Peer Victimization in Middle Childhood Impedes Adaptive Responses to Stress: A Pathway to Depressive Symptoms

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Abstract

Although associations between peer victimization in childhood and later psychopathology are well documented, surprisingly little research directly examines pathways accounting for these enduring effects. The present study addresses this issue by examining whether maladaptive responses to peer aggression (less effortful engagement coping and more involuntary responses) mediate associations between peer victimization and later depressive symptoms. Data were collected on 636 children (338 girls, 298 boys; *M* =8.94 years, *SD* =.37) for three consecutive years beginning in 3rd grade. Findings supported the proposition that peer victimization predicts lower levels of effortful engagement coping and higher levels of involuntary engagement and disengagement responses to stress. Moreover, these responses to stress helped to explain the link between 3rd-grade peer victimization and 5th-grade depressive symptoms. No sex differences in these linkages emerged. These findings build on prior theory and research by providing a more nuanced understanding of how and why peer victimization serves as an early risk factor for depressive symptoms.

Peer victimization has been at the forefront of the public discourse on children's safety and well-being for well over a decade. Peer victimization serves as a significant source of stress for many children and can lead to adverse mental health consequences that persist long after the immediate experience of being harassed (Hanish & Guerra, 2002; Ladd & Troop-Gordon, 2003; Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011). Of particular concern is the risk that peer victimization poses for depressive symptoms. A meta-analysis by Hawker and Boulton (2000) identified depressive symptoms as one of the strongest mental health correlates of peer victimization. Moreover, longitudinal studies have established peer

victimization as a significant predictor of depressive symptoms over time (Bilsky et al., 2013; Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011; Taylor, Sullivan, & Kliewer, 2013). Depressive symptoms and related internalizing problems, in turn, predict future peer victimization (Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006; Sweeting, Young, West, & Der, 2006; Tran, Cole, & Weiss, 2012), suggesting an escalating cycle of peer abuse and emotional distress (Hodges & Perry, 1999; Reijntjes, Kamphius, Prinzie, & Telch, 2010). Understanding why peer victimization has lasting effects on mental health is imperative for breaking this cycle (Barchia & Busey, 2010; Hoglund & Leadbeater, 2007; Ladd & Troop-Gordon, 2003; McLaughlin, Hatzenbuehler, & Hilt, 2009; Troop-Gordon & Ladd, 2005). The present study addressed this issue by examining whether the link between peer victimization and subsequent depressive symptoms can be explained by erosion in children's ability to effectively respond to stress.

PEER VICTIMIZATION AND RESPONSES TO STRESS

This study is premised on the assumption that peer victimization impedes children's ability to effectively cope with stressful experiences. The hypothesized consequence is dysregulated and ineffectual responses to stress, particularly when encountering difficulties in peer relationships. To test this premise, we drew upon the work of Compas and colleagues (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001), who conceptualize responses to stress as encompassing effortful (volitional) coping strategies as well as involuntary (automatic) physiological, cognitive, behavioral, and affective responses to stress. Within this conceptual framework, stress responses fall along two dimensions: (a) effortful versus involuntary, and (b) engagement with versus disengagement from the stressor. Across these two dimensions, four subtypes of responses to stress can be identified. These include two forms of effortful coping responses—effortful engagement (e.g., problem solving, cognitive restructuring) and effortful disengagement (e.g., avoidance, denial)—and two forms of involuntary stress responses—involuntary engagement (e.g., rumination, emotional arousal) and involuntary disengagement (e.g., emotional numbing, escape). Among adults, stress responses assume a traitlike quality, showing little change across time or contexts (Compas, Connor, Saltzman, Thomsen, & Wadsworth, 1999). However, the stress responses of children are more context specific and open to change (Compas et al., 2001). Thus, social experiences occurring during childhood may have a formative role in the development of stress reactivity and coping.

Peer victimization likely hampers children's' ability to respond to stress with effortful engagement coping. Effortful engagement strategies serve to change a stressful situation or promote adaptation to stressful circumstances and, therefore, are presumed to foster healthy relationships and emotional well-being (Compas et al., 2001; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). For children who experience relatively frequent peer victimization, however, such strategies may feel futile. Their attempts to resolve conflicts or prevent further harassment may be ineffective (Kochenderfer-Ladd & Skinner, 2002; Visconti & Troop-Gordon, 2010), leading to feelings of helplessness. Moreover, ensuing frustration and pessimism may impair their ability to reframe stressors in a positive light. Over time, peer victimization may result in reduced efforts to address stress through engagement coping. In the absence of active efforts to change or adapt to peer stress, peer

victimization may increase the likelihood that children cope with problems in their peer relationships through effortful disengagement. Consistent with this proposition, children who are the targets of peer victimization often withdraw from peer activities (Boivin, Petitclerc, Feng, & Barker, 2010) and may even stay home from school as a means of preventing further harassment (Buhs, Ladd, & Herald, 2006; Kochenderfer & Ladd, 1996). To the extent that encounters with peers are unavoidable, children experiencing high levels of peer victimizaton also may enlist cognitive disengagement strategies (e.g., denial, wishful thinking) as a means of distancing themselves from peer stress.

Peer victimization also may lead to heightened involuntary responses to peer aggression. Victimization can elicit high levels of physiological and emotional arousal and dysregulation (Rudolph, Troop-Gordon, & Flynn, 2009; Vaillancourt et al., 2008), taxing children's ability to effectively regulate their emotions, thoughts, and behaviors in response to stress (Herts, McLaughlin, & Hatzenbuehler, 2012; McLaughlin et al., 2009; Rudolph et al., 2009). Thus, among children who are frequently victimized by peers, peer aggression may trigger a series of automatic responses including those that reflect involuntary engagement (e.g., ruminative thoughts, physiological arousal) or involuntary disengagement (e.g., emotional numbness, inaction). Such involuntary responses to stress not only may be detrimental on their own but also may impede the use of more adaptive, effortful engagement strategies (Compas, 1987; Compas & Boyer, 2001).

RESPONSES TO STRESS AND DEPRESSIVE SYMPTOMS

Our second premise was that maladaptive responses to peer aggression provide a mechanism through which peer victimization contributes to subsequent depressive symptoms. Theory and research link responses to stress with mental health outcomes (Carver & Connor-Smith, 2010; Compas et al., 2001). Actively engaging with a stressor is presumed to curtail risk for depressive symptoms by reducing negative affect, promoting a sense of competence, and fostering supportive relationships (Flynn & Rudolph, 2007, 2010). The protective effects of effortful engagement coping have been borne out in the literature. Effortful engagement coping is associated with lower levels of internalizing problems in children (Compas et al., 2006; Connor-Smith et al., 2000; Thomsen et al., 2002; Valiente, Lemery-Chalfant, & Swanson, 2009) and has been specifically linked to lower levels of depressive symptoms among young adolescents (Jaser et al., 2008; Wadsworth, Rieckmann, Benson, & Compas, 2004). However, only a few studies have established prospective relations between effortful engagement coping and lower levels of depressive symptoms (Agoston & Rudolph, 2011; Flynn & Rudolph, 2011; Osowiecki & Compas, 1999).

In comparison to effortful engagement, the research on effortful disengagement strategies has been mixed (Compas et al., 2001). Although often construed as a risk factor for mental health (Connor-Smith et al., 2000), research on children has not found that disengagement coping in response to peer stress is associated with higher levels of depressive symptoms concurrently (Flynn & Rudolph, 2007) or over time (Agoston & Rudolph, 2011). However, voluntary disengagement in response to peer stress was concurrently associated with more internalizing symptoms in a recent study of early adolescents (Sontag & Graber, 2010). As evidence of concurrent associations between effortful disengagement and depressive

symptoms is inconsistent, and no evidence of an association has been found longitudinally, it was not anticipated that effortful disengagement would predict subsequent depressive symptoms in the current study.

Theory and empirical evidence implicate involuntary engagement and disengagement responses as risk factors for depressive symptoms. These responses likely amplify negative affect, lead to intrusive thoughts that compromise well-being, and impede the successful resolution of interpersonal problems, thereby heightening risk for depression (Agoston & Rudolph, 2011; Compas et al., 2001; Flynn & Rudolph, 2011). Research consistently shows that involuntary responses to stress are positively linked to internalizing problems among children (Connor-Smith et al., 2000; Jaser et al., 2008; Langrock, Compas, Keller, Merchant, & Copeland, 2002; Silk, Steinberg, & Morris, 2003; Wadsworth et al., 2004). Involuntary responses also predict increases in depressive symptoms among early adolescents (Flynn & Rudolph, 2011).

The proposition that responses to stress mediate the link between peer victimization and depressive symptoms also has received preliminary empirical support. Examining early adolescent girls, Sontag, Graber, Brooks-Gunn, and Warren (2008) found that lower levels of voluntary engagement coping and higher levels of involuntary engagement responses to interpersonal stress partially accounted for the relation between exposure to numerous peer stressors (e.g., having fights with peers, not having many friends, being teased by peers) and internalizing distress. In a subsequent study of early adolescent boys and girls, Sontag and Graber (2010) found that involuntary responses to interpersonal stress fully mediated, and voluntary disengagement coping partially mediated, links between peer stress and internalizing symptoms. However, these studies relied solely on cross-sectional data. Thus, although consistent with the proposed mediated pathways, the observed linkages could be attributed to stress responses contributing to children's interpersonal difficulties (Flynn & Rudolph, 2011) and/or to the influence of emotional distress on peer stressors or stress responses.

STUDY OVERVIEW

The goal of the present investigation was to test a theoretical model describing one process through which peer victimization may contribute to subsequent depressive symptoms. It was hypothesized that peer victimization would forecast lower levels of effortful engagement coping and higher levels of involuntary responses to stress, which would predict heightened subsequent depressive symptoms. Although it was not anticipated that effortful disengagement coping would predict heightened depressive symptoms, potential indirect effects were explored. Building on prior research, this study used a rigorous prospective longitudinal design examining the proposed process model across three consecutive years, following children from third through fifth grades. During this development stage, children place increasing importance on peer acceptance and close dyadic relationships (Rubin, Bukowski, & Parker, 2006; Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005) and make substantial gains in their ability to independently regulate their emotions and behavior (Denham, 2007; Higgins, 1991; Shields & Cicchetti, 1997). Thus, exposure to peer victimization may be particularly detrimental to the development of effective stress

responses during this period. Moreover, the inability to effectively regulate stress responses may play a critical role in the early emergence of depressive symptoms.

Also investigated were potential sex differences in the hypothesized process model. Girls place greater value on their interpersonal relationships than do boys (Rose & Rudolph, 2006), perhaps increasing the likelihood that victimization impairs girls' responses to peer aggression more so than boys' responses and/or that ineffective stress responses are more likely to precipitate depressive symptoms in girls than in boys. Consistent with this notion, Agoston and Rudolph (2011) found that responses to interpersonal stress predicted subsequent levels of depression in girls but not in boys, although other studies have found no sex differences in these relations, particularly in preadolescents (Sontag & Graber, 2010; Valiente et al., 2009). Thus, potential sex differences also were examined to test the hypothesis that the indirect paths would be stronger for girls than for boys.

METHOD

Participants and Procedures

Participants were 636 third graders (338 girls, 298 boys; $M = 8.94$ years, $SD = .37$) from several small urban and rural Midwestern towns. The sample included children from various ethnic groups (66.7% White, 21.7% African American, 7.1% Asian American, 4.5% Other) and socioeconomic backgrounds (34.7% received a subsidized school lunch). Consent forms were sent home through schools and were distributed at parent–teacher conferences. Parents provided written consent, and children provided oral assent. Participants completed the questionnaires on two occasions, 1 to 2 weeks apart, in the spring semester for 3 years (third to fifth grades). Child measures were administered aloud in classrooms in small groups (three to four students). Nonparticipating students engaged in regular activities outside the classrooms. Teachers returned their surveys in a locked box at their school or in person.

In second grade, of the 724 eligible children, 576 (80%) received parental consent to participate. Participants and nonparticipants in second grade did not significantly differ in sex, $\chi^2(1) = .15$, ns; age, $t(723) = .63$, ns; ethnicity (White vs. minority), $\chi^2(1) = .59$, ns; or school lunch status (full pay vs. subsidized), $\chi^2(1) = .35$, ns. Children attended one of 11 schools. In third grade, an additional 60 classmates of the participants were recruited. By the fifth grade, participating children attended 99 different schools. Of the 636 participants, 527 (83%) had complete data on the study variables across all three waves. The percentage of participants with complete data was 93%, 90%, and 88% in third, fourth, and fifth grades, respectively. Participants with and without missing data did not significantly differ on demographics or most study variables ($ts < 1.24$, $\chi^2 < 1.09$, ns) except for (a) age, third grade: $t(595) = 2.58$, $p < .05$ ($M = 9.05$, $SD = .41$ vs. $M = 8.93$, $SD = .36$, $d = .33$); fourth grade: $t(572) = 3.96$, $p < .001$ ($M = 10.15$, $SD = .45$ vs. $M = 9.93$, $SD = .35$, $d = .60$); fifth grade: $t(557) = 5.10$, $p < .001$ ($M = 11.27$, $SD = 44$ vs. $M = 10.93$, $SD = .36$, $d = .93$), (b) fifth-grade effortful engagement, $t(556) = 2.23$, $p < .05$ ($M = .37$, $SD = .08$ vs. $M = .40$, $SD = .06$, $d = .41$), and (c) fifth-grade involuntary engagement, $t(556) = 2.09$, $p < .05$ ($M = .24$, $SD = .05$ vs. $M = .22$, $SD = .04$, $d = .39$).

Measures

Table 1 provides descriptive and psychometric information for the measures. As sex was not found to moderate the hypothesized associations (see the Results section), descriptive statistics are presented across sex. *T* tests revealed no significant sex differences in the mean levels of the study variables, with the exception of fifth-grade involuntary disengagement, $t(556) = 2.09$, $p < .05$ ($M = .17$, $SD = .04$ vs. $M = .16$, $SD = .16$, $d = .18$), with boys scoring higher than girls. All of the measures showed strong internal consistency.

Peer victimization—Children and teachers completed a revised version (Rudolph, Troop-Gordon, Hessel, et al., 2011) of the Social Experiences Questionnaire (SEQ; Crick & Grotpeter, 1996) to assess exposure to victimization. Eleven items (e.g., "How often does another kid insult you or put you down?"; "How often does a friend spread rumors about you because they are mad at you?") were added to the original measure to provide a more comprehensive assessment. Children checked a box, and teachers provided a rating indicating how often children experienced each type of victimization on a 5-point scale from 1 (*never*) to 5 (*all the time*). Scores were computed as the mean of the items, with higher scores reflecting more exposure to overt and relational victimization. This revised version has strong reliability (αs = .92–.95) and predicts psychological and behavioral maladjustment (Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011). Self-reports of victimization correspond to reports by peers (Graham & Juvonen, 1998) and parents (Bollmer, Harris, & Milich, 2006). Teacher reports of victimization also have established reliability and predict psychosocial maladjustment (Ladd & Kochenderfer-Ladd, 2002), and self- and teacher-reported victimization are significantly correlated (Ladd & Kochenderfer-Ladd, 2002). Although factor analysis of the SEQ yields separate overt and relational victimization subscales (e.g., Crick & Grotpeter, 1996), subscale scores often are highly correlated (e.g., *r* = .57, *p* < .01; Crick & Grotpeter, 1996) as they were in the current data (all *r*s .74). Preliminary analyses revealed no substantive differences in the results when these two forms of victimization were examined separately. Therefore, scores were calculated separately for self- and teacher-reports averaging across overt and relational victimization items.

Correlations between self-reported and teacher-reported peer victimization were modest (within-wave *r*s ranged from .25 to .36, *p*s < .001). Previous research suggests that the correlates of peer victimization may be dependent on the source of the data (Bouman et al., 2012; Graham & Juvonen, 1998). Thus, discrete sources of data may provide unique information regarding the role of peer victimization in the development of psychopathology. Therefore, models were estimated separately for self-reported and teacher-reported peer victimization, allowing for a test of the robustness of the hypothesized pathways across informants.

Responses to stress—Children completed a revision (Rudolph, Abaied, Flynn, Sugimura, & Agoston, 2011) of the Responses to Stress Questionnaire (Connor-Smith et al., 2000), modified to assess responses to peer aggression (when other kids are mean). Children checked a box indicating how often they engaged in each response on a 4-point scale from 1 (*not at all*) to 4 (*very much*) when peers are mean to them. The original measure consists of 57 items across 19 subscales. The items were reworded for younger children and the

measure was shortened. Based on item-total correlations examined in two samples (Connor-Smith et al., 2000; Flynn & Rudolph, 2007), the highest loading items on each subscale were retained. When item loadings were different across the samples, we selected items most relevant to responses to peer aggression or items from the sample closer in age to the present one. This process yielded a 41-item measure that retained the same 19 subscales, grouped into four dimensions as the original measure: (a) effortful engagement (14 items; e.g., "I do something to try to fix the problem or take action to change things."), (b) effortful disengagement (nine items; e.g., "I try to believe it never happened."), (c) involuntary engagement (10 items; e.g., "I keep remembering what happened or can't stop thinking about what might happen."), and involuntary disengagement (eight items; e.g., "I don't feel anything at all, it's like I have no feelings." "I just have to get away, I can't stop myself."). Consistent with other studies of responses to stress (Connor-Smith et al., 2000; Osowiecki & Compas, 1999), to account for differences in the overall level of responses to stress, proportion scores were computed as the score for each subscale divided by the total score. Connor-Smith and others found good internal consistency (*a*s =.73–.89) and test–retest reliability over 1 to 2 weeks (*r*s =.69–.81; Connor-Smith et al., 2000). Convergent and discriminant validity have been established through correlations with another well-validated coping measure (Connor-Smith et al., 2000). In addition, the scores on effortful disengagement and involuntary engagement were correlated with heart rate reactivity (Connor-Smith et al., 2000).

Depressive symptoms—Children completed the Short Mood and Feelings Questionnaire (Angold, Costello, Messer, & Pickles, 1995). This measure includes 13 items describing children's depressive symptoms (e.g., "I felt unhappy or miserable."). Children checked a box indicating how often they experienced each symptom in the past 2 weeks. To provide a format similar to other questionnaires, the response options were changed from a 3-point to a 4-point scale, ranging from 1 (*not at all*) to 4 (*very much*); see also Lau & Eley (2008). Scores were computed by averaging across items. Reliability and validity have been documented (Angold et al., 1995), and this measure differentiates depression from other psychiatric diagnoses (Thapar & McGuffin, 1998). This measure has good convergent validity with a widely used diagnostic depression measure and discriminates clinically depressed children from nondepressed children and clinically referred psychiatric children from pediatric patients (Angold et al., 1995). Cronbach's alphas for the present sample (Table 1) are comparable to that reported in the measurement development study (.87) using the original 3-point scale (Angold et al., 1995).

RESULTS

Intercorrelations Among the Variables

Table 2 presents intercorrelations among the variables. Within waves, victimization was significantly negatively correlated with effortful engagement, not correlated with effortful disengagement, and significantly positively correlated with involuntary engagement, involuntary disengagement, and depressive symptoms. Within waves, depressive symptoms were significantly negatively correlated with effortful engagement and significantly

positively correlated with involuntary engagement and disengagement. Depressive symptoms and effortful disengagement were weakly negatively correlated.

Data Analytic Strategy and Preliminary Analyses

Path analyses were conducted using Mplus statistical software (Muthén & Muthén, 1998–2007) to examine whether third-grade victimization indirectly predicted fifth-grade depressive symptoms through fourth-grade stress responses. All models were tested using full information maximum likelihood estimation (Enders & Bandalos, 2001), allowing for parameter estimation based on all available data from the 636 children. The models were specified following recommendations from Cole and Maxwell (2003). Separate models were tested for effortful engagement, effortful disengagement, involuntary engagement, and involuntary disengagement (see Figures 1 and 2). Each model included peer victimization, stress responses, and depressive symptoms at each of the three waves (third, fourth, and fifth grades). Self-reported and teacher-reported peer victimization were tested in separate models. Autoregressive paths and stability coefficients from third to fifth grade were estimated, as were covariances between constructs within each wave. As previous research has suggested that depressive symptoms may contribute to continued or heightened peer harassment (Sweeting et al., 2006; Tran et al., 2012), cross-lagged paths were included to account for associations between third- and fourth-grade depressive symptoms and fourth- and fifth-grade peer victimization, respectively. Paths also were added to account for proximal effects of third- and fourth-grade peer victimization on fourth- and fifth-grade depressive symptoms not accounted for by changes in stress responses. To test the hypothesized indirect effects, cross-lagged paths were included between third- and fourth-grade peer victimization and fourth-and fifth-grade stress responses, respectively, and between third- and fourth-grade stress responses and fourth- and fifth-grade depressive symptoms, respectively. Child ethnicity (0 =White; 1 =other) was included as a predictor of all variables in the models.

A series of preliminary models was first tested to establish whether (a) the pattern of associations varied for overt and relational peer victimization; (b) there were meaningful sex differences in the hypothesized indirect effects of peer victimization on depressive symptoms through stress responses; and (c) whether autoregressive paths, cross-lagged paths, and within-wave covariances remained stable over time (see Cole & Maxwell, 2003). Multigroup path analyses and chi-square difference tests were employed when testing for sex differences. When data were collapsed across sex, sex (0 =boys, 1 =girls) was included as a predictor of all study variables.

When examining models separately for overt and relational victimization, there were no differences in the magnitude or significance of (a) the paths from third-grade peer victimization to fourth-grade stress responses, (b) the paths from fourth-grade stress responses to fifth-grade depressive symptoms, or (c) the confidence intervals (CIs) for the hypothesized indirect effects. No significant sex differences in the paths of interest emerged. When data were collapsed across sex, the findings for overt and relational victimization again did not differ. Therefore, the total peer victimization score was used in all subsequent analyses.

Models were next estimated to test for sex differences when total peer victimization scores were used. No significant sex differences emerged for the four models testing teacher-reported victimization or for the models testing indirect effects of self-reported victimization through effortful disengagement or through involuntary disengagement, $\chi^2(10)$ 17.26, *ns.* Freeing paths to be estimated separately for girls and boys improved the fit of the model testing the indirect effects of self-reported victimization through effortful engagement, $\chi^2(10)$ 20.35, p =.03, and involuntary engagement, $\chi^2(10)$ 21.96, p =.02. Sequentially testing each path for sex differences revealed sex differences in the stability of depression from fourth to fifth grade and in some of the within-wave covariances, although in each case the coefficients were significant and in the same direction for boys and girls. Due to the lack of substantive sex differences related to our central hypotheses, data were collapsed across sex for all subsequent analyses. Sex was retained as a predictor of all variables in the models.

Paths were then sequentially freed to test for equality of associations over time (e.g., the equality of the autoregressive paths across waves; stability of cross-lagged associations). For each of the four models testing self-reported victimization, the path from third-grade depressive symptoms to fourth-grade victimization was stronger than the path from fourth-grade depressive symptoms to fifth-grade victimization. For each of the four models testing teacher-reported victimization, the path from third-grade victimization to fourth-grade victimization was stronger than the path from fourth-grade victimization to fifth-grade victimization.

A final set of models was then estimated. Ethnicity and sex were retained as covariates of each variable in the models, and models were estimated separately for self-reported and teacher-reported peer victimization scores. Thus, eight models (2 sources of peer victimization data ×4 stress responses) were tested.

Results of Final Path Analyses

Fit statistics for the final path analyses are presented in Table 3, and standardized parameter estimates for the final models are presented in Figures 1 and 2. Standard errors of these estimates can be obtained from the first author. For each model, we report the indirect effect of third-grade victimization on fifth-grade depressive symptoms through fourth-grade stress responses as well as the 95% CI for the bootstrap estimate of the indirect effect using 5,000 resamples (MacKinnon, Lockwood, & Williams, 2004). To ease readability of the figures, within-wave covariances (presented next) and paths from sex and ethnicity are not displayed. Within-wave covariances between victimization and depression (ranging from .00 to .47) consistently were stronger in third grade than fourth and fifth grades. Within-wave covariances between victimization and stress responses (absolute values ranging from .02 to .30) and between stress responses and depressive symptoms (absolute values ranging from .05 to .45) were small to moderate in magnitude and with few exceptions did not differ between third, fourth, and fifth grades. Across all eight models, depressive symptoms in the fifth grade were predicted by sex (.07 to .08, p .05) and ethnicity (−.07 to − .08, p .05), reflecting higher levels in girls and White children than in boys and non-White children, respectively. In addition, teacher-reported victimization in the fourth (.14 to .15, $p < .001$)

and fifth (.20, $p < .001$) grades was predicted by ethnicity, reflecting higher levels in non-White than White children. Teacher-reported victimization in the fourth grade also was predicted by sex ($-.08$, $p =.04$), reflecting higher levels in boys than girls.

Effortful engagement—Figure 1a presents the standardized path estimates for the models testing the indirect effects of third-grade self-reported and teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful engagement. Even after accounting for cross-wave stability, self-reported and teacher-reported victimization predicted less subsequent effortful engagement; in turn, effortful engagement predicted fewer subsequent depressive symptoms. The indirect effect of third-grade self-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful engagement was significant because the 95% CI for the indirect effect did not include 0 (.01), 95% CI [.001, .012]. The indirect effect of third-grade teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful engagement also was significant (.01), 95% CI [.004, .018].

Effortful disengagement—Figure 1b presents standardized path estimates for the models testing the indirect effects of third-grade self-reported and teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful disengagement. Although effortful disengagement predicted fewer subsequent depressive symptoms, self-reported and teacher-reported victimization did not predict subsequent effortful disengagement. The indirect effect of third-grade self-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful disengagement was 0, 95% CI [$-.005$, .003]. The indirect effect of third-grade teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade effortful disengagement also was 0, 95% CI [$-.006$, .003]. Therefore, neither indirect effect was significant.

Involuntary engagement—Figure 2a presents the standardized path estimates for the models testing the indirect effect of self-reported and teacher-reported third-grade victimization on fifth-grade depressive symptoms via fourth-grade involuntary engagement. Although self-reported victimization predicted heightened involuntary engagement, involuntary engagement did not predict subsequent depressive symptoms. The indirect effect of third-grade self-reported victimization on fifth-grade depressive symptoms via fourth-grade involuntary engagement was 0, 95% CI [.000, .009] and, therefore, not significant. Even after accounting for cross-wave stability, teacher-reported victimization predicted heightened subsequent involuntary engagement; in turn, involuntary engagement predicted more subsequent depressive symptoms. The indirect effect of third-grade teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade involuntary engagement was significant (.01), 95% CI [.002, .014].

Involuntary disengagement—Figure 2b presents the standardized path estimates for the models testing the indirect effects of third-grade self-reported and teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade involuntary disengagement. Even after accounting for cross-wave stability, self-reported and teacher-reported victimization predicted more subsequent involuntary disengagement; in turn,

involuntary disengagement predicted more subsequent depressive symptoms. The indirect effect of third-grade self-reported victimization on fifth-grade depressive symptoms via fourth-grade involuntary disengagement was .01, 95% CI [.003, .019]. The indirect effect of third-grade teacher-reported victimization on fifth-grade depressive symptoms via fourth-grade involuntary disengagement also was .01, 95% CI [.002, .019]. Therefore, both indirect effects were significant.

DISCUSSION

Increasingly, evidence points to peer victimization as a source of substantial stress for children (Hanish & Guerra, 2002; Hawker & Boulton, 2000; Ladd & Troop-Gordon, 2003; Rudolph, Troop-Gordon, Hessel, & Schmdit, 2011). We proposed that this stress impedes children's ability to adaptively respond to interpersonal challenges, placing them at risk for depressive symptoms. Consistent with this proposition, peer victimization predicted lower levels of effortful engagement coping and heightened involuntary responses to peer aggression 1 year later. These maladaptive stress responses, in turn, predicted depressive symptoms the following year, yielding a pathway through which peer victimization predicted later depressive symptoms. These findings are consistent with the proposition that peer victimization leaves an enduring legacy on depressive symptoms by impairing children's ability to effectively respond to stress.

Peer Victimization and Responses to Stress

Although previous research documents concurrent associations between difficulties in peer relationships and children's responses to stress (Sontag & Graber, 2010; Sontag et al., 2008), this study was novel in identifying longitudinal associations between peer victimization and lower levels of effortful engagement coping as well as higher levels of involuntary engagement and disengagement. Thus, this study provides compelling evidence that peer victimization may disrupt children's ability, or propensity, to actively cope with the stress caused by peer aggression and may foster more involuntary responses including rumination, physiological arousal, and escape. Furthermore, these findings complement research documenting associations between peer victimization and dysregulation in cognitive, emotional, and physiological systems (Barchia & Bussey, 2010; Rudolph et al., 2009; Rudolph, Troop-Gordon, & Granger, 2011; Vaillancourt et al., 2008). Disruptions in these systems may underlie an inability to enact planful engagement strategies (e.g., problem solving) or to inhibit involuntary responses when encountering stress in relationships.

By studying these links longitudinally, the findings also suggest that children's stress responses may be evolving during middle childhood. Coping responses in adulthood have been characterized as having a traitlike quality, varying little over interpersonal contexts or time (Compas et al., 1999). In childhood and adolescence, however, coping responses are believed to vary depending on the nature of the problem encountered and as a function of the child's cognitive and emotional maturity (Compas et al., 2001). Yet few studies have examined changes in stress responses and what factors may affect their development (Skinner & Zimmer-Gembeck, 2007). The current findings provide evidence that peer

victimization may disrupt the development of effortful engagement strategies and trigger involuntary responses to stress.

Responses to Stress and Depressive Symptoms

Links between maladaptive responses to stress and internalizing problems, including depressive symptoms, have been documented in adult and children samples (e.g., Connor-Smith & Compas, 2002; Flynn & Rudolph, 2011; Silk et al., 2003; Valiente et al., 2009; Wadsworth, Santiago, & Einhorn, 2009). In the current study, maladaptive responses to peer aggression, including low levels of effortful engagement and high levels of involuntary responses, forecast heightened levels of depression 1 year later. This is one of the few studies to provide evidence that maladaptive stress responses prospectively predict depressive symptoms among children (see also Flynn & Rudolph, 2011). Consistent with our proposed process model, these findings also indicated that peer victimization is indirectly associated with subsequent depressive symptoms through lower levels of effortful engagement coping and heightened involuntary responses to interpersonal stress. It should be noted that these indirect effects emerged despite being tested within a highly conservative model in which all autoregressive paths were estimated and cross-wave associations were presumed to be stable across time points (Cole & Maxwell, 2003). For involuntary engagement, a significant indirect effect was found when examining teacher-reported peer victimization. The pattern was somewhat weaker and not statistically significant (i.e., 0 was the bottom limit for the 95% CI for the indirect effect) when self-reported victimization. This discrepancy may be due to the moderately strong bivariate relation between self-reported peer victimization and involuntary engagement within each wave. Thus, predictive associations between involuntary engagement and subsequent depressive symptoms may have been masked by the covariance with self-reported peer victimization.

In addition to the indirect effect from third-grade peer victimization to fifth-grade depressive symptoms, victimization predicted heightened depressive symptoms 1 year later. It is possible that changes in responses to stress also account for these more proximal links between victimization and depressive symptoms. Studies in which stress responses are assessed multiple times within the same school year would allow for a test of whether more immediate links between peer victimization and depressive symptoms can be accounted for by a compromised ability to effectively respond to interpersonal stress. It also is possible that additional mediators (e.g., emotional dysregulation, need for approval, negative self-perceptions; Rudolph, Caldwell, & Conley, 2005; Rudolph et al., 2009; Troop-Gordon & Ladd, 2005) account for the links between peer victimization and depressive symptoms. It is therefore important to simultaneously study the role of stress responses along with other possible mediating processes when examining the enduring effects of peer victimization on mental health.

Of the indirect paths studied, only the one through effortful disengagement proved nonsignificant. This was due to a lack of association between peer victimization and effortful disengagement 1 year later. Among elementary school students, effortful disengagement strategies may be difficult to employ in response to peer aggression. Behavioral avoidance, for example, may not be possible for children who spend much of

their day with the same set of peers, and denial or wishful thinking may be challenging when victimization is frequent. Although links between effortful disengagement and mental health have been mixed, in the current study, effortful disengagement predicted lower levels of subsequent depressive symptoms, indicating that children experiencing peer victimization may be at a disadvantage in not learning to employ disengagement coping when faced with interpersonal stress. However, as effortful disengagement has been associated with higher levels of depression and internalizing problems among adolescents (Connor-Smith et al., 2000; Sontag & Graber, 2010), encouraging this form of coping may have deleterious consequences later in development.

Reciprocal Associations Between Victimization and Depressive Symptoms

Paths also were included to account for reciprocal linkages between depressive symptoms and subsequent peer victimization. Evidence that depressive symptoms elicit victimization from peers is not new (Kochel, Ladd, & Rudolph, 2012; Tran et al., 2012) and is highly consistent with the stress-generation perspective of depression (Hammen, 1991). Children with heightened depressive symptoms have difficulty responding to relational stress (Agoston & Rudolph, 2011); this difficulty may help explain why depression forecasts later victimization from peers. Alternatively, or in addition, aspects of depressive symptoms, such as irritability or heightened emotional reactivity, may elicit negative reactions from peers or mark depressed children as suitable targets of harassment. Thus, reciprocal associations may be anticipated between peer victimization and depression in childhood, fueled in part by an increasing inability to effectively respond to peer aggression.

Strengths, Limitations, and Future Directions

The current study had a number of strengths including a longitudinal design that spanned 3 years of development, the inclusion of autoregressive paths for all key variables, and the inclusion of sex and ethnicity as covariates. The robustness of the results is underscored by the fact that prospective links replicated across waves, across self-reported and teacher-reported peer victimization, and across sex. However, a few methodological limitations of the current research should be addressed in future studies. Most notably, the current findings are limited to a single developmental period, middle childhood. Although links between responses to stress and depressive symptoms have been identified in child, adolescent, and adult samples (Connor-Smith & Compas, 2002; Flynn & Rudolph, 2011; Silk et al., 2003; Valiente et al., 2009; Wadsworth et al., 2009), whether peer victimization predicts changes in stress responses among older youth remains unknown. With age, stress responses may become increasingly stable and resistant to proximal interpersonal experiences. Alternatively, links between peer victimization and stress responses may be amplified during adolescence when peer victimization peaks (Nansel et al., 2001; Smith, Madsen, & Moody, 1999) and concern for peer status rises (Gavin & Furman, 1989; LaFontana & Cillessen, 2010). Moreover, although sex differences were not found in the current study, the possibility remains that differences in stress responses to peer victimization help explain the well-established sex-linked divergence in trajectories of depression during adolescence.

Although peer victimization was assessed using both self- and teacher-report measures, responses to stress and depressive symptoms were assessed solely through self-report.

Inflation of associations due to shared method variance was likely significantly reduced as a result of estimating the stability of constructs over time in the analytic models; however, future investigations should include multimethod, multi-informant designs. Furthermore, only main effects were tested in this study. The nature and extent of peer victimization's association with stress responses may depend on a range of child characteristics (e.g., need for approval, physiological reactivity to stress) and contextual variables (e.g., presence of supportive others, chronicity of victimization). For parsimony, each stress response also was tested in a separate model. It is possible that the indirect effects identified in this study can be attributed to variance shared by the response strategies and, therefore, it cannot be assumed that unique mediational pathways were identified. Furthermore, investigators have begun considering the interactive contributions of stress responses in the prediction of mental health (Compas & Boyer, 2001). Thus, it will be important in the future to examine how peer victimization may impact the presence of a constellation of responses to interpersonal stress, rather than each stress response individually.

Implications for Practice

The findings from this study underscore the need for intervention programs that not only seek to prevent peer harassment (Hoglund, Hosan, & Leadbeater, 2012; Kärnä et al., 2012) but also address mental health disturbances among children who have been victimized. Programs that foster emotion regulations skills and teach strategies for effectively managing stress in interpersonal relationships would disrupt the development of maladaptive stress responses characteristic of depressed children. As this study showed that peer victimization forecasts ineffective responses to peer stress, victimized children may benefit from practice engaging in adaptive coping strategies to a range of interpersonal stressors (e.g., teasing from peers, conflict with friends). Ultimately, training children in adaptive stress responses may help to prevent the onset or persistence of depressive symptoms associated with victimization.

Acknowledgments

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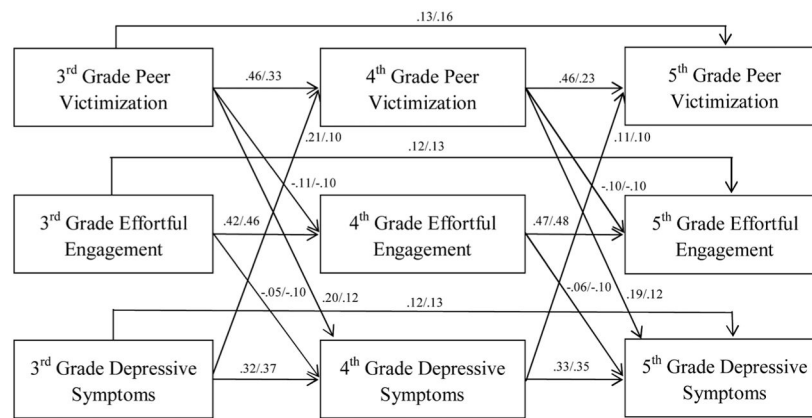
(a) Path analysis testing indirect effect through effortful engagement.
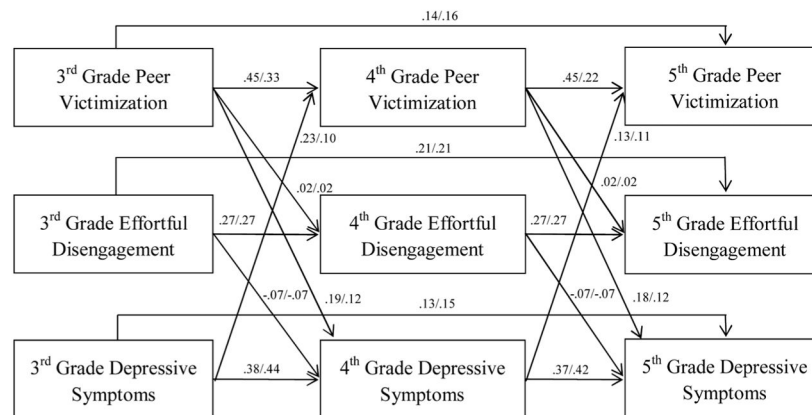
(b) Path analysis testing indirect effect through effortful disengagement.

FIGURE 1.
Standardized coefficients for path analysis of the indirect effect of third-grade peer victimization on fifth-grade depressive symptoms through fourthth grade (a) effortful engagement and (b) effortful disengagement. *Note*: Coefficients for models using self-reported peer victimization are left of the slash, and coefficients for models using teacher-reported peer victimization are right of the slash. Not shown are within-wave covariances and covariances with sex and ethnicity (see text). All paths |.05| or above are significant at *p* < .05.
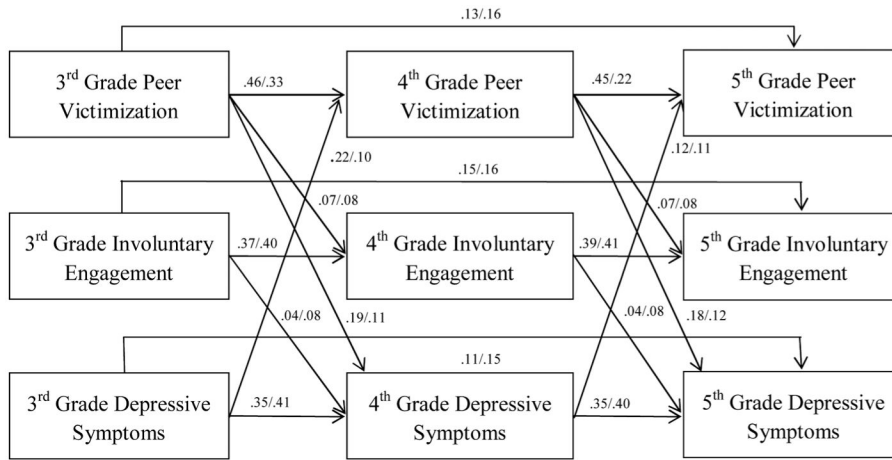
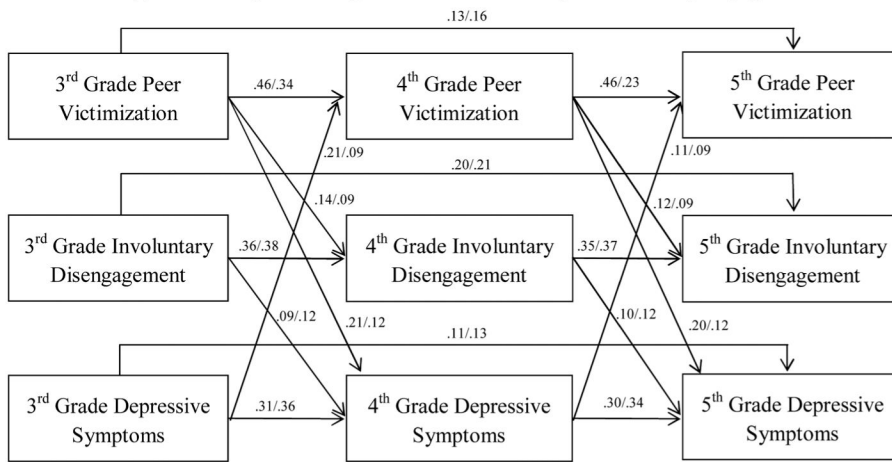(a) Path analysis testing indirect effect through involuntary engagement.

(b) Path analysis testing indirect effect through involuntary disengagement.

FIGURE 2.
Standardized coefficients for path analysis of the indirect effect of third-grade peer victimization on fifth-grade depressive symptoms through fourth-grade (a) involuntary engagement and (b) involuntary disengagement. *Note*: Coefficients for models using self-reported peer victimization are left of the slash, and coefficients for models using teacher-reported peer victimization are right of the slash. Not shown are within-wave covariances and covariances with sex and ethnicity (see text). All paths .07 or above are significant at $p < .05$.

TABLE 1

Descriptive Data

	M	SD	Range	α
3rd-Grade Victimization (self)	1.97	.71	1.00–4.71	.93
3rd-Grade Victimization (teacher)	1.72	.61	1.00–4.05	.97
4th-Grade Victimization (self)	1.84	.67	1.00–4.52	.93
4th-Grade Victimization (teacher)	1.73	.65	1.00–3.81	.97
5th-Grade Victimization (self)	1.78	.65	1.00–4.29	.93
5th-Grade Victimization (teacher)	1.67	.62	1.00–4.05	.97
3rd-Grade Effortful Engagement	.38	.05	.21–.59	.84
4th-Grade Effortful Engagement	.39	.06	.21–.57	.86
5th-Grade Effortful Engagement	.40	.06	.19–.57	.86
3rd-Grade Effortful Disengagement	.23	.04	.14–.40	.77
4th-Grade Effortful Disengagement	.22	.04	.10–.34	.79
5th-Grade Effortful Disengagement	.22	.04	.11–.35	.77
3rd-Grade Involuntary Engagement	.22	.04	.11–.40	.81
4th-Grade Involuntary Engagement	.22	.04	.13–.36	.82
5th-Grade Involuntary Engagement	.22	.04	.12–.39	.83
3rd-Grade Involuntary Disengagement	.17	.03	.09–.31	.73
4th-Grade Involuntary Disengagement	.16	.03	.08–.28	.80
5th-Grade Involuntary Disengagement	.16	.04	.08–.30	.82
3rd-Grade Depressive Symptoms	1.60	.58	1.00–3.69	.87
4th-Grade Depressive Symptoms	1.53	.57	1.00–3.85	.90
5th-Grade Depressive Symptoms	1.51	.60	1.00–4.00	.92

TABLE 2

Intercorrelations of Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. 3rd Grade Victimization (self)																					
2. 3rd Grade Victimization (teacher)	.32																				
3. 4th Grade Victimization (self)	.56	.31																			
4. 4th Grade Victimization (teacher)	.21	.37	.25																		
5. 5th Grade Victimization (self)	.43	.25	.59	.19																	
6. 5th Grade Victimization(teacher)	.23	.28	.28	.33	.26																
7. 3rd Grade Effortful Engagement	−.34	−.24	−.32	−.26	−.28	−.17															
8. 4th Grade Effortful Engagement	−.27	−.24	−.37	−.25	−.31	−.16	.51														
9. 5th Grade Effortful Engagement	−.24	−.24	−.29	−.22	−.37	−.20	.41	.57													
10. 3rd Grade Effortful Disengagement	−.09	.00	−.04	.02	−.05	.00	−.11	.03	.07												
11. 4th Grade Effortful Disengagement	−.01	.06	−.01	−.04	−.04	.08	−.06	−.14	−.01	.31											
12. 5th Grade Effortful Disengagement	−.03	.03	.00	−.02	−.02	.07	−.02	−.03	−.12	.29	.29										
13. 3rd Grade Involuntary Engagement	.34	.17	.29	.16	.26	.13	−.69	−.42	−.31	−.37	−.12	−.15									
14. 4th Grade Involuntary Engagement	.22	.17	.31	.19	.26	.05	−.36	−.76	−.41	−.18	−.30	−.11	.44								
15. 5th Grade Involuntary Engagement	.19	.18	.22	.16	.31	.11	−.32	−.47	−.77	−.18	−.14	−.27	.37	.48							
16. 3rd Grade Involuntary Disengagement	.21	.19	.21	.22	.17	.12	−.71	−.35	−.35	−.14	.02	−.01	.21	.20	.21						
17. 4th Grade Involuntary Disengagement	.23	.18	.29	.25	.27	.16	−.43	−.76	−.51	−.07	−.13	−.03	.31	.37	.36	.37					
18. 5th Grade Involuntary Disengagement	.23	.19	.25	.22	.31	.18	−.34	−.44	−.79	−.12	−.02	−.16	.23	.25	.41	.36	.50				
19. 3rd Grade Depressive Symptoms	.47	.22	.45	.14	.33	.21	−.42	−.32	−.27	−.09	−.01	−.06	.38	.22	.21	.31	.31	.27			
20. 4th Grade Depressive Symptoms	.39	.25	.48	.13	.40	.22	−.30	−.43	−.35	−.08	−.09	−.02	.28	.34	.24	.22	.42	.36	.47		
21. 5th Grade Depressive Symptoms	.28	.18	.40	−.26	.50	.22	−.26	−.31	−.52	−.06	−.14	−.05	.24	.25	.41	.19	.35	.46	.39	.54	

*Note: r*s =|.09| and above are significant at *p* < .05.

TABLE 3

Fit Statistics for Final Path Models

Mediator	χ^2	CFI	RMSEA	SRMR
Effortful Engagement–Self-Report	50.25 (*df* =21, *p* < .001)	.98	.059	.047
Effortful Engagement–Teacher Report	53.68 (*df* =18, *p* < .001)	.97	.056	.044
Effortful Disengagement–Self-Report	14.62 (*df* =21, *ns*)	1.00	.000	.021
Effortful Disengagement–Teacher Report	29.77 (*df* =20, *ns*)	.99	.028	.027
Involuntary Engagement–Self-Report	26.28 (*df* =20, *ns*)	1.00	.022	.041
Involuntary Engagement–Teacher Report	40.92 (*df* =20, *p* =.004)	.98	.041	.034
Involuntary Disengagement–Self-Report	46.89 (*df* =21, *p* < .001)	.98	.044	.042
Involuntary Disengagement–Teacher Report	75.83 (*df* =20, *p* < .001)	.95	.066	.052

Note: CFI =comparative fit index; RMSEA =root mean square error of approximation; SRMR =standardized root mean square residual.