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Associations Between Physical and Relational Forms of Peer Aggression and Victimization and Risk for Substance Use Among Elementary School-Age Youth

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Abstract

This study examined associations between physical and relational forms of aggression and victimization and risk for willingness to engage in substance use and actual use in a sample of 231 (50% Male) 2nd thru 4th grade students (Mean age = 8.3 years). Physical aggression was more strongly associated with risk for substance use outcomes than physical victimization. Neither relational aggression nor victimization were linked to risk for substance use. Specifically targeting physical aggression for the prevention of early substance use among elementary school-age youth appears to be warranted.

Keywords

substance use willingness; aggression; victimization

Peer aggression and victimization occur frequently in childhood and adolescence (Crick, Casas, & Ku, 1999; Crick & Grotpeter, 1996), and previous research indicates that both peer aggression and victimization are associated with a host of negative outcomes (e.g., Vernberg & Biggs, 2010), including adolescent substance use (e.g., Adelman, 2005). However, the links between peer aggression and victimization and substance use outcomes among elementary school-age youth have not been evaluated. From a prevention perspective, targeting those identified as at risk for a behavior prior to the initiation of the behavior is essential. Understanding the associations between peer aggression and victimization and risk for willingness to engage in substance use in addition to risk for actual use in elementary school-age youth is necessary so that appropriate prevention programs can be implemented prior to the initiation of substance use. Accordingly, the current study is the first study (to our knowledge) to evaluate associations between physical and relational forms of aggression and victimization and risk for substance use outcomes (i.e., willingness to engage in substance use and actual use) in a sample of 2nd thru 4th grade students.

Peer aggression and victimization are widespread problems in today's schools, with data suggesting that approximately 19% of children engage in aggressive acts toward their peers

(Nansel et al., 2001). Further, as many as 10–20% of children and adolescents experience chronic victimization by their peers (Graham & Juvonen, 1998; Kochenderfer-Ladd & Wardrop, 2001; Stadler, Feifel, Rohmann, Vermeiren, & Poustka, 2010), with 60% of youth reporting exposure to peer victimization during the elementary school years alone (Kochenderfer-Ladd & Wardrop, 2001).

Peer aggression and victimization can take many forms, and research increasingly distinguishes between physical and relational forms of peer aggression and victimization. While physical aggression and victimization refers to physical attacks (e.g., hitting, pushing, or kicking) or verbal threats (Crick et al., 1999), relational aggression and victimization involves harm through the manipulation of (or damage to) peer relationships and social status through the spreading of rumors and social ostracism (Crick & Grotpeter, 1996). All forms of aggression and victimization are detrimental to both the aggressor and the victim (e.g., Vernberg & Biggs, 2010). Numerous findings indicate that peer aggression and victimization are both associated with increased risk of depression, anxiety, low self-esteem, peer rejection, and externalizing problems, including antisocial behavior and delinquency (for reviews, see Card, Stucky, Sawalani, & Little, 2008; Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Most relevant to the current study, growing evidence suggests that both peer aggression and victimization are associated with early substance use (e.g., Adelman, 2005).

Link between Peer Aggression and Early Substance Use

Problem behavior theory asserts that if an individual is willing/able to engage in one type of problem behavior, then they are at increased risk for engaging in other problem behaviors (Jessor, 1992; Jessor & Jessor, 1977). That is, participating in multiple problem behaviors (such as aggression, delinquency, and substance use) is the manifestation of a single underlying behavioral concern. Thus, engaging in aggressive behavior puts an individual at risk for early substance use, along with other problem behaviors. Indeed, Nansel and colleagues (2001 & 2004) demonstrated that peer aggression was associated with alcohol use in a sample of 6th thru 10th graders. Research by Radliff, Wheaton, Robinson, and Morris (2012) also found that middle and high school students who engage in aggression towards peers used more substances (i.e., alcohol, tobacco, and marijuana use) than those who did not report engaging in aggressive behavior. Other research has provided further support for these findings across studies of middle- and high-school aged students (Adelman, 2005; Carlyle & Steinman, 2007; Houbre, Tarquinio, Thuillier, & Hergott, 2006; Niemela et al., 2011; Peleg-Oren, Cardenas, Comerford, & Galea, 2012). However, this literature does not provide a clear picture regarding what forms of aggressive behavior (i.e., physical or relational) are most strongly linked to early substance use, with the majority of this literature broadly assessing physically aggressive behavior and not differentiating between physical and relational forms of aggression. This focus on physical aggression is likely due to relational aggression only being recognized as a concern since the 1990s, with research focusing predominantly on peer relationship (peer rejection and isolation) and internalizing (depression and anxiety) outcomes rather than externalizing outcomes (delinquency and substance use) of relational aggression (Crick et al., 1999; Crick & Grotpeter, 1996). Differentiating between the forms of aggression would allow a more

refined intervention approach, depending on the form of aggression exhibited. For example, whereas an intervention for physical aggression would focus on behavioral control and prosocial ways of problem solving conflicts, interventions for relational aggression would target social relationships and non-manipulative ways of interacting with peers. Thus, further research evaluating associations between physical and relational forms of aggression and substance use would be useful in determining what types of aggression to target for the prevention of substance use.

Link between Experiencing Peer Victimization and Early Substance Use

In contrast to peer aggression, experiencing peer victimization may be associated with substance use through a failure to bond to conventional social institutions and/or self-medicating purposes (Bierman 2004; Coie 1990; Hawkins et al., 1986). Specifically, the Social Development Model posits that if an individual does not become invested and attached to the social entities in their environment (i.e., peers, school, family), then they may reject the norms of the group and engage in behavior that is contrary to the norms (e.g., Catalano, 1982; Catalano et al., 2004; Catalano & Hawkins, 1996; Hawkins & Weis, 1985). Thus, victimized youth may become disenfranchised from societal rules due to the negative interactions with peers, and this lack of engagement is thought to provide little motivation to engage in socially valued behavior, resulting in inappropriate behavior that may come to include substance use (Bierman 2004; Coie 1990; Hawkins et al., 1986). Additionally, youth who are victimized may use substances to cope with the negative emotions experienced as a result of these aversive peer interactions.

While there is some evidence to suggest that victimization is associated with substance use (e.g., Peleg-Oren et al., 2012), findings have been mixed. For example, in a study of 11 to 14 year olds, Sullivan, Farrell, and Kliewer (2006) noted an association between youth drinking behavior and status as a victim of both emotional and physical aggression. Luk, Wang, and Simons-Morton (2010) also found a positive association between victimization (physical, relational, and cyber victimization) and substance use in tenth-graders. In addition, Tharp-Taylor and others (2009) identified an association between peer victimization and alcohol and cigarette usage in middle-school youth. However, other studies did not find a significant relation between victimization and substance use (e.g., Houbre et al., 2006; Rivers, Poteat, Noret, & Ashurst, 2009). These inconsistencies may be explained by differing operational definitions of peer victimization across studies, with some measures of peer victimization being broad and others assessing and including various forms of victimization (i.e., physical vs. relational). Further some studies classified or grouped youth based on victimization status (e.g., Houbre et al., 2006; Rivers et al. 2009) while other studies examined victimization on a continuum (e.g., Luk et al., 2010; Sullivan et al., 2006). Interestingly, both the Houbre et al. (2006) and Rivers et al. (2009) studies that did not find a relation between victimization and substance use grouped youth base on their victimization status (victim or not) using a global measure of victimization that did not differentiate between the various forms of victimization (i.e., physical vs. relational). Thus, more research distinguishing between physical and relational victimization and using continuous measures (rather than dichotomizing) of victimization may be necessary to better understand these associations.

Further, to our knowledge, no research has examined these associations in elementary school-age samples, with all research conducted with middle and high school-age students. This is an important limitation for research on the development of substance use behavior, as early initiation of substance use behavior is a risk factor for future use-related problems (e.g., Grant, Stinson, & Harford, 2001; Maggs & Schulenberg, 2005) and other adverse psychosocial adjustment factors (e.g., poor academic achievement, depression, and anxiety; Fergusson, Horwood, & Beaudrais, 2003; Patton et al., 2002). Research suggests that peer aggression and victimization are evident in elementary school (Kochenderfer-Ladd & Wardrop, 2001). Further, rates of substance use initiation begin to peak in middle school (Barnam et al., 2004; Johnston et al., 2011), with rates increasing linearly from 4th to 9th grade (Fite et al., 2008). Thus, evaluating associations in a sample of elementary school-age youth is ideal for prevention research.

Current Study

Although there is growing evidence to suggest that both peer aggression and victimization may be associated with early substance use (e.g., Adelman, 2005), additional research is needed to further clarify associations. From a prevention intervention perspective, it is important to understand the links between peer aggression and victimization and substance use outcomes in elementary-age children, as early use is associated with life-long substance abuse and use-related problems (e.g., Grant, Stinson, & Harford, 2001; Maggs & Schulenberg, 2005). Additionally, differences in associations between physical and relational forms of peer aggression and victimization and substance use are not yet clear. Thus, we need to know what types of behavior to target in elementary school in order to implement effective interventions so that subsequent substance use and use-related problems can be prevented. If victimization effects are evident, then negative emotions and disenfranchisement may be targeted for the prevention of substance use. Alternatively, if aggression effects are evident then overall behavioral difficulties may be a target of intervention and strategies would likely include behavioral control and/or more prosocial and less manipulative ways of interacting with peers.

Willingness to engage in substance use is a strong predictor of future use (Andrews et al., 2008). Thus, it would also be useful to evaluate associations between peer aggression and victimization and risk for willingness to use substances in order to inform the development of early targeted prevention programs. Accordingly, using a sample of 231 2nd thru 4th grade students, the current study cross-sectionally evaluates associations between teacher reports of physical and relational forms of aggression and victimization and student reports of willingness to use substances in addition to actual substance use by estimating path models within a structural equation modeling framework. Both peer aggression and victimization were expected to be associated with substance use outcomes; however, due to the more consistent findings in the literature, the associations between aggressive behavior and substance use outcomes were expected to be stronger than the links between victimization and substance use outcomes.

METHODS

Participants

Participants included 231 children (50% male; Mean age = 8.3 years, SD = .95) and their homeroom teachers in Grades 2 (31.6%), 3 (32.5%), and 4 (35.9%) from an elementary school in a small, Midwestern town. According to school records, the racial composition of the school was predominantly Caucasian, with less than 20% of the student body identifying with a racial/ethnic minority group. Socioeconomic data were not available for the participants; however the average income for the town was approximately \$25,369 per capita, with 5.1% of individuals residing in the town living below the federal poverty line. School records indicated that approximately 35% of the student population was eligible for free and reduced lunch. The researchers' Institutional Review Board as well as school administration provided approval for the study. Caregiver consent and child assent were obtained prior to data collection. In the summer, an informational booth was set up during school enrollment. Caregivers who approached the table were given information regarding study participation, and parents interested in signing up their children provided written informed consent. At the beginning of the school year, consent forms were sent home to the caregivers of the remaining students. Of the 380 2nd thru 4th grade students enrolled in the school, 252 (66%) received parental consent to participate in the study. A total of 233 students completed the survey. Reasons for the loss of consented participants included absence from school, moving out of the district, and the need for special education accommodations. Note that 2 participants were missing data relevant to the current study aims, resulting in 231 participants included in the current analyses.

Measures

Demographics—Teachers reported on students' gender and grade.

Aggression and Victimization—A teacher-reported 18-item measure was used to assess levels of aggression and victimization. Teachers responded on a 5-point Likert scale (Never–Almost Always). This measure was adapted from a peer-nominated scale (Cricks & Bigbee, 1998), and teachers were asked to complete this measure for each student. The measure included six items pertaining to aggression, with two subgroups containing 3 items each: physical aggression (e.g., “pushes and shoves others”) and relational aggression (e.g., “tries to make other kids not like a certain person by spreading rumor about them”). Similarly, there were six items pertaining to victimization, with two subgroups containing 3 items for each subgroup: physical victimization (e.g., “gets hit, kicked, punched by others”) and relational victimization (e.g., “other kids tell rumors about them behind their back”). The remaining six questions were related to bystander behaviors, which were not included in the current analysis. Sum scores for each category were calculated, with higher scores indicating more peer aggression or victimization experiences. In this sample, the subscales demonstrated good internal consistency ($\alpha = .86$ for physical aggression, $\alpha = .82$ for relational aggression, $\alpha = .89$ for physical victimization, $\alpha = .83$ for relational victimization).

Willingness to Use Substances—Self-reported willingness to use substances was assessed using the Willingness to Use questionnaire (Wills et al., 2000). The measure consisted of 6 items regarding the child's willingness to engage in tobacco, alcohol, and marijuana use. For each substance, children were provided a description of a situation that involved use with friends (e.g., "Suppose you were with a group of friends and some of them were smoking. There were some extra cigarettes there that you could have if you wanted."). Children responded to items (e.g., "How willing would you be to smoke a cigarette") using a 3-point Likert scale (Not at all willing, Kind of willing, and Very willing). Due to the low base rates of willingness to use, "kind of willing" and "very willing" responses were both treated as a positive response and a dichotomous (yes-no) variable was created to indicate whether the student endorsed willingness to engage in the use of any substance.

Substance Use—Self-reported substance use was assessed using 3 items from the Center for Substance Abuse Prevention Student Survey (Pentz et al., 1989). Three yes/no questions assessed the lifetime use of tobacco, alcohol, and marijuana use (i.e., "Have you ever had a drink of alcohol", "Have you ever smoked a cigarette, even just a few puffs, or used chewing tobacco, snuff, or dip", and "Have you ever tried marijuana"). Due to low base rates of use, a dichotomous (yes-no) variable was created to indicate whether the student had endorsed the use of any substance.

Procedures

Data collection began 10 weeks after the start of the fall semester and was conducted over the course of one month. Child self-report measures were administered in the classrooms during a 30-minute period. Only children whose caregivers provided written consent remained in the classroom. Children provided verbal assent before their participation (98% agreed to participate; n=4 refusals). Data from each classroom was collected by 2–3 trained research team members; one team member in each room read standardized instructions and the questionnaire items aloud, while the other team members circulated the room to answer questions and ensure students were able to keep pace with the reading of each question. No school personnel were permitted in the room during the data collection to ensure confidentiality of responses and to increase accuracy in reporting. All classrooms received a \$75 gift card upon completion of the study to compensate the school for their time and effort. Homeroom teachers provided consent (n = 24; 100% participation) and completed online surveys over the course of a month using Qualtrics interview software. Specifically, teachers were asked to complete a 10 minute survey about each of the students in their homeroom class and were compensated \$7 per survey completed.

RESULTS

Statistical Analysis

In order to evaluate study variables and understand basic associations, descriptive statistics (i.e., frequencies, means, standard deviations, and correlations) were first computed. Unique associations between physical and relational aggression and victimization on substance use outcomes were then evaluated within a structural equation model framework by estimating

path models using Mplus statistical software (Muthen & Muthen, 1998–2011). Estimating path models allows for multiple outcomes to be examined simultaneously and allows for direct comparisons across outcomes to be made (Kline, 2010).

Because the substance use outcomes were dichotomous in nature, Weighted Least Squares (WLSMV) estimation with a mean and variance adjusted chi-square test statistic was used to evaluate associations. WLSMV provides unbiased estimates, standard error, and model fit test statistics for dichotomous data (Muthen, 1984). The weighted root-mean-square residual (WRMR) statistic was used to evaluate model fit, whereby a WRMR value of $<.90$ indicates a good fit to the data (Yu & Muthen, 2001).

Descriptive Statistics

Teachers reported that 16.5% of students experienced relational victimization and 6.5% of students experienced physical victimization. Teachers also indicated that 10% of students reportedly engaged in at least one physical act of aggression and 21% of students engaged in at least one act of relational aggression. With regard to substance use, 12.6% ($n = 29$) of the students reported willingness to use substances and 7.4% ($n = 17$) reporting having used substances. Consistent with prior research (Johnston et al., 2011), boys were more likely to have used a substance ($n = 13$ vs. 4; $X^2 = 5.23$, $p = .02$) and were more likely to endorse willingness to use substances than were girls ($n = 22$ vs. 7; $X^2 = 9.01$, $p = .00$).

Correlations, means, and standard deviations of study variables can be found in Table 1. Physical aggression was associated with increased likelihood of both willingness to use substances and actual substance use. Physical victimization was also associated with increased risk for willingness to use substances, but not actual use. However, neither relational aggression nor relational victimization were linked to either substance use outcome. Boys demonstrated higher levels of both physical aggression and physical victimization than did girls; however no gender differences in relational forms of aggression or victimization were evident. As reported above, correlation analyses also suggest that boys were more likely to indicate both willingness to use and actual use than were girls. Finally, the only grade level effect found was that younger children were more likely to report willingness to use substances than were older children.

Path Model—A path model in which willingness to engage in substance use and actual use were regressed on physical aggression, relational aggression, physical victimization, relational victimization, grade and gender was estimated in order to evaluate unique effects. As seen in Figure 1 (WRMR = .00), physical aggression was uniquely positively associated with increased risk for willingness to engage in substance use and marginally statistically positively associated with increased risk for actual use; however, no other aggression or victimization variable was uniquely associated with either substance use outcome. Boys were more likely to endorse willingness to engage in substance use and marginally statistically more likely to report actual use than were girls. Finally, younger children were more likely to report willingness to use than were older children.

DISCUSSION

The goal of the current study was to evaluate the associations between two forms of peer aggression and victimization (physical and relational) and risk for both willingness to engage in substance use and actual use in a sample of 2nd thru 4th grade students. The present study advances the literature by examining differences in physical and relational forms of both aggression and victimization, and by examining these associations in a sample of elementary school-age students, which has implications for early prevention and intervention. Findings suggest that physical aggression, but not physical victimization, is uniquely associated with substance use outcomes, and neither relational aggression nor relational victimization are linked to either substance use outcome.

Consistent with previous research (Adelmann, 2005; Carlyle & Steinman, 2007; Houbre, Tarquinio, Thuillier, & Hergott, 2006; Niemela et al., 2011; Peleg-Oren, Cardenas, Comerford, & Galea, 2012), physically aggressive behavior was associated with increased risk for both substance use outcomes. The current study extends this line of research by demonstrating that these links are evident in elementary school-age youth. Findings are consistent with problem behavior theory, which suggests that if an individual exhibits one type of problem behavior, then they are at risk for other problem behaviors (Jessor, 1992; Jessor & Jessor, 1977).

Physical victimization was also associated with increased risk for willingness to engage in substance use, but not actual use, at the bivariate level. However, when accounting for the variance associated with physical aggression and other factors, the link between physical victimization and willingness to engage in substance use was no longer evident. The link between victimization and substance use has been mixed in the literature, with some studies finding an association (e.g., Luk, Wang, and Simons-Morton, 2010; Peleg-Oren et al., 2012) and other studies finding no association (e.g., Houbre et al., 2006; Rivers, Poteat, Noret, & Ashurst, 2009). The current results suggest that the link with substance use is specific to physical victimization in elementary school-age youth, but that this link is not as strong as physical aggression.

Interestingly, relational forms of aggression and victimization were not associated with willingness to engage in substance use or actual use. It may be that the link between involvement in peer victimization and substance use is specific to physical forms of aggression and victimization in elementary school-age youth. However, relational aggression and victimization may be more strongly associated with substance use outcomes as youth transition into adolescence and both relational forms of aggression (e.g., Galen & Underwood, 1997) and negative emotions (Hankin et al., 1998; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Lakdwalla, Hankin, & Mermelstein, 2007) increase and substances are more accessible. The impact of relational forms of aggression and victimization may also become more salient in adolescence, when peer relationships take on increasing importance (Larson & Richards, 1991).

From a prevention intervention perspective, targeting physical aggression may be useful for preventing early substance use. Indeed, there is evidence to suggest that the Coping Power

Program, which targets disruptive and reactively aggressive behavior in the classroom context, is effective in preventing early substance use (Lochman et al., 2007; Lochman & Wells, 2002; 2004). However, the impact of this intervention in reducing aggressive behavior and preventing substance use in the context of peer aggression and victimization has yet to be evaluated. It will be important for future research to evaluate whether this intervention is effective in preventing early substance use with those involved in physically aggressive behavior.

Although physical victimization was not uniquely associated with increased risk for willingness to use substances, physical victimization was associated with increased risk at the bivariate level. If further evidence suggests an association between physical victimization and substance use outcomes then prevention programs may also need to target physical victimization among elementary school-age youth. From a prevention intervention perspective, it may be useful to target the negative emotions associated with victimization (Card, Stucky, Sawalani, & Little, 2008; Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010), as negative emotions may result in substance use for coping and self-medicating purposes and/or a failure to bond to conventional social institutions (Bierman 2004; Coie 1990; Hawkins et al., 1986). Cognitive-behavioral interventions have been found to be effective in reducing internalizing symptoms among children and adolescents (Ferdon & Kaslow, 2008), and therefore may be effective in reducing negative emotions associated with victimization, ultimately reducing risk for substance use. However, more research is needed to evaluate the effectiveness of such interventions for victimized youth before specific recommendations can be made.

Further note that consistent with previous research (Fite, et al., in press; Radliff et al., 2012), aggression and victimization were correlated, suggesting that many youth who are victimized are also aggressors. Thus, although it appears that physical aggression is the key component to target for early substance use, interventions will likely include youth identified as both aggressors and victims.

Finally, findings also suggested that younger children were more likely to report a willingness to use substances than older children. Younger children may not have had the opportunity to be exposed to anti-substance use messages as much as older children, as many anti-substance use programs are targeted for 4th grade and up. Findings may suggest that it is worthwhile to develop and implement anti-substance use programs for younger children.

Limitations and Conclusions

There are several noteworthy methodological limitations that need to be reviewed. In particular, this study focuses on predominantly Caucasian 2nd thru 4th graders in a small Midwestern town, and findings may not generalize to other racial or age groups in other geographical locations. Also, this research was cross-sectional, which limits our ability to examine possible change in associations over time. Given the strong correlations between physical and relational aggression as well as physical and relational victimization, it may be that, at this age, physical aggression accounts for majority of the variance in substance use

and youths' willingness to use. Yet, this relation may shift over time, suggesting that future research should continue to examine these associations at various developmental stages.

Further, there were low rates of actual use, as expected with this age group. Although the estimator used for modeling associations is set up to accommodate the limited endorsement of the substance use outcomes, it is important to replicate findings in larger samples of youth who endorse willingness to use and actual use. We point out, however, that findings are consistent with expectations and prior research conducted with older youth that have increased rates of use (Adelmann, 2005; Carlyle & Steinman, 2007; Houbre, Tarquinio, Thuillier, & Hergott, 2006; Niemela et al., 2011; Peleg-Oren, Cardenas, Comerford, & Galea, 2012). The items used to assess lifetime use were vague and did not separate out use in the context of family versus use with friends or in isolation. While this is a common approach to assess substance use behavior, future research examining the role of peer aggression and victimization in substance in these various contexts would be useful.

Some may also question our use of child self-reports of substance use outcomes. In particular, relationally aggressive youth may demonstrate stronger social skills, which could lead them to be more sensitive to issues such as social desirability bias in their report on substance use. However, we note that self-reports are the most common method used to assess child/adolescent substance use, and child reports of substance use have been found to be valid and reliable (Dolcini, Adler, & Ginsberg, 1996; Rosenbaum, 2009). Additionally, the current study relied on teacher reports of both aggression and victimization. Child perceptions of victimization have been argued to be important in understanding the impact of victimization (Grills-Taquechel, Polifroni, & Pane, 2010; Vernberg, Nelson, Fonagy, Twemlow, 2011). Thus, future research utilizing child self-reports of victimization will be helpful before firm conclusions regarding victimization findings should be drawn.

Despite these limitations, the current study contributes to our understanding of associations between peer aggression and victimization and risk for early substance use. Findings suggest that physical rather than relational forms of aggression need to be the focus of substance use prevention among elementary school-age youth. Future directions in this line of research include evaluating potential moderators (e.g., peer delinquency) and mediators (e.g., negative emotions) of these associations as well as examining how these relations may change over time.

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References

- Adelmann PK. Social environmental factors and preteen health-related behaviors. *Journal of adolescent health*. 2005; 36(1):36–47. [PubMed: 15661595]
- Barnam SK, Pulkinnen JK, Rose RJ. Inattentiveness, parental smoking, and adolescent smoking initiation. *Addiction*. 2004; 99:1049–1061. [PubMed: 15265102]
- Bierman, KL. *Peer rejection: Developmental processes and intervention strategies*. New York: Guilford Press; 2004.

- Card NC, Stucky BD, Sawalani GM, Little TD. Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development*. 2008; 79:1185–1229. [PubMed: 18826521]
- Carlyle KE, Steinman KJ. Demographic differences in the prevalence, co-occurrence, and correlates of adolescent bullying at school. *Journal of School Health*. 2007; 77:623–629. [PubMed: 17970866]
- Catalano RF. Relative reward deprivation and delinquency causation. *Dissertation Abstracts International*. 1982; 43:934.
- Catalano RF, Haggerty KP, Oesterle S, Fleming CB, Hawkins JD. The influence of bonding to school for healthy development: Findings from the social development research group. *Journal of School Health*. 2004; 74:252–261. [PubMed: 15493702]
- Catalano, RF.; Hawkins, JD. The social development model: a theory of antisocial behavior. In: Hawkins, JD., editor. *Delinquency and Crime: Current Theories*. New York, NY: Cambridge University Press; 1996. p. 149-197.
- Coie, JD. Toward a theory of peer rejection. In: Asher, SR.; Coie, JD., editors. *Peer rejection in childhood*. Cambridge, England: Cambridge University Press; 1990. p. 365-401.
- Crick NR, Casas JF, Ku HC. Relational and physical forms of peer victimization in preschool. *Developmental Psychology*. 1999; 33:579–588. [PubMed: 9232373]
- Crick NR, Grotpeter JK. Children's treatment by peers: Victims of relational and overt victimization. *Development and Psychopathology*. 1996; 8:367–380.
- Crick NR, Bigbee MA. Relational and overt forms of peer victimization: A multiinformant approach. *Journal of Consulting and Clinical Psychology*. 1998; 66(2):337–347. [PubMed: 9583337]
- Dolcini MM, Adler NE, Ginsberg D. Factors influencing agreement between self-reports and biological measures of smoking among adolescents. *Journal of Research on Adolescence*. 1996; 6:515–542.
- Ferdon DC, Kaslow NJ. Evidence-based psychosocial treatments for child and adolescent depression. *Journal of Clin Child Adolescence*. 2008; 37(1):62–104.
- Fergusson DM, Horwood LJ, Beutrais AL. Cannabis and educational achievement. *Addiction*. 2003; 98:1681–1692. [PubMed: 14651500]
- Fite PJ, Colder CR, Lochman JE, Wells KC. The relation between childhood proactive and reactive aggression and substance use initiation. *Journal of Abnormal Child Psychology*. 2008; 36(2):261–271. [PubMed: 17823863]
- Fite PJ, Evans S, Cooley J, Rubens S. Further Evaluation of Associations between Attention-Deficit/Hyperactivity and Oppositional Defiance Symptoms and Bullying-Victimization in Adolescence. *Journal of Child Psychiatry and Human Development*. in press.
- Galen BR, Underwood MK. A developmental investigation of social aggression among children. *Developmental Psychology*. 1997; 33:589–600. [PubMed: 9232374]
- Graham S, Juvonen J. Self-blame and peer victimization in middle school: An attributional analysis. *Developmental Psychology*. 1998; 34:587–599. [PubMed: 9597367]
- Grant BF, Stinson FS, Harford TC. Age at onset of alcohol use and DSM-IV alcohol abuse and dependence: a 12-year follow-up. *Journal of Substance Abuse*. 2001; 13(4):493–504. [PubMed: 11775078]
- Grills-Tauechel, AE.; Polifroni, R.; Pane, HT. Methods for assessing and treating bully-victim problems for individual children and adolescents. In: Vernberg, E.; Biggs, BK., editors. *Preventing and Treating Bullying and Victimization*. New York, NY: Oxford University Press; 2010. p. 135-160.
- Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE. Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology*. 1998; 107:128–140. [PubMed: 9505045]
- Hawkins JD, Lishner DM, Catalano RF, Howard MO. Childhood predictors of adolescent substance abuse: toward an empirically grounded theory. *Journal of Children in Contemporary Society*. 1986; 18:11–48.
- Houbre B, Tarquinio C, Thuillier I, Hergott E. Bullying among students and its consequences on health. *European Journal of Psychology of Education*. 2006; 21(2):183–208.

- Jessor R. Risk Behavior in Adolescence -A Psychological Framework for Understanding and Action. Adolescents at Risk. 1992; 12:19–34.
- Jessor, RY.; Jessor, SL. Problem Behaviour and Psychosocial Development: A Longitudinal Study on Youth. NY: Academic Press; 1977.
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Monitoring the Future national results on adolescent drug use: Overview of key findings, 2010. Ann Arbor: Institute for Social Research, The University of Michigan; 2011.
- Kessler RC, McGonagle KA, Swartz M, Blazer DG, Nelson CB. Sex and depression in the National Comorbidity Survey I: Lifetime prevalence, chronicity, and recurrence. Journal of Affective Disorders. 1993; 29:85–96. [PubMed: 8300981]
- Kline, R. Principal and Practice of Structural Equation Modeling. 3. New York: Guilford Press; 2010.
- Kochenderfer-Ladd B, Wardrop JL. Chronicity and instability of children's peer victimization experiences as predictors of loneliness and social satisfaction trajectories. Child Development. 2001; 72:134–151. [PubMed: 11280475]
- Lakdawalla Z, Hankin BL, Mermelstein R. Cognitive theories of depression in children and adolescents: A conceptual and quantitative review. Clinical Child and Family Psychology Review. 2007; 10:1–24. [PubMed: 17318382]
- Larson R, Richards MH. Daily companionship in late childhood and early adolescence: Changing developmental contexts. Child Development. 1991; 62:284–300. [PubMed: 2055123]
- Lochman JE, Wells KC. The Coping Power Program at the middle school transition: Universal and indicated prevention effects. Psychology of Addictive Behaviors. 2002; 16:S40–S54. [PubMed: 12502276]
- Lochman JE, Wells KC. The coping power program for preadolescent aggressive boys and their parents: Outcome effects at the 1-year follow-up. Journal of Consulting and Clinical Psychology. 2004; 72(4):571–578. [PubMed: 15301641]
- Lochman, JE.; Wells, KC.; Murray, M. The Coping Power Program: Preventive intervention at the middle school transition. In: Tolan, P.; Szapocznik, J.; Sambrano, S., editors. Preventing Youth Substance Abuse: Science-Based Programs for Children and Adolescents. Washington, DC: American Psychological Association; 2007.
- Luk JW, Wang J, Simons-Morton BG. Bullying victimization and substance use among US adolescents: mediation by depression. Prevention Science. 2010; 11(4):355–359. [PubMed: 20422288]
- Maggs JL, Schulenberg JE. Initiation and course of alcohol consumption among adolescents and young adults. Recent developments in alcoholism. 2005:29–47. [PubMed: 15789858]
- Muthén BO. A general structural equation model with dichotomous, ordered categorical and continuous latent variable indicators. Psychometrika. 1984; 49:115–132.
- Muthén, LK.; Muthén, BO. Mplus User's Guide. 6. Los Angeles, CA: Muthén & Muthén; 1998–2011.
- Nansel TR, Craig W, Overpeck MD, Saluja G, Ruan WJ. Crossnational consistency in the relationship between bullying behaviors and psychosocial adjustment. Archives of Pediatrics and Adolescent Medicine. 2004; 158:730–736. [PubMed: 15289243]
- Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. Journal of the American Medical Association. 2001; 285:2094–2100. [PubMed: 11311098]
- Niemelä S, Brunstein-Klomek A, Sillanmäki L, Helenius H, Piha J, Kumpulainen K, et al. Childhood bullying behaviors at age eight and substance use at age 18 among males. A nationwide prospective study. Addictive Behaviors. 2011; 36:256–260. [PubMed: 21146319]
- Patton GC, Coffey C, Carlin JB, Degenhardt L, Lynskey M, Hall W. Cannabis use and mental health in young people: Cohort study. British Medical Journal. 2002; 325(7374):1195–1198. [PubMed: 12446533]
- Peleg-Oren N, Cardenas GA, Comerford M, Galea S. An association between bullying behaviors and alcohol use among middle school students. The Journal of Early Adolescence. 2012
- Pentz MA, Dwyer JH, MacKinnon DP, Flay BR, Hansen WB, Wang EY, Johnson CA. A multicomunity trial for primary prevention of adolescent drug abuse: Effects on drug use

prevalence. *Journal of the American Medical Association*. 1989; 262:3259–3266. [PubMed: 2785610]

Radliff KM, Wheaton JE, Robinson K, Morris J. Illuminating the relationship between bullying and substance use among middle and high school youth. *Addictive Behaviors*. 2012; 37:569–572. [PubMed: 22277772]

Rivers I, Poteat VP, Noret N, Ashurst N. Observing bullying at school: The mental health implications of witness status. *School Psychology Quarterly*. 2009; 24(4):211.

Reijntjes A, Kamphuis JH, Prinzie P, Boelen PA, van der Schoot M, Telch MJ. Prospective linkages between peer victimization and externalizing problems in children: A meta-analysis. *Aggressive Behavior*. 2011; 37:215–222. [PubMed: 21433031]

Reijntjes A, Kamphuis JH, Prinzie P, Telch MJ. Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect*. 2010; 34(4):244–252. [PubMed: 20304490]

Rosenbaum JE. Truth or consequences: The intertemporal consistency of adolescent self-report on the Youth Risk Behavior Survey. *American Journal of Epidemiology*. 2009; 169:1388–1397. [PubMed: 19363096]

Stadler C, Feifel J, Rohrmann S, Vermeiren R, Poustka F. Peer victimization and mental health problems in adolescents: Are parental and school support protective? *Child Psychiatry and Human Development*. 2010; 41:371–386. [PubMed: 20221691]

Sullivan TN, Farrell AD, Kliwer W. Peer victimization in early adolescence: Association between physical and relational victimization and drug use, aggression, and delinquent behaviors among urban middle school students. *Development and Psychopathology*. 2006; 18:119–137. [PubMed: 16478555]

Tharp-Taylor S, Haviland A, D'Amico EJ. Victimization from mental and physical bullying and substance use in early adolescence. *Addictive Behaviors*. 2009; 34:561–567. [PubMed: 19398162]

Vernberg, EM.; Biggs, BK. *Preventing and Treating Bullying and Victimization*. New York: Oxford University Press; 2010.

Vernberg EM, Nelson TD, Fonagy P, Twemlow SW. Victimization, aggression, and visits to the school nurse for somatic complaints, illnesses, and physical injuries. *Pediatrics*. 2011; 127(5):842–848. [PubMed: 21518714]

Wills TA, Gibbons FX, Gerrard M, Bordy GH. Protection and vulnerability processes relevant for early onset of substance use: A test among African American children. *Health Psychology*. 2000; 19:253–263. [PubMed: 10868770]

Yu, CY.; Muthen, BO. *Evaluation of Model Fit Indices for Latent Variable Models with Categorical and Continuous Outcomes (Technical report)*. Los Angeles: University of California, Los Angeles, Graduate School of Education and Information Studies; 2001.

Figure 1. Path model evaluating associations between involvement in peer victimization and substance use outcomes

*and bolded line = $p < .05$; [†] and solid line = $p < .10$; dotted line = $p > .10$.

Table 1

Correlations, means, and standard deviations.

	1	2	3	4	5	6	7	8
1. Grade	-							
2. Gender	-.10	-						
3. Physical Aggression	-.07	-.20**	-					
4. Relational Aggression	.00	-.08	.60**	-				
5. Physical Victimization	-.12	-.19**	.77**	.54**	-			
6. Relational Victimization	.08	-.09	.54**	.74**	.52**	-		
7. Willingness	-.20**	-.20**	.30**	.09	.22**	.06	-	
8. Use	-.04	-.15*	.14*	.02	.06	.08	.29**	-
Mean	3.04	1.50	3.31	3.71	3.20	3.49	.13	.07
Std. Deviation	.82	.50	1.18	1.76	.95	1.34	.33	.26

*
 $p < .05$ **
 $p < .01$