The Role of Childhood Abuse and Neglect in the Sensitization to Stressful Life Events in Adolescent Depression

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This study examined the role of childhood abuse and neglect in sensitizing adolescents to the effects of proximal stressful life events in a cross-sectional sample of 103 depressed and nondepressed adolescents. Consistent with hypotheses, adolescents with a history of childhood abuse and/or neglect reported a lower level of threat of stressful life events prior to episode onset than that reported by those without. This effect was specific to those on their 1st episode of depression and was specific to independent events (i.e., stressors outside of adolescents’ control). Further, this effect was robust when controlling for level of chronic difficulties, which was higher in those with childhood abuse and/or neglect. The authors suggest that childhood abuse and/or neglect may be an important risk factor that sensitizes individuals to the effects of acute independent life events.

Keywords: depression, adolescence, childhood adversity, stressful life events, stress sensitization

A wealth of research has shown that stressful life events are strongly related to the onset of major depression in adults (see Mazure, 1998) and adolescents (e.g., Duggal et al., 2000; Goodyer, Kolvin, & Gatzianis, 1985; Lewinsohn, Joiner, & Rohde, 2001; Williamson et al., 1998). In particular, studies using rigorous contextual life event interviews have shown that those who develop depression are 3–6 times more likely than those who do not to have experienced a severely threatening event (e.g., marital breakup or financially devastating job loss) in the preceding 3 months (Brown & Harris, 1989; Goodyer et al., 1985).

One of the most intriguing developments in life stress research has been the discovery that the role of stress in depression changes across recurrence (see Monroe & Harkness, 2005). The stress sensitization (or “kindling”) hypothesis proposes that individuals become sensitized to the life events that precipitate depression, and to the depressive episodes themselves, such that less stress is required to precipitate recurrences of depression than was required to precipitate the first onset (Post, 1992). As such, this theory helps greatly in understanding why the risk of recurrence increases with each successive episode and why the course of depression involves increasingly shorter well intervals between episodes over time (Solomon et al., 2000).

Research has provided consistent support for stress sensitization. In cross-sectional studies, individuals with recurrent depression are significantly less likely to experience a severely threatening life event prior to onset than are those on their first episode (e.g., Brown, Harris, & Hepworth, 1994; Ezquiaga, Gutierrez, & Lopez, 1987). Furthermore, severely threatening life events are significantly stronger prospective predictors of a first onset of depression than a recurrence (e.g., Daley, Hammen, & Rao, 2000; Monroe, Rohde, Seeley, & Lewinsohn, 1999).

Researchers have recently extended the above findings to an investigation of additional variables (besides depression) that heighten sensitivity to stress. This new line of inquiry is intriguing, as it suggests that stress sensitization might be useful in understanding not only the pathology of depression recurrence but also the disorder’s etiology. For example, Kendler, Thornton, and Gardner (2001) have suggested that a genetic liability to major depression may increase sensitivity to events that precede the first onset of the syndrome, such that less stress would be required to precipitate such first onsets in those with versus without this genetic predisposition (i.e., “prekindling”). This notion is also consistent with diathesis-stress models that posit a differing role of stress in depression given a preexisting diathesis (Monroe & Simons, 1991).

Kendler, Kuhn, and Prescott (2004) recently extended the above reasoning to childhood sexual abuse as a risk factor for stress sensitization. They found that women with a history of sexual abuse were more likely to develop depression in the face of a recent severely threatening life event than were women with no abuse history. Two additional studies have supported these findings. First, in a 2-year prospective study of 121 young women, Hammen, Henry, and Daley (2000) found that women with a history of one or more early adversities (e.g., parental death or separation, family violence) were more likely to develop depression following a lower level of life event severity than were those without such a history. Second, in a recent 1-year prospective...
study of fifth- and sixth-grade children, Rudolph and Flynn (in press) found that children exposed to a significant parental separation or loss were more likely to develop depression following a lower level of life event severity than were those without such a history. These latter two results are particularly important; they suggest that early adversity predicts depression because it sets up a heightened sensitivity to the environment, such that even minor events may evoke a depressogenic response. Given that minor events have a higher base rate than do the sorts of severely threatening events that typically precede depression onset (Monroe & Harkness, 2005), individuals with this early diathesis are at a much greater risk for developing depression than are those without. That is, not only are individuals with a history of adversity more likely to develop depression in the face of stress than are those without but they are more likely to develop depression in the face of even minor events.

The purpose of the present study was to examine the role of childhood abuse and/or neglect in lowering the threshold of stress prior to depression onset in adolescence. Childhood abuse and/or neglect is defined as a history of severe antipathy (i.e., hostility, verbal abuse), physical abuse, sexual abuse, or emotional or material neglect. In this study, we extended previous research in a number of ways. First, we examined a wider range of stressful life event severity, or threat, than has typically been considered. All of the studies examining the stress sensitization hypothesis and depression recurrence have examined stress as the presence versus absence of a severely threatening life event. However, if individuals are sensitized to stress, either as a result of many episodes of depression or as the result of a history of early abuse and/or neglect, then their depressive episodes should be precipitated by lower levels of event threat (see Hammen et al., 2000; Monroe & Harkness, 2005). This interpretation is also consistent with the biological definition of kindling from which Post’s (1992) stress sensitization hypothesis was developed (i.e., kindled animals develop seizures in the face of lower intensity levels of electrical stimulation than those required for nonkindled animals to develop seizures; Adamec, 1990). Therefore, we could not rely on the presence versus absence of a severe event as our event variable because this variable does not provide information regarding events that are not severely threatening. Instead, we needed a continuous gradient of threat to test the hypothesis most germane to stress sensitization; that is, those who are sensitized should, on average, show a lower threat rating for events prior to onset than do those who are not sensitized. This level of event threat could hypothetically descend to zero in highly sensitized individuals, such that the level necessary to trigger onset is no longer captured by the stress assessment. Such a conceptualization of stress sensitization is captured poignantly by Kraepelin’s (1921) classic observation of a patient who became depressed “after the death first of her husband, next of her dog, and then of her dove” (p. 179).

Second, no study to our knowledge has investigated the differential sensitization to independent versus dependent events. Independent events are those that are outside of the individual’s control (e.g., mother’s cancer diagnosis), whereas dependent events are in some way influenced by the individual (e.g., relationship breakup). Hammen (1991) and others (e.g., Daly et al., 1997; Harkness, Monroe, Simons, & Thase, 1999; Williamson, Birnmaher, Anderson, Al-Shabbout, & Ryan, 1995) have found that individuals with depression generate dependent life events, thereby reporting higher rates of such events than do nondepressed individuals, whereas these two groups do not differ in rates of independent events. In the present study, we examined whether adolescents with a history of childhood abuse and/or neglect show differential sensitization to independent or dependent events. As we are the first to consider the distinction between independent and dependent events in the context of stress sensitization, this question was exploratory.

Third, it is unclear whether childhood maltreatment adds to the sensitizing effect of depression recurrence. If maltreatment is associated with a lower level of event threat prior to the first depression onset and a recurrence, then this would suggest that early trauma influences both the initial etiology of depression and its ongoing pathology. We predicted that the effect of childhood abuse and/or neglect on event threat would be especially pronounced among those on a recurrence who have experienced the additional sensitizing effect of their previous episode(s).

Finally, any study examining the impact of adverse childhood history on the threshold of proximal life events in depression should consider the mediating role of chronic difficulties. This is important because childhood abuse and neglect are significantly associated with the generation of chronic difficulties, including difficulties in relationship, educational, occupational, and health domains (e.g., Cicchetti & Toth, 2005). These difficulties may then form a background context of chronically elevated stress. Brown and Harris (1986) noted that severely threatening events may not be necessary to provoke depression in individuals with chronic difficulties, and minor provoking agents may be all that are required: “Where there is onset of depression in the setting of a major difficulty without a severe event, it can often be linked to the occurrence of a less threatening event in the few weeks before onset” (p. 129). Thus, depression onset in those with a history of childhood abuse and/or neglect may be associated with a lower level of event threat not because of sensitization but simply because these individuals have a high baseline level of chronic stress. We controlled for the threat level of chronic difficulties in our models, thus allowing us to determine whether the effect of childhood adversity on lowering the event threat required to trigger onset is direct or is mediated through the generation of chronic difficulties.

In summary, our goals were to (a) examine the relation of childhood abuse and/or neglect to the average level of threat (i.e., severity) associated with independent and dependent life events prior to onset, (b) determine whether this relation depends on whether the individual is on a first onset of depression or a recurrence, and (c) determine whether this relation is robust when controlling for the level of threat of chronic difficulties. We predicted that, among depressed adolescents, a history of childhood abuse and/or neglect would be associated with a lower level of event threat prior to onset, particularly among those on a recurrent episode of depression.

Method

Participants

Participants included 103 adolescents from a midsized community in Ontario, Canada. Consistent with the ethnic distribution of this small city, 98% of the adolescents were White (see Table 1). The remaining 2% of participants were Asian or Hispanic. Adolescents in the depressed group were referred from community mental health agencies and recruited.
through local high schools. Community referral sources were asked to refer clients ages 13–18 years in a current episode of depression with no evidence of mania, psychosis, or conduct disorder. Adolescents in the nondepressed group were recruited through local high schools. Adolescents in the depressed group had to meet criteria for depression but did meet criteria for another psychiatric disorder; PTSD was paid $20 for their involvement. Following the interview, participants referred from community mental health agencies were referred back to their treatment provider. We provided treatment referrals for participants in the depressed group who were not receiving mental health services.

Measures

Demographic. A structured interview was administered to collect basic demographic information. Parental occupation was coded by two raters using the Hollingshead Index of Social Position (Hollingshead, 1975). A scale ranging from 1–6 was used, with higher scores indicating lower social position. Most scores in the present sample fell in the 3–5 range. According to the Hollingshead guidelines, scores of 3 include administrative personnel, small business owners, and minor professionals (e.g., real estate agent, physical therapist, nurse). Scores of 4 include clerical or sales workers and technicians (e.g., massage therapist, computer sales manager, paralegal). Scores of 5 include skilled manual employees (e.g., auto body repairer, hair stylist, police officer). Kappa coefficients were .69 for fathers and .60 for mothers, and consensus ratings were achieved through discussion. The average of the parents’ ratings was used in analyses.


Table 1

Descriptive Characteristics of the Sample by Depression Group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Nondepressed (n = 49)</th>
<th>First onset (n = 30)</th>
<th>Recurrent (n = 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Age (years)</td>
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<td>1.26</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
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</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>40.8</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>White</td>
<td>48</td>
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<td></td>
</tr>
<tr>
<td>Asian</td>
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<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
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<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Hollingshead index</td>
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<td>1.30</td>
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<tr>
<td>BDI score</td>
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<td>3.76</td>
<td></td>
</tr>
<tr>
<td>Age at first onset (years)</td>
<td>14.33&lt;sub&gt;a&lt;/sub&gt;</td>
<td>1.63</td>
<td></td>
</tr>
<tr>
<td>Comorbidities</td>
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<tr>
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<tr>
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<td>6.7</td>
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<tr>
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<tr>
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<td></td>
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<tr>
<td>GAD</td>
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<td>13.3</td>
<td></td>
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<tr>
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<tr>
<td>No</td>
<td>9</td>
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</table>

Note. Subscripts represent significant differences between group means (p < .05). BDI = Beck Depression Inventory; OCD = obsessive–compulsive disorder; PTSD = posttraumatic stress disorder; GAD = generalized anxiety disorder; ODD = oppositional defiant disorder.
Disorder, not otherwise specified (n = 25); dysthymia (with no history of major depression; n = 1); depressive disorder, not otherwise specified (n = 2); and adjustment disorder with depressed mood (n = 2). The latter 5 participants were included in this group because they were experiencing their first onset of a mood disorder. All of the results reported below were robust when these 5 adolescents who met criteria for an Axis I disorder other than major depression were excluded. Third, the recurrent depressed group (n = 24) included participants diagnosed with major depression, recurrent. The percentages of participants in the depressed groups who suffered from at least one, two, or more than two comorbid disorders were 62% (n = 14), 26% (n = 14), and 7% (n = 4), respectively. Depressed participants with versus without a comorbid diagnosis did not differ significantly on any of the main study variables (all ps > .30).

Depression severity. The 21-item self-report Beck Depression Inventory—II (BDI–II; Beck, Steer, & Brown, 1996) was administered to determine the presence and severity of depression symptoms. This measure is widely used in the study of depression in adolescents, and the standardized internal consistency estimate for the BDI–II in the present sample was .95.

Childhood history. The Childhood Experience of Care and Abuse scale (CECA; Bifulco, Brown, & Harris, 1994)\(^3\) is a retrospective semistructured contextual interview assessing the following variables related to the quality of parental care, from as far back as the participant can remember to the present: (a) antipathy—hostility or coldness toward the child (e.g., harsh criticism or name calling); (b) indifference—neglect of the child’s physical and/or emotional needs (e.g., not providing adequate food or clothing, not comforting the child when upset); (c) physical abuse—violence toward the child (e.g., punching, hitting with an object, or threatening with a knife); and (d) sexual abuse—nonconsensual sexual contact by any perpetrator (e.g., fondling, oral sex, and/or penetration). All interviews were audiorecorded. Interviewers were trained not to query about the effect of the stressors on the participants’ depression or the participants’ subjective reaction to, or perception of, the stressors. Interviews were audiotaped.

A research assistant listened to the interviews and prepared vignettes of each event and difficulty, deleting information regarding the participants’ depression and emotional reaction to the stressors. The rating team consisted of 2–4 raters who were unaware of the participants’ depression status, childhood history, or subjective response to the events. Ratings were based on the LEDS-II manual, which includes over 5,000 examples and rating rules. Raters had to justify each rating by appealing to a specific example. All interviewers and raters had received extensive training and supervision in the Bedford College LEDS-II procedures by Kate L. Harkness.

Life events were rated for their level of contextual threat (i.e., severity) on a 5-point scale (1 = marked, 2a = high moderate, 2b = low moderate, 3 = some, 4 = little/none). Chronic difficulties were rated on a 6-point threat scale (1 = high marked, 2 = low marked, 3 = high moderate, 4 = low moderate, 5 = mild, 6 = very mild; see Brown & Harris, 1989). Consistent with the LEDS-II procedure, each rater provided his or her own threat rating for each event and difficulty. Any discrepancies among raters were then discussed, and a consensus threat rating was achieved. It was this consensus rating that was used in all analyses. Pairwise comparisons of four raters on the threat ratings of events and difficulties ranged from \(k = .84\) to \(k = .94\) (\(M = .90\)).

Events were also categorized for independence. Independent events were those totally or nearly totally independent of the behavior of the individual, such that the participant played no role in causing the stressor (e.g., father’s job layoff, death of grandmother). Dependent events were at least partly dependent upon the behavior or characteristics of the individual (e.g., quit job, suspended from school for truancy). Consensus decisions regarding independence were made on the basis of the context surrounding each event through the use of the LEDS-II manual.

Because stress sensitization is a theory of depression onset, we restricted our analyses to life events that occurred in the most etiologically central 3 months prior to onset (Brown & Harris, 1989).\(^5\) We based the control

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\(^3\) The CECA was originally developed to be used with adults. Bifulco and colleagues (Bifulco et al., 1994) subsequently developed a version for use with teenagers, ages 14–18, who are still living in the parental home. The rating criteria are to be applied similarly with teenage and adult samples, and the standardized manualized examples are applicable to both populations.

\(^4\) Differences between the adolescent and adult LEDS-II interviews include the deletion of age-inappropriate questions (e.g., “How do you get along with your children?”), the addition of adolescent-specific questions (e.g., “Do you ever break the rules at school?”), and the rephrasing of some existing questions (e.g., “Do you know if your parents owe a lot of money?”). The rating criteria are applied similarly, except that events are generally rated higher on contextual severity for adolescents than for adults (see Brown et al., 1992).

\(^5\) To confirm that events in the 3 months preceding onset were indeed etiologically related to onset, we also examined independent and dependent events in the more distal 3- to 6-month period prior to onset. These events failed to significantly discriminate between depressed and nondepressed groups. In addition, paired \(t\) tests revealed a significant increase in the frequency of events from the 3–6 months to the 0–3 months prior to onset only in the depressed groups and for independent events but not dependent events: independent events, \(t(53) = 3.31, p < .005\); dependent events, \(t(53) = 1.62, p = .11\). That is, independent events, which we found most strongly discriminated between depressed and nondepressed adolescents, appear to cluster in the 3 months directly preceding onset in the depressed groups. These results suggest that the 0- to 3-month period prior to onset is the most etiologically central period in our sample.
period on the mean period of time between the depressed group’s episode onset date and the LEDS-II interview date (M = 24.5 weeks, or ~6 months). Therefore, in the control group, we examined events occurring in the 6–9 months prior to the interview. Chronic difficulties had to be present in the relevant 3-month period but could have begun some time before. Difficulties must have lasted at least 4 weeks (Brown & Harris, 1989).

The event variables used in analyses included the average consensus threat rating of all independent or dependent events that had occurred in the relevant 3-month time period.6 The average threat rating of chronic difficulties was used as a covariate. The threat ratings were reverse coded prior to calculating the means so that higher numbers represent greater threat. Participants who experienced no stressors in the time period were assigned a score of 0 (see also Hammen et al., 2000). Average threat of life events was used so that we could test the hypothesis that adolescents with a score of 0 (see also Hammen et al., 2000). Average threat of life events to calculating the means so that higher numbers represent greater threat. Difficulties must have lasted at least 4 weeks (Brown & Harris, 1989).

Results

Descriptive Characteristics

Descriptive characteristics by depression group are presented in Table 1. There were no differences among the three depression groups in sex distribution.7 However, the first onset group had a significantly lower parental occupation status than did the other two groups, F(2, 100) = 6.57, p < .05. In addition, those in the recurrent group were older than both the nondepressed and first onset depressed groups, F(2, 100) = 5.82, p < .05, and had a younger age at first depression onset than did the first onset group, t(46) = 3.17, p < .005.

The distributions of the CECA variables were skewed, with relatively few marked or moderate ratings. Therefore, the variables were dichotomized into severe (ratings of marked or moderate) versus nonsevere (ratings of some or little/none) levels (see Bifulco et al., 1994). The percentages of participants who reported severe antipathy, indifference, physical abuse, or sexual abuse were 10% (n = 10), 5% (n = 5), 9% (n = 9), and 7% (n = 7), respectively. We then created a composite variable, childhood abuse and/or neglect, defined as the presence versus absence of severe antipathy and/or indifference and/or physical abuse and/or sexual abuse. All cases of abuse and neglect had their onset in childhood (i.e., prior to age 13). Childhood abuse and/or neglect was reported by 23% (n = 24) of the sample.8 Girls were more likely to report this history than were boys (30%, n = 20, vs. 11%, n = 4, respectively): χ²(1, N = 103) = 5.59, p < .05.

The mean age of onset of severe childhood abuse and/or neglect was 6.8 (range = 3–13, SE = 1.11), and its mean duration was 6.38 (range = 1–18, SE = 1.23). Adolescents in the three depression groups who experienced this history did not differ significantly in its age of onset, F(2, 21) = 0.63, p = .54, or duration, F(2, 21) = 0.19, p = .83. In addition, age of onset and duration of maltreatment were not significantly related to the average threat level of independent (r = .016, p = .94, and r = .16, p = .45, respectively) or dependent (r = .056, p = .79, and r = .097, p = .65, respectively) events.

Descriptive statistics for the stress variables by depression group are reported in Table 2. Girls had a higher level of difficulty threat than did boys at a trend level (Ms = 2.09 and 1.59, respectively, SEs = 0.14 and 0.24, respectively), t(101) = 1.94, p = .06. No other demographic or clinical differences were significant.

Most of the adolescents in the present study were living with one or both parents. As a result, although the CECA and LEDS-II interviews assess very distinct constructs (i.e., a lifetime history of maltreatment versus recent specific stressors), it is possible that some experiences reported in the CECA interview would also be endorsed in the LEDS-II. All of the physical and sexual abuse incidents reported in the CECA occurred at least 1 year prior to the time period examined in the LEDS-II (average age of offset of abuse = 11 years), typically because the adolescent was no longer living with the perpetrator. Four participants were experiencing current antipathy and/or indifference. There were no events coded in the LEDS-II that related to the ongoing maltreatment. For some adolescents this was because, again, they were no longer living with the offending parent. For others, it was simply by chance that no related event occurred during this particular period. Nevertheless, we were concerned that these 4 individuals might endorse fewer LEDS-II events because they were experiencing concurrent maltreatment. When we reran our analyses below with these 4 individuals excluded, the results did not differ. Finally, 8 adolescents reported chronic difficulties with parents in the LEDS-II. However, these 8 adolescents were no more or less likely to have reported childhood abuse and/or neglect on the CECA (3 reported maltreatment and 5 did not). Therefore, we are confident that the

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6 In the event coding stage, the following classes of events were created: (a) Level 4 events, which were events rated 4 (little/none) on threat; (b) Level 3 events, which were events rated 3 (some) on threat; (c) Level 2 events, which were events rated 2b (low moderate) on threat or events rated 2a (high moderate) on threat and that were not focused on the participant; and (d) severe events, which were events rated 1 (marked) on threat or events rated 2a (high moderate) on threat and that were focused on the participant. In creating our average threat variable, we assigned the following values to these variables and then averaged over the relevant time period: Level 4 = 1, Level 3 = 2, Level 2 = 3, and severe = 4.

7 Although sex was not significantly related to depression group, the first onset group contained 20% more girls than did the other two groups (see Table 1). As mentioned below, however, sex did not emerge as a significant covariate in any of our main analyses.

8 The number of participants reporting childhood abuse and/or neglect does not equal the sum of those reporting severe levels of each individual CECA scale because some participants reported more than one adverse experience.
significantly correlated (~ emoc~ emphasize the need to include chronic difficulties in our models.

The effect of chronic difficulties was related to higher independent event threat. In addition, the effect of childhood abuse and/or neglect approached significance, \( F(1, 96) = 3.26, p < .07, \eta^2 = .03 \), such that those with maltreatment had a lower level of independent event threat than did those without (\( M = 54 \) and .80, respectively, \( SE = .21 \) and .12, respectively). The interaction between childhood abuse

To further address the concern of small cell sizes, we conducted a bootstrapping approach for average event threat level (with 500 bootstrap draws used in the computation). The bootstrap standard errors and \( t \) values replicated the results from the MLE with robust standard errors, which were consistent with the ANCOVA results. Results of the MLE and bootstrapping analyses are available from Kate L. Harkness by request.
and/or neglect and depression group was also significant, $F(2, 96) = 3.53, p < .05, \eta^2 = .07$.

As shown in Figure 1A, those with childhood abuse and/or neglect had significantly lower levels of independent event threat than did those without, but only among those on a first onset, $F(1, 96) = 12.63, p < .001, \eta^2 = .12$. The difference in level of independent event threat between those with versus without maltreatment did not approach significance among the nondepressed ($\eta^2 = .001$) or recurrent depressed ($\eta^2 = .001$) groups. In further support of stress sensitization, among those without child maltreatment (i.e., the nonsensitized adolescents), the first onset group did not differ significantly in level of independent event threat from the recurrent group ($\eta^2 = .008$) and had a significantly higher level of event threat than did the nondepressed group, $F(1, 96) = 7.23, p < .01, \eta^2 = .07$. By contrast, among those with maltreatment, the first onset group had a significantly lower level of independent event threat than did the recurrent group, $F(1, 96) = 4.21, p < .05, \eta^2 = .04$, and did not differ from the nondepressed group ($\eta^2 = .01$).

**Dependent events.** The effect of chronic difficulties in this model only approached significance, $F(1, 96) = 2.76, p = .10, \eta^2 = .03$. This model also failed to reveal significant effects of

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**Figure 1.** Relation of depression status and childhood adversity to the average threat of independent (A) and dependent (B) events.
and depression group ($\eta^2 = .01$), depression group ($\eta^2 = .004$), or the interaction of childhood abuse and/or neglect and depression group ($\eta^2 = .004$; see Figure 1B).

**Follow-Up Descriptive Analyses: Categorical Versus Continuous Definitions of Stress**

As is evident from Table 2, many participants reported no events in the observed time period. This raises the question of whether the sensitizing effect of child abuse and/or neglect is one of lowering the threat level of independent events required to trigger onset, as hypothesized, or do individuals with childhood maltreatment simply not require an event at all to trigger onset? We followed up on this question in two ways. (Note that the foregoing analyses should be interpreted as descriptive because of some very low cell sizes.)

First, we examined group differences on a dichotomous variable representing the percentage of participants who reported zero versus at least one independent event. Second, we examined group differences in independent event threat in the subsample of participants who had at least one independent event. If a similar pattern of results to that reported above is observed in both sets of analyses, then this would support our interpretation of the stress sensitization hypothesis; that is, because of the sensitizing effect of child maltreatment, a less severely threatening level of stress is required to precipitate onset than was the non-depressed group, $\chi^2(1, N = 103) = 5.66, p < .05$. Furthermore, among those without child maltreatment, the depression groups were significantly more likely to report at least one independent event than was the non-depressed group, $\chi^2(2, N = 103) = 9.84, p < .01$ (odds ratio = 2.67). By contrast, among those with child maltreatment, the first onset group was less likely to report at least one independent event than was the recurrent group and did not differ from the non-depressed group, $\chi^2(2, N = 103) = 5.28, p = .07$ (odds ratio = 1.76).

Second, we also observed differences among groups in the level of event threat in the 42 participants with at least one independent event. Similar to the pattern reported above, the first onset ($n = 12$; $M = 2.17, SD = 0.55$), $F(1, 36) = 2.50, p < .05$, $\eta^2 = .13$, and recurrent ($n = 9$; $M = 2.06, SD = 0.95$), $F(1, 36) = 1.61, p = .09$, $\eta^2 = .08$, groups without child abuse and/or neglect had a higher threat level of independent events than did the nondepressed participants ($n = 12$; $M = 1.53, SD = 0.66$). By contrast, the means for the first onset ($n = 2$; $M = 1.50, SD = 0.70$) and recurrent ($n = 6$; $M = 1.56, SD = 0.50$) groups with child abuse and/or neglect were nearly identical to those for the nondepressed group. That is, the depressed individuals with child maltreatment had a lower independent event threat level than did those without, such that the level of threat among those with child maltreatment was nearly identical to that of the control group.

**Discussion**

Consistent with the stress sensitization hypothesis, adolescents reporting childhood abuse and/or neglect had a lower threat level of independent life events prior to the first depressive episode onset than did those with no history of early trauma. We suggest from these findings that the prior history of trauma may have sensitized these adolescents to the effects of independent events, such that a lower level of threat of these events was required to precipitate their very first depression onset than was required for

![Figure 2](image_url). Relation of depression status and childhood adversity to the percentage of participants with at least one independent event.
those with no trauma history. Our findings are consistent with those of Hammen et al. (2000), Kendler et al. (2004), and Rudolph and Flynn (in press). Together, these four studies provide converging evidence that a wide range of adverse experiences in childhood—from parental psychopathology, family violence, and parental loss to severe physical, sexual, and verbal abuse or neglect—confer a vulnerability to stress sensitization.

Adolescents with a history of childhood abuse and/or neglect also reported a significantly higher threat level of chronic difficulties than that reported by those without. These results are consistent with studies documenting persistent difficulties in educational, occupational, health, and relationship functioning following child maltreatment (e.g., Cicchetti & Toth, 2005). Thus, it is possible that maltreatment is related to the sensitization to acute life events through the generation of chronic difficulties, such that lower levels of acute life events are required to trigger onset given a context of elevated stress in the months and years prior to the first depression onset. Our results suggest that the effect of childhood maltreatment on stress sensitization may not work entirely through the generation of chronic difficulties, as this effect was robust when controlling for the level of chronic difficulty threat. This finding strengthens our conclusions regarding the role of childhood abuse and neglect in stress sensitization and motivates a search for other mechanisms.

For example, childhood trauma may lead to disruptions in neurobiological mechanisms, such as hypothalamic–pituitary–adrenal (HPA) axis function (e.g., Cicchetti, 2004). These disruptions appear to be particularly prominent in abused children with depression (Kaufman et al., 1997). At a cognitive level, Segal, Williams, Teasdale, and Gemar (1996) proposed that repeated stressors and depressive episodes contribute to the strengthening of depressogenic schema networks. The experience of childhood maltreatment may lead to greater depressogenic schema consolidation even prior to the first depression onset, thus rendering the schema network vulnerable to activation in the face of minor life events. Indeed, children with a history of maltreatment endorse a more negative cognitive style than do those without (e.g., Garber & Flynn, 2001). Further, individuals with a history of childhood abuse and/or neglect may possess a genetic susceptibility to depression that drives an increased sensitivity to life events. In support of this mechanism, Kendler and colleagues (Kendler et al., 2001) found that women with a high genetic susceptibility to depression evidenced both childhood maltreatment and an increased risk of depression in the face of proximal life events. Future multivariate models are required to fully articulate the role of childhood abuse and/or neglect in the stress sensitization process.

We did not expect childhood maltreatment to exert its strongest effect as a risk factor for stress sensitization among those on their first onset of depression. This finding remained robust after controlling for demographic differences across the groups. Prior to the first onset, childhood abuse and/or neglect may be somewhat alone in creating a risk for stress sensitization and, hence, may exert its effects relatively unimpeded by the effects of proximal risk factors, such as provoking life events and the onset of the depression syndrome itself. Once the course of depression is underway, however, these more proximal factors may become the most potent in driving stress sensitization over time. Longitudinal studies that chart the within-subject course of stress sensitization across several recurrences are required to address this hypothesis.

In addition, we did not expect a preferential sensitization to independent events. This finding likely emerged because only independent events significantly distinguished our depressed and nondepressed adolescents. This finding stands in contrast to the study of Williamson et al. (1995), which reported higher rates of dependent events in depressed versus nondepressed adolescents. However, Williamson et al. assessed for life events in the 1 year prior to the date of the assessment, not specifically prior to depression onset. Therefore, the assessed events may have been generated by the depressive episode itself. This is different from our research question, which focused on events in the 3-month period prior to onset.

The present results are consistent with studies asserting the primacy of independent events in depression onset (e.g., Shrout et al., 1989). However, Brown and Harris (1986) reported that both independent and dependent events are etiologically relevant. Brown and Harris focused their analyses only on severe events, which researchers agree are most important in the etiology of depression (see Mazure, 1998). If severe events are more likely to be related to depression, in general, then a differential distribution of dependent and independent events across the range of threat ratings may account for a differential effect of these events on depression.

Because of very low frequencies, we could not compare rates of dependent versus independent severe events in our sample. However, we did find a significant differential distribution of events across levels of threat, \( \chi^2(2, N = 103) = 16.00, p < .001 \). In our sample, 26% (11/43) of the independent events were rated 1 (marked) or 2a or 2b (high moderate or low moderate) on threat, whereas only 11% (7/64) of the dependent events were so rated. In contrast, 66% (42/64) of the dependent events were rated 4 (little/none) on threat, whereas only 28% (12/43) of the independent events were so rated. This suggests that independent events were more highly threatening than dependent events.

The independent events rated high on threat in our sample generally involved a loss, and loss events have been specifically linked to depression (Brown & Harris, 1989; e.g., 2 adolescents experienced the unexpected marital separation of their parents, 4 moved to a new city and left their only close confidant, 1 boy’s mother had a life-threatening operation, and 3 suffered the death of a close friend or relative). In adult samples, many of these events would have received dependent ratings (i.e., we would have been rating the adult’s own separation or move). By contrast, the dependent events rated high on threat typically did not involve loss (e.g., school suspensions, charged with theft, loaned friend a large sum of money). Even when adolescents experienced a dependent loss event, it was generally rated low on threat. For example, most relationship breakups did not receive high threat ratings because the relationship had not lasted long, there was no expectation of a commitment, and the breakup was uncomplicated. In contrast, relationship separations for adults are typically more complex.

We suggest that independent events may be more relevant to the precipitation of depression in adolescents than are dependent events. The social spheres in which adolescents exist may be more circumscribed than those of adults. Thus, they may be less likely to experience the same range of severely threatening dependent events as adults. At the same time, they will be affected by the severely threatening events that happen to their parents—for example, separations, moves, or financial losses that would be rated as dependent for parents but independent for their children. Thus,
it is possible that childhood abuse and/or neglect would increase the sensitization to both dependent and independent events in adults. An examination of age effects in the experience of life events in future research will help elucidate developmental differences in the role of stress in depression, in general, and in the mechanism of stress sensitization, in particular.

Many participants in our sample reported no independent events in the 3 months prior to onset. Therefore, it is unclear whether the sensitizing effect of childhood history is one of lowering the threshold of event threat required to precipitate onset, as hypothesized, or whether those with childhood maltreatment are simply less likely than those without to experience stress at all prior to onset. This distinction highlights two interpretations of the stress sensitization hypothesis that exist in the literature. The first posits that the threshold of depressive episode precipitation in the face of stress is reduced in sensitized individuals, such that depression becomes triggered by ever-decreasing threat levels of events, perhaps to levels that are not detectable by stress instruments. The second posits that depression becomes autonomous of stress, such that other non-stress-related mechanisms become important in triggering onset in sensitized individuals (see Monroe & Harkness, 2005, for a detailed review of this distinction).

In follow-up analyses to our main models, we found support for the former interpretation of stress sensitization. That is, although those first onset depressed participants with childhood abuse and/or neglect were significantly less likely to have an independent event at all prior to onset than were those without child maltreatment, maltreatment in the depressed groups was also significantly associated with a lower level of independent event threat in the subset of those with events. It is important to note that these analyses were severely limited by low cell sizes and, thus, should be interpreted solely as descriptive support for our primary findings. These subsidiary analyses also still beg the question of what directly triggered onset in those with no events: Was their depression precipitated by events so minor that they were not picked up by the LEDS-II, or was some other non-stress-related trigger involved? We cannot answer this question with our data, nor was our study designed to address this issue. Future studies with larger samples that are specifically designed to tease apart the different interpretations of stress sensitization are required to fully address this intriguing distinction.

A number of limitations should be considered when interpreting our findings. First, sex was differentially distributed across the depression and maltreatment groups, with a greater percentage of girls than boys in the depressed groups and significantly more girls than boys reporting a history of child abuse and/or neglect. Sex was not a significant covariate in any of our analyses; thus, our pattern of results is not due to this differential distribution of sex across levels of our independent variables. However, a related issue of concern is that the very small number of boys who reported maltreatment (n = 4) meant that we could not include sex in our models as a separate independent variable to assess gender differences in the role of child maltreatment in stress sensitization. All of the published studies examining childhood adversity and stress sensitization have used female participants only. However, studies of the effect of childhood sexual abuse on depression, in general, suggest that abuse may have a stronger pathological effect in boys than in girls (e.g., Garnefski & Diekstra, 1997; Schraedley, Gotlib, & Hayward, 1999). Thus, it is very important that future studies use larger samples of boys to examine gender differences in the relation of childhood maltreatment to stress sensitization.

Second, our sample comprised a large age range (13–19), and there were significant differences in age across our three depression groups. Age did not emerge as a significant covariate in our models, and thus, our effects cannot be explained by age. Nevertheless, a related concern is that chronological age may be related to differences in the duration and age of onset of childhood abuse and/or neglect. Adolescents with a longer duration of maltreatment might show greater evidence of stress sensitization because the pathological effects of maltreatment (e.g., disruptions in HPA axis function) may be greater. Our three depression groups did not differ significantly in maltreatment duration or age of onset, nor did these parameters relate to the stress variables. Nevertheless, future longitudinal models are required to chart the developmental trajectory of stress sensitization in relation to individual differences in childhood history and depression onset.

Third, the present study was limited by small cell sizes. We used a number of statistical safeguards to protect against Type II error. Specifically, we reran our analyses using MLE with robust standard errors, and we used a bootstrapping procedure. Both of these procedures confirmed our results using the ANCOVA model. Further, the effect sizes for most significant effects were in the moderate range, whereas the effect sizes for nonsignificant effects were small to negligible (Cohen, 1988), thus suggesting that our results are robust and interpretable. Nevertheless, replication in a larger sample is warranted.

Fourth, the present sample comprised adolescents who volunteered to participate. Therefore, they may not be entirely representative of the population of adolescents with depression, and further study using large epidemiological samples is needed. That said, our depressed group represented adolescents from a wide range of socioeconomic groups, from both rural and suburban areas, who displayed moderate to severe levels of depression severity.

Fifth, this study relied on retrospective self-report of childhood history. The main disadvantage of this method is the possibility of bias on the part of respondents in recalling their experience and on the part of the raters of this experience. In particular, a respondent bias to recall negative information may have accounted for the higher report of child maltreatment in depressed versus nondepressed adolescents. In addition, the experience of severe childhood maltreatment may have made the more recent stressful life events seem less important by comparison, thus accounting for the lower event threat reported by those with childhood abuse and/or neglect. However, it is unclear how this bias would have preferentially deflated reports of independent events and only in those with a first onset. Similarly, the raters may have been more likely to include, and inflate the severity of, reports of child maltreatment and life events in adolescents known to be depressed versus nondepressed adolescents. As above, however, it is unclear how such a rater bias would have resulted in the particular pattern of results seen here.

The LEDS-II and CECA address the concern of respondent and rater bias in a number of ways. First, in terms of rater bias, interviewers query only about the practical details of participants’ experiences and not about the participants’ emotional reaction to stressors or the relation of stressors to depression. In addition, raters are unaware of the participants’ depression status, and in the case of the LEDS-II, the information from the interview is filtered through a research assistant who deletes such information. Ratings
are based on manualized examples to ensure standardization. Second, in terms of respondent bias, the format of the interviews is well suited to priming autobiographical memory by encouraging the participant to tell a story about their experiences, probing for both positive and negative experiences, and soliciting rich contextual details. The Bedford College system is widely regarded as a gold standard and has shown superior reliability and predictive validity in the study of depression compared with questionnaire measures of stress (e.g., McQuaid, Monroe, Roberts, Kupfer, & Frank, 2000).

Nevertheless, to avoid issues of bias, many investigators recommend focusing solely on children with officially documented abuse. The disadvantage of documented reports is that many incidents even of severe maltreatment are not identified (London, Bruck, Ceci, & Shuman, 2005). Therefore, such samples may be biased by factors known to be associated with reporting (e.g., low socioeconomic status and non-White ethnicity) and may miss many cases, especially those that are nonsevere. The maltreatment experienced by the adolescents in our sample ranged from relatively minor experiences (e.g., one girl’s parents stopped acknowledging her birthday at age 10, another boy’s father hit him across the bottom with a belt on a weekly basis, and another girl was touched on the breasts several times by an older boy at school) to quite severe abuse (e.g., one girl’s mother stopped talking to her for 3 months in the context of a chronically hostile relationship; another girl’s father pushed her down the stairs several times, resulting in hospitalization; and several adolescents were touched in the genitals against their will on a regular basis). Thus, the present findings may not be generalizable to studies focusing solely on participants with severe, documented abuse, which tend also to include younger children (e.g., Thornberry, Ireland, & Smith, 2001; Toth, Manly, & Cicchetti, 1992). However, our findings can be generalized to, and are consistent with, a large number of studies using retrospective self-report interviews in adolescents that confirm a strong association of child abuse and neglect to depression and other disorders (e.g., Boney-McCoy & Finkelhor, 1996; Kilpatrick et al., 2003).

Finally, the correlational design raises questions about the implied causal relations among our variables. Perhaps adolescents with childhood abuse and/or neglect reported a lower level of events than that reported by those without because the maltreatment served as an ongoing stressor. However, we confirmed that all abuse incidents occurred well before the LEDS-II time period, and our results were robust when adolescents with current antipathy or neglect were excluded. Furthermore, the several adolescents who did report ongoing parental relationship difficulties were less likely than those who did not to have reported a severe childhood abuse and/or neglect in the CECA.

The present study is the first to demonstrate that childhood abuse and/or neglect is associated with lower threat levels of independent life events prior to the first onset of depression. These results have intriguing theoretical implications as they suggest that the effect of childhood maltreatment on stress sensitization may play out through pathological processes that have different implications at different ages (adolescent versus adult) and at different stages of the depression syndrome (first onset versus recurrence). This is important for informing clinical practice. In particular, childhood maltreatment is a potent vulnerability factor that should be routinely assessed in clinical practice. Those with a history of abuse or neglect may especially benefit from cognitive and behavioral strategies that focus on resilience in the face of stressful events (Nemeroff et al., 2003). More specifically, treatment may need to include skills that help adolescents to identify even minor events in their environment as potential depression triggers.

References
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CHILDHOOD ABUSE AND STRESS