis was conducted through a series of steps in SPSS. The first stage was to run the EFA in SPSS to determine the optimal number of factors. In this first analysis, 10 factors produced Eigenvalues of 1 or more. Items 1-5, which captured very minor instances of risk taking (e.g., "doesn't wear a seatbelt"), did not load onto any factors, so they were excluded. Visual inspection of the SPSS Scree plot output indicated a plateau after either 3 or 4 factors. Based on these findings, two additional EFA's using Unweighted Least Squares, which is the most appropriate for non-normal data, extraction method were tested – one with 3 specified factors, and one with 4 specified factors. Both models yielded a simple structure that was easy to interpret where items loaded cleanly (close to one or close to zero). The four-factor structure was chosen because of the fourth factor captured the frequency of sexual activity, which was theoretically relevant to the research questions. Table 1 compares the relative fit of both the 3 and 4-factor structure. Altogether, these four factors accounted for 81.3% of the variance

Table 4 Internal consistency of 3- and 4 – factor structures

	Number of Items (Item numbers)	alpha
<i>3 factor structure</i>		
Factor 1	28 (6-13, 17-36)	0.98
Factor 2	23 (37-59)	0.91
Factor 3	3 (14-16)	0.97
<i>4 Factor structure</i>		
Factor 1	34 (25-55)	0.97
Factor 2	16 (6-13, 17-24)	0.97
Factor 3	3 (14-16)	0.97
Factor 4	4 (56-59)	0.78

A total score was also created from the items that loaded onto the factors, items 6-59. The internal consistency was calculated for each factor. Table 2 lists which items loaded onto each factor.

Factor 1 – Risky behavior. Thirty-four items (items 25-55) loaded onto Factor 1. Factor loadings ranged from 0.45 to 0.93, and the internal consistency was high. All of the items also cross-loaded onto the second factor, however the factor loadings were low (less than .22), so they were deemed most appropriate for factor 1. All of the items on this factor dealt with overt aggression (e.g., “In the past year have you attacked someone to hurt them”), delinquent acts (e.g., In the past year have you purposefully damaged property), or risky sexual behavior (e.g., “In the past year have you been told by a doctor/nurse that you had an STD”). Three items were directly related to contact with the juvenile justice system such as “In the past year, have you been in Juvenile detention”,

and one item described trouble with the school system “In the past year, have you been suspended from school.” Three items were related to drug and alcohol use (items 43-45) and two of the items were in line with behavior definitions of conduct disorder – “In the past year have you purposely set a fire” and “In the past year have you hurt and animal on purpose.” The remaining items were related to delinquency, some of the items described illegal acts (e.g., “In the past year, have you stolen something with a weapon”) and some were socially delinquent behaviors such as status offenses (e.g., “In the past year, have you run away from home”).

Factor 2 – Victimization. A total of 16 items (6-13 and 17-24) loaded onto the second factor with factor loadings ranging from .40 to .73. All of the items also cross-loaded onto the first factor. The factors loadings fell between .35 and .64, however, upon inspection every item had a higher factor loading for factor 2. Eleven out of the 16 items contained content related to be a victim of a crime such as “In the past year have you been beaten up.” The other remaining items had to do with overt acts of violence by the adolescents – two of the items described gang activity, and the three remaining items were (1) threatening behavior, (2) shooting a gun, and (3) selling drugs. Although these items – at their face value – had more to do with actions of the participant instead of being a victim, the decision was made to include them. This decision was made because there is a theoretical argument that these items are specific to gang related activity, which has elements of victimization and therefore they do indeed fit in this factor. Internal consistency was high for the 16 items.

Factor 3 – Dating violence. In both the three and four-factor extraction, three items (14,15, and 16) that addressed issues of dating violence loaded onto an independent factor. These three items describe instances of verbal, physical, and sexual violence at the hand of a date (e.g., “In the past year, have you been forced to have sex with a date”). The three items had factor loadings between 0.67 and 0.87, and high internal consistency of $\alpha = 0.97$.

Factor 4 – Sexual activity. The four items that loaded on to the fourth factor are in regard to the frequency of sexual activity. There are a total of 8 items on the measure that ask participants about sexual activity. The first four items (52-55), which loaded onto factor 1, asked about sexual activity within the past year and are measured on a Likert scale like the rest of the previous items. The other four items (56-59), which make up factor 4, are also sexual in nature but they are free response where participants can enter the number of sexual partners they have had in the last 6 months and in their entire life. Items 56 and 57 asked about the number of oral sex partners in their entire life and in the last 6 months, respectively. Item 58 and 59 asked about the number of sexual intercourse partners in their entire life and in the last 6 months, respectively. The factor loadings for the four items ranged from 0.43 to 0.56, and the internal consistency was moderately high.

Table 5 Factor structure of “Things I do”

Factor 1 (44.5%)

- 25. Attacked someone to hurt
- 26. Been on probation
- 27. Been in juvenile detention
- 28. Been injured from fight
- 29. Been in fight between kids
- 30. Used weapon to threaten
- 31. Been suspended from school
- 32. Carried a hidden weapon
- 33. Vandalized property/graffiti
- 34. Stolen something w/ out a weapon
- 35. Stolen something w/ a weapon
- 36. Threaten attack w/ weapon
- 37. Beat up someone w/ out weapon
- 38. Beat up someone w/ weapon
- 39. Been arrested
- 40. Skipped school w/ out permission
- 41. Purposely set a fire
- 42. Hurt and animal on purpose
- 43. Smoked cigarette/used tobacco
- 44. Drunk a bottle/glass of alcohol
- 45. Used or smoked marijuana
- 46. Taken something worth a lot
- 47. Taken something worth a little
- 48. Gotten into a place w/ out paying
- 49. Run away from home
- 50. Broke into a building

- 51. Purposely damaged property

- 55. Told by a doctor or nurse you had an STD
- 53. Had sexual intercourse
- 54. Got pregnant or got a girl pregnant
- 52. Had oral sex

Factor 2 (27.8%)

- 10. Threatened by someone with weapon
- 11. Been beaten up, mugged
- 12. Been injured by any weapon
- 13. Been shot at
- 17. Harassed because of race
- 18. Harassed because of sexual orientation
- 19. Harassed because of disability
- 20. Harassed because of gender
- 21. Someone steal your property
- 22. Had friends shot at
- 23. Had relatives shot at
- 6. Threaten to beat someone up
- 7. Taken part in a gang fight
- 8. Been a member of a gang
- 9. Sold drugs
- 24. Fired a gun

Factor 3 (4.6%)

- 14. Shouted at or made fun of by a date
- 15. Physically hurt by a date
- 16. Forced to have sex by a date

Factor 4 (4.4%)

- 56. # of partners oral sex in entire life
- 57. # of partners oral sex in the last 30 days
- 58. # of partners sexual intercourse in entire life
- 59. # of partners sexual intercourse in the last 30 days

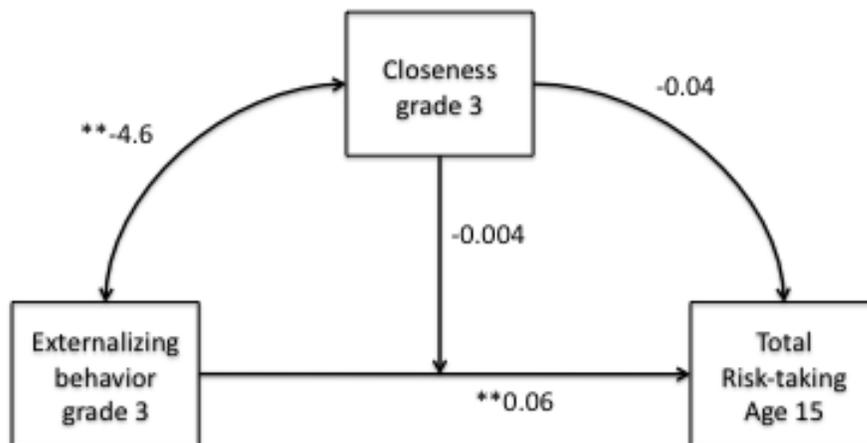
In summary, while our initial hypothesis was not confirmed through the CFA, the use of an EFA revealed four socially significant factors of risk-taking. The items that loaded onto each factor also fit together theoretically, giving our subsequent research questions both quantitative and theoretical relevance. Through this factor structure, we can determine the unique variance that contributes to various types of risk-taking, narrowing our definition of risk and providing more specific interpretations as to how externalizing behavior contributes to risk-taking.

Research Question 2

This question asked whether student–teacher relationships characterized by high levels of closeness in third grade are particularly important for children with high levels of externalizing behavior in third grade for preventing later risk-taking behaviors at age 15. In order to answer this question, a model was constructed that included the main effects of 3rd grade closeness and 3rd grade externalizing behavior as well as the interaction between closeness (third) and externalizing behavior (third). The variables were used to predict total risk-taking behavior at age 15. The covariates entered into the model were income to needs ratio in 3rd grade, maternal education, and gender.

I expected that children who have high levels of externalizing behavior, but who have a closer relationship with their teacher in third grade would have disproportionately less risk-taking behavior at age 15. I also expected that higher closeness and lower externalizing behaviors would be related to fewer risk-taking behaviors. As shown in Figure 1, the analysis indicates that 3rd grade externalizing behavior predicts higher levels of total risk-taking behavior at age 15. There was no main effect for 3rd grade closeness

and the interaction between 3rd grade closeness and 3rd grade externalizing behavior was not significant. Therefore, the hypotheses were not supported, and this suggests that closeness is not a protective factor in third grade. It should also be noted, however, that both gender ($b = 1.4, p < .001$) and income to needs ($b = -0.2, p < .001$) were significant predictors of total risk-taking. In this case, being male predicted high rates of total risk-taking and adolescents from lower income families were more likely to engage in risk-taking. This indicates that there is a pathway between externalizing behavior and risk-taking.



Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 1 Research Question 2, model 1 predicting total-risk taking score at age 15

In order to answer the second part of question 2, looking at the four factors of risky behavior, the model was also run with the same predictors, where the outcome was each of the four identified factors, i.e., Risky behavior, Victimization, Dating violence, and Sexual Activity. Factor 4, regarding sexual activity was treated differently, because the distribution of responses were heavily inflated by responses of “0.” A negative binomial regression was used to account for the distribution of these data. In a negative binomial regression, the responses are divided into two membership groups, either 0 or more than zero, and separate estimates are made. In this type of regression, the predictors predict membership in the zero-inflated group, as well as a separate analysis predicting membership for those with non-zero scores. This results in two outputs for factor four – one for the zero group, and one for the distribution of non-zero scores.

For the first factor, the outcome was risky behavior and 3rd grade externalizing behavior significantly predicted higher levels of risky behavior at age 15 (Table 6). For the second factor, higher rates of 3rd grade externalizing behavior also predicted later victimization. Gender and income-to-needs ratio also had significant main effects for both risky behavior and victimization where being male and coming from lower income families made adolescent more likely to engage in risky behavior and to be victimized. Dating violence (factor 3) had no significant main effects for any of the predictors or covariates. Lastly, for factor 4 (sexual activity), membership for the zero-inflated group was significantly predicted by high levels of closeness in 3rd grade, and by more years of maternal education ($b = 0.2, p < .01$). Membership in the count model was not significantly predicted by any of the model predictors. Overall, this tells us that there is a

pathway between externalizing behavior and risk-taking and that closeness acts as a protective factor for certain types of risk.

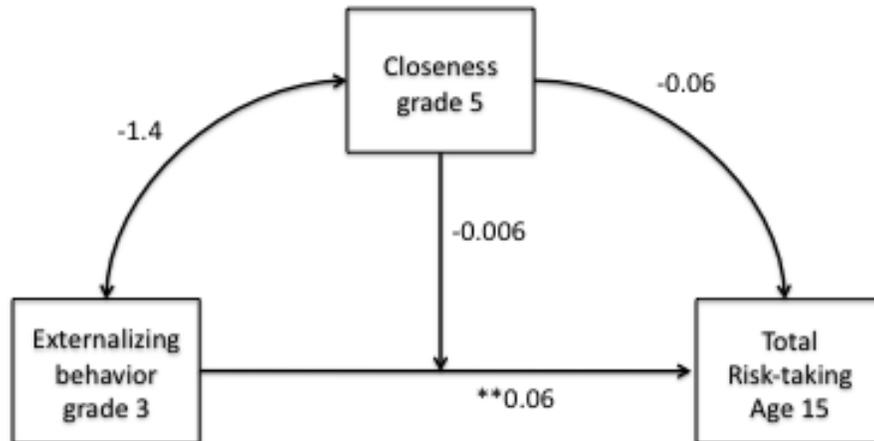
Table 6 Results of Model 2 predicting the four factors of risk-taking

Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Externalizing behavior in 3 rd grade	0.05	0.02	0.003
Closeness in 3 rd grade	-0.04	.03	.13
Interaction	-0.003	.003	.4
Victimization (Factor 2)			
Externalizing behavior in 3 rd grade	.02	.008	.007
Closeness in 3 rd grade	.002	.014	.9
Interaction	-.003	.002	.13
Dating Violence (Factor 3)			
Externalizing behavior in 3 rd grade	.002	.002	.3
Closeness in 3 rd grade	.002	.003	.5
Interaction	.00	.00	.7
Sexual activity (factor 4)			
Externalizing behavior in 3 rd grade	-.011	.008	.2
Closeness in 3 rd grade	.008	.013	.5
Interaction	-.001	.001	.2
Sexual activity – Zero group			
Externalizing behavior in 3 rd grade	-.02	.013	.2
Closeness in 3 rd grade	.04	.01	.000
Interaction	-.001	.002	.5

Research Question 3

This question asks whether student–teacher relationship characterized by high levels of closeness in 5th grade are particularly important for children with high levels of externalizing behavior in 3rd grade for preventing later risk-taking behaviors at age 15? To answer this question, a model that includes the main effects of closeness (fifth) and externalizing behavior (third) as well as the interaction between closeness (fifth) and externalizing behavior (third) was evaluated. The outcome variable is the total score of risk-taking behaviors at age 15. The covariates are income to needs ratio in 3rd and 5th grade, maternal education, and gender.

I expected that children who have high levels of externalizing behavior, but who have a closer relationship with their teacher in fifth grade would have disproportionately less risk-taking behavior at age 15. Similar to findings from research question 2, as shown in Figure 2, the analysis indicates that 3rd grade externalizing behavior predicts higher levels of total risk-taking behavior at age 15. In addition, the main effect of 5th grade closeness approached significance ($b = -0.06, p < .09$) where the direction of the coefficient indicates that higher levels of closeness were associated with lower levels of risk-taking. The interaction between 5th grade closeness and 3rd grade externalizing behavior was not significant, and therefore the hypothesis cannot be fully supported, suggesting that closeness in 5th grade is not especially important for children with externalizing behavior. The covariate, gender, also had a significant main effect on total risk-taking at age 15 ($b = 1.4, p < .001$), where being male predicted high rates of total risk-taking. These findings indicate that there is a pathway between externalizing behavior and later risk-taking.



Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2 Research Question 3, model 3 predicting total-risk taking score at age 15

In order to answer the second part of question 3, looking at the four factors of risky behavior, the model was also run where the outcome was each of the four identified factors, i.e., Victimization, Risky behavior, Dating violence, and Sexual Activity. Third grade externalizing behavior predicted higher rates of risky behavior and 5th grade closeness significantly predicted lower levels of Risky behavior. There was also a main effect for gender ($b = 0.7, p < .01$) where being male predicted higher rates of risky

behavior. For Victimization, there was a significant main effect for 3rd grade externalizing behavior, as well as 3rd grade income-to-needs ratio ($b = -0.05, p < .05$) and gender ($b = 0.6, p < .001$). Third grade externalizing behavior predicted higher rates of victimization, as did lower income, and being male. Dating violence (factor 3) had no significant main effects for any of the predictors or covariates. Lastly, for sexual activity, membership for the zero-inflated group was significantly predicted by high levels of closeness in 3rd grade and more years of maternal education ($b = 0.2, p < .01$). Membership in the count model was not significantly predicted by any of the model predictors or covariates. Overall, this indicates that there is a pathway between externalizing behavior and risk-taking and that closeness in 5th grade acts as a protective factor for multiple types of risk

Table 7 Results of Model 4 predicting the four factors of risk-taking

Variable	Coefficient b	S.E.	p-value
Risky behavior (Factor 1)			
Externalizing behavior in 3 rd grade	.05	.015	.002
Closeness in 5 th grade	-.05	.021	.03
Interaction	-.003	.003	.3
Victimization (Factor 2)			
Externalizing behavior in 3 rd grade	.02	.008	.008
Closeness in 5 th grade	-.01	.01	.3
Interaction	-.002	.002	.13
Dating Violence (Factor 3)			
Externalizing behavior in 3 rd grade	.002	.98	.3
Closeness in 5 th grade	.001	.003	.8
Interaction	.00	.00	.5
Sexual activity (factor 4)			

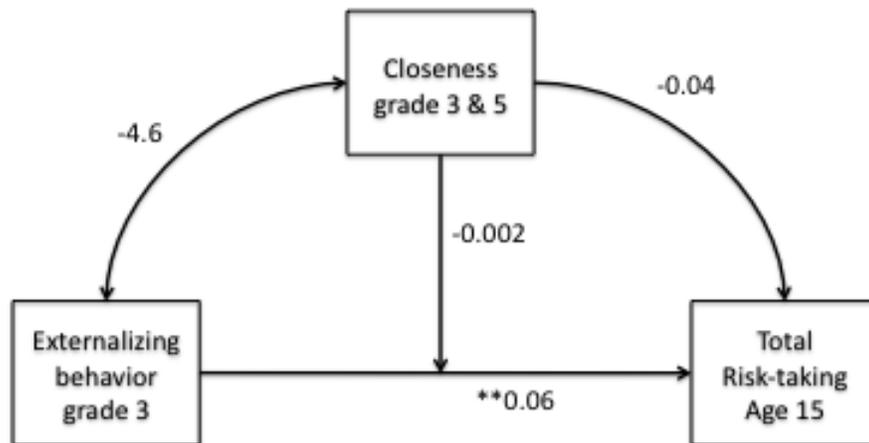
Externalizing behavior in 3 rd grade	-.01	-1.2	.24
Closeness in 5 th grade	.024	.016	.14
Interaction	.002	.002	.3
<hr/>			
Sexual activity – Zero group			
Externalizing behavior in 3 rd grade	-.02	.01	.2
Closeness in 5 th grade	.027	.01	.01
Interaction	.00	.003	.9

Research Question 4

Question 4 asked if the combined effect of having a student–teacher relationship characterized by high levels of closeness in 3rd and 5th grade would act as a moderator of the relationship between externalizing behavior and later risk–taking? To answer this question, a model was constructed that includes the main effects of closeness in 3rd grade plus closeness in 5th grade, and externalizing behavior (third) as well as the interactions between combined closeness (third and fifth) and externalizing behavior (third). The outcome variable is total risk-taking behaviors at age 15. The covariates are income to needs ratio in 3rd and 5th grade, maternal education, and gender.

I expected that children who have high levels of externalizing behavior, but who have a closer relationship with their teacher in both third and fifth grade would have disproportionately less risk-taking behavior at age 15 than those who either who have a student–teacher relationship characterized by low levels of closeness in one or both grades. I expected that those students who had consistently positive relationships with their teachers across grades 3 and 5 would have less risk-taking behaviors at age 15. As shown in Figure 3, the analysis indicates that 3rd grade externalizing behavior predicts higher rates of total risk-taking behavior at age 15. The main effect of 3rd and 5th grade

closeness and the interaction between 5th grade closeness and 3rd grade externalizing behavior were not significant, and therefore the hypothesis cannot be fully supported suggesting that combined closeness is not especially important for children with externalizing behavior. The covariate, gender, also had a significant main effect on total risk-taking at age 15 ($b = 1.3, p < .001$) indicating that males are more likely to engage in risk-taking. In summary, these findings illustrate again that there is a pathway between externalizing behavior and later risk-taking.



Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 3 Research Question 4, model 5 predicting total-risk taking score at age 15

In order to answer the second part of question 4, looking at the four factors of risky behavior, the model was also run where the outcome was each of the four identified factors, i.e., Victimization, Risky behavior, Dating violence, and Sexual Activity. Third grade externalizing behavior predicted higher rates of risky behavior and the combined grade closeness significantly predicted lower levels of Risky behavior (shown in table 8). There was also a main effect for gender ($b = 0.6, p < .01$) where being male predicted higher rates of risky behavior. For Victimization, there was a significant main effect where 3rd grade externalizing behavior predicted more incidences of victimization, as did 3rd grade income-to-needs ratio ($b = -0.05, p < .05$) and being male ($b = 0.6, p < .001$). Dating violence had no significant main effects for any of the predictors or covariates. Lastly, for sexual activity, membership for the zero-inflated group was significantly predicted by combined levels of closeness in 3rd and 5th grade as well as more years of maternal education ($b = 0.2, p < .01$). Lastly, membership in the count model (the true distribution of non-zero scores) was significantly predicted by income-to-needs ratio in 3rd grade ($b = -.07, p < .05$), meaning that lower incomes predicted more sexual activity. These findings indicate that there is a pathway between externalizing behavior and later risk-taking that closeness acts as a protective factor for certain types of risk-taking.

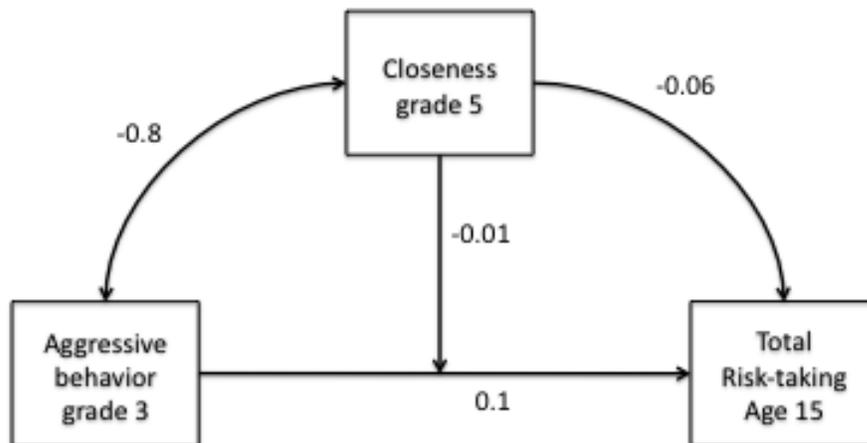
Table 8 Results of Model 6 predicting the four factors of risk-taking

Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Externalizing behavior in 3 rd grade	.05	.02	.003
Closeness in 3 rd /5 th grade	-.04	.02	.04
Interaction	-.001	.002	.5
Victimization (Factor 2)			
Externalizing behavior in 3 rd grade	.02	.008	.01
Closeness in 3 rd /5 th grade	-.005	.009	.6
Interaction	-.001	.001	.3
Dating Violence (Factor 3)			
Externalizing behavior in 3 rd grade	.002	.002	.3
Closeness in 3 rd /5 th grade	.002	.002	.4
Interaction	.00	.00	.9
Sexual activity (factor 4)			
Externalizing behavior in 3 rd grade	-.009	.008	.3
Closeness in 3 rd /5 th grade	.01	.009	.3
Interaction	.00	.001	.9
Sexual activity – Zero group			
Externalizing behavior in 3 rd grade	-.01	.01	.3
Closeness in 3 rd /5 th grade	.02	.006	.002
Interaction	-.001	.002	.7

Research Question 5

This question asked, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with different kinds of externalizing behavior? Specifically, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children high levels of aggressive behavior in 3rd grade for preventing later risk-taking behaviors at age 15? The outcome variable is the total score of later risk-taking behaviors at age 15. The covariates were gender, maternal education, and income to needs ratios in 3rd and 5th grades.

The aim of questions 5 and 6 were to determine if either of the subtypes of externalizing behavior contributed more to risk-taking behavior at age 15. The externalizing behavior scale is a composite score of two subscales: aggressive behavior and delinquent behavior. To answer question 5, the sub-score of Aggressive behavior from the CBLC was used as a predictor, along with closeness in 5th grade. A model was created (figure 4) that includes the main effects of closeness in fifth grade, and aggressive behavior in third grade as well as the interaction between 5th grade closeness and aggression. I expected that children who have high levels of aggressive behavior, but who have a closer relationship with their teacher in fifth grade would have disproportionately less risk-taking behavior at age 15 than those who either have a student-teacher relationship characterized by low levels of closeness.



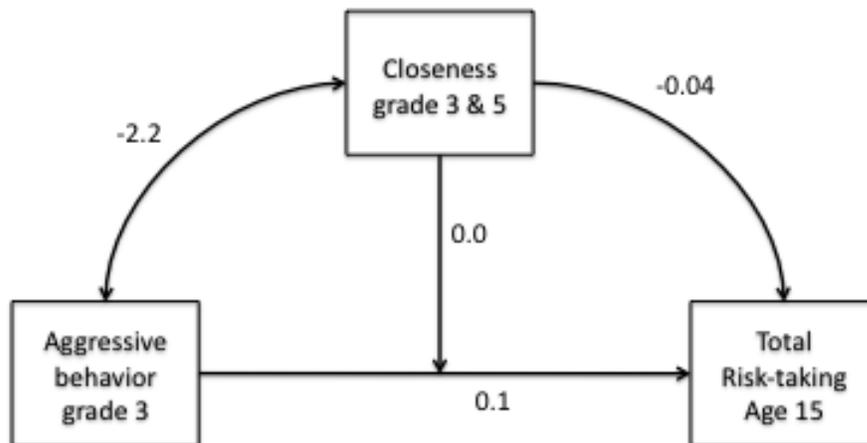
Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. *p<.05, **p<.01, ***p<.001

Figure 4 Research Question 5, model 7 predicting total-risk taking score at age 15

As shown in Figure 4, the analysis indicates that the main effect of 3rd grade aggressive behavior approaches significance to predict higher levels of total risk-taking behavior at age 15. The main effect of 5th grade closeness and the interaction between 5th grade closeness and 3rd grade externalizing behavior were not significant, and therefore the hypothesis cannot be fully supported, suggesting that closeness in 5th grade is not especially important for children with aggressive behavior. The covariate, gender, had a

significant main effect on total risk-taking at age 15 ($b = 1.4, p < .001$) where being male predicted higher rates of risk-taking.

In addition, another model was run that used the combined closeness score from 3rd and 5th grade (see figure 5), because in previous analyses this combined predictor had a significant main effect on risky behavior (see table 8). I expected that children who have high levels of aggressive behavior, but who have a closer relationship with their teacher in both third and fifth grade would have disproportionately less risk-taking behavior at age 15 than those who either who have a student-teacher relationship characterized by low levels of closeness in one or both grades. As shown in Figure 5, in this analysis, the main effect of 3rd grade aggressive behavior approaches significance to predict higher levels of total risk-taking behavior at age 15, ($b = 0.1, p < .06$). The main effect of the combined grade closeness and the interaction between combined closeness and 3rd grade aggressive behaviors were not significant, and therefore the hypothesis cannot be fully supported. The covariate, gender, had a significant main effect on total risk-taking at age 15 ($b = 1.3, p < .001$). These findings indicate that aggressive behavior does not contribute any unique variance to later risk taking behavior.



Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. *p<.05, **p<.01, ***p<.001

Figure 5 Research Question 5, model 8 predicting total-risk taking score at age 15

In order to answer the second part of question 5, looking at the four factors of risky behavior, two additional models were also run where the outcome was each of the four identified factors, i.e., Victimization, Risky behavior, Dating violence, and Sexual Activity. In this case, the first model included closeness at 5th grade, and the second used the combined score for closeness in 3rd and 5th grade. Both of the models included aggressive behavior in 3rd grade, as well as the interaction between closeness and

aggressive behavior. The covariates were gender, maternal education, and income to needs ratio in 3rd and 5th grade.

As shown in Table 9, the analysis reveals that 3rd grade aggressive behavior has a significant main effect predicting higher scores on the risky behavior factor in both models. In the first model, 5th grade closeness had a significant main effect predicting lower scores of risky behavior. In addition, there was a main effect for gender ($b = 0.7$, $p < .01$) where being male predicted higher rates of risky behavior. There was a main effect which approached significance for 3rd grade aggressive behavior predicting victimization. In addition, 3rd grade income-to-needs ratio ($b = -0.05$, $p < .05$) and being male ($b = 0.6$, $p < .001$) predicted higher victimization. Dating violence had no significant main effects for any of the predictors or covariates. Lastly, for sexual activity, membership for the zero-inflated group was significantly predicted by higher levels of closeness in 5th grade and more years of maternal education ($b = 0.2$, $p < .01$). Membership in the count model was not significantly predicted by any of the predictors or covariates.

Table 9 Results of Model 9 predicting the four factors of risk-taking

Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Aggressive behavior in 3 rd grade	.09	.04	.01
Closeness in 5 th grade	-.05	.04	.03
Interaction	-.005	.008	.5
Victimization (Factor 2)			
Aggressive behavior in 3 rd grade	.04	.02	.06

Closeness in 5 th grade	-.01	.01	.3
Interaction	-.004	.004	.4
<hr/>			
Dating Violence (Factor 3)			
Aggressive behavior in 3 rd grade	.005	.004	.2
Closeness in 5 th grade	.001	.003	.8
Interaction	-.001	.001	.5
<hr/>			
Sexual activity (factor 4)			
Aggressive behavior in 3 rd grade	-.02	.03	.5
Closeness in 5 th grade	.03	.02	.1
Interaction	.004	.005	.4
<hr/>			
Sexual activity – Zero group			
Aggressive behavior in 3 rd grade	-.02	.03	.6
Closeness in 5 th grade	.03	.01	.04
Interaction	-.001	.007	.9

Similarly, in the second model (table 10) the combined grade closeness had significant main effects predicting lower scores of risky behavior. There was also a main effect for gender ($b = 0.6, p < .01$) where males were more likely to engage in risky behavior. For Victimization, there was a main effect approaching significance for higher 3rd grade aggressive behavior ($b = 0.04, p < .06$). In addition, 3rd grade income-to-needs ratio ($b = -0.05, p < .05$) and male gender ($b = 0.7, p < .001$) predicted higher rates of victimization. Dating violence had no significant main effects for any of the predictors or covariates. Lastly, for sexual activity, membership for the zero-inflated group was not significantly predicted by any of the predictors, however the coefficient for maternal education approached significance ($b = 0.2, p < .06$). Membership in the count model was not significantly predicted by any of the predictors or covariates. Overall, models 9 and 10 (see table 9 and 10, respectively) indicate that there is a pathway between aggressive

behavior and some risk-taking behaviors and that closeness acts as a protective factor for certain types of risk.

Table 10 Results of Model 10 predicting the four factors of risk-taking

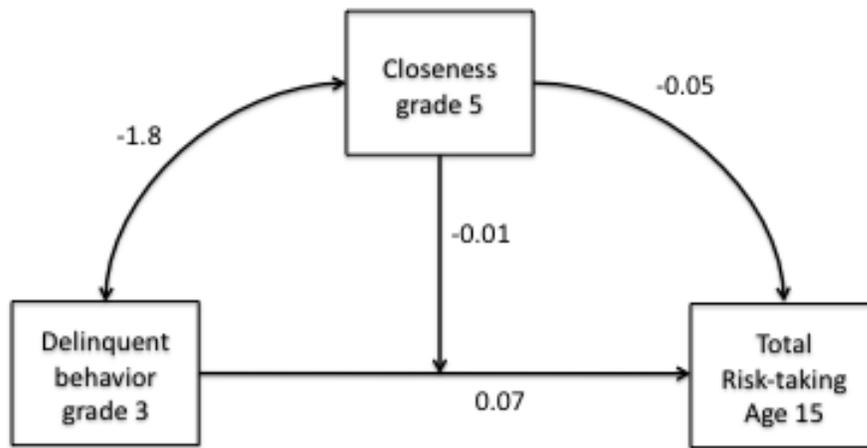
Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Aggressive behavior in 3 rd grade	.09	.04	.017
Closeness in 3 rd /5 th grade	-.03	.02	.047
Interaction	.00	.005	.96
Victimization (Factor 2)			
Aggressive behavior in 3 rd grade	.04	.02	.06
Closeness in 3 rd /5 th grade	-.004	.009	.7
Interaction	-.001	.003	.9
Dating Violence (Factor 3)			
Aggressive behavior in 3 rd grade	.005	.004	.2
Closeness in 3 rd /5 th grade	.002	.002	.4
Interaction	.00	.00	.97
Sexual activity (factor 4)			
Aggressive behavior in 3 rd grade	-.012	.09	.9
Closeness in 3 rd /5 th grade	.01	.03	.7
Interaction	.00	.00	.99
Sexual activity – Zero group			
Aggressive behavior in 3 rd grade	-0.06	.1	.96
Closeness in 3 rd /5 th grade	.02	.05	.7
Interaction	-.002	.01	.8

Research Question 6

This question asked, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with different kinds of

externalizing behavior. Specifically, are student–teacher relationships characterized by high levels of closeness in 5th grade particularly important for children with high levels of delinquent behavior (according to the CBCL) in 3rd grade for preventing later risk-taking behaviors at age 15? The outcome variable is the total score of later risk-taking behaviors at age 15. The covariates were gender, maternal education, and income to needs ratios in 3rd and 5th grades.

I expected that children who have high levels of delinquent behavior in 3rd grade, but who have a closer relationship with their teacher in fifth grade would have disproportionately less risk-taking behavior at age 15 than those who either who have a student–teacher relationship characterized by low levels of closeness. As shown in Figure 6, the analysis indicates that there was no main effect of 3rd grade delinquent behavior on total risk-taking behavior at age 15. The main effect of 5th grade closeness and the interaction between 5th grade closeness and 3rd grade externalizing behavior were also not significant, and therefore the hypothesis cannot be supported, suggesting that delinquent behavior does not predict overall risk and that closeness in 5th grade is not especially important for children with delinquent behavior. The covariate, male gender, had a significant main effect on total risk-taking at age 15 ($b = 1.3, p < .001$).

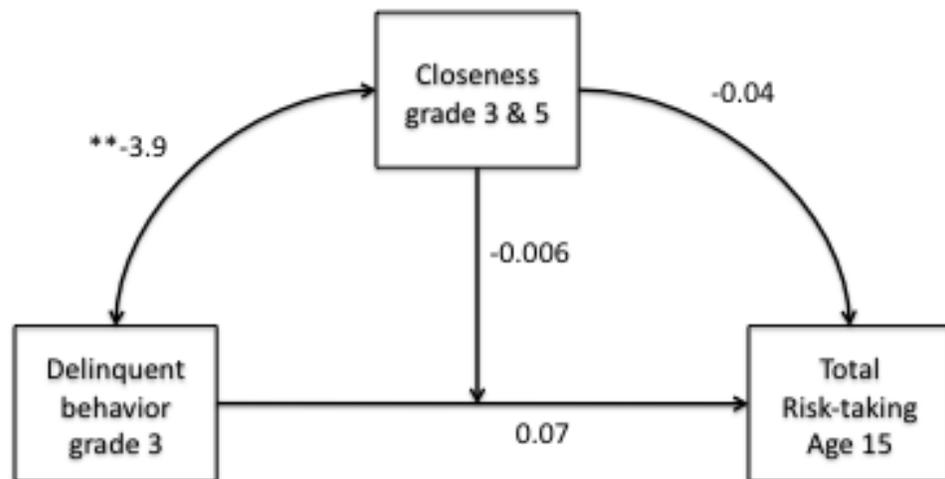


Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. *p<.05, **p<.01, ***p<.001

Figure 6 Research Question 6, model 11 predicting total-risk taking score at age 15

In addition, another model was run that used the combined closeness score from 3rd and 5th grade, because in previous analyses (see table 8) this combined predictor had a significant main effect on risky behavior. For this model, I expected that children who have high levels of delinquent behavior in 3rd grade, but who have a closer relationship with their teacher in both third and fifth grade would have disproportionately less risk-taking behavior at age 15 than those who either have a student–teacher relationship characterized by low levels of closeness in one or both grades. Similarly, in this analysis,

as shown in Figure 7, there were no main effects between any of the predictors and our outcome of interest; therefore, the hypothesis cannot be supported, suggesting delinquent behavior does not predict overall risk-taking and that combined closeness is not especially important for children with early delinquent behavior. The covariate, gender, had a significant main effect on total risk-taking at age 15 ($b = 1.3, p < .001$). The results of these two models (see figures 6 and 7) indicate that delinquent behavior is not predictive risk-taking in general.



Note. Control variables (gender, maternal education, and income-to-needs ratio) are not pictured in the model.
 Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 7 Research Question 6, model 12 predicting total-risk taking score at age 15

In order to answer the second part of question 6, looking at the four factors of risky behavior, two additional models were also run where the outcome was each of the four identified factors, i.e., Victimization, Risky behavior, Dating violence, and Sexual activity. In this case, the first model included closeness at 5th grade, and the second used the combined score for closeness in 3rd and 5th grade. Both of the models included delinquent behavior in 3rd grade, as well as the interaction between closeness and delinquent behavior. The covariates were gender, maternal education, and income to needs ratio in 3rd and 5th grade.

For the first model (Table 11), the analysis reveals that higher rates of 3rd grade delinquent behavior has a significant main effect on the risky behavior factor. In the first model, higher scores of 5th grade closeness had a significant main effect on lower rates of risky behavior. In addition, there was a main effect for gender ($b = 0.6, p < .01$) where males were more likely to engage in risky behavior. For Victimization, there was a main effect which approached significance for 3rd grade delinquent behavior ($b = 0.03, p < .07$). In addition, lower 3rd grade income-to-needs ratio ($b = -0.05, p < .05$) as well as male gender ($b = 0.6, p < .001$) predicted victimization. Dating violence had no significant main effects for any of the predictors or covariates. Lastly, for sexual activity, membership for the zero-inflated group was significantly predicted by closeness in 5th grade and more years of maternal education ($b = 0.2, p < .01$). Membership in the count model was not significantly predicted by any of the predictors or covariates.

Table 11 Results of Model 13 predicting the four factors of risk-taking

Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Delinquent behavior in 3 rd grade	.06	.03	.03
Closeness in 5 th grade	-.04	.02	.04
Interaction	-.007	.006	.3
Victimization (Factor 2)			
Delinquent behavior in 3 rd grade	.03	.02	.076
Closeness in 5 th grade	-.01	.01	.3
Interaction	-.005	.004	.2
Dating Violence (Factor 3)			
Delinquent behavior in 3 rd grade	-.001	.003	.8
Closeness in 5 th grade	.001	.003	.8
Interaction	-.001	.001	.2
Sexual activity (factor 4)			
Delinquent behavior in 3 rd grade	.001	.02	.9
Closeness in 5 th grade	.03	.02	.12
Interaction	.003	.003	.3
Sexual activity – Zero group			
Delinquent behavior in 3 rd grade	.005	.02	.8
Closeness in 5 th grade	.03	.01	.016
Interaction	.007	.004	.098

Similarly, in the second model, the analysis (Table 12) indicates that 3rd grade delinquent behavior has a significant main effect ($b = 0.06, p < .05$) predicting higher rates of risky behavior and the combined grade closeness ($b = -0.03, p < .05$) had significant main effects for predicting lower rates risky behavior. There was also a main effect for male gender ($b = 0.6, p < .01$). There was also a main effect for lower 3rd grade income-to-needs ratio ($b = -0.06, p < .05$) and male gender ($b = 0.6, p < .001$) for higher scores on the victimization factor. Dating violence had no significant main effects for any of the predictors or covariates. For sexual activity, membership for the zero-inflated

group was significantly predicted by combined grade closeness ($b = 0.02, p < .01$) and more years of maternal education ($b = 0.2, p < .01$). Lastly, the count model was significantly predicted by income to needs ratio in the 3rd grade ($b = -0.08, p < .05$) indicating that those adolescents from lower income backgrounds were more likely to endorse sexual activity. Overall, models 13 and 14 (see tables 11 and 12, respectively) indicate that there is a pathway between delinquent behavior and some risk-taking behaviors and that closeness acts as a protective factor for certain types of risk.

Table 12 Results of Model 13 predicting the four factors of risk-taking

Variable	Coefficient <i>b</i>	S.E.	p-value
Risky behavior (Factor 1)			
Delinquent behavior in 3 rd grade	.07	.03	.057
Closeness in 3 rd /5 th grade	-.03	.016	.03
Interaction	-.002	.004	.6
Victimization (Factor 2)			
Delinquent behavior in 3 rd grade	.03	.02	.2
Closeness in 3 rd /5 th grade	-.005	.009	.6
Interaction	-.003	.003	.3
Dating Violence (Factor 3)			
Delinquent behavior in 3 rd grade	-.001	.004	.8
Closeness in 3 rd /5 th grade	.002	.002	.5
Interaction	.00	.00	.3
Sexual activity (factor 4)			
Delinquent behavior in 3 rd grade	-.01	.02	.6
Closeness in 3 rd /5 th grade	.009	.01	.4
Interaction	.00	.002	.8
Sexual activity – Zero group			
Delinquent behavior in 3 rd grade	.002	.03	.9
Closeness in 3 rd /5 th grade	.02	.007	.002
Interaction	.003	.003	.4

DISCUSSION

Factor Analysis

The results indicate that the initial hypothesis regarding the moderating effect of student–teacher relationships on the pathway between externalizing behavior and risk-taking is not supported, meaning that student–teacher relationships are not particularly important for children with behavior problems. However, we do find that student–teacher relationships in the fifth grade act as a protective against later risk-behaviors for students in general. We also find that early externalizing behaviors are predictive of later rates of risk-taking to a limited extent.

The initial hypothesis was that there was a 3-factor structure for risk-taking that includes sexual risk-taking, aggressive behavior, and delinquent acts. Although the results of the Confirmatory Factor Analysis did not support the initial theoretical structure of the items, subsequent Exploratory Factor Analysis partially confirms the hypothesis. In both the three and four factor structures that were extracted, a clear factor containing delinquent acts emerged, consistent with the hypothesis. However, it was not until a fourth factor was extracted that the sexual risk-taking factor emerged and that factor only contains a subset of the items that are directly sexual in nature. Although the theoretical specifications for the organization of the items was not supported, the hypothesis that more than 2 factors would be present was supported.

The “Things I do – Risky behavior” measure contains several items related to victimization, which addressed events that have happened to the subjects, versus behaviors that they have engaged in (see Factor 2, table 4). Although not originally hypothesized, it makes sense theoretically that these items would group together because being the victim of violence is clearly different from engaging in acts of violence. Interestingly, two victimization factors emerged – one dealing with general acts of victimization (Factor 2) such as “In the past year, have you been shot at?” and Factor 3 which contained three items related to dating violence (e.g., “In the past year, have you been forced to have sex with a date?”) Theoretically it makes sense for these items to be considered separately because the pathology of dating-related violence is a unique kind of victimization.

One interesting findings was the inclusion of acts of overt violence on the victimization factor. Although the face value of only two items are explicitly related to gang activity, it could be argued that the remaining three items, although not necessarily exclusive to gang membership, are indeed related to gang activity. Assuming that all five of these items are related to gang violence (i.e., selling drugs, making threats), it can be argued that these items belong with this factor because there is an established link between gang membership and victimization (Wu & Pyrooz, 2015). Gang membership has many coercive elements – and therefore victimization is involved, and the theoretical inclusion of these items on this factor makes sense. Essentially, gang membership is often driven by a need for protection from victimization, and members are often victimized in the process of joining the gang and there is often member to member

violence within the gang (Knox, 1999). In addition, once a member is initiated into a gang, there is little free choice regarding illegal activity. By this I mean that although they are certainly complicit, when an individual joins a gang, they become an agent of the group and failure to do things like selling drugs (Bartol & Bartol, 2014), making threats, etc. would be met with varying negative consequences. In addition, both the behaviors related to gang membership (i.e., harming people) and witnessing gang related violence have been related to forms post-traumatic stress disorder for youth who are in gangs (Kerig, Chaplo, Bennett, & Modrowski, 2016).

Both the three and the four-factor structure had clear factor loadings and good fit, and high internal consistency among the factors. The four-factor structure was ultimately chosen for two reasons: four items regarding the frequency of sexual activity loaded onto a separate factor, and the themes among the items in this grouping was more theoretically sound. Factor 4 contained items regarding the frequency of sexual intercourse and oral sex. Separating these particular items into a unique factor became necessary in the pathway analyses because of the nature of the responses to the items. Since it was a frequency item, there were more potential answers but there was a greater number of participants answered 0, than all of those who answered 1-4 combined. Separating out these items allowed the unusual distribution of answers to be identified and dealt with statistically in the final analyses. There is value of knowing not just whether or not participants have had sexual intercourse or oral sex but also the frequency that youth engage in the behavior is captured by loading these items onto an independent factor. This value lies in understanding what predicts more frequent sexual encounters since

increased frequency would lead to more risk of pregnancy and STDs. In addition, it is also helpful, descriptively to know whether the sexual encounter was one time incident, or whether the adolescent is engaging in consistent sexual activity.

Externalizing Behavior

Externalizing behavior is one of the most robust predictors in the model, and significant main effects were found for both total scores of risk-taking, as well as the risky behavior and victimization factors. Our finding that higher rates of externalizing behavior in 3rd grade predicted higher rates of risk-taking is not surprising considering the similarity between early externalizing behaviors and the content of the outcome measure, which includes both aggressive and delinquent behaviors. In addition, it is well established in the literature that there is a link between early problem behaviors and risk-taking (Bartol & Bartol, 2014; Broidy et al., 2003; Calkins & Keane, 2009; Hughes et al., 1999), so the findings of this study are consistent with previous work. This association certainly does speak to the persistence of these behaviors over time (Broidy et al., 2003), and highlights the need to intervene early and change the behavioral patterns of these students. Problem behaviors as early as third grade can not only persist but also transition into more troublesome behaviors, such as delinquent acts, that may lead to detention or harm. Besides the obvious negative effects of delinquent and aggressive behaviors on student outcomes, these behaviors may also harm society at large. Preventing the continuation of these behaviors helps the students to be fully functioning members of society, and it protects the needs of the general population.

It is especially significant to gain insight into the prediction of the items related to sexual behavior (e.g., “in the past year have you had sexual intercourse) that are included in the risky behavior factor. As mentioned previously there are many negative outcomes associated with adolescent sexual activity, (e.g., teen pregnancy, transmission of STDs), so it is meaningful that this study indicates that early externalizing behaviors may also play a role. Even though teen pregnancy has declined since the 1990’s, it is still an ongoing societal issue, and if there is a predictive association for early problem behavior, then it would be socially significant to address these behaviors. If early behavior problems are related to general risky behavior, then we can suggest that early intervention of problem behaviors can prevent multiple kinds of risk-taking

One interesting finding was in regards to the victimization factor. Externalizing behavior predicted later victimization in all of the models, even when externalizing behavior was broken down into aggressive and delinquent behavior. There are two potential explanations for this apparent relationship. The first would be the co-occurrence of violence and victimization. In communities characterized by high crime rates, individuals are at higher risk for both committing crimes and are also more likely to be the victim of crimes (Bartol & Bartol, 2014). In addition to the externalizing behavior, the income-to-needs ratio from 3rd grade also had a significant main effect on victimization in every model. It is possible that those same youth who become victims of crime are also those from low-SES families or communities. Another potential explanation for this main effect is that 5 of the items within factor 2 are not related to victimization at face value, and in fact two are explicitly gang related. As mentioned

previously, these items and gang activity in general can be viewed within the context of victimization but it is possible that the early externalizing behavior could be predictive of this factor because of the inclusion of those items. A future direction of this study would be to re-examine this factor looking at these items separately to parse this out. In addition, just like victimization, gang membership is more likely for adolescents who come from low socioeconomic backgrounds (Carvalho & Soares, 2016) and since income-to-needs ratios were also predictive of victimization, both the inclusions of the gang items and the predictive relationship of externalizing behavior could be due to poverty and community based factors. In some ways, it is surprising that the relation was not stronger. However, there were different reporters for each measure, and even different reporters using the same measure can provide strikingly different results. In addition, there were several years of intervening time between phases 3 and 4. These several years may be at a time when these behaviors are being consolidated into a pattern, and thus, the predictive ability of externalizing behaviors prior to that consolidation may be limited.

Closeness

Findings indicate that although student–teacher relationships do not have an omnibus effect on global risk-taking behavior; there were main effects on specific kinds of risk-taking. The lack of findings regarding closeness in the analyses predicting the total scores of risk-taking behavior could be a product of the diverse nature of the behaviors contained in the measure. The items on the “Things I do” measure cover a vast array of behaviors and it seems that only certain kinds of behavior may be impacted by

the student–teacher relationship. When the factors were examined as separate outcomes, findings emerged that linked closeness to risky behaviors and sexual activity. There was a main effect of closeness at 5th grade and combined closeness (combination of 3rd and 5th grade) on risky behavior in each model. The implications of these findings are that although interventions focusing on student–teacher relationship quality may protect students from engaging in certain behaviors, there isn't enough evidence to support the notion that this type of intervention would be the cure-all for risk-taking behavior. However, the fact that there is an association between the quality of the student–teacher relationship and future risky behavior emphasizes the importance of these relationships.

The findings of this study also give valuable information regarding the timing of the importance of positive student–teacher relationships. Closeness in the 3rd grade did not demonstrate a main effect on any of the measures of risk-taking, so at first glance, it seems that the quality of the relationship matters more in the later grades when youth are more prone to be beginning to engage in risky behavior. Levels of closeness in 5th grade also had significant main effects on risky behavior and sexual activity. These findings suggest that the quality of relationships with teachers has an effect on the four factors of risk-taking. They also suggest that it is especially important for students to form good relationships with their teachers in 5th grade. However, when closeness in 3rd and closeness in 5th grade were considered together, main effects also were found for risky behavior and sexual activity so multiple years of quality relationships do have an effect. This additive effect of closeness on risky behaviors could suggest the importance of consistency across grade levels in order to reduce risky behaviors, but there is a much

greater argument for later close student–teacher relationship, because closeness in 3rd grade only showed effects when it was combined with 5th grade.

In terms of sexual activity, membership in the zero–inflated group of the sexual activity factor was predicted by levels of closeness in 3rd grade, 5th grade, the combined grade score, and maternal education. This could mean that those participants who had not engaged in any sexual activity (either intercourse or oral sex) in their life or in the last 6 months were more likely to respond with 0 when they had relationships high in closeness in third and/or fifth grade. This coupled with the fact that closeness did not predict the actual distribution of response in the negative binomial regression model indicates that closeness may ameliorate the risky decision to engage in sexual activity or not at all. But closeness does not predict the frequency of sexual activity once an adolescent has already become sexually active. In addition, there was no evidence that externalizing behavior predicted future sexual activity.

What does the closeness of the student –teacher relationship do, that it acts as a buffer for these behaviors? In general, the theoretical basis for positive outcomes related to student–teacher relationships involves an attachment perspective (Hughes et al., 1999). Just as children need healthy attachments to their parents in order to securely explore their environments, students need warm and supportive relationships with their teachers in order to adequately navigate the academic and behavioral challenges of the classroom (Baker, 2006; Pianta, 1999). Teachers are charged with the academic success of their students, but they are also major socializers of child behaviors (Baker, 2006). Our findings indicate that the attachment to teachers and the student’s ability to thrive

continues into late elementary and high school. When teachers are warm and supportive, students internalizing feelings of self-efficacy (Baker, 2006). Our findings indicate an internal working model where these close relationships may also allow older children (5th grade) to internalize feelings of self worth and that help them to make healthier choices in adolescence. Perhaps a supportive teacher, who believes in the student's abilities, can make a young student realize that they have a future, which would lead them to consider long-term consequences when making decisions. In addition, many 5th graders are beginning to go through the physical and cognitive changes associated with puberty. It is possible that having a supportive student-teacher relationship gives these children an additional resource to turn to in dealing with these changes. Teachers are socializers for young children, and they may also help pre-pubescent youth navigate the changing academic and social demands that they encounter within the context of warm and supportive relationships.

Covariates

It is also worth noting that several of the covariates that were controlled for in the models turned out to be predictive of the outcomes of interest, supporting our decision to use them as covariates. The covariates that controlled for gender, income-to-needs ratio, and maternal education predicted various kinds of risk-taking. Notably, in all of the models, gender had a main effect on total scores of risk-taking, the risky behavior factor, and victimization. For risky behavior and victimization, being male was predictive of higher rates of endorsement. This indicates that male adolescents are more likely to engage in risky behavior, which is consistent with the literature (Broidy et al., 2003), and

when it comes to delinquent acts, this is also consistent with statistics on arrest and crime rates (Bartol & Bartol, 2014).

Higher rates of maternal education were associated with membership in the zero–inflated group for sexual activity. This indicates that adolescents, especially for girls, who have well educated mothers, are less likely to endorse having multiple sexual partners. Along those same lines, lower income-to-needs ratios in the 3rd grade were predictive of membership in the sexual activity count group – meaning that lower income was associated with higher frequency counts of sexual intercourse and oral sex partners. It is well known in the adolescent literature that sexual activity is more common in adolescents that come from economically disadvantaged families, and impoverished communities (Berk, 2013). Based on this, it does not come as a surprise that lower income was associated with sexual activity, and our findings are consistent with other studies.

The implications of these findings regarding the covariates are that, though student–teacher relationships do have an influence on later risk-taking behavior, we also need to focus on the systemic factors that put youth at risk for the behaviors in the first place. Although it’s not possible to change the gender of the adolescent, knowing that gender differentiates the risk of certain behaviors helps to inform approaches to treatment. For instance, interventions that target the reduction of delinquent behaviors should focus more heavily on male adolescents, especially those with early externalizing behavior. The implication of the findings regarding income and sexual activity demonstrate the importance of intervention in economically disadvantaged communities

and schools. Of course, the long-term solution would be to end poverty and create equity among communities and in schools. Realistically, the most effective approach would be to build up these communities by providing resources, training, and by focusing intervention on schools in areas of disadvantage.

Limitations

One of the major limitations of this study was the low-frequency nature of the responses as well as the lack of risky behavior in the sample. On the one hand, it is a promising result that so few 15 year olds in our sample of over 900 youth are actually engaging in these maladaptive behaviors. However, the lack of responses limits our ability and power to detect the potential relationships that lead to the lack of risk-taking. One of the issues regarding longitudinal data in general, is the attrition of kids who are at-risk. Although it is not alone in this issue, the NICHD SECCYD data collection has been criticized for its inability to retain the most at-risk populations, particularly families with low SES backgrounds (Duncan & Gibson, 2000). This is an issue due to the fact that children from disadvantaged backgrounds are more likely to engage in risk-taking behaviors as well as delinquency (Bartol & Bartol, 2014). Because those children who are at the most risk of engaging in risk-taking behaviors tend to be the ones to drop out of the study, with each wave of data, our sample becomes less risky and further limits our ability to draw conclusions about all youth who engage in risk-taking.

Another limitation of the study is in regards to the nature of data collection for maternal education. Maternal education was only recorded in Phase one of data collection, in the early 1990's; so one potential limitation is that the child's mother may

have attained more degrees by the time their children reached 3rd or 5th grade. The lack of data collection regarding maternal education in the later phases of data collection limits our ability to control for this variable. This is unfortunate since there is evidence that maternal education is an important factor concerning sexual activity.

There was also lack of data collection between 5th grade and age 15. Due to this gap, it is not possible to assess these student–teacher relationships in the middle school and high school years. The fact that student–teacher relationships as late as 5th grade were predictive of risk-taking behavior at age 15 indicates that student–teacher relationships may continue to be important in middle school, and even high school. Since the quality of the student–teacher relationship was not recorded at age 15, it was not possible to look at the influence of student–teacher relationships in high school. This is understandable, given the complicated methodology that would have to be involved in order to collect this data with high-school students who have multiple teachers. One approach could be to have the student select their favorite teacher and then collect data about that student–teacher relationship. In addition measures that are developmentally appropriate for measuring adolescent relationships with teachers would have to be developed.

Future Directions

The findings of this study suggest that student–teacher relationships continue to influence student behavior well into the later years of elementary school. Most research conducted on student–teacher relationships looks at younger children and the formation of student–teacher relationship within early intervention efforts. This study indicates that

student–teacher relationships are the most important in 5th grade when it comes to adolescent risk-taking. The future direction of these findings is to establish effective interventions that focus on the quality of student–teacher relationships before students enter middle school. These studies should focus on how schools can support teachers to develop close student–teacher relationships. They should also focus on specific strategies that teachers can use to be supportive and warm with their students.

As mentioned in the limitations, there was a large gap in this study between data collection in 5th grade and then again at age 15. Seeing the importance of close student–teacher relationships in 5th grade suggests that these high quality relationships may be important in middle-school and high school as well as elementary school. Future studies should collect data on student–teacher relationship quality through out middle school and high school to determine if even later interventions could be beneficial to students who persist in problem behaviors.

Based on the finding that 3rd grade externalizing behavior predicts the victimization factor, a potential future direction would be to conduct an item level analysis to determine what kind of victimization is contributing to this relationship. It would be especially interesting to parse out these items since both the aggression and delinquent subscales of the externalizing behavior approached significance ($p < .05$) in predicting the victimization factor as well.

Although the dating violence factor was distinctly extracted in all of the factor analysis steps of the study, both closeness and externalizing behavior failed to predict it at any degree of significance. A future step would be to first look for any gender

differences within the factor to see if perhaps teacher closeness would be a protective factor for female students against dating related victimization. Another approach would be to look at other predictive variables beyond the scope of this study to examine what puts youth at risk for these kinds of violent encounters. Item level analysis where those who endorsed multiple partners in their life also more likely to endorse other items (52 and 53) related to sexual activity.

IMPLICATIONS

Although the hypothesis regarding the interaction between externalizing behavior and student–teacher closeness was not supported by the data, there are still several implications for this study for teachers, intervention, and policy. Although the quality of the student–teacher relationship doesn’t moderate the pathway between externalizing behavior and risk-taking behavior, what we do find is that higher levels of closeness predict less risk-taking behavior at age 15. Although the data and subsequent analyses do not indicate that this protective factor is especially true for children with behavior problems, this relationship does inform what our policies should be in regards to preventing risk-taking behavior in students in general. The fact that close a relationship with a teacher is associated with lower levels of delinquent behavior has a significant impact on how we approach intervention to reduce these maladaptive behaviors.

In terms of practice, interventions can focus on the quality of the relationships during formative years of development between students and their teachers in addition to traditional behavioral management strategies. Our data suggest that it is clear that behavioral management is still a necessary tool for reducing these behaviors since we did also find that higher levels of externalizing behavior as early as 3rd grade are predictive of later risk-taking, especially delinquent, and victimization factors. However, in addition to behavior management, establishing healthy student–teacher relationships as early as

third but especially by fifth grade can have an influence on adolescent behavior. Given this information, teachers should focus on cultivating relationships with the students in their classrooms and teacher training should include strategies to help teachers do this effectively. If teachers are more aware of the impact that they can have on their students, they may be more intentional about enhancing their interactions and relationships within the classroom. Along those lines, this information would also be relevant to school administrators. If student–teacher relationships can help to curb later behaviors that may interfere with schooling and the well being of youth, then administrators should build supports for teachers in the classroom so that they can focus on establishing these close relationships with all of their students.

The impact of risk-taking behaviors and delinquent behaviors on society is large. Efforts to use preventative measures to counteract the cost to society should be of special interest to policy makers. There is already a push in the house and through other non-profit agencies to implement juvenile justice reform and the corner stone of that reform is using preventative science. All children go to school and if we can use this naturally occurring opportunity to introduce protective factors and reduce later delinquency and problem behaviors we have a chance to actually put prevention science to work for the whole population of students.

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