

## CHILDHOOD EMOTIONAL MALTREATMENT AND THE STRESS GENERATION MODEL OF DEPRESSION

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Despite consistent support for Hammen's (1991, 1992) stress generation model of depression and support for the adverse effects of childhood emotional maltreatment on later functioning and vulnerability to depression, the relation between the two is unclear. Therefore, the primary aim of the current study of young adults was to examine whether changes in recent negative life events would mediate versus moderate the relation between childhood emotional maltreatment and prospective changes in depressive symptoms. We also examined whether the stress generation effect was specific to depressive symptoms. Changes in recent negative events mediated the relation between childhood emotional maltreatment and changes in depressive symptoms. Additionally, initial depressive symptoms, but not anxiety symptoms, contributed to prospective changes in negative life events.

Both recent and childhood negative life events are well-known risk factors for depression in adulthood (for reviews, see Brown & Harris, 1978; Goodman, 2002; Monroe & Hadjiyannakis, 2002). More recently, researchers and theorists have focused on the influence of depression upon the occurrence of negative life events. Specifically, in her stress generation model of depression, Hammen (1991, 1992) proposed a reciprocal relation between depression and negative life events such that depressed individuals actively contribute to the occurrence of negative events in their lives. This stress generation hypothesis has been supported in a number of studies (e.g., Daley et al., 1997; Davila, Hammen, Burge, Paley, & Daley, 1995; Joiner, Wingate, Gencoz, & Gencoz, 2005; Potthoff, Holahan, & Joiner, 1995; Wingate & Joiner, 2004).

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Despite strong support for the bidirectional relationship between recent events and depression in adulthood, however, the potential influence of negative childhood events on this vicious cycle is unclear. One possibility is that negative events in childhood may serve as a risk factor for future negative events, setting the stage for the onset of both depression and additional negative events in adulthood. In this view, recent negative events would serve to mediate the link between negative events in childhood and depression in adulthood. That is, recent negative events may serve as the mechanism through which negative events in childhood are related to levels of depression in adulthood (cf. Baron & Kenny, 1986). This view would be consistent with research suggesting that early maltreatment by parents contributes to future difficulties with peer interactions (Bolger & Patterson, 2001) and psychological distress (Duncan, 1999). Another possibility is that negative events in adulthood may simply serve as an additional risk factor for depression among those already at heightened risk because of a history of negative childhood events. In this view, recent negative events would serve to moderate the link between negative events in childhood and depression in adulthood. That is, rather than serving as the mechanism linking childhood events to current depressive symptoms as specified under the mediation model, recent negative events may instead augment or strengthen the relationship between negative childhood events and current depression (cf. Baron & Kenny, 1986). This view would be consistent with research suggesting that multiple forms of negative life events have an additive effect on risk for depression (Brown, Harris, & Eales, 1993; Brown, Harris, & Eales, 1996; Brown, Harris, Hepworth, & Robinson, 1994).

The primary goal of this study, therefore, was to test these two possibilities in relation to Hammen's stress generation model of depression. Specifically, using data from a 7-week longitudinal study, we examined whether changes in recent negative events mediated versus moderated the link between reports of childhood emotional maltreatment and changes in depressive symptoms. Regardless of the mediating versus moderating role of recent events, we anticipated that once developed, depressive symptoms would predict further increases in negative events. We chose to focus specifically on childhood emotional maltreatment in this study because research has suggested that it may be more strongly related to adult depression than other forms of negative childhood events (Gibb, Butler, & Beck, 2003; Gibb, Chelminski, & Zimmerman, 2005; Rose & Abramson, 1992).

A secondary goal of this study was to test the specificity of the stress generation effects to symptoms of depression versus anxiety. Specifically, although Hammen (1991) suggested that the stress generation ef-

fect would be specific to unipolar depression, few studies have tested this hypothesis. This said, there is preliminary evidence to suggest that the generation of negative events is more strongly tied to symptoms of depression than anxiety (e.g., Wingate & Joiner, 2004; Joiner et al., 2005). Given this, we hypothesized that initial symptoms of depression, but not anxiety, would predict changes in negative events over the follow-up.

## METHOD

### PARTICIPANTS

Participants for this study were 208 undergraduate students. The mean age of participants was 19.6 years ( $SD = 4.3$ ) and 148 (71.2%) of the participants were female. In terms of racial/ethnic composition, 121 (58.2%) were Caucasian, 50 (24%) were Asian, 18 (8.7%) were African American, nine (4.3%) were Hispanic, and the remaining nine (4.3%) were from other racial/ethnic groups or did not report their race/ethnicity.

### MEASURES

*Emotional Maltreatment.* The Life Experiences Questionnaire (LEQ; Gibb et al., 2001) is a 92-item self-report measure that was used to assess participants' histories of childhood emotional maltreatment committed by multiple perpetrators (e.g., caretakers, peers, strangers). For each event listed in the LEQ, participants are asked to indicate whether or not they have experienced the event, the age of onset and cessation of the event, its frequency of occurrence, and who the perpetrator was. Given that we were interested in childhood maltreatment specifically and not maltreatment occurring in either adolescence or adulthood, we included only those events endorsed as occurring before the age of 15 years. Levels of emotional maltreatment were determined by summing the number of different forms of maltreatment (e.g., humiliation, rejection, extortion, and teasing) endorsed for the emotional maltreatment category. The emotional maltreatment subscale of the LEQ has been found to correlate highly with levels of emotional maltreatment reported in structured clinical interviews and has demonstrated predictive validity for episodes of depression among young adults (Gibb et al., 2001). In the current study, the LEQ exhibited good internal consistency ( $\alpha = .80$ ).

*Negative Life Events.* The Hassles and Uplifts Scale (DeLongis, Folkman, & Lazarus, 1988) was used to assess participants' negative life events. In this study, only the Hassles subscale was used. We chose to focus on hassles, rather than major negative life events (e.g., deaths or loss

of job), in this study because participants were expected to experience few, if any, major negative life events from week to week, which would have limited our statistical power for the analyses of interest. The Hassles Scale (HS) is a 53-item self-report scale. For each item, participants are asked to indicate if the given event was a hassle or irritant for them during the past week and, if so, the degree of its impact. In the current study, levels of negative life events were calculated by summing the number of hassles endorsed, rather than the subjective impact ratings. In the current study, the Hassles Scale exhibited excellent internal consistency ( $\alpha$  ranged from .86 to .93 across the 7 time points). For this study, two hassles scores were computed and used in all analyses: (a) the sum of all hassles reported at Time 1 and (b) the sum of all hassles reported at Times 2 to 7.

*Depressive Symptoms.* The Beck Depression Inventory–II (BDI–II; Beck, Steer, & Brown, 1996) was used to assess participants' levels of depressive symptoms. The BDI–II is a 21-item self-report scale measuring the presence and severity of depressive symptoms. Total scores range from 0 to 63, with higher scores indicating more severe symptoms of depression. Numerous studies have supported the validity and reliability of the BDI–II (Beck et al., 1996; Beck, Steer, & Garbin, 1988; Storch, Roberti, & Roth, 2004; Whisman, Perez, & Ramel, 2000). For the current study, the BDI–II exhibited excellent internal consistency ( $\alpha = .91$  at Time 1 and .93 at Time 8)

*Anxiety Symptoms.* The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) was used to assess participants' levels of anxiety symptoms. The BAI is a 21-item self-report measure. Total scores range from 0 to 63, with higher scores indicating more severe symptoms of anxiety. Several studies have supported the validity and reliability of the BAI (e.g., Beck, Epstein et al., 1988). In the current study, the BAI exhibited excellent internal consistency ( $\alpha = .90$  at Time 1 and .91 at Time 8).

## PROCEDURE

Participants were recruited from undergraduate psychology courses and received course credit for their participation in the initial and final assessment. During this initial assessment, participants completed the LEQ, Hassles Scale, BDI–II, and BAI. Participants were then asked to complete the Hassles Scale each week for the next 7 weeks using a secure Website, for which they were compensated \$10. Finally, at Week 8, participants were asked to come back to the laboratory to complete the BDI–II and BAI.

TABLE 1. Correlations and Descriptive Statistics for Study Variables

Variables	1	2	3	4	5	6	7	<i>M</i>	<i>SD</i>
1. T1 LEQ-EM	—							6.61	4.35
2. T1 HS	.33**	—						28.28	15.79
3. T2-T7 HS	.22**	.70**	—					92.65	48.92
4. T1 BDI-II	.20**	.34**	.37**	—				11.50	9.27
5. T8 BDI-II	.18*	.28*	.38**	.73**	—			8.27	8.24
6. T1 BAI	.26**	.34**	.33**	.63**	.56**	—		9.36	8.43
7. T8 BAI	.15*	.40**	.45**	.51**	.66**	.60**	—	8.28	8.42

Note. LEQ-EM = Life Experiences Questionnaire-Emotional Maltreatment subscale. HS = Hassles Scale. BDI-II = Beck Depression Inventory-II. BAI = Beck Depression Inventory. \* $p < .05$ . \*\* $p < .01$ .

## RESULTS

Preliminary analyses revealed that a number of variables exhibited significant skew. These variables were transformed (e.g., square root) prior to further analysis to satisfy assumptions of normality. Given the presence of some missing data, we then examined whether the data were missing at random in order to justify the use of data imputation methods for estimating missing values (cf. Shafer & Graham, 2002). As a first step, a series of *t*-tests was conducted to determine if attriting individuals differed from nonattriting individuals on any of the study variables. Specifically, we compared individuals participating at all time points ( $n = 138$ ) with those who did not participate at all time points in terms of demographic and study variables. There were no significant differences among attritors and nonattritors on any of the measures (lowest  $p = .27$ ). 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,  $\chi^2(15) = 9.48, p = .85$ . Given these results, maximum likelihood estimates of missing data were created and used in all subsequent analyses (see Shafer & Graham, 2002).

Correlations and descriptive statistics for all variables are shown in Table 1. Means and standard deviations represent values obtained prior to transformations. Although multigroup comparisons were conducted for all models tested to determine whether individuals' gender or race/ethnicity moderated the models' fit, none of these comparisons was significant. Therefore, all results are presented collapsing across sex and race/ethnicity.

In examining our primary aim, we first tested a full mediation model (see Figure 1). Specifically, path analysis, using AMOS 5.0 (Arbuckle, 2003), was used to test the hypothesis that changes in negative events

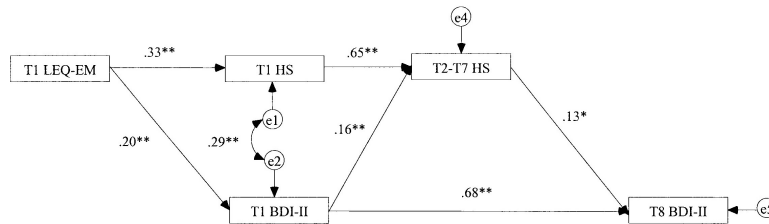


FIGURE 1. Full mediation model. LEQ-EM = Life Experiences Questionnaire-Emotional Maltreatment subscale, HS = Hassles Scale, BDI-II = Beck Depression Inventory-II. \* $p < .05$ , \*\* $p < .01$ .

would fully mediate the link between childhood emotional maltreatment and changes in depressive symptoms. The results of the path analysis supported this hypothesis,  $\chi^2(3, N = 208) = 2.11, p = .55$ , comparative fit index (CFI) = 1.00, root mean-square error of approximation (RMSEA) = .00, standardized root mean-square residual (SRMR) = .01, suggesting that the model provided a good fit to the data (Kline, 2005). Despite finding support for the full mediation model, we also tested a partial mediation model to determine whether fit might be improved by adding direct paths from (a) LEQ-EM to T2-T7 HS, and (b) LEQ-EM to T8 BDI-II. Providing stronger support for the full mediation model, this partial mediation model did not fit the data significantly better than the more parsimonious full mediation model,  $\chi^2(2) = 2.24, p = .89$ , and neither of the added paths was significant (lowest  $p = .67$ ).

Next, we tested an alternate model in which we examined whether recent negative events moderated the relation between childhood emotional maltreatment and changes in depressive symptoms. More specifically, we added the LEQ-EM  $\times$  T2-T7 HS interaction term to the full mediation model, and added a path from the LEQ-EM  $\times$  T2-T7 HS interaction to T8 BDI-II. This interaction term was also allowed to correlate with LEQ-EM and the T2-T7 HS error term. Consistent with the suggestions of Aiken and West (1991), all variables were mean-centered to reduce multicollinearity prior to analysis. The results from the path analysis suggest that the model provides a good fit to the data,  $\chi^2(5, N = 208) = 3.21, p = .67$ , CFI = 1.00, RMSEA = .00, SRMR = .02 (Kline, 2005). However, the path from LEQ-EM  $\times$  T2-T7 HS to T8 BDI-II,  $\beta = -.04, p = .48$ , was not significant, suggesting that current negative life events did

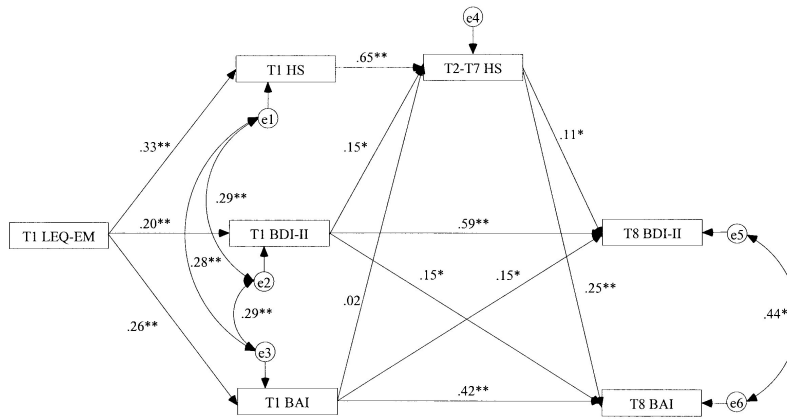


FIGURE 2. Full mediation model with specificity analysis. LEQ-EM = Life Experiences Questionnaire-Emotional Maltreatment subscale, HS = Hassles Scale, BDI-II = Beck Depression Inventory-II, BAI = Beck Anxiety Inventory. \* $p < .05$ , \*\* $p < .01$ .

not moderate the relation between a history of childhood emotional maltreatment and changes in depressive symptoms. Thus, the current results suggest that recent events mediate rather than moderate the relation between a history of childhood emotional maltreatment and changes in young adults' depressive symptoms.

In examining our secondary aim, we added T1 BAI and T8 BAI to the full mediation model. Specifically, we tested the hypothesis that, in addition to our full mediation findings, initial depressive symptoms, but not anxiety symptoms, would predict changes in negative events. Therefore, in adding BAI scores to the model, paths were added from (a) LEQ-EM to T1 BAI, (b) T1 BAI to T2-T7 HS, (c) T1 BAI to T8 BAI, and (d) T2-T7 HS to T8 BAI. In addition, the error terms for BAI and BDI were allowed to correlate at each time point. This model provided an equivocal fit to the data,  $\chi^2(7, N = 208) = 22.78$ ,  $p < .01$ , CFI = .98, RMSEA = .10, SRMR = .04 (Kline, 2005). Specifically, although the CFI and SRMR indicated a good fit, the  $\chi^2$  and RMSEA suggested that fit could be improved. An examination of the modification indices indicated that fit could be improved by adding direct paths from T1 BDI to T8 BAI and from T1 BAI to T8 BDI. Because these modifications were consistent with previous research supporting the bidirectional relations between depression and anxiety (Bittner et al., 2004; Biederman, Faraone, Mick, & Lelon, 1995; Brady & Kendall, 1992; Franko et al., 2005; Goodwin, Fergusson, & Horwood, 2004; Kendall, Safford, Flannery-Schroeder, & Webb, 2004;

Stein et al., 2001; Stein, Tancer, & Uhde, 1990), these paths were added. The paths from T1 BDI-II to T8 BAI and from T1 BAI to T8 BDI-II were significant ( $\beta = .15, p = .02$ , and  $\beta = .16, p = .03$ , respectively). Adding these two paths significantly improved model fit,  $\chi^2(2) = 14.98, p < .01$ , and provided a good fit to the data,  $\chi^2(5, N = 208) = 7.80, p = .17$ , CFI = 1.00, RMSEA = .05, SRMR = .02. As can be seen in Figure 2, all of the paths in this model, except one, were significant. Specifically, supporting the specificity of the stress-generation model, although changes in hassles significantly predicted changes in depressive symptoms,  $\beta = .15, p = .01$ , as well as anxiety symptoms,  $\beta = .31, p < .01$ , only initial depressive symptoms,  $\beta = .15, p = .05$ , but not initial symptoms of anxiety,  $\beta = .02, p = .74$ , contributed to prospective changes in hassles. Consistent with previous research (Bittner et al., 2004; Biederman et al., 1995; Brady & Kendall, 1992; Franko et al., 2005; Goodwin et al., 2004; Kendall et al., 2004; Stein et al., 2001; Stein et al., 1990), we also found that initial depressive symptoms contributed to prospective changes in anxiety, and vice versa.

## DISCUSSION

The purpose of this study was to examine the relation between reports of childhood emotional maltreatment and the stress generation model of depression in young adults. Specifically, our primary aim was to examine whether changes in recent negative life events would mediate versus moderate the relation between reports of childhood emotional maltreatment and changes in depressive symptoms in young adults. Supporting developmental extensions of the stress generation model (e.g., Hammen, Davila, Brown, Ellicott, & Gitlin, 1992), we found that changes in recent negative events mediated, rather than moderated, the link between reports of childhood emotional maltreatment and changes in depressive symptoms. Additionally, supporting the specificity of the stress generation model, we found that although changes in negative events predicted changes in symptoms of both depression and anxiety, only initial depressive symptoms contributed to prospective changes in negative life events during the follow-up.

Although preliminary, the findings from this study have potentially important implications for developmental extensions of the stress generation model of depression. Specifically, the results suggest that negative events in childhood, such as emotional maltreatment, may lay the foundation for a vicious cycle of depressive symptoms and negative events in adulthood. In this view, childhood emotional maltreatment functions as a risk factor for negative events in adulthood, leaving the individual vulnerable to the onset of depressive symptoms and additional



self-generated negative events. Thus, childhood emotional maltreatment does not appear to serve merely as an additional risk factor for depression among individuals already at heightened risk for the disorder. Rather, it may contribute to the onset of an ongoing cycle of depression and negative events in adulthood. Future longitudinal studies should seek to replicate these findings in younger samples so that the more proximal effects of childhood emotional maltreatment can be examined in relation to the stress generation hypothesis.

Providing further support for the stress generation model of depression, and consistent with recent research (Joiner et al., 2005; Wingate & Joiner, 2004), we also found support for the specificity of the stress generation effect to depressive symptoms versus symptoms of anxiety. Specifically, although changes in negative events predicted changes in symptoms of both depression and anxiety, only initial depressive symptoms contributed to changes in negative life events during the follow-up. These results, therefore, suggest that there is something unique about symptoms of depression that contributes to the onset of negative events. Future research should seek to not only explore the potential mechanism of this effect (cf. Joiner et al., 2005) but also to test the specificity of the stress generation effects to other forms of psychopathology (e.g., substance abuse).

This study had a number of strengths, including its strong basis in theory, the testing and integration of two well-established lines of research, the assessment of both depressive and anxiety symptoms, as well as its longitudinal design. Despite these strengths, there were several limitations, as well. First, assessments of all constructs relied on individuals' self-report. Responses to self-report measures might be biased by mood states; that is, depressed individuals might be more likely to respond negatively on all measures. Given this, future studies should seek to include multimethod assessments of the constructs (e.g., questionnaire- and interview-based assessments). A second limitation of this study was that the sample was limited to university undergraduates, which may limit the generalizability of our findings. Relatedly, we focused on depressive symptoms, rather than diagnoses. Although studies have consistently found evidence for the stress generation effect in clinical samples (Chun, Cronkite, & Moos, 2004; Hammen, 1991; Hammen et al., 1992), future stress generation studies attempting to incorporate childhood emotional maltreatment into the model should also seek to replicate the current results with more impaired samples and should include diagnostic assessments of depression. Finally, given that our measure of anxiety does not distinguish between different types of anxiety, it is unclear whether the current results would generalize to the various anxiety

disorders. Future studies should examine the stress generation model in relation to specific forms of anxiety (e.g., social phobia).

In summary, this is the first study to examine childhood emotional maltreatment in the context of the stress generation model of depression. Results from this study support previous research on the stress generation effect and extend previous findings in two ways. First, we found support for a model in which changes in negative life events mediated, rather than moderated, the relation between childhood emotional maltreatment and changes in depressive symptoms. Second, we found support for the stress generation effect with depressive symptoms, but not anxiety symptoms. This study serves as a first step in an effort to integrate research on the effects of childhood emotional maltreatment with research on the stress generation model of depression.

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