



Childhood abuse and stress generation: The mediational effect of depressogenic cognitive styles

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ABSTRACT

According to the stress generation hypothesis (Hammen, 1991), depressed and depression-prone individuals experience higher rates of negative life events influenced by their own behaviors and characteristics (i.e., dependent events), which in part may account for the often recurrent nature of depression. Relatively little is known about the interrelation between stress generation predictors, and distal risk factors for this phenomenon. This study examined whether childhood emotional, sexual, and physical abuse, each uniquely predicted negative dependent events in individuals with a history of depression. The role of negative inferential styles as a potential mediator was also assessed. A sample of 66 adults with a history of depression completed self-report measures of childhood abuse history and negative inferential styles at baseline. The “contextual threat” method was used to assess the occurrence of negative life events over a 4-month prospective follow-up period. Childhood emotional abuse, but not sexual or physical abuse, prospectively predicted greater stress generation. Negative inferential styles mediated this relation. These findings suggest that targeting negative cognitive styles in clinical settings, especially in patients with a history of childhood emotional abuse, may be important for reducing the occurrence of negative life events, thereby possibly decreasing risk for depression recurrence.

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1. Introduction

Depression is an often recurrent condition (Burcusa and Iacono, 2007). Given the substantial current and long-term disease burden associated with this disorder (Mathers and Loncar, 2006), it is important to elucidate the processes underlying its recurrence so as to advance prevention efforts in this area. One possibility that may contribute to depression recurrence is stress generation (Hammen, 1991), the tendency for depressed or depression-prone individuals to experience higher rates of stressful life events that are in some measure influenced by their own behaviors and characteristics (i.e., dependent events), but not fateful life events outside their control (i.e., independent events).

The stress generation hypothesis has received considerable empirical support (Hammen, 2006; Liu and Alloy, 2010). Among the characteristics of depression-prone individuals that have been examined in relation to stress generation are depressogenic cognitive styles, especially as conceptualized by the hopelessness theory of depression (Abramson et al., 1989). According to this

theory, when faced with a negative life event, individuals who tend to attribute it to stable and global causes, and infer negative consequences and self-characteristics, are at greater risk for experiencing hopelessness, which in turn leads to depression. There is evidence that individuals with such inferential styles are indeed at greater risk for depression (Alloy et al., 2006). Several studies have implicated negative inferential styles in the stress generation process (Safford et al., 2007; Kercher and Rapee, 2009; Shih et al., 2009; Calvete, 2011). Although these findings are important in providing consistent support for the role of negative inferential styles in the generation of negative dependent events, the two studies to date utilizing adult samples assessed cognitive vulnerability as defined by a combination of negative inferential styles and ruminative response styles (Kercher and Rapee, 2009), and a composite of negative inferential styles and cognitive vulnerability as conceptualized in Beck's (1987) theory of depression (Safford et al., 2007). Hence, the unique role of negative inferential styles in the generation of negative dependent events in adults remains unexamined, a potentially important consideration given the developmental changes that have been documented in this vulnerability and in its association with negative life events (Rose and Abramson, 1992; Gibb and Alloy, 2006; Abela and Hankin, 2008). Furthermore, only one of these studies

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(Shih et al., 2009) utilized a “contextual threat” interview approach in determining the occurrence of negative dependent events. Of particular relevance to the study of stress generation, the availability of contextual information is essential for accurately rating dependence/independence for events and resolving related ambiguity (e.g., did a child change schools after being expelled from the previous one or because the family had moved?).

Worth noting too is that, despite growing empirical interest in this area, and the increasing number of variables that have been associated with stress generation (e.g., childhood abuse experiences, negative inferential styles, and hopelessness; Hankin, 2005; Joiner et al., 2005; Safford et al., 2007; Uhrlaass and Gibb, 2007; Kercher and Rapee, 2009; Shih et al., 2009; Calvete, 2011), relatively few studies have examined how different stress generation predictors, apart from depressive symptoms, may interrelate in conferring risk for the occurrence of negative dependent events (e.g., mediational relationships). For instance, although negative inferential styles have been related to several other depressogenic vulnerabilities (e.g., childhood abuse experiences, hopelessness, and self-esteem; Abela, 2002; Gibb, 2002), the degree to which this cognitive vulnerability may serve as a mediator of other vulnerability constructs or itself be mediated in relation to stress generation remains unclear. In addition to enhancing current understandings of the stress generation phenomenon, advancing beyond single risk factor models of stress generation is important in that such research may point to multiple targets of clinical intervention.

Also unclear are the distal risk factors associated with the stress generation process. One promising possibility within the context of the hopelessness theory and mediational models of stress generation is childhood abuse. Childhood emotional abuse (CEA) and to some degree childhood sexual abuse (CSA), but not childhood physical abuse (CPA), have been associated with depressogenic cognitive styles (Gibb, 2002), and there appears to be a similar specificity between the two former types of abuse, relative to the latter, and depression (Gibb et al., 2003b, 2007).

Additionally, two studies provide some evidence for a relation between CEA and prospectively occurring life stress (Hankin, 2005; Uhrlaass and Gibb, 2007). A pair of studies (Hankin, 2005) with unselected samples of undergraduates reported mixed findings, with one study observing a prospective relation between CEA and negative life events over a 10-week period, and the other failing to find this relation over a 2-year follow-up period. In another study similarly examining CEA and negative life events in a college sample over a 7-week period (Uhrlaass and Gibb, 2007), a positive association was found between these two variables. These studies are notable in providing the first evaluations of childhood abuse in relation to prospectively occurring negative life events, but their general use of unselected community samples, although perhaps yielding a relatively more accurate estimate of effect sizes than would be found with clinical samples, limits the generalizability of their findings to depressed populations. Moreover, interpretation of these findings in the context of stress generation is qualified by the absence of differentiation between dependent and independent events. This distinction is important inasmuch as the stress generation effect is specific to dependent, and not independent, life events. Thus, the absence of differentiation between these two types of life events may potentially attenuate any putative relations between different forms of childhood abuse and stress generation.

More recent support for the relevance of childhood abuse in general to the stress generation effect comes from a study of depressed adolescents (Harkness et al., 2008), which found that a history of childhood maltreatment was associated with experiencing higher occurrences of negative interpersonal dependent

events in the 3 months following the index depressive episode compared to the 3 months preceding it. As this study examined childhood maltreatment as a general construct, however, the unique role of certain forms of childhood abuse in the stress generation process cannot be ascertained. This distinction is potentially important given the aforementioned specificity of CEA and CSA, in contrast to CPA, to the development of negative cognitive styles and depression. In addition to studies suggesting a possible link between CEA and stress generation, CSA may also have a role in the generation of negative dependent events. Specifically, the cognitive and behavioral reactions of CSA victims to their abuse experience (e.g., becoming more guarded and self-isolative) have been suggested to increase risk for experiencing subsequent negative life events (Spaccarelli, 1994). Although perhaps less directly related to the pathogenesis of depression, there is also reason to suspect CPA to be relevant to stress generation. For example, CPA has been associated with later engagement in aggressive behaviors in romantic and non-romantic social relationships (Wolfe et al., 1998; Linder and Collins, 2005). Finally, as different forms of abuse often co-occur (Finkelhor et al., 2007), there is a need for research to examine them concurrently to allow for an evaluation of the unique influence of each on the stress generation effect. Failure to account for the influence of other abuse subtypes leaves open the possibility that an observed association between a specific abuse subtype and the outcome of interest may to some extent be an artifact of its high co-occurrence with an unconsidered abuse subtype which may better account for variance in the outcome.

The present study thus expanded on previous research in several ways. We examined CEA, CSA, CPA, and negative inferential styles as predictors of prospectively occurring negative dependent events in adults with a history of depression. We hypothesized that each of the three forms of childhood abuse would be uniquely associated with stress generation. That is, we predicted that, when examined concurrently, CEA, CSA, and CPA, would each prospectively predict higher occurrences of negative dependent, but not independent, events. We also predicted that CEA and CSA would differ from CPA in the pathway through which they exert their influence on the stress generation process. Specifically, given that CEA and CSA, but not CPA, have been previously associated with negative cognitive styles (Gibb, 2002), we hypothesized that negative inferential styles would mediate the relations between CEA and CSA, respectively, but not CPA, and negative dependent events.

2. Method

2.1. Participants

Participants consisted of a subsample derived from a larger study examining the interrelations between negative life events and depressogenic risk factors in university undergraduates. Only participants ($n=66$) with a lifetime history of depression at the time of study enrollment were included in the current sample. All participants completed the study in partial fulfillment of course requirements or received a small monetary compensation.

2.2. Measures

2.2.1. Modified Schedule for Affective Disorders and Schizophrenia-Lifetime (SADS-L) interview

The SADS-L (Endicott and Spitzer, 1978) is a semi-structured diagnostic interview for lifetime history of Axis I disorders, and has exhibited high inter-rater reliability (Endicott and Spitzer, 1978). As detailed in Alloy et al. (2000, 2012), the SADS-L was modified to allow for the assessment of DSM-IV-TR (American Psychiatric Association, 2000) diagnoses of major and minor depression. The modified SADS-L was administered by research assistants and graduate students in clinical psychology who had received extensive training in diagnostic interviewing, including didactic instruction, role-playing, and observation and

practice of live interviews. The modified SADS-L has demonstrated high inter-rater reliability ($\kappa \geq 0.90$; Alloy et al., 2000) for depression diagnoses.

2.2.2. Beck Depression Inventory II (BDI-II)

The BDI-II (Beck et al., 1996) is a 21-item self-report questionnaire used to assess Time 1 (T1) depressive symptoms, with higher scores indicating greater symptom severity. The internal consistency was found to be good in the current sample ($\alpha=0.87$).

2.2.3. Childhood Trauma Questionnaire (CTQ)

The CTQ (Bernstein et al., 2003) was used to assess the degree to which individuals experienced childhood abuse, with specific subscales for CEA, CPA, and CSA. Item response options for this measure fell on a five-point Likert scale (from 1 = “Never true” to 5 = “Very often true”). Items included “People in my family called me things like ‘stupid,’ ‘lazy,’ or ‘ugly’” for CEA, “People in my family hit me so hard that it left me with bruises or marks” for CPA, and “Someone tried to make me do sexual things or watch sexual things” for CSA. Higher scores for each subscale reflect greater abuse severity. The internal consistency for each abuse type in the current study was adequate (α 's = 0.79, 0.77, and 0.95 for CEA, CPA, and CSA, respectively).

2.2.4. Cognitive Style Questionnaire (CSQ)

The CSQ (Alloy et al., 2000; Haefel et al., 2008) measures individuals' tendency to make internal, global, and stable attributions, and to infer negative consequences and characteristics about themselves following a negative life event. A composite score was calculated for inferences (mean ratings for the globality, stability, consequences, and self-implication dimensions) in response to the hypothetical events, with higher scores reflecting more negative inferential styles. Adequate internal consistency was demonstrated with the current sample ($\alpha=0.95$). In previous research, the CSQ exhibited good 1-year test–retest reliability ($r=0.80$; Alloy et al., 2000).

2.2.5. Life Events Scale (LES) and Life Events Interview (LEI)

The LES and LEI (Safford et al., 2007) are a combination of questionnaire and semi-structured interview designed to assess the occurrence of negative life events spanning a wide range of content domains relevant to college students (e.g., school, family, relationships, finances). In the current study, the LES and LEI were used to assess negative life events that occurred in the 4 months between T1 and T2. This 4-month follow-up interval was chosen based on previous research indicating that recollection of non-severe events tend to become less reliable after about half a year (Brown and Harris, 1982), while also being of sufficient duration to allow for meaningful variability in the occurrence of the events under consideration.

Following completion of the LES, participants were interviewed with the LEI by a trained research assistant or graduate student. The LEI was adapted in the current study to be based on the “contextual threat” method (Brown and Harris, 1978). Endorsed events on the LES were probed for objective information regarding the circumstances surrounding their occurrence, as well as their timing, duration, and consequence. Only events with onsets within the 4-month follow-up period were included in the study. In addition to allowing for a determination of the objective impact of individual events, separate from participants' interpretation and subjective response, the information derived from the interview was used by three raters, blind to participants' depression symptoms, diagnoses, and vulnerabilities, to code individual events in terms of independence/dependence on a three-point scale (1 = mostly independent of participant; 2 = partly dependent on participant; 3 = mostly dependent on participant). Events with ratings of two or more were dichotomized as dependent. Inter-rater reliability in the current study was high (intra-class correlation coefficient = 0.90).

2.3. Procedure

Participants were assessed at two time-points separated by four months ($M=117.77$ days, $S.D.=10.45$). During the initial assessment (T1), they completed the BDI-II, CTQ, and CSQ. At follow-up (T2), participants completed the LES, and they also completed two semi-structured interviews: LEI and SADS-L. The LES and LEI were used to assess negative life events that had occurred since T1.

3. Results

3.1. Preliminary analyses

Demographic and descriptive characteristics of the study sample are detailed in Table 1. As T1 BDI-II scores were positively skewed, they were submitted to a square root transformation to satisfy assumptions of normality. A series of correlation analyses was conducted to assess possible associations between demographic

Table 1
Demographic and descriptive characteristics of the sample.

Variable	<i>n</i>	%	Mean (<i>S.D.</i>)	Scale range
Gender (female)	51	77.3		
Ethnicity				
Caucasian	41	62.1		
African-American	17	25.8		
Asian	6	9.1		
Hispanic	1	1.5		
Other	1	1.5		
Age (years)			19.86 (1.67)	
Education (years)			13.24 (1.01)	
BDI-II			10.66 (7.72)	0–63
Childhood abuse				
CEA			10.67 (4.45)	5–25
CPA			6.58 (2.93)	5–25
CSA			6.14 (3.41)	5–25
CSQ			139.78 (45.77)	48–336
Negative life events				
Independent events			1.02 (0.98)	
Dependent events			4.41 (3.15)	

Note: BDI-II = Beck Depression Inventory II (scores prior to square root transformation are presented for ease of interpretability); CEA = Childhood Emotional Abuse; CPA = Childhood Physical Abuse; CSA = Childhood Sexual Abuse; CSQ = Cognitive Styles Questionnaire.

characteristics (i.e., gender, ethnicity, age, and education) and prospective occurrence of negative independent and dependent events over the follow-up period. None of the demographic variables were correlated with independent and dependent events (P 's > 0.05). Scores for each of the three abuse subtypes in the current sample ranged from low to severe (5–22 for CEA, 5–20 for CPA, and 5–25 for CSA), with 30.77% of participants scoring in the moderate to severe range for CEA, 12.12% for CPA, and 13.64% for CSA, according to cut-offs specified by Bernstein and Fink (1998).

Table 2 presents bivariate correlations between the main study variables. Consistent with past research (Gibb et al., 2007; Spinhoven et al., 2010), CPA was positively correlated with CEA ($r=0.52$, $P < 0.001$) and CSA ($r=0.34$, $P < 0.01$). The correlation between CEA and CSA, however, was not significant ($P > 0.05$). Additionally, neither suppressor effects nor multicollinearity was present in the results.

3.2. Childhood abuse and prospective occurrence of negative events

To examine whether CEA, CPA, and CSA each uniquely predicted the occurrence of negative dependent, but not independent, events over the 4-month follow-up period, we conducted two hierarchical linear regression analyses with negative dependent and independent events, respectively, as the criterion variable. Given that depression symptoms and female gender have both been implicated in the stress generation process (Liu and Alloy, 2010), both variables were covaried in all analyses. Both covariates were entered in Step 1 of the hierarchical regression analyses, and all three forms of childhood abuse were entered simultaneously in Step 2.

As detailed in Table 3 (Steps 1 and 2), T1 BDI-II severity was positively associated with the prospective occurrence of negative dependent events. Greater CEA, but not CPA or CSA, prospectively predicted higher occurrence of negative dependent events. None of the predictors was associated with prospectively occurring negative independent events.

3.3. Mediation by depressogenic cognitive styles

To determine whether negative inferential styles (CSQ) mediated the relation between childhood abuse and negative dependent events, the 95% confidence interval around the product

Table 2
Correlational relationships between main study variables.

Variable	1	2	3	4	5	6	7
1.Female gender	–						
2.BDI-II	0.134	–					
3.CEA	0.059	0.210	–				
4.CPA	0.009	0.017	0.518**	–			
5.CSA	0.140	0.064	0.194	0.341**	–		
6.CSQ	0.128	0.548**	0.375**	–0.062**	0.005	–	
7.Negative dependent events	0.198	0.340**	0.250**	–0.084	–0.101	0.601**	–
8.Negative independent events	0.156	0.073	0.061	0.021	–0.125	0.212	0.300*

Note: CEA=childhood emotional abuse; CPA=childhood physical abuse; CSA=childhood sexual abuse; CSQ=Cognitive Style Questionnaire.

* $P < 0.05$.

** $P < 0.01$.

Table 3
Hierarchical linear regression models for the prediction of negative dependent and independent events.

Predictor	Negative dependent events						Negative independent events					
	B	S.E.	t	R ²	ΔR ²	f ²	B	S.E.	t	R ²	ΔR ²	f ²
Step 1				0.146	–					0.024	–	
Female gender	0.993	0.927	1.072				0.336	0.293	1.147			
BDI-II	0.857	0.309	2.775**				0.028	0.100	0.282			
Step 2				0.254	0.108					0.053	–	
Female gender	1.155	0.897	1.288				0.387	0.299	1.294			
BDI-II	0.680	0.306	2.221*			0.09	0.027	0.104	0.261			
CEA	0.265	0.103	2.575*			0.12	0.010	0.034	0.299			
CPA	–0.231	0.151	–1.530				0.021	0.052	0.403			
CSA	–0.155	0.113	–1.010				–0.051	0.039	–1.297			
Step 3				0.398	0.144							
Female gender	0.982	0.814	1.206									
BDI-II	0.109	0.319	0.341									
CEA	0.111	0.102	1.083									
CPA	–0.083	0.143	–0.582									
CSA	–0.109	0.103	–1.060									
CSQ	0.035	0.010	3.634***			0.24						

Note: BDI-II=Beck Depression Inventory II; CEA=Childhood Emotional Abuse; CPA=childhood Physical Abuse; CSA=Childhood Sexual Abuse; CSQ=Cognitive Style Questionnaire.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

of the two components of the mediational pathway was computed using the PRODCLIN program (MacKinnon et al., 2007). A test of mediation was only considered for CEA given that it was the only form of childhood abuse prospectively associated with negative dependent events. The unstandardized coefficient and standard error for the pathway from the predictor to the mediator were determined by regressing CSQ onto CEA, controlling for CPA, CSA, female gender, and T1 BDI-II scores ($B=4.419$, $S.E.=1.299$, $P=0.001$, $f^2=0.21$). The unstandardized coefficient and standard error for the pathway from the mediator to the dependent variable were derived by regressing negative dependent events onto CSQ, along with the same covariates and CEA (see Step 3 in Table 3). In this model, CSQ, but not CEA, prospectively predicted negative dependent events.¹ Entering these values in the PRODCLIN program yielded a 95% confidence interval of 0.049 and 0.295, indicating that CSQ was a significant mediator of the relation between CEA and prospectively occurring negative dependent events.

¹ Incidentally, and consistent with the stress generation hypothesis, when this analysis was repeated with negative independent events as the criterion variable, negative inferential styles were not found to be a significant predictor ($B=0.006$, $S.E.=0.004$, $P>0.05$).

4. Discussion

Although previous research has suggested the relevance of childhood abuse, and CEA in particular, to the stress generation process, the present study provided the first examination of multiple forms of childhood abuse concurrently as prospective predictors of this phenomenon in individuals with a history of depression. We found support for our hypothesis that CEA would independently predict the occurrence of negative dependent events. That is, CEA was prospectively associated with higher occurrences of negative dependent, and not independent, events. Although CSA and CPA similarly were not predictive of negative independent events, no association was observed between these forms of abuse and negative dependent events. These findings add to previous research indicating a relation between CEA and prospective life stress (Hankin, 2005; Uhrlass and Gibb, 2007) by demonstrating that the relation is specific to this form of childhood abuse, and in a manner consistent with the stress generation hypothesis, specific to negative dependent events.

The second aim of the study was to examine whether negative inferential styles mediated the prospective relation between childhood abuse and negative dependent events, thereby addressing the general need for research in this area to extend beyond

single-predictor models of stress generation, as well as providing the first assessment in adults of this cognitive style unconfounded by other cognitive vulnerabilities. We found support for our hypothesis, with negative inferential style mediating the effect of CEA on the occurrence of negative dependent events. In light of previous research finding negative inferential styles, and depressogenic cognitions in general, in like manner to mediate the relation between CEA and depression (Gibb et al., 2003a, 2006), the current findings suggest a possible elaboration of Rose and Abramson's (1992) developmental model accounting for the depressogenic effect of CEA. According to their extension of the hopelessness theory of depression, CEA, relative to CPA and CSA, may be more likely to contribute to the development of depressogenic cognitive patterns, given that, unlike with other forms of abuse, the perpetrator of emotional abuse directly supplies the negative attributions to the child (e.g., "You are such a disappointment; you will never succeed in anything"). The current findings suggest that these negative cognitive styles may in turn confer increased risk for depression in victims of CEA by bringing about the very negative life events that precipitate a depressive episode.

These findings should be interpreted within the context of the study limitations. Insofar as there is some evidence that stress generation may be especially relevant to females (Safford et al., 2007; Shih and Auerbach, 2010; Shih and Eberhart, 2010, but also see Shih et al., 2009), larger studies are needed to assess possible gender interactions. Additionally, our sample size may have limited our ability to detect small effects. Thus, the current findings, particularly the absence of a stress generation effect for CSA and CPA, must be viewed as preliminary and require future replication. Although participants were selected for a history of depression, the relatively low levels of current depression symptoms and exposure to childhood abuse, particularly CPA and CSA, in the current sample are also important to the degree that they limit the detection of stress generation effects associated with these variables. Indeed, although the average levels of CEA, CPA, and CSA in the current study were not dissimilar from those reported in previous research (Gibb et al., 2007), the lack of significant correlation between CEA and CSA was an unexpected finding, given the generally high rate with which different forms of abuse typically co-occur (Finkelhor et al., 2007). This may have been a function of the relatively low base rate of CSA and the small sample size. In addition, participant discomfort and reluctance to disclose CSA experiences may possibly have attenuated the magnitude of the observed correlation. Thus, larger studies with more psychiatrically severe samples (e.g., inpatient) and naturally higher rates of childhood abuse, or selecting participants based on childhood abuse history, are required before firm conclusions can be drawn regarding the role of CPA and CSA in the stress generation process.

The strengths of this study bear mentioning as well. In particular, the adoption of a "contextual threat" life stress interview provides a more rigorous assessment of negative life events than is possible with the more common alternative of self-report checklists (for more details, see Miller et al., 1986; Paykel, 2001; Hammen, 2005; Liu and Alloy, 2010). Such an approach is particularly important to the study of stress generation, as it allows for accurately determining the degree to which an event is dependent or independent on the behaviors and characteristics of an individual.

Insofar as negative dependent relative to independent events are more associated with risk for depression (Kendler et al., 2002, 2006, but also see Harkness et al., 2006), and insofar as dependent events, as well as the behaviors and characteristics from which they stem, are amenable to modification, understanding the processes that generate dependent events has important clinical

implications. In addition to working with depressed individuals on effective strategies for coping with life stress, and in the case of CEA victims, as part of processing the long-term effects of their abuse experience, it may be beneficial to target maladaptive cognitive patterns and other predictors of stress generation so as to reduce its future recurrence.

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