# Depression and Interpersonal Stress Generation in Children: Prospective Impact on Relational Versus Overt Victimization

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The goal of this study was to examine depressive stress generation effects on children's reports of relational and overt peer victimization. Participants in this multiwave prospective study were 100 children assessed every 2 months for 6 months who completed self-report assessments of peer victimization and depressive symptoms at each assessment point. Using linear mixed modeling, we found that children's elevations in depressive symptoms predicted prospective increases in children's levels of peer victimization, with the effects being specific to relational victimization. Further, this stress generation effect was specific to girls and was not observed among boys. These results add to the growing body of research supporting the stress generation model of depression and suggest a specific type of negative peer experience that may be particularly susceptible to stress generation effects.

According to Hammen's (1991) stress generation hypothesis, depressed individuals may contribute to the generation of additional stress in their lives. These stress generation effects are predicted to be specific to dependent (or controllable) rather than independent (or fateful) events, and to be strongest for dependent interpersonal events. There is now considerable empirical support for the stress generation model (for reviews, see Hammen, 2006; Hammen & Shih, 2008; Liu & Alloy, 2010). As hypothesized, these effects appear to be strongest for dependent, interpersonal events. What remains unclear, however, is whether stress generation effects may be stronger for some types of interpersonal stress than others.

Among children, a particularly salient form of interpersonal stress is peer victimization. Although researchers have traditionally focused on overt forms of peer victimization (e.g., hitting and punching), there is growing recognition of the impact

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of relational forms of peer victimization (see Crick, Casas, & Nelson, 2002). Relational victimization involves acts done to negatively impact someone's social status or relationships with other peers (Crick & Bigbee, 1998; Crick et al., 2002). Examples include threatening to withdraw friendship, social exclusion from activities, and spreading lies or rumors with the intention of damaging a peer's group status. There is considerable evidence that various forms of peer victimization are cross-sectionally related to levels of depression (for a review, see Hawker & Boulton, 2000) and growing evidence that peer victimization predicts prospective changes in children's internalizing problems including depression (see Heilbron & Prinstein, 2008; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). There is also evidence that depressive symptoms may predict future increases in peer victimization or bullying, broadly defined (Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006; Sweeting, Young, West, & Der, 2006). However, no studies of which we are aware have specifically examined the impact of children's depressive symptoms on prospective changes in relational versus overt victimization.

The stress generation hypothesis was initially proposed to help explain vicious cycles of depression risk in women (Hammen, 1991, 1992). To date, there is some evidence to support the hypothesis that stress generation effects are stronger in girls/ women than boys/men (Davila, Bradbury, Cohan, & Tochluk, 1997; Jones, Beach, & Forehand, 2001), though some studies have found no gender difference in the stress generation effect (e.g., Rudolph et al., 2000; Cole, Nolen-Hoeksema, Girgus, & Paul, 2006). In terms of gender differences in levels of overt versus relational peer victimization, there are clear gender differences in overt victimization, with boys exhibiting higher levels than girls (Crick et al., 2002; Rose & Rudolph, 2006). Evidence for gender differences in relational victimization is less consistent. Although there is some evidence that relational victimization may be more prevalent in girls than boys, findings are generally mixed (Crick et al., 2002; Rose & Rudolph, 2006). With regard to sex differences in the link between victimization and depressive symptoms, there is evidence that, among girls, symptoms of depression are more strongly related to symptoms of relational than overt victimization while the reverse is true of boys (e.g., Prinstein, Boergers, & Vernberg, 2001). This said, it is unclear whether there may be gender differences in the impact of depression on the future occurrence of either form of peer victimization.

Our goal in the current study was to examine depressive stress generation effects in relation to peer victimization. Specifically, using a multiwave longitudinal design, we examined the impact of children's depressive symptom fluctuations on prospective changes in levels of relational and overt victimization. We predicted that we would observe stress generation effects for both forms of victimization. We also examined gender moderation of these effects to determine whether the impact of depressive symptoms on changes in relational or overt victimization may be stronger in girls versus boys.

# **METHOD**

# **Participants**

Participants in this study were 100 mothers and their children drawn from the community who participated in a larger study of the intergenerational transmission of

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depression (Gibb, Urhlass, Grassia, Benas, & McGeary, 2009). To qualify for inclusion in the "depressed" group (n = 52), mothers were required to meet criteria for a major depressive disorder (MDD) during the child's lifetime according to the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV; American Psychiatric Association, 1994). To qualify for inclusion in the "nondepressed" group (n = 48), mothers were required to have no lifetime diagnosis of any DSM-IV mood disorder. Exclusion criteria for both groups included symptoms of schizophrenia, organic mental disorder, alcohol or substance abuse within the last 6 months, or history of bipolar I or II disorder. Children's participation was limited such that no more than one child per mother could participate. The only inclusion criterion for children was that they be 8 to 12 years old. If more than one child was available within this age range, one child was chosen at random for participation. The average age of mothers in our sample was 38.56 years (SD = 6.66, Range = 26-53) and 88% were Caucasian. The median family income was \$50,000 to \$55,000 and, in terms of education level, 45% of the mothers had graduated from college. For the children in our sample, the average age was 9.97 years (SD = 1.32), 59% were girls, and 82% were Caucasian. Maternal history of MDD was not significantly related to children's age, sex, or race (Caucasian vs. non-Caucasian).

# Measures

The Schedule for Affective Disorders and Schizophrenia-Lifetime Version (SADS-L; Endicott & Spitzer, 1978) and the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997) were used to assess for lifetime histories of DSM-IV Axis I disorders in mothers and their children, respectively. Both measures are widely used diagnostic interviews with well-established psychometric properties (Angold, 1989; Endicott & Spitzer, 1978; Kaufman et al., 1997). The SADS-L and K-SADS-PL were administered by separate interviewers. For the K-SADS-PL, mothers and children were interviewed separately. As noted above, 52 mothers met criteria for MDD during their child's life; 8 mothers met criteria for current MDD. Eleven children met lifetime criteria for MDD (10 children of mothers in the depressed group), with 4 meeting criteria for current MDD. A subset of 20 SADS-L and 20 K-SADS-PL interviews from this project were coded by a second interviewer and kappa coefficients for diagnoses of MDD in mothers and in children were excellent ( $\kappa = 1.00$ ).

Children's symptoms of depression were assessed at each assessment point using the Children's Depression Inventory (CDI; Kovacs, 1981). Numerous studies have supported the reliability and validity of the CDI (e.g., Kovacs, 1981, 1985; Smucker, Craighead, Craighead, & Green, 1986). In the current study, the CDI exhibited good internal consistency across all time points ( $\alpha s = .77-.86$ ).

Children's levels of peer victimization were assessed at each time point using the Social Experiences Questionnaire (SEQ; Crick & Grotpeter, 1996). The SEQ is a self-report measure used to assess for experiences of overt (SEQ-OV) and relational (SEQ-RV) victimization. Levels of victimization are calculated by averaging participants' responses to each of the five items for each subscale (range = 1 to 5), with higher scores indicating higher levels of victimization. The SEQ has exhibited good psychometric properties in previous research (e.g., Crick & Grotpeter, 1996; Phelps,

2001). In the current study, both subscales exhibited good internal consistency across all time points (SEQ-OV:  $\alpha s = .71-.83$ ; SEQ-RV:  $\alpha s = .70-.85$ ).

#### **Procedure**

Potential participants were recruited from the community through a variety of means (e.g., newspaper and bus ads, flyers). Mothers responding to the recruitment advertisements were initially screened over the phone to determine potential eligibility. Those reporting either significant depressive symptoms during the child's life or no significant lifetime symptoms of depression were invited to participate in the study. Upon arrival at the laboratory, mothers were asked to provide informed consent and children were asked to provide assent to be in the study. Next, the mother was administered the K-SADS-PL interview by a research assistant. During this time, the child completed questionnaires, including the CDI and SEQ in a separate room. After completing the K-SADS-PL with the mother, the same interviewer then administered the K-SADS-PL to the child. While children were being administered the K-SADS-PL, mothers were administered the SADS-L by a separate interviewer. Participation in this initial assessment took approximately 3 hours, which included frequent breaks for children to minimize fatigue effects. Follow-up assessments occurred 2, 4, and 6 months after the initial assessment, during which children were administered the CDI and SEQ over the phone. Families were compensated \$100 for their participation.

## **RESULTS**

Of the 100 mother-child pairs, 90, 89, and 90 participated at the 2, 4, and 6-month follow-ups, respectively (10% attrition). Given the presence of missing data, we examined whether the data were missing at random, thereby justifying the use of data imputation methods for estimating missing values (cf. Shafer & Graham, 2002). As a first step in examining the pattern of missing data, a series of t tests was conducted to determine if families who completed all of the assessments differed from those with missing data on any Time 1 variables. None of these analyses was significant. In addition, Little's missing completely at random (MCAR) test, for which the null hypothesis is that the data are MCAR (Little & Rubin, 1987) was nonsignificant,  $\chi^2(276) = 243.01$ , p = .92, providing further support for the imputation of missing values. Given these results, maximum likelihood estimates of missing data were created and used in all subsequent analyses (see Shafer & Graham, 2002).

Correlations among the study measures, as well as their means and standard deviations, are presented in Table 1. As can be seen in the table, there were no significant gender differences in levels of relational or overt victimization or depressive symptoms at any of the time points. In addition, although mother history of MDD was significantly related to children's depressive symptom levels, it was not significantly related to reports of either relational or overt victimization. Finally, the correlations among reports of both forms of victimization and depressive symptoms were significant both within and across waves of assessment.

Next, a series of multilevel models (Linear Mixed Models) was used to examine the effects of depressive symptoms on prospective changes in children's levels of relational and overt peer victimization. Changes in relational and overt victimization were

TABLE 1. Correlations and Descriptive Statistics for Study Variables

|            |               |          |      | IABI  | LE 1. Corre | IABLE 1. Correlations and Descriptive Statistics for Study Variables | n Descripti | ve statistic | s ror study  | variables |       |       |        |       |      |
|------------|---------------|----------|------|-------|-------------|--|-------------|--------------|--------------|-----------|-------|-------|--------|-------|------|
|            |               | -        | 2    | т     | 4           | 5  | 9           | 7            | <sub>∞</sub> | 6         | 10    | 11    | 12     | 13    | 14   |
| <u>-</u> : | 1. Mom MDD —  |          |      |       |             |  |             |              |              |           |       |       |        |       |      |
| 2.         | Child Sex     | 07       | I    |       |             |  |             |              |              |           |       |       |        |       |      |
| ĸ.         | T1 CDI        | .20*     | .03  | I     |             |  |             |              |              |           |       |       |        |       |      |
| 4          | T2 CDI        | .32**    | 90:- | .71** | I           |  |             |              |              |           |       |       |        |       |      |
| 2.         | T3 CDI        | .29**    |      | .54** | .76**       | I  |             |              |              |           |       |       |        |       |      |
| 9          | T4 CDI        | 19       | 02   | .55** | **29.       | .78**  | I           |              |              |           |       |       |        |       |      |
| 7.         | T1 SEQ-0V     | .02      | 80.  | .53** | **04.       | **64.  | .55**       | I            |              |           |       |       |        |       |      |
| ∞i         | T2 SEQ-0V     | .07      | .02  | .32** | .35**       | .35**  | **86.       | **64.        | I            |           |       |       |        |       |      |
| 6          | T3 SEQ-OV     | .15      | 1.   | .28** | **86.       | .48**  | **44.       | .52**        | .65**        | Ι         |       |       |        |       |      |
| 10.        | T4 SEQ-0V     | <u>+</u> | 12   | .31** | .36**       | .42**  | .43**       | .47**        | **65.        | .76**     | I     |       |        |       |      |
| 1.         | T1 SEQ-RV     | .07      | .10  | .52** | **44.       | **44.  | .46**       | .72**        | .33**        | .46**     | **04. | I     |        |       |      |
| 12.        | T2 SEQ-RV     | .12      | .07  | .25*  | .33**       | .23*   | .15         | **68.        | **64.        | .54**     | .31** | **44. | I      |       |      |
| 13.        | T3 SEQ-RV     | .15      | 90.  | .34** | **05.       | .48**  | **44.       | **85.        | .48**        | .72**     | **74. | .64** | ** 29. | I     |      |
| 14.        | 14. T4 SEQ-RV | .14      | .04  | .27** | **86.       | **14.  | .34**       | .42**        | .30**        | .57**     | .52** | **68: | **09.  | .57** | I    |
|            | ×             | i        | I    | 69.9  | 4.36        | 3.26   | 3.03        | 1.72         | 1.57         | 1.55      | 1.53  | 1.98  | 1.80   | 1.69  | 1.66 |
|            | SD            | 1        | 1    | 6.16  | 4.16        | 3.68   | 3.52        | 0.71         | 0.57         | 0.65      | 0.56  | 0.81  | 0.75   | 0.63  | 0.73 |

Note. Mom MDD = maternal history of major depressive disorder (1 = yes, 0 = no). Child Sex (1 = girl, 0 = boy). CDI = Children's Depression Inventory. SEQ-OV = Social Experiences Questionnaire-Relational Victimization subscale. \* $^{\prime}$  \* $^{\prime}$  \* $^{\prime}$  \* $^{\prime}$  \* $^{\prime}$  0.1.

examined in separate analyses. Because waves of data collection were nested within participants, we modeled an autoregressive (lag 1) covariance structure to account for the effects of the previous wave on the current wave (e.g., relation between peer victimization at time T-1 on peer victimization at Time T). The dependent variable in all analyses was reports of victimization at Time T. Reports of victimization (relational or overt) at Time T-1 were included as a covariate in all analyses and the primary predictor was level of depression at Time T-1. The analyses focused on within-subject relations between levels of depressive symptoms reported at a given assessment point and prospective changes in children's levels of peer victimization (overt or relational) over the subsequent follow-up interval (change between Time T-1 and Time T). All models included a random intercept and slope effect. And, because children were selected for this study based on their mothers' history of MDD, all analyses were conducted statistically controlling for the influence of mother's MDD history (yes vs. no).

We found that children's levels of depressive symptoms predicted prospective changes in relational, t(76.83) = 2.36, p = .02,  $r_{\text{effect size}} = .26$ , and overt, t(196.19)= 2.44, p = .02,  $r_{\text{effect size}} = .17$ , victimization. As noted above, however, levels of relational and overt victimization were significantly correlated at each time point across the study (rs = .49-.72). Therefore, to evaluate the robustness of the findings and to evaluate the unique impact of depressive symptoms on future changes in relational versus overt victimization, we repeated the analyses statistically controlling for levels of the alternate form of victimization at Time T (i.e., we controlled for reports of overt victimization at Time T when examining stress generation effects for relational victimization and we controlled for reports of relational victimization at Time T when examining stress generation effects for overt victimization). In these analyses, the effect of depressive symptoms on prospective change in relational victimization was maintained even after statistically controlling for reports of overt victimization at Time T, t(127.65) = 2.29, p = .02,  $r_{\text{effect size}} = .20$ . In contrast, statistically controlling for reports of relational victimization at Time T, depressive symptoms no longer predicted prospective changes in overt victimization,  $t(218.33) = 0.19, p = .85, r_{\text{effect size}} = .01.$ 

Next, we examined whether the stress generation effects were moderated by children's gender. We found that child gender moderated the impact of depressive symptoms on prospective changes in both relational, t(132.87) = -2.37, p = .02,  $r_{\text{effect size}} = -2.37$ -.20, and overt, t(142.03) = -2.12, p = .04,  $r_{\text{effect size}} = -.18$ , victimization. Examining the effects separately among boys and girls, we found that, among boys, depressive symptoms were a marginally significant predictor of prospective change in relational victimization, t(95.67) = 1.95, p = .054,  $r_{\text{effect size}} = .20$ , and did not predict significant change in overt victimization, t(83.80) = -0.14, p = .89,  $r_{\text{effect size}} = -.02$ , victimization. Further, controlling for the reports of overt victimization at Time T, the impact of depressive symptoms on prospective changes in relational victimization was substantially reduced, t(44.53) = 0.37, p = .71,  $r_{\text{effect size}} = .06$ , suggesting that the relation was not robust among boys. Focusing next on girls, we found that depressive symptoms predicted future increases in both relational, t(45.20) = 3.62, p = .001,  $r_{\text{effect size}} =$ .47, and overt, t(61.15) = 2.62, p = .01,  $r_{\text{effect size}} = .32$ , victimization. Examining the robustness of the stress generation findings in girls, we found that the effect for relational victimization was maintained even when we statistically controlled for levels of overt victimization at Time T,  $t(94.78) = 2.81, p = .006, r_{\text{effect size}} = .28$ . However, the reverse was not true. When we statistically controlled for the influence of relational victimization at Time T, the effect of depressive symptoms on prospective change in overt victimization was reduced to nonsignificant, t(115.58) = 1.10, p = .27, 364 GIBB AND HANLEY

 $r_{\text{effect size}} = .10$ . These results suggest that the impact of depressive symptoms on changes in overt victimization in girls was due, primarily, to its co-occurrence with relational victimization, with the primary impact of depressive symptoms in girls being in terms of the impact on increasing levels of relational victimization.

Finally, we tested whether any of the stress generation effects were moderated by children's age, or mother's or children's history of MDD. None of these analyses was significant.

#### **DISCUSSION**

The goal of this study was to extend previous research examining the stress generation model of depression by examining the effects of depressive symptom elevations on prospective changes in two specific forms of interpersonal stress in children's lives relational and overt victimization. We also sought to determine whether these stress generation effects may be stronger for girls versus boys. We found that children's levels of depressive symptoms predicted prospective changes in both relational and overt victimization. However, when we accounted for the comorbidity between the two forms of victimization, we found that the effect was specific to experiences of relational victimization. In addition, this effect was specific to girls rather than boys. The current results add to a growing body of research supporting the stress generation model of depression (for reviews, see Hammen, 2006; Hammen & Shih, 2008; Liu & Alloy, 2010). They also provide additional evidence that stress generation effects may be stronger for girls than boys, at least for some types of negative life events. Further, they are consistent with previous research suggesting that the link between relational victimization and depressive symptoms may be stronger among girls than boys (e.g., Prinstein et al., 2001; see also Uhrlass, Crossett, & Gibb, 2008).

An important question is why stress generation effects were not observed among boys in this study. One possibility, of course, is that depressive stress generation effects are simply more likely to occur among girls and women than boys and men and there is some support for this hypothesis (see Hammen, 2006; Hammen & Shih, 2008; Liu & Alloy, 2010). However, it is also possible that some aspect of the current design contributed to the null findings. For example, we did not observe significant sex differences in levels of overt victimization, although previous research has found consistent evidence that boys report more overt victimization than girls (Crick et al., 2002; Rose & Rudolph, 2006). The lack of sex difference in overt victimization in the current sample does not appear to be due to a restricted range in our sample as the means and standard deviations for both forms of victimization are similar to those reported in prior research (e.g., Phelps, 2001). Future research is needed, therefore, to determine whether stress generation effects on experiences of peer victimization are truly specific to relational victimization among girls, or whether depressed boys may also be at risk for increased levels of (certain forms of) victimization from their peers.

This is the first study of which we are aware to examine stress generation effects of depressive symptoms on future increases in relational victimization. This said, there is some evidence from previous research suggesting that social anxiety may predict future increases in relational victimization among youth (Siegel, La Greca, & Harrison, 2009; but see also Storch, Masia-Warner, Crisp, & Klein, 2005). Given the strong comorbidity between depression and social anxiety (Kessler, Stang, Wittchen, Stein,

& Walters, 1999), future research should seek to determine whether stress generation effects for relational victimization are specific to one form of psychopathology versus the other.

Future research is also needed to determine the mechanism of risk for these stress generation effects. A number of studies have now supported the role of specific cognitive (e.g., inferential style, hopelessness), personality (e.g., neuroticism), and interpersonal (e.g. excessive reassurance seeking, interpersonal competence, interpersonal problemsolving) styles that may contribute to stress generation effects (for reviews, see Hammen, 2006; Hammen & Shih, 2008; Liu & Alloy, 2010). However, we are not aware of any research that has examined the impact of any of these risk factors on prospective changes in relational victimization. It is also possible that stress generation effects are driven by specific (clusters of) depressive symptoms. For example, one study found that the impact of depression on future increases in dependent interpersonal stress was driven primarily by adolescents' cognitive-affective symptoms of depression rather than their somatic symptoms (Harkness & Stewart, 2009). It is also possible that the irritability or social withdrawal that frequently accompany depression in children increase risk for future peer victimization. Indeed, previous research has suggested that children who are socially withdrawn are more likely to be victimized by their peers (see McDougall, Hymel, Vaillancourt, & Mercer, 2001). Because social withdrawal is also common in social phobia, social withdrawal may help to explain both sets of findings. Future research is needed to determine the specific mechanisms by which depressed children may increase their risk for future peer victimization.

The current study exhibited a number of strengths including the prospective, multiwave design and the focus on both relational and overt victimization. However, there were limitations as well, which should be noted. First, all of the measures were based upon participants' self-report, which may have inflated the relations among them. For example, although we were able to demonstrate that depressive symptoms predicted prospective changes in reports of victimization, it is possible that children's reports of victimization were influenced by their current mood. Future research, therefore, would benefit from the inclusion of multimethod assessments of both constructs, such as sociometric ratings of victimization and interviewer-based assessments of depressive symptom levels. Second, children in this study were chosen for inclusion based on their mothers' histories of MDD (presence during child's life vs. no lifetime history). Therefore, the extent to which the current results will generalize to a more representative sample remains unclear. This said, however, all results were maintained when statistically controlling mother MDD history and none of the relations were moderated by mother history of MDD.

In summary, the current results add to the growing body of research supporting the stress generation model of depression (Hammen, 1991). They also extend previous research by more precisely identifying how these stress generation effects may be expressed within children's relationships with their peers. That is, stress generation effects in this study appeared to be specific to the impact of depressive symptom elevations on future increases in relational victimization among girls. Future research is needed to identify the mechanisms of stress generation in depressed children so that more targeted and effective interventions can be developed with the goal of breaking the vicious cycle of depression risk.

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