

# **Childhood Emotional Maltreatment, Cognitive Vulnerability to Depression, and Self-Referent Information Processing in Adulthood: Reciprocal Relations**

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Previous work has established a relationship between reports of childhood emotional maltreatment and cognitive vulnerability to depression, as well as an association between cognitive vulnerability and self-referent information-processing biases. Findings from this study of individuals at low (LR) and high (HR) cognitive risk for depression revealed a relationship between reports of childhood emotional maltreatment and current information processing biases. Specifically, individuals with greater childhood emotional maltreatment exhibited more negative self-referent information processing. Moreover, cognitive risk mediated the relationship between childhood emotional maltreatment and these information-processing biases. Testing an alternate model, information-processing biases also mediated the relationship between childhood emotional maltreatment and cognitive risk.

**B**eck (1967, 1987; Clark, Beck, & Alford, 1999) has hypothesized that negative events in childhood may contribute to the development of depressogenic self-referent schemata involving themes such as worthlessness, rejection, and failure. Individuals with maladaptive schemata are hypothesized to exhibit information-processing biases (e.g., attention, encoding, and memory) when these schemata are activated by negative life events or a depressed mood. These biases are characterized by an increased accessibility of negative self-referent information,

decreased accessibility of positive self-referent information, and ultimately contribute to the development of depression (Clark et al., 1999). Negative self-schemata, therefore, may be seen as a potential mediator of the relationship between negative childhood events and depressotypic information processing in adulthood.

Although no studies have directly tested this mediational model, support has been found for links among its components. For example, studies have provided support for the relationship between a history of childhood emotional and sexual, but not physical, maltreatment and the presence of negative cognitive styles (for a review, see Gibb, 2002). For childhood sexual maltreatment, however, this relationship was significant only among studies including relatively older participants (i.e., over 30). Although the reason for this is unclear, it may have been due to potentially higher levels of revictimization among older participants, or it may be that the effects of childhood sexual maltreatment upon cognitive styles emerge gradually over time (see Gibb, 2002). Of particular relevance to the current study, participants in the Cognitive Vulnerability to Depression (CVD) Project (Alloy & Abramson, 1999) who were at high cognitive risk for depression as defined by both the hopelessness theory (Abramson, Metalsky, & Alloy, 1989) and Beck's (1967, 1987) theory reported more childhood emotional, but not physical or sexual, maltreatment than did participants at low cognitive risk for depression.<sup>1</sup> In addition, cognitive styles mediated the relation between reports of childhood emotional maltreatment and episodes of major depression diagnosed over a 2.5-year prospective follow-up period (Gibb et al., 2001).

Researchers have also provided some support for the link between childhood maltreatment and information-processing biases. For example, one study found that children with a documented history of emotional, physical, or sexual maltreatment, compared to children with no history of maltreatment, were more hypervigilant to aggressive stimuli and were less able to withhold attention from irrelevant information when faced with aggressive distracting stimuli (Reider & Cicchetti, 1989). In addition, physically maltreated children, compared to children with no history of maltreatment, were more likely to interpret ambiguous facial expressions as angry than were nonmaltreated children (Pollak, Cicchetti, Hornung, & Reed, 2000; Pollak & Kistler, 2002; Pollak & Sinha, 2002).

Finally, there is some evidence for a relation between cognitive vulnerability to depression and information-processing biases. For example, Alloy, Abramson, Murray, Whitehouse, and Hogan (1997) found a relationship between cognitive vulnerability to depression and depressotypic self-referent information-processing biases. Specifically, compared to low-risk participants, high cognitive risk participants in the CVD Project endorsed a higher percentage of negative than positive words as self-descriptive, exhibited quicker response times for these judgments, provided more behavioral examples for negative self-descriptive words and fewer examples for positive words, predicted more negative and less positive future behavior, and recalled a higher proportion of the negative than positive self-referent words initially endorsed (Alloy et al., 1997).

The goal of the current study was to examine the relations among childhood emotional maltreatment, cognitive vulnerability to depression, and depressotypic self-referent information processing.<sup>2</sup> In so doing, we sought to extend previous

findings from the CVD Project (Alloy & Abramson, 1999). Specifically, we sought to extend Gibb and colleagues (2001) and Alloy and colleagues (1997) findings by incorporating them within a developmental model. We hypothesized that participants' cognitive styles would mediate the relation between reports of childhood emotional maltreatment and their self-referent information processing. Although this hypothesis was based both upon Beck's cognitive theory regarding the etiology of depression (1967, 1987; Clark et al., 1999), as well as evidence that cognitive styles may be more stable than self-referent information processing (Alloy et al., 2000; Wang, 2002), there have been few examinations of the relation between cognitive styles and information processing biases. Given this, as well as the cross-sectional design of our study, we also explored an alternate mediation model. Specifically, we also tested the possibility that self-referent information-processing mediates the relation between childhood emotional maltreatment and cognitive styles that provide risk for depression.

## METHOD

### Participants

Participants in the study were a subset of individuals selected through a two-phase screening process to participate in the CVD Project (Alloy & Abramson, 1999). During the first phase of screening, the Cognitive Style Questionnaire (CSQ; Alloy et al., 2000), and a modified version of the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978) were administered to 5,378 university freshmen. Students who scored in the lowest (most positive) or the highest (most negative) quartile on *both* the DAS and the CSQ composite (mean ratings for the stability, globality, consequences, and self-characteristics dimensions) for negative events were categorized as being at low (LR;  $n = 585$ ) and high (HR;  $n = 619$ ) cognitive risk for depression, respectively (see Alloy & Abramson, 1999, for more details).

In Phase II of screening, 236 LR and 313 HR freshmen who were less than 30 years old were randomly selected from the pool of Phase I eligible participants and administered an expanded Schedule for Affective Disorders and Schizophrenia-Lifetime (exp-SADS-L) diagnostic interview (Endicott & Spitzer, 1978), which was expanded to allow for both Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1978) and *Diagnostic and Statistical Manual-Third Edition-Revised (DSM-III-R*; American Psychiatric Association, 1987) diagnoses. As discussed in Alloy and Abramson (1999), participants over the age of 30 were excluded from participation in the CVD project because one of the primary aims of the study was to predict first lifetime onsets of depression in as many participants as possible. Given that the first onset of depression usually occurs during late adolescence or early adulthood, this age limit was used to increase the probability of detecting initial onsets of depression. Participants were excluded from the study at Phase II if they qualified for any of the following diagnoses based on RDC or *DSM-III-R* criteria:

1. Any current episodic mood disorder;
2. Any other current psychiatric disorder;

3. Current psychotic symptoms;
4. Past history of mania, hypomania, bipolar, or cyclothymia; and
5. Serious medical disorder that would prevent them from participating in a longitudinal study.

In order to prospectively predict the onset of depression, it was crucial to the CVD Project's behavioral high-risk design to begin with a sample of nondepressed participants. Accordingly, any participants with current depression or any other current Axis I disorders were excluded. Participants with past depression that had remitted for at least 2 months, however, were included in the study. These participants were included to avoid the possibility of an unrepresentative sample of high risk participants who, despite their possession of very negative cognitive styles, have not become depressed, perhaps due to other protective factors (see Alloy & Abramson, 1999).

The sample that remained eligible for participation after Phase II screening consisted of 207 LR and 209 HR participants. From this subsample, 176 LR and 173 HR individuals agreed to participate in the prospective part of the investigation. The final sample for the present study includes only those individuals who completed the maltreatment assessment and the information-processing task battery, which is described below in the Measures section ( $N = 276$ ; LR = 144; HR = 132). The current sample was 67.0% female and 78.6% Caucasian, with an average age of 18.96 years ( $SD = 2.08$ ). There were no significant age, gender, or ethnic differences between LR and HR groups. Compared to the total CVD Project sample, participants included in the current sample did not differ significantly from those not included on age, gender, ethnicity, risk status, or initial depressive symptom levels.

## MEASURES

### Emotional Maltreatment

The Life Experiences Questionnaire (LEQ; Gibb et al., 2001), developed for use in the CVD project, is a 92-item self-report questionnaire that assesses one's history of emotional, physical, and sexual maltreatment, as well as emotional and physical neglect, inflicted by adults and peers. This measure was modeled after Cicchetti's (1989) Child Maltreatment Interview but, consistent with the suggestions of Brewin, Andrews, and Gotlib (1993), is more specific and comprehensive with regard to the events it assesses. In the current study, only experiences of childhood emotional maltreatment were included. Forms of childhood emotional maltreatment assessed included derogation, humiliation, extortion, rejection, and teasing. Levels of childhood emotional maltreatment were determined by summing the number of relevant items endorsed as occurring before age 15. The childhood emotional maltreatment subscale of the LEQ has been found to correlate with childhood emotional maltreatment reported in structured maltreatment interviews ( $r = .78$ ) and to predict episodes of depression over a 2.5-year follow-up (Gibb et al., 2001). In the current study, the childhood emotional maltreatment subscale exhibited good internal consistency ( $\alpha = .84$ ).

### Cognitive Risk

The Cognitive Style Questionnaire (CSQ; Alloy et al., 2000) and the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978) were used to assess participants' cognitive vulnerability to depression as specified by the hopelessness theory (Abramson et al., 1989) and Beck's theory (1967, 1987) of depression, respectively. As discussed above, participants scoring in the upper and lower quartile on *both* measures were designated as high versus low cognitive risk for depression, respectively. The CSQ is a self-report measure used to assess individuals' tendency to make internal, stable, and global attributions and to infer negative consequences and negative characteristics about themselves following the occurrence of a negative life event. A composite score was created for inferences (mean ratings for the stability, globality, consequences, and self-implication dimensions) generated in response to hypothetical negative events. In the CVD project, the CSQ composite for negative events demonstrated good internal consistency ( $\alpha = .88$ ; Alloy et al., 2000), retest reliability over 1 year ( $r = .80$ ,  $p < .0001$ ; Alloy et al., 2000), and predictive validity for episodes of depression (Alloy et al., 1999).

The Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978) is a 40-item self-report inventory that assesses maladaptive attitudes, such as perfectionistic performance standards, sensitivity to social criticisms, expectations of control, and rigid ideas about the world. Participants' response options range, on a 7-point Likert-type scale, from "totally agree" to "totally disagree." In the CVD project, 24 items were added to the original 40 to assess dysfunctional attitudes in both achievement and interpersonal domains, bringing the total scale to 64 items. The expanded DAS has exhibited excellent internal consistency ( $\alpha = .90$ ; Alloy et al., 2000), good retest reliability over 1 year ( $r = .78$ ,  $p < .0001$ ; Alloy et al., 2000), and predictive validity for depressive episodes (Alloy et al., 1999).

Supporting the construct validity of our cognitive risk variable, HR participants in the CVD project were more likely to have a lifetime history of major depression than were LR participants (Alloy et al., 2000). In addition, HR participants were also more likely to experience both first onsets and recurrences of major depression over a 2.5-year follow-up than were LR participants. Supporting the specificity of cognitive styles to depression versus other forms of psychopathology, with the exception of prospective risk group differences for anxiety comorbid with depression, there were no lifetime or prospective risk group differences in anxiety or other Axis I disorders (Alloy et al., 2000, 2003).

### Self-Referent Information Processing (SRIP)

A list of 40 trait words was generated and used in the SRIP Task Battery (Alloy et al., 1997). Only data from the 20 negative (e.g., failure, lazy, worthless) and positive (e.g., competent, motivated, important) depression-relevant (DR) trait words were included in the current study. Participants individually completed the following five tasks, which yielded 10 measures of self-referent information processing (i.e., each task resulted in both a positive and a negative score of interest).

**Self-Descriptiveness Judgments and Latencies.** The 40 trait words were presented to participants on computers programmed to record response choices and response times. Participants were instructed to press the key labeled "Me" or "Not Me" to indicate whether they found the words to be self-descriptive. The labels on these keys were counterbalanced across participants. There was a 4-second interstimulus interval, and words remained in the center of the monitor until the participant responded. Following five practice words designed to familiarize participants with the task (and minimize primacy effects in the incidental recall task), all 40 words were presented two times in random order, with the condition that the entire list was presented before any word was repeated. The proportion of negative and positive words endorsed as "Me" and the associated response times were the dependent measures.

**Behavioral Descriptions.** Individuals received a booklet containing 10 words chosen at random from the original 40 words. For each word judged as self-descriptive, participants were asked to list evidence of their past behaviors indicating why the word described them. For example, if an individual believed that he or she was incompetent, he or she would provide specific examples of past incompetent behaviors in his or her life. Participants were given an unlimited amount of time, and were instructed to provide as many examples as possible. The mean number of examples provided for negative and positive words were the dependent measures.

**Behavioral Predictions.** Participants read 24 statements detailing hypothetical behaviors related to the 40 trait adjectives. Participants were instructed to judge the probability, on a 100-point scale, that they would behave or react in the described way at some point in the future. Examples include "You become flustered when attempting to answer difficult questions on a job interview," and "You give up in the face of major obstacles." Two dependent measures were created, consisting of the mean probability judgments for positive and negative behaviors.

**Incidental Free Recall.** Participants were given 5 minutes to write as many of the words that they could recall from the "Me/Not Me" task (completed approximately 2 hours earlier). The proportions of positive and negative words correctly recalled were the dependent measures.

A composite score was created from these self-referent processing variables. Specifically, scores on each of the variables were standardized and then recoded such that higher scores on each variable represented more negative processing. The composite score was calculated by taking the mean of the 10 variables. The internal consistency of this composite score was .71.

## Procedure

Participants hypothesized to be at high versus low cognitive risk for depression, based on their responses to the CSQ and DAS, were chosen for inclusion in the study. Participants agreeing to continue in the prospective phase of the study were followed longitudinally for 2.5 years. At the beginning of the 2.5-year prospective follow-up phase, participants were administered the SRIP Task Battery. At the end of the second year of follow-up, participants completed the LEQ. All participants were paid for their time.

## RESULTS

Before testing the mediational models, preliminary analyses were conducted to determine whether there were any gender and/or ethnic differences for any of the variables. None of these was significant. Therefore, all analyses were conducted collapsing across gender and ethnic groups.

Next, we examined the relations among the variables. As predicted, HR participants reported higher levels of childhood emotional maltreatment,  $t(271) = 2.27$ ,  $p = .02$ ,  $r_{effect\ size} = .14$ , and exhibited more negative self-referent information processing,  $t(271) = 8.00$ ,  $p < .001$ ,  $r_{effect\ size} = .44$ , than did LR participants.<sup>3</sup> In addition, participants reporting more childhood emotional maltreatment also exhibited more negative self-referent information processing,  $r(270) = .13$ ,  $p = .04$ .

Next, a hierarchical regression analysis was used to test the hypothesis that cognitive risk would mediate the relation between childhood emotional maltreatment and self-referent information processing. As can be seen in Table 1, using self-referent information processing composite scores as the criterion variable, reports of childhood emotional maltreatment were entered in the first step of the linear regression and were significant,  $t(271) = 2.11$ ,  $p = .04$ , ( $\beta = .13$ ). In the second step, cognitive risk was added and was significant,  $t(270) = 7.76$ ,  $p < .001$ ,  $\beta = .43$ . In this second step, the effect of childhood emotional maltreatment was reduced to non-significant,  $t(270) = 1.25$ ,  $p = .21$ ,  $\beta = .07$ , suggesting that cognitive risk fully mediated the relation between childhood emotional maltreatment and self-referent information processing.

A hierarchical logistic regression analysis was used to test the alternate model in which self-referent information processing mediated the relation between childhood emotional maltreatment and cognitive risk status. As can be seen in Table 2, using cognitive risk group status as the criterion variable, reports of childhood emotional maltreatment were entered in the first step of the logistic regression and were significant, Wald = 4.87,  $p = .03$ . In the second step, the self-referent information processing composite was entered and was significant, Wald = 40.34,  $p < .001$ . In this

**TABLE 1. Summary of Hierarchical Regression Analysis for Variables Predicting Self-Referent Information Processing**

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
EM	.02	.01	.13*
Step 2			
EM	.01	.01	.07
Risk	.49	.06	.43**

Note. EM = Childhood Emotional Maltreatment.

Risk = Cognitive risk group status.

$R^2 = .02$  for Step 1;  $\Delta R^2 = .18$  for Step 2 ( $ps < .05$ ).

\* $p < .05$ . \*\* $p < .001$ .

**TABLE 2. Summary of Logistic Regression Analysis for Variables Predicting Cognitive Risk Group Status**

Variable	<i>B</i>	<i>SE B</i>	Wald	OR	95% CI
Step 1					
EM	0.08	.04	4.87*	1.08	1.01– 1.16
Step 2					
EM	0.08	.04	3.60	1.08	1.00– 1.17
SRIP	2.39	.38	40.34**	10.94	5.23– 22.88

Note. OR = Odds Ratio. CI = Confidence Interval. EM = Childhood emotional maltreatment. SRIP = Self-referent information-processing composite.

$\chi^2 = 5.19$  for Step 1;  $\chi^2 = 63.30$  for Step 2 ( $ps < .05$ ).

\* $p < .05$ . \*\* $p < .001$ .

second step, the effect of childhood emotional maltreatment was reduced to non-significant, Wald = 3.06,  $p = .06$ , suggesting that self-referent information processing also fully mediated the relation between childhood emotional maltreatment and cognitive risk for depression.

## DISCUSSION

This study integrated previous findings regarding the relationship between childhood emotional maltreatment and cognitive risk for depression (Gibb et al., 2001) and the association between cognitive risk and negative self-referent information processing (Alloy et al., 1997) to examine the relations among the three variables within a developmental model. Supporting our hypothesized model, we found that cognitive styles mediated the relation between reports of childhood emotional maltreatment and self-referent information processing. However, we also found that self-referent information processing mediated the relation between reports of childhood emotional maltreatment and cognitive risk for depression. Although causal conclusions cannot be drawn from cross-sectional findings, these results are consistent with the hypothesis of a reciprocal relationship between cognitive risk and self-referent information processing.

In finding support for both the hypothesized and alternate models, it appears that the influence of emotional maltreatment on cognitive risk and self-referent information processing may not be as simple as one might expect. It seems that one's cognitive style may play an intermediate role as one mechanism through which childhood emotional maltreatment is associated with information-processing biases. Conversely, the data also provide evidence that information-processing biases may provide one pathway through which childhood emotional maltreatment influences cognitive risk. It may be overly simplistic, therefore, to discuss the *direct associations* between emotional maltreatment, cognitive risk, and self-schema content. Rather, these data suggest the importance of recognizing the



overlap among cognitive vulnerability and information-processing biases, and the utility of examining their associations with other variables (e.g., emotional maltreatment) in the context of one another.

Although we did not address, in this project, the mechanism or process by which childhood emotional maltreatment may contribute to the development of negative cognitive styles and self-referent information-processing biases, there is some evidence for a specific developmental pathway. Specifically, Rose and Abramson (1992) hypothesized that when maltreatment first occurs, the child tends to explain its occurrence in a way that will maintain his or her sense of hopefulness (e.g., "He was just in a bad mood today."). If the maltreatment is chronic and widespread, however, these hopefulness-inducing explanations will meet with repeated disconfirmation and the child may begin to make hopelessness-inducing explanations (e.g., "I'm bad and deserve it."). Over time, these depressive explanations may generalize to initially unrelated negative events and crystallize into a relatively stable negative cognitive style, which then contributes to one's vulnerability to depression. Preliminary results from a cross-sectional study have supported this developmental model (see Gibb, Alloy, Abramson, & Marx, in press). Although not addressed by Rose and Abramson (1992), a similar process might occur in the development of information-processing biases. For example, with repeated experiences of emotional maltreatment, the child may become hypervigilant for its occurrence, developing both attentional and encoding biases. These biases may then be self-reinforcing, much as patients tend to distort their experiences to be consistent with their core beliefs (Beck, 1995). Future studies are needed, therefore, to not only examine whether childhood emotional maltreatment contributes to the development of information-processing biases, but also to explore the process by which this may occur.

### **Clinical Implications**

In addition to their theoretical implications, these findings also have potentially important implications for therapists conducting cognitive therapy. For example, given evidence that emotional maltreatment contributes to the development of negative cognitive styles (Abela et al., 2003; see "References" Gibb et al., 2003) and evidence that this relationship may be mediated by the attributions that children make for specific instances of emotional maltreatment (Gibb et al., in press), clinicians working with depressed children should assess for the occurrence of experiences such as teasing, humiliating, degrading, or terrorizing. Once identified, therapists can elicit and evaluate patients' automatic thoughts and modify any dysfunctional thinking. Therapists can also work to reduce patients' information-processing biases with tools such as the Core Belief Worksheet (Beck, 1995). In this way, patients can be made aware of any processing biases and learn to be more even-handed in their attention, encoding, and memory.

### **Limitations and Future Directions**

Despite the contributions offered by this study, it is also qualified by several limitations. First, we relied upon self-reports of childhood emotional maltreatment assessed at the second year of follow-up. Although research suggests that adults'

recall of specific childhood events, such as those assessed by the LEQ, is reasonably accurate (for a review, see Brewin et al., 1993), future studies would benefit from independent corroboration of maltreatment histories. In addition, future studies should evaluate whether children's reports of emotional maltreatment prospectively predict changes in cognitive styles and information processing.

A second limitation was that we did not examine changes in either cognitive style or information processing over time. However, initial cross-sectional investigations of developmental theories are necessary to determine the feasibility of larger scale longitudinal studies. Given the encouraging results from this study, future longitudinal investigations do appear warranted. To fully understand the relations among childhood emotional maltreatment, cognitive styles, and information processing, these studies should assess each of these constructs in a sample of children over several time points.

Third, although statistically significant, the magnitude of the effects found in the current study was relatively small. This may have been due, in part, to the use of college students as participants, who represent a relatively high functioning population. For example, participants in the current study reported relatively low levels of childhood emotional maltreatment (mean number of maltreatment experiences = 3.74 [ $SD = 3.89$ ] for HR vs. 2.69 [ $SD = 3.33$ ] for LR participants), which may have attenuated the relation between maltreatment and the other variables. Future studies, therefore, should seek to replicate the current results in more impaired samples (e.g., individuals with more severe histories of childhood emotional maltreatment).

Fourth, as discussed above, inasmuch as the CVD project was a behavioral high-risk design (Alloy & Abramson, see "References" 1999), in which participants were prospectively followed in order to examine factors related to depression onset, individuals over the age of 30 were excluded, as were individuals who met current criteria for depression or any other current Axis I disorder. Future studies should extend research to nonselected college populations, as well as clinical samples to examine generalizability.

## CONCLUSION

Despite these limitations, the current results suggest a model by which childhood emotional maltreatment may contribute to a developmental cycle of mutually reinforcing cognitive vulnerability and depressive information processing in adulthood. Future studies should continue to explore this model by prospectively examining changes in children's and adults' cognitive styles and information processing over time. In this way, a more comprehensive developmental model of depressive vulnerability may be elaborated.

## NOTES

1. Details regarding the assessment of cognitive risk for depression in the CVD Project are provided in the Measures section.

2. We chose limit our examination to childhood emotional maltreatment for two reasons. First, there is little empirical support for the relationship between cognitive styles and histories of either childhood physical or sexual maltreatment among the age range of individuals included in this study (see Gibb, 2002). Second, previous analyses of CVD Project data have suggested that the high cognitive risk participants report more childhood emotional, but not physical or sexual, maltreatment than low-risk participants. It should also be noted, however, that reports of childhood physical,  $r(270) = .04$ ,  $p = .53$ , and sexual,  $r(270) = .09$ ,  $p = .15$ , maltreatment were not significantly related to the measures of self-referent information processing used in this study.

3. The  $r_{effect\ size}$  is calculated as a point-biserial correlation. Advantages of using  $r_{effect\ size}$  over Cohen's  $d$  are discussed on pp. 17–18 in Rosenthal (1991). In interpreting the magnitude of  $r_{effect\ size}$ , Rosenthal, Rosnow, and Rubin (2000) recommended using the Binomial Effect Size Display (BESD), calculated as  $.50 + r_{effect\ size}^2$ . Using the BESD, therefore, having a negative cognitive style is associated with an increase in the risk of having been emotionally maltreated from 43% to 57%. Similarly, the risk of having negative self-referent information processing is 28% among those at low cognitive risk for depression and 72% among those at high cognitive risk.

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