This study examined whether temperamental traits and sex moderate the effects of peer victimization on children’s adjustment over a year to identify factors that put victimized children at heightened risk for adjustment difficulties. Children (N = 282; M age = 7.94 years, SD = 0.32) and teachers reported on exposure to peer victimization. Parents provided ratings of children’s temperament (i.e., inhibitory control and negative emotionality) and depressive symptoms, and teachers provided ratings of children’s aggression. Results revealed that overt victimization predicted aggression in girls with low levels of inhibitory control. Results also revealed that total victimization predicted depressive symptoms in girls with high levels of negative emotionality and in boys with low levels of negative emotionality. This research identifies temperament and sex as contributors to individual differences in children’s responses to peer victimization. The findings are discussed in the context of temperament x environment and diathesis-stress frameworks.
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CHAPTER 1
INTRODUCTION

Approximately 10% of children experience repeated peer victimization, with even more experiencing periodic victimization (Hanish & Guerra, 2000; Olweus, 1978, 1991; Perry, Kusel, & Perry, 1988). This victimization can occur in the form of physical (e.g., hitting, pushing), verbal (e.g., name calling), or relational (e.g., ostracism) aggression. Because peer victimization is associated with a wide range of adjustment difficulties (Hanish & Guerra, 2002), scientists, educators, and policy makers are increasingly concerned about its effects on children.

Research indicates individual differences in the mental health consequences of victimization. Variable-centered analyses link victimization to both heightened aggression (Lamarche, et al., 2007) and heightened depressive symptoms (Snyder, et al., 2003). Moreover, person-centered analyses identify separate clusters of victimized children who demonstrate externalizing versus internalizing symptoms (Hanish & Guerra, 2002). Understanding these individual differences is key to identifying children at particular risk for problematic outcomes following victimization and to preventing severe levels of maladjustment. This study examined the hypothesis that two temperamental traits (inhibitory control and negative emotionality) and the sex of the victim would moderate the contribution of peer victimization to adjustment.

Mental Health Consequences of Peer Victimization: The Moderating Role of Temperament and Sex

Prospective longitudinal research reveals that victimization predicts subsequent adjustment problems. Some studies provide evidence that victimization predicts externalizing symptoms, such as delinquency and aggression, over time (Lamarche et al., 2007; Rusby, Forrester, Biglan, & Metzler, 2005; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1998).
Victimization also has been found to predict depressed mood and loneliness (Boivin, Hymel, & Bukowski, 1995), depressive symptoms (Snyder et al., 2003), and internalizing problems more broadly (Hodges & Perry, 1999) over time. Despite the knowledge that victimized youth are at risk, research has not yet identified the factors that contribute to individual differences in the mental health consequences of peer victimization. It is important to identify factors that moderate the effect of victimization on adjustment to understand which children are at particular risk for specific adjustment difficulties. Drawing from theory and research suggesting that temperament moderates the effect of the environment on developmental outcomes (Kochanska, 1997; Lengua, Wolchik, & Sandler, 2000; Mangelsdorf, McHale, Diener, Goldstein, & Lehn, 2000; Rothbart & Bates, 2006), the present study examined the hypothesis that the consequences of victimization would be contingent on children’s temperament.

Temperament is defined as constitutionally based individual differences in emotional, motor, and attentional reactivity and self-regulation (Rothbart & Bates, 1998). Among many dimensions of temperament, we focused on inhibitory control and negative emotionality as possible moderators of the mental health consequences of victimization. Inhibitory control is a subcomponent of effortful control, and refers to the capacity to plan and to suppress dominant responses in favor of subdominant responses (Rothbart, Ahadi, & Evans, 2000; Rothbart, Ahadi, Hershey, & Fisher, 2001). Thus, for example, children with low levels of inhibitory control may have difficulty inhibiting their impulsive behaviors when they are excited or angry. Negative emotionality refers to the tendency to demonstrate intense negative emotions (e.g., fear, anger or frustration, and sadness) (Ellis & Rothbart, 2001; Rothbart et al., 2001), often reflected in sensitivity to negative environmental cues, and to have difficulty being soothed once emotionally aroused (Compas, Connor-Smith, & Jaser, 2004; Gray, 1991; Rothbart, 1989). In the present study,
we anticipated that victimization would more strongly predict aggression over time in children with low than high levels of inhibitory control, whereas victimization would more strongly predict depressive symptoms over time in children with high than low levels of negative emotionality.

*Inhibitory control.* When victimized, children’s sense of status in a social group can be threatened; children may try to re-establish this status through the use of aggressive behaviors. Children with low levels of inhibitory control may demonstrate particular difficulties formulating adaptive responses to victimization, thereby heightening their aggression. We further hypothesized that the interactive contribution of victimization and inhibitory control to aggression would be stronger in boys than in girls. Because boys show a heightened focus on status and dominance in the peer group (Jarvinen & Nicholls, 1996; Rose & Asher, 2004; for a review, see Rose & Rudolph, 2006), victimized boys may feel more pressure to re-establish their status than would victimized girls. In this struggle to reassert their position in the hierarchy, boys low in inhibitory control may resort to aggression.

Supporting the contribution of inhibitory control to aggression, low inhibitory control, or effortful control more broadly, predicts externalizing problems over time (Lengua, 2003; Lengua, Bush, Long, Kovacs, & Trancik, 2008). Moreover, a few studies have demonstrated that effortful control moderates the effects of risky environments on externalizing psychopathology. In one study, low socioeconomic status predicted heightened antisocial behavior in preadolescents with low but not high levels of effortful control (Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). In another study, environmental risk, including household density, low quality of the home environment, and lack of neighborhood safety predicted increasing externalizing problems over three years in children with low but not high levels of effortful control (Lengua et al., 2008).

Some research also supports a link between poor inhibitory control and internalizing
problems (Lengua, 2003; Riggs, Blair, & Greenberg, 2003). However, the support has been primarily based on concurrent data or longitudinal data that does not adjust for the earlier internalizing problems. Moreover, some researchers suggest that attentional control, another subcomponent of effortful control, may be more strongly associated with internalizing problems than inhibitory control (Eisenberg et al., 2001; Muris, van der Pennen, Sigmond, & Mayer, 2008). In the present study, we only measured inhibitory control. Thus, we expected that inhibitory control would primarily moderate the effect of victimization on aggression rather than depressive symptoms.

**Negative emotionality.** When victimized, children also experience lower self-worth (Graham, Bellmore, Nishina, & Juvonen, 2009; Grills & Ollendick, 2002; Hawker & Boulton, 2000), and they may attribute peer maltreatment to their own personality or behavior (Graham et al., 2009; Graham & Juvonen, 1998); diminished self-worth and negative internal attributions may, in turn, lead to depressive symptoms (Burwell & Shirk, 2006; Cole & Turner, 1993; Eberhart, Shih, Hammen, & Brennan, 2006; Kraaij et al., 2003). In addition, victimized children experience heightened negative emotions such as sadness and shame (Menesini & Camodeca, 2008). High levels of temperamental negative emotionality may intensify these adverse cognitive and emotional reactions to victimization and make it more difficult for children to effectively manage their reactions, thereby increasing the likelihood that children ultimately develop depressive symptoms. We further hypothesized that the interactive contribution of victimization and negative emotionality to depressive symptoms would be stronger in girls than in boys. Girls show a heightened focus on connection-oriented social goals relative to boys (Chung & Asher, 1996; Rose & Asher, 1999; for a review, see Rose & Rudolph, 2006). Consequently, when girls’ relationships are compromised by victimization, their sense of self-worth may be more threatened than would be
the case for boys, causing girls to be more prone to heightened emotional distress; these adverse reactions would be intensified for girls who are high in negative emotionality.

Supporting the contribution of negative emotionality to depressive symptoms, research suggests that negative emotionality predicts internalizing problems, including depression, over time (Katainen, Raikkonen, & Keltikangas-Jarvinen, 1999; Lonigan, Phillips, & Hooe, 2003). Moreover, these effects seem to be stronger in girls than in boys. For instance, negative emotionality predicted depression over five years in adolescent girls but not boys (Katainen et al., 1999). Negative emotionality also moderates the effects of environmental risk on depression, particularly in girls. For example, peer rejection predicted heightened depression over three years in girls with high levels of negative emotionality but not in boys or in girls with medium or low levels of negative emotionality (Brendgen, Wanner, Morin, & Vitaro, 2005).

Some research also suggests that negative emotionality predicts externalizing problems over time (Eisenberg et al., 1997; Eisenberg et al., 2005). Thus, we thought it possible that negative emotionality would intensify the effect of victimization on aggression.

Overview of the Present Study

In sum, this research examined the hypothesis that temperament and the sex of the victim would moderate the influence of peer victimization on subsequent aggression and depressive symptoms. We hypothesized that (a) victimization would more strongly predict aggression in boys with low than high levels of inhibitory control, and (b) victimization would more strongly predict depressive symptoms in girls with high than low levels of negative emotionality. Using a prospective longitudinal design, we examined the effects of victimization on children’s adjustment over time. Moreover, a multi-informant approach (i.e., children, parents, and teachers) was used to reduce the bias that arises from shared method variance.
CHAPTER 2

METHOD

Participants

Participants were 282 2nd graders (125 boys, 157 girls; \( M = 7.94 \) years, \( SD = 0.32 \)) from several Midwestern towns. The sample included children from a variety of ethnic groups (78.0% White, 13.8% African American, 3.5% Asian American, and 4.6% other) and socioeconomic backgrounds (31% received a federally subsidized school lunch). For the initial recruitment, consent forms were sent home through schools and were distributed at parent-teacher conferences. Parents provided written consent, and children provided oral assent. Of the 494 eligible children, 373 (76%) received parental consent to participate. Participants and nonparticipants at Wave 1 (W1) did not significantly differ in sex, \( \chi^2(1) = .25, ns \), age, \( t(492) = .13, ns \), ethnicity (white versus minority), \( \chi^2(1) = .01, ns \), or school lunch status (full pay versus subsidized), \( \chi^2(1) = .16, ns \).

Of the 373 participants, W1 parent data were available for 300 children (80%). Children whose parents did and did not participate at W1 did not differ in sex, \( \chi^2(1) = .96, ns \), age, \( t(371) = 1.23, ns \), relational victimization, \( t(371) = .71, ns \), or relational aggression, \( t(367) = 1.64, ns \). The two groups did differ in race, \( \chi^2(1) = 11.34, p < .01 \), school lunch status, \( \chi^2 (1) = 12.47, p < .001 \), overt victimization, \( t(371) = 2.14, p < .05 \), and overt aggression, \( t(369) = 2.69, p < .01 \). Specifically, children whose parents did not participate were more likely to be members of minority groups and recipients of subsidized lunch, to experience overt victimization, and to show overt aggression. Of the 300 children with W1 parent data, 282 (94%) had relevant data for inclusion in the analyses on aggression and 242 (81%) had relevant data for inclusion in the analyses on depressive symptoms. Children with and without W2 aggression scores did not significantly differ in demographic variables or W1 study variables (\( ts < .96, \chi^2 < 2.88, ns \)) except for age, \( t(298) = 2.20, p < .05 \).
Specifically, children with $W_2$ aggression scores tended to be slightly, but not meaningfully, younger than those without $W_2$ aggression scores. Children with and without $W_2$ depressive symptom scores did not significantly differ in demographic variables or $W_1$ study variables ($t < 1.89, \chi^2 < .14, ns$).

**Procedures**

Participants completed the questionnaires twice, approximately one year apart. The child questionnaires were administered in small groups (i.e., 2 – 4 children) in the classrooms. Research assistants read each question aloud; participants followed along and circled their answers. Parent surveys were distributed and returned by mail or home visits. Teachers returned their surveys in a locked box at their school or in person.

**Measures**

*K Peer victimization.* Child and teacher report on a revised version of the Social Experiences Questionnaire (Crick & Grotpeter, 1996) was used to assess children’s exposure to peer victimization. This measure assesses overt victimization (being the target of behaviors intended to harm others through physical damage or the threat of such damage) and relational victimization (being the target of behaviors intended to harm others through manipulation of peer relationships). Eleven items were added to the original measure to provide a more comprehensive assessment of victimization. Of the new items, six assessed overt victimization and five assessed relational victimization. Children checked a box indicating how often they experienced each type of victimization on a 5-point scale *(Never to All the Time)*. Scores were computed by averaging across items on each subscale, with higher scores reflecting greater exposure to overt victimization (11 items; e.g., “How often do you get hit by another kid?” “How often does another kid insult you or put you down?” “How often do you get teased by another kid?”) and relational victimization (10 items; e.g., “How often do you feel isolated or excluded from play?” “How often do you feel neglected by your peers?”).
items; e.g., “How often does another kid say they won’t like you unless you do what they want you to do?” “How often does a friend spread rumors about you because they are mad at you?”). High internal consistency was found across waves for child report ($\alpha = .84 - .88$) and teacher report ($\alpha = .94 - .96$). Child report and teacher report were significantly correlated for overt victimization, $r(280) = .21$, $p < .001$, and for relational victimization, $r(280) = .14$, $p < .001$).

Composite victimization scores were created by standardizing and averaging the child and teacher reports. Composite scores provide increased reliability and reduce the impact of measurement error (Rushton, Brainerd, & Pressley, 1983; Schwarz, Barton-Henry, & Pruzinsky, 1985). Moreover, this composite score provides a more comprehensive picture of victimization by integrating across child and teacher perspectives.

**Temperament.** Children’s inhibitory control and negative emotionality were assessed with parent report on the Temperament in Middle Childhood Questionnaire (Simonds & Rothbart, 2004; Simonds, Kieras, Rueda, & Rothbart, 2007). The inhibitory control subscale included 8 items reflecting the capacity to plan and to suppress inappropriate approach responses (e.g., “Likes to plan carefully before doing something.” “Can stop her/himself when s/he is told to stop.”). The negative emotionality subscale included 24 items reflecting the tendency to demonstrate intense negative emotions, including sadness (e.g., “Becomes tearful when tired.”) and anger (e.g., “Gets angry when s/he has trouble with a task.”) as well as low soothability (e.g., “Is very difficult to soothe when s/he has become upset.”). Parents rated each item on a 5-point scale (1 = Almost Always Untrue to 5 = Almost Always True). Inhibitory control scores were computed by averaging across the 8 items, with higher scores reflecting greater levels of inhibitory control. Negative emotionality scores were computed by averaging across the 24 items, with higher scores reflecting greater levels of negative emotionality. High internal consistency was found across waves for
inhibitory control ($\alpha = .72 - .75$) and negative emotionality ($\alpha = .91 - .92$).

**Aggression.** Teachers completed the Children’s Social Behavior Scale (Crick & Grotpeter, 1995) to assess children’s aggression. This measure assesses overt aggression (behaviors intended to harm others through physical damage or the threat of such damage) and relational aggression (behaviors intended to harm others through manipulation of peer relationships). Teachers rated each item on a 5-point scale (1 = *Never True* to 5 = *Almost Always True*). Scores were computed by averaging across items on each subscale, with higher scores reflecting greater levels of overt aggression (4 items; e.g., “This child hits or kicks peers.”) and relational aggression (5 items; e.g., “This child spreads rumors or gossips about some peers.”). High internal consistency was found across waves for overt aggression ($\alpha = .96 - .97$) and relational aggression ($\alpha = .91 - .92$).

**Depressive symptoms.** Parents completed the Short Mood and Feelings Questionnaire (SMFQ; Angold, Costello, Messer, Pickles, Winder & Silver, 1995) to assess children’s recent depressive symptoms. This measure includes 13 items describing recent depressive symptoms (e.g., “My child felt unhappy or miserable.” “My child didn’t enjoy anything at all.”). This scale was selected because it includes more depression-specific items than other measures of children’s depressive symptoms (Kuo, Vander Stoep, & Stewart, 2005). The original SMFQ was modified to provide a response format similar to the other questionnaires in the study. Specifically, the response options were changed from a 3-point (*Never to Always*) to a 4-point (*Not at All to Very Much*) scale (see also, Lau & Eley, 2008; Liang & Eley, 2005). Scores were computed by averaging across the 13 items, with higher scores reflecting greater levels of depressive symptoms. High internal consistency was found across waves ($\alpha = .76 - .87$). Reliability and validity of this measure have been documented in previous studies. For instance, the SMFQ discriminates psychiatric and pediatric samples of children, and shows moderately high correlations with the
scores on the Children’s Depression Inventory and the Diagnostic Interview Schedule for Children (Angold, et al., 1995). This measure also differentiates depression from other psychiatric diagnoses assessed by the Child and Adolescent Psychiatric Assessment (Thapar & McGuffin, 1998).

It has been shown that both parent and child reports of depression are valid in young children, and parent reports are equally or more reliable than child reports (for a review, see Rudolph & Lambert, 2008). Supporting their validity, parent reports of depression show concordance with clinician-rated diagnoses (Jensen et al., 1999; Kaufman et al., 1997). Research also suggests that both parent and child reports of internalizing symptoms, including depression, provide unique incremental information (Hope et al., 1999). The incremental validity of parent reports may be particularly important for assessing depression in young children; for example, parent-only reports have been linked to more impairment and service use than child-only reports (Jensen et al., 1999). Thus, data support the reliability, validity, and clinical utility of parent-reported depressive symptoms in young children.
CHAPTER 3

RESULTS

Descriptive and Correlational Findings

Table 1 presents descriptive data for girls and boys at both waves. A multivariate repeated-measures analysis of variance was conducted with Sex as a between-subjects factor and Wave as a within-subjects factor. This analysis revealed a significant multivariate main effect of Sex, $F(7, 228) = 11.92, p < .001$, a nonsignificant multivariate main effect of Wave, $F(7, 228) = .64, ns$, and a nonsignificant Sex x Wave interaction, $F(7, 228) = 1.48, ns$. Univariate analyses revealed significant main effects of sex for inhibitory control, $F(1, 234) = 13.07, p < .001$, and relational aggression, $F(1, 234) = 5.58, p < .05$, reflecting higher scores for girls than for boys. These findings are consistent with prior research suggesting that girls show higher levels of inhibitory control (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006) and relational aggression (Crick & Grotpeter, 1995) than do boys. Univariate analyses also revealed significant main effects of sex for overt victimization, $F(1, 234) = 6.07, p < .05$, negative emotionality, $F(1, 234) = 6.41, p < .05$, overt aggression, $F(1, 234) = 11.68, p < .01$, and depressive symptoms, $F(1, 234) = 5.14, p < .05$, reflecting higher scores for boys than for girls. These findings are consistent with prior research suggesting that boys show higher levels of overt victimization (Crick & Grotpeter, 1996), negative emotionality (Schmitz, Saudino, Plomin, Fulker, & DeFries, 1996), and overt aggression (Crick & Grotpeter, 1995) than do girls. Moreover, boys often experience more depressive symptoms than do girls during preadolescence (Anderson, Williams, McGee, & Silva, 1987; Hankin, et al., 1998).

Table 2 presents intercorrelations among the measures. Because the pattern of correlations between overt and relational aggression and other variables was similar, we computed aggression scores by averaging across the nine items. In both girls and boys, both types of
victimization were significantly positively correlated with aggression. Both types of victimization were significantly correlated with depressive symptoms in girls but not in boys. In both girls and boys, inhibitory control was significantly negatively correlated with aggression and depressive symptoms, and negative emotionality was significantly positively correlated with depressive symptoms. Comparisons of the size of the correlations across sex using Fishers r-to-Z transformations revealed that overt victimization was significantly more strongly correlated with depressive symptoms in girls than in boys (\(Z = 2.51, p < .05\)). None of the other correlations was significantly different across sex.

**Victimization x Temperament Interactions Predicting Adjustment**

A series of hierarchical multiple regression (HMR) analyses was conducted to examine the interactive contribution of victimization and temperament to adjustment (i.e. aggression and depressive symptoms) among girls and boys over time. In each regression, \(W_1\) adjustment was entered at the first step to adjust for the initial level of aggression or depressive symptoms. The main effects of victimization, temperament, and sex were entered at the second step, the two-way interactions were entered at the third step, and the three-way interaction was entered at the fourth step. Victimization and temperament were centered prior to analysis and calculation of the interaction terms. If the three-way interaction was significant, follow-up regressions were conducted separately for girls and boys to examine the nature of the interaction; if the three-way interaction was nonsignificant, follow-up regressions were conducted collapsed across sex. Regression equations with sex and without sex yielded similar results. None of the main effects of sex was significant. Moreover, there were no significant two-way interactions between victimization and sex or between temperament and sex. Thus, in cases in which the three-way interaction was not significant, sex was excluded from the equation.
Significant interactions were decomposed and depicted by solving the regression equations to predict adjustment from victimization at low (-1 SD), moderate (mean), and high (+ 1 SD) levels of inhibitory control or negative emotionality (Aiken & West, 1991).

The first set of analyses examined the prediction of aggression (see Table 3), and the second set of analyses examined the prediction of depressive symptoms (see Table 4). For analyses in which the three-way interaction was nonsignificant, results are shown in the first column (Total Sample). For analyses in which the three-way interaction was significant, results are shown separately for girls and boys in the second and third columns.

**Aggression**

*Inhibitory control.* HMR analyses predicting aggression from overt victimization and inhibitory control revealed a significant Overt Victimization x Inhibitory Control x Sex interaction ($\beta = -.17, t(273) = -1.97, p < .05$). Separate regressions were conducted to examine the two-way Overt Victimization x Inhibitory Control interaction in girls and boys. In girls, this analysis revealed a significant positive main effect of overt victimization, a significant negative main effect of inhibitory control, and a significant Overt Victimization x Inhibitory Control interaction (see Table 3). As reflected in Figure 1, decomposition of this interaction revealed that overt victimization significantly predicted aggression in girls with low levels of inhibitory control ($\beta = .26, t(152) = 3.04, p < .01$) and marginally predicted aggression in girls with moderate levels of inhibitory control ($\beta = .14, t(152) = 1.95, p < .10$), but did not predict aggression in girls with high levels of inhibitory control ($\beta = .02, t(152) = .20, n.s.$). In boys, this analysis revealed a nonsignificant main effect of overt victimization, a marginally significant negative main effect of inhibitory control, and a nonsignificant Overt Victimization x Inhibitory Control interaction (see Table 3).
HMR analyses predicting aggression from relational victimization and inhibitory control revealed a nonsignificant Relational Victimization x Inhibitory Control x Sex interaction ($\beta = -.05$, $t(273) = -.53$, $ns$). Follow-up analyses collapsing across sex revealed a significant positive main effect of relational victimization, a significant negative main effect of inhibitory control, and a nonsignificant Relational Victimization x Inhibitory Control interaction (see Table 3).

**Negative emotionality.** HMR analyses predicting aggression from victimization and negative emotionality revealed similar patterns for overt and relational victimization. To reduce the number of analyses, we computed total victimization scores by averaging across the overt and relational victimization items. HMR analyses predicting aggression from total victimization and negative emotionality revealed a nonsignificant Total Victimization x Negative Emotionality x Sex interaction ($\beta = .05$, $t(272) = .49$, $ns$). Follow-up analyses collapsing across sex revealed a significant positive main effect of total victimization, a nonsignificant main effect of negative emotionality, and a nonsignificant Total Victimization x Negative Emotionality interaction (see Table 3).

**Summary.** Results indicated that overt victimization significantly predicted subsequent aggression in girls with low but not high levels of inhibitory control. Neither negative emotionality nor its interaction with victimization predicted subsequent aggression.

**Depressive Symptoms**

**Inhibitory control.** HMR analyses predicting depressive symptoms from victimization and inhibitory control revealed similar patterns for overt and relational victimization. Thus, analyses were conducted on total victimization scores. HMR analyses predicting depressive symptoms from total victimization and inhibitory control revealed a nonsignificant Total Victimization x Inhibitory Control x Sex interaction ($\beta = -.09$, $t(233) = -.87$, $ns$). Follow-up analyses collapsing
across sex revealed a nonsignificant main effect of total victimization, a significant negative main effect of inhibitory control, and a nonsignificant Total Victimization x Inhibitory Control interaction (see Table 4).

Negative emotionality. HMR analyses predicting depressive symptoms from victimization and negative emotionality revealed similar patterns for overt and relational victimization. Thus, analyses were conducted on total victimization scores. HMR analyses predicting depressive symptoms from total victimization and negative emotionality revealed a significant Total Victimization x Negative Emotionality x Sex interaction ($\beta = .41, t(233) = 3.84, p < .001$). Separate regressions were conducted to examine the two-way Total Victimization x Negative Emotionality interaction in girls and boys. In girls, this analysis revealed a marginally significant positive main effect of total victimization, a significant positive main effect of negative emotionality, and a significant Total Victimization x Negative Emotionality interaction (see Table 4). As reflected in Figure 2a, decomposition of this interaction revealed that total victimization significantly predicted depressive symptoms in girls with high levels of negative emotionality ($\beta = .31, t(131) = 3.42, p < .01$) but was not associated with depressive symptoms in girls with moderate ($\beta = .10, t(131) = 1.33, ns$) or low ($\beta = -.11, t(131) = -1.06, ns$) levels of negative emotionality. In boys, this analysis revealed a nonsignificant main effect of total victimization, a significant positive main effect of negative emotionality, and a significant Total Victimization x Negative Emotionality interaction (see Table 4). As reflected in Figure 2b, decomposition of this interaction revealed that total victimization significantly predicted depressive symptoms in boys with low levels of negative emotionality ($\beta = .34, t(101) = 2.40, p < .05$) but was not associated with depressive symptoms in boys with moderate ($\beta = .12, t(101) = 1.34, ns$) or high ($\beta = -.10, t(101) = -.88, ns$) levels of negative emotionality.
Summary. Results indicated that inhibitory control protected children against depressive symptoms but did not moderate the effect of victimization. Results also indicated that victimization significantly predicted subsequent depressive symptoms in girls with high but not low levels of negative emotionality. In contrast, victimization was associated with depressive symptoms in boys with low but not high levels of negative emotionality; boys who were high in negative emotionality experienced heightened depressive symptoms regardless of how much they were exposed to victimization.
CHAPTER 4
DISCUSSION

This study examined the proposition that temperament and sex of the victim would moderate the effects of victimization on subsequent adjustment over a one-year period. Findings indicated an interactive effect of overt victimization and inhibitory control on aggression in girls but not in boys. Findings also indicated an interactive effect of total victimization and negative emotionality on depressive symptoms for girls and boys, although the nature of the interaction differed across sex. This research helps to elucidate possible contributors to individual differences in the mental health consequences of victimization and to identify children who are at particularly high risk for experiencing adjustment difficulties following victimization.

Prediction of Aggression

As anticipated, victimization (specifically overt victimization) predicted subsequent aggression in children with low but not high levels of inhibitory control. Contrary to expectations, however, this association was found in girls but not in boys. Because overt victimization is more common among boys than among girls (Crick & Grotman, 1996), overtly victimized girls may represent a gender-atypical group who is at particular risk for negative outcomes. Moreover, because girls typically show higher levels of inhibitory control than do boys (Else-Quest et al., 2006), as they did in this study, girls with low levels of inhibitory control may reflect a group with particularly impaired regulatory abilities. Girls with difficulty planning appropriate responses to victimization may instead resort to aggression when they are victimized. Alternatively, girls with low levels of inhibitory control may not be able to regulate their behaviors when they are angry, and may simply release their anger through aggressive behavior. It is important to note, however, that overt victimization showed a strong concurrent correlation with aggression in boys. Thus, it
also is possible that boys show immediate aggressive behavior in response to victimization, thus reducing the likelihood that these boys show heightened aggression over a one-year period.

Interestingly, although relational victimization and inhibitory control independently contributed to subsequent aggression, the effects of relational victimization did not depend on levels of inhibitory control or the sex of the child. It may be that children require greater inhibitory control when they are overtly victimized than when they are relationally victimized because physical or verbal forms of victimization are more salient and present more of an immediate threat to children’s status in the peer group than do relational forms of victimization. Thus, overtly victimized children may react with more impulsivity, with a higher intensity of emotions, and with a more urgent need to re-establish their status, creating a tendency toward aggressive behavior over time.

Negative emotionality did not directly contribute to subsequent aggression or moderate the effect of victimization on aggression. Because our measure of negative emotionality included a tendency to experience sadness and low soothability, as well as anger, we conducted exploratory analyses to examine whether anger alone would moderate the effect of victimization on aggression. These analyses also revealed a nonsignificant interaction, suggesting that the composite negative emotionality measure did not account for the pattern of effects. Another possibility is that negative emotionality interacts with victimization concurrently but not longitudinally to predict aggression. To test this possibility, we examined whether the Total Victimization x Negative Emotionality interaction significantly predicted aggression concurrently, and found a significant interactive effect ($\beta = .11$, $t(289) = 2.27, p < .05$). Thus, it might be that the tendency to experience heightened negative emotions such as anger has a more immediate, rather than a long-term, effect on children’s aggressive behavior in the context of victimization. Of course, it could be that children
who show aggressive behavior have high levels of negative emotionality. It is impossible to
determine the direction of effect from this concurrent analysis.

**Prediction of Depressive Symptoms**

Consistent with hypotheses, negative emotionality predicted a heightened risk for
depressive symptoms, and moderated the effects of victimization on symptoms. In girls,
victimization predicted depressive symptoms in children with high but not low levels of negative
emotionality. When victimized, girls with high levels of negative emotionality may have been
particularly likely to suffer from diminished self-worth and negative emotions (e.g., sadness,
shame) or to blame themselves for the victimization; these negative thoughts and feelings may, in
turn, have put them at risk for the development of depressive symptoms. Additionally, girls tend to
engage in rumination more than boys (Broderick, 1998), which leads to depressive symptoms.
When victimized, girls with high levels of negative emotionality may be at particularly heightened
risk for engaging in rumination and thus developing depressive symptoms.

In boys, however, victimization predicted depressive symptoms in children with low but
not high levels of negative emotionality. Specifically, boys with high levels of negative
emotionality showed more depressive symptoms regardless of how much they were victimized,
whereas boys with low levels of negative emotionality showed more depressive symptoms only at
higher levels of victimization. Several explanations may explain these effects. It is possible that
high negative emotionality in boys creates a risk for depression that is independent of their stress
level; perhaps, for example, this risk reflects a heightened genetic susceptibility to depression.
Alternatively, possessing high levels of negative emotionality actually may sensitize boys to stress,
such that even mild levels of victimization are sufficient to trigger depressive symptoms. The
present study cannot disentangle these possibilities. Future research examining the process
through which negative emotionality contributes to depression in boys may shed light on this issue.

Although inhibitory control protected children from depressive symptoms, the contribution of victimization to depressive symptoms did not differ depending on children’s level of inhibitory control. It may be that inhibitory control is more important for regulating long-term behavioral reactions to victimization, such as aggression, whereas negative emotionality is more important for regulating long-term emotional reactions to victimization, such as depressive symptoms. It also may be that attentional control, another subcomponent of effortful control, is a stronger moderator of the link between victimization and depressive symptoms.

**Implications and Future Directions**

Consistent with the idea that temperament interacts with the environment to predict mental health (Lengua et al., 2000; Rothbart & Bates, 2006), this study revealed that temperament of the victim contributes to individual differences in children’s reactions to peer victimization. The pattern of findings was consistent with two different models of person x environment interactions. According to a stress-amplification model, stress reactivity is heightened at severe levels of stress, thereby resulting in a bigger difference in psychopathology between those with and without vulnerability (e.g., risky temperament) at severe than mild levels of stressor (Rudolph & Flynn, 2007). In the present study, girls with low levels of inhibitory control showed high levels of aggression when exposed to severe but not mild victimization whereas girls with high levels of inhibitory control showed lower levels of aggression regardless of their exposure to victimization. Likewise, girls with high levels of negative emotionality showed high levels of depressive symptoms when exposed to severe but not mild victimization whereas girls with low levels of negative emotionality showed lower levels of depressive symptoms regardless of their exposure to
According to a stress-sensitization model, stress reactivity is heightened primarily at mild levels of stress, thereby resulting in a bigger difference in psychopathology between those with and without vulnerability (e.g., risky temperament) at mild than severe levels of stress (Rudolph & Flynn, 2007). Boys with high levels of negative emotionality showed high levels of depressive symptoms even when exposed to relatively mild victimization whereas boys with low levels of negative emotionality showed high levels of depressive symptoms only when exposed to severe victimization. These findings suggest that boys with high levels of negative emotionality may have been sensitized to stress and thus have a lower threshold for demonstrating depressive symptoms. However, it is difficult to determine, from these analyses, whether boys reacted to low levels of victimization, or they showed depressive symptoms regardless of the levels of victimization they experienced.

This research also provides evidence for the important role that temperament plays in psychological adjustment. More specifically, findings from this study are consistent with previous research showing that effortful control moderated the effects of environmental risk on externalizing problems (Lengua et al., 2008; Veenstra et al., 2006), and negative emotionality moderated the effects of environmental risk on depression (Brendgen et al., 2005). Elaboration of these victimization x temperament interactions sheds light on individual differences in responses to victimization. Interestingly, some of the effects differed across type of victimization. Specifically, inhibitory control played a more important role in helping children (particularly girls) to refrain from aggression when they were overtly but not relationally victimized. In contrast, negative emotionality played an equally important role in fostering depressive symptoms when children were overtly or relationally victimized. These findings suggest the importance of
differentiating between different types of victimization and different types of adjustment outcomes when examining the effects of victimization on children’s mental health.

Although this study contributes to research on individual differences in the consequences of victimization, the processes through which these mental health problems emerge are not entirely clear. It is possible that victimization and victimization x temperament interactions contribute to mental health difficulties by influencing children’s coping and responses to stress. For instance, children with low levels of inhibitory control may engage in less planful problem solving and more retaliation in response to victimization, and thus show heightened aggression over time. Children with high levels of negative emotionality may engage in more rumination in response to victimization, and thus develop heightened depressive symptoms over time. Identifying both voluntary coping efforts and involuntary stress responses that are associated with particular temperamental traits in victimized girls and boys may elucidate the processes through which victimization puts children at risk for certain adjustment difficulties.

Moreover, it would be interesting for future research to examine whether other temperamental traits contribute to individual differences in emotional and behavioral reactions to victimization. For instance, impulsivity also has been found to be associated with externalizing problems (Eisenberg et al., 2001; Eisenberg et al., 2005). Although we did not find a significant interactive effect of victimization and inhibitory control on aggression in boys, it is possible that impulsivity moderates the effect of victimization on aggression in boys. Impulsivity reflects reactive undercontrol (Eisenberg et al., 2005) or speed of response initiation (Rothbart et al., 2001), which is less voluntary than inhibitory control. It might be that victimized boys with high levels of impulsivity are more drawn to potential rewards (e.g., gaining control over the situation, getting their way) and engage in aggressive behavior because they are more reactive and quick to respond.
This involuntary impulsivity may better account for boys’ aggressive reactions to victimization than inadequate levels of voluntary inhibitory control.

Temperamental traits also may interact with each other to predict adjustment (Rothbart & Bates, 1998). For instance, negative emotionality moderates the effects of regulation in predicting externalizing problems (Eisenberg et al., 1997; Eisenberg et al., 2000). Examining multi-dimensional profiles of temperament would provide a more nuanced perspective on how children’s temperament contributes to their reactions to victimization.

Beyond these theoretical questions of interest, this research also has implications for prevention and intervention efforts in the context of peer victimization. For instance, low inhibitory control in girls appears to increase risk for responding to bullies with aggression, which may, in turn, lead to further victimization (Camodeca, Goossense, Terwogt, & Schuengel 2002; Lamarche et al., 2007; Schwartz, Dodge et al., 1998). To prevent this cycle of violence, it may therefore be helpful to foster skills that bolster girls’ ability to engage in more planful and well-regulated responses to victimization that aim to deter the persistence of victimization over time. Likewise, high negative emotionality in girls appears to increase risk for responding to victimization with heightened depressive symptoms. It may therefore be helpful to teach girls emotion regulation skills to prevent declines in self-worth, self-blame, or other responses following victimization that eventually foster depressive symptoms. Although negative emotionality predicted depression in boys regardless of their level of victimization, reducing these negative emotional experiences may help to prevent boys from becoming the target of victimization, given that research shows that internalizing problems place children at risk for future victimization (Hodges, Malone, & Perry, 1997; Hodges & Perry, 1999).

**Limitations of the Present Research**
Although the present research is significant in that it investigated the effects of victimization on children’s mental health over a year, it provides only a small snapshot of children’s development. The effects of victimization may change over a longer period of time or across different developmental stages. For instance, victimization may affect the victims’ mental health more strongly during the challenging life transitions, such as the transition through adolescence or puberty. During these transitions, youth are not only concerned about their appearance and peer acceptance, but they also sometimes experience disruption in friendships or difficulty in relationships with the opposite sex (Larson & Ham, 1993; Simmons, Blyth, Van Cleave, & Bush, 1979). These new challenges are likely to impair youth’s ability to cope with stress that may be caused by peer victimization. It would be interesting to examine the effects of victimization and temperament in conjunction with these developmental milestones.

It also may be important to distinguish between proactive and reactive forms of aggression. Proactive aggression refers to instrumental, offensive, and non-provoked acts aimed at influencing or dominating others, whereas reactive aggression refers to affective, defensive, emotionally driven, and impulsive acts in response to an actual or perceived threat or provocation (Lamarche et al., 2007). It is possible that a victimization x inhibitory control contribution to aggression would emerge specifically in the context of reactive aggression rather than proactive aggression. Boys may resort to aggression when they are victimized simply to release their anger or to defend themselves, and this reaction may be enhanced in boys with low levels of inhibitory control.
CONCLUSIONS

Although research has found that victimization is associated with a variety of adjustment difficulties, there is a paucity of studies, especially using longitudinal designs, examining what moderates the effects of victimization. The present research demonstrated that individual differences in responses to victimization are partly accounted for by the sex and temperament of the victim, supporting the notion that temperament x environment interactions predict psychological adjustment. Girls demonstrated patterns that are consistent with a stress-amplification model, such that low levels of inhibitory control and high levels of negative emotionality put them at heightened risk for aggression and depressive symptoms, respectively, following victimization. Boys demonstrated a pattern that is consistent with a stress-sensitization model, such that high levels of negative emotionality put them at heightened risk for depressive symptoms regardless of their level of victimization. Findings have implications for intervention and prevention of maladjustment, taking into consideration specific vulnerabilities of victimized children.
## TABLES AND FIGURES

**Table 1**

*Descriptive Data*

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***p < .001.
Table 2

Wave 1 Intercorrelations among the Variables

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*Note.* Intercorrelations presented above the diagonal are for girls; intercorrelations presented below the diagonal are for boys. *p < .05. **p < .01. ***p < .001.
**Table 3**

*Predicting Wave 2 Aggression from Victimization, Temperament, and the Victimization x Temperament Interaction*

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*(table continues)*
Table 3 (continued)

*Predicting Wave 2 Aggression from Victimization, Temperament, and the Victimization x Temperament Interaction*

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*p < .05. **p < .01. ***p < .001.*
Table 4

*Predicting Wave 2 Depressive Symptoms from Victimization, Temperament, and the Victimization x Temperament Interaction*

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*p < .05, **p < .01, ***p < .001.*
Figure 1. The interactive contribution of overt victimization and inhibitory control to W2 aggression in girls, adjusting for W1 aggression.
Figure 2a. The interactive contribution of total victimization and negative emotionality to W2 depressive symptoms in girls, adjusting for W1 depressive symptoms.

Figure 2b. The interactive contribution of total victimization and negative emotionality to W2 depressive symptoms in boys, adjusting for W1 depressive symptoms.
REFERENCES


