

# **Developmental Antecedents of Cognitive Vulnerability to Depression: Review of Findings From the Cognitive Vulnerability to Depression Project**

**Lauren B. Alloy**

*Temple University, Philadelphia*

**Lyn Y. Abramson**

*University of Wisconsin-Madison*

**Brandon E. Gibb**

*Binghamton University  
Binghamton, NY*

**Alisa G. Crossfield**

**Antonia M. Pieracci**

**Jelena Spasojevic**

**Jennifer A. Steinberg**

*Temple University, Philadelphia*

In this article, we review findings from the Temple-Wisconsin Cognitive Vulnerability to Depression (CVD) Project (Alloy & Abramson, 1999) regarding potential developmental antecedents of cognitive vulnerability to depression after first briefly summarizing the evidence from the project that negative cognitive styles, information processing, and rumination do, in fact, provide vulnerability to depression. Based on the project findings, we suggest that a continuum of negative emotional feedback, ranging from low emotional warmth/acceptance and negative inferential feedback at the milder end to emotional abuse at the more severe end, may play an important role in the development of cognitive vulnerability to depression and depression itself.

**C**ognitive theories of depression have contributed importantly to our understanding of the processes that give rise to vulnerability to depression. Cognitive models of depression (e.g., Abramson, Metalsky, & Alloy, 1989; Beck, 1967, 1987; Ingram, Miranda, & Segal, 1998; Nolen-Hoeksema, 1991) emphasize the role that negative inferential styles, dysfunctional beliefs, negative information processing, and maladaptive emotion-regulation

strategies (e.g., rumination) play in increasing individuals' risk for depression when they experience stressful life events. Moreover, a growing body of evidence suggests that such cognitive vulnerabilities do, in fact, increase risk for depression (e.g., Abramson et al., 1999; Alloy et al., 1999; Clark, Beck, & Alford, 1999; Ingram et al., 1998).

If dysfunctional cognitive styles and information processing do confer vulnerability to depression, then the developmental origins of these cognitive vulnerabilities become of great relevance. What are the pathways by which some individuals develop cognitive vulnerability to depression? An understanding of the developmental antecedents of negative cognitive styles may facilitate the creation of early interventions to prevent the formation of cognitive vulnerability and, in turn, initial onsets and recurrences of depression. Thus, in this article, we review findings from the Temple-Wisconsin Cognitive Vulnerability to Depression (CVD) Project (Alloy & Abramson, 1999) and related studies, regarding potential developmental antecedents of cognitive vulnerability to depression.

Although the CVD Project is a prospective, longitudinal study of the cognitive and psychosocial processes that contribute vulnerability to depression, the portion of the CVD Project focused on discovering potential developmental origins of cognitive vulnerabilities relies on cross-sectional or retrospective reports of participants and their parents. Consequently, we emphasize from the outset that our developmentally relevant findings must be viewed as hypothesis-generating rather than as definitive. Our findings provide an empirical basis and rationale for subsequent prospective studies that can more powerfully test the role played by the factors identified here in the development of cognitive vulnerability to depression. Before turning to the findings regarding potential developmental origins of cognitive vulnerability from the CVD Project, we first briefly review the major cognitive models that provided the theoretical basis for the CVD Project, the project's methodology, and the evidence from the project that negative cognitive styles, information processing, and rumination do, in fact, provide vulnerability to depression.

## COGNITIVE THEORIES OF DEPRESSION

The CVD Project was designed to test the vulnerability and other etiological hypotheses of two major cognitive theories of depression, the Hopelessness Theory (Abramson et al., 1989; Alloy, Abramson, Metalsky, & Hartlage, 1988) and Beck's (1967, 1987) Theory. According to both theories, particular maladaptive cognitive patterns increase an individual's likelihood of developing an episode of depression—in particular, a cognitively mediated subtype of depression—after experiencing negative life events (Abramson et al., 1989; Abramson & Alloy, 1990). Specifically, according to the Hopelessness Theory (Abramson et al., 1989), people who tend to make negative inferences regarding the causes, consequences, and self-implications of negative life events are hypothesized to be vulnerable to developing episodes of depression, particularly a "hopelessness depression" (HD) subtype, when they encounter negative life events. This depressogenic inferential style consists of the tendency to attribute negative events to stable (enduring) and global (widespread) causes, to infer that further negative consequences will follow from current negative events, and to infer that one is flawed or worthless from the occurrence of negative events. Individuals who exhibit this negative inferential style should be more likely than those who do not to make negative causal, consequence, and self-inferences for any particular stressful event they experience, thereby increasing the likelihood that they will develop hopelessness, the proximal sufficient cause of the symptoms of HD.

In Beck's (1967, 1987; Beck, Rush, Shaw, & Emery, 1979) cognitive model of depression, individuals who possess negative self-schemata revolving around themes of inadequacy, failure, loss, and worthlessness are hypothesized to be vulnerable to depression when they

encounter negative life events. Such negative self-schemata are thought to be represented as a set of dysfunctional attitudes in which the individual believes that his or her happiness and worth depend on being perfect or on others' approval. When negative self-schemata are activated by the occurrence of negative life events, their filtering of information leads to negatively biased perceptions of the self, world, and future (hopelessness), which then, in turn, contribute to depressive symptoms. Thus, although Hopelessness and Beck's theories differ in some of their specifics, both theories hypothesize that negative cognitive styles or schemata operate to increase vulnerability to depression through their effects on processing or appraisals of personally relevant life experiences.

According to another cognitive theory of depression, the response styles theory (Nolen-Hoeksema, 1991), individuals who tend to ruminate in response to depressed mood are at increased risk for experiencing longer and more severe depressive episodes compared to individuals who tend to distract themselves from dysphoria. Rumination may be thought of as an emotion-regulation strategy involving perseverative self-focus that is recursive and persistent. According to Nolen-Hoeksema (1991), depressive rumination in particular involves repetitively focusing on one's depressive symptoms and the causes and consequences of those symptoms. Several laboratory and field studies have found that depressive rumination is indeed associated with longer and more severe episodes of depression (see Spasojevic, Alloy, Abramson, MacCoon, and Robinson, 2003, for a review). In the CVD Project, therefore, we also included measures of ruminative response style.

## OVERVIEW OF THE CVD PROJECT

The CVD Project (Alloy & Abramson, 1999) is a two-site, prospective longitudinal study that uses a behavioral high-risk design (Alloy, Lipman, & Abramson, 1992; Alloy et al., 2000) to test the cognitive vulnerability and other etiological hypotheses of Hopelessness and Beck's theories of depression. In a behavioral high-risk design, the strategy involves studying individuals who do not currently have the disorder of interest (e.g., depression), but who are hypothesized to be at high risk for developing the disorder because they possess some behavioral characteristic that makes them vulnerable. Thus, in the CVD Project, those selected for participation were university freshmen from Temple University (TU) and the University of Wisconsin-Madison (UW) who were nondepressed and had no current Axis I disorders at the outset of the study, but who were at hypothesized high or low risk for depression based on the presence versus absence of negative inferential styles and dysfunctional attitudes. These cognitively high-risk (HR) and low-risk (LR) freshmen were followed prospectively every 6 weeks for 2.5 years and then every 16 weeks for an additional 3 years with self-report and structured interview assessments of negative life events, cognitions, and symptoms and diagnosable episodes of psychopathology.

Participants were selected for the CVD Project based on a two-phase screening procedure. In Phase I, 5,378 freshmen (2,438 at TU and 2,940 at UW) completed two measures of cognitive style: the Cognitive Style Questionnaire (CSQ; Alloy et al., 2000), a modified version of the Attributional Style Questionnaire (Peterson, 1991), which assesses individuals' styles for inferring causes, consequences, and self-characteristics following the occurrence of positive and negative events; and a modified version of the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). Individuals scoring in the highest (most negative) and lowest (most positive) quartile on *both* the DAS and CSQ composite (stability + globality + consequences + self) for negative events were designated as HR and LR for depression, respectively (see Alloy & Abramson, 1999, and Alloy et al., 2000, for more details). Thus, CVD Project participants were selected on the basis of the presence versus absence of cognitive vulnerability to depression as specified by *both* Hopelessness and Beck's theories.

In Phase II of screening, a randomly selected subsample of HR and LR participants, who were less than 30 years old, were administered an expanded version of the Schedule for Affective Disorders and Schizophrenia-Lifetime (SADS-L) diagnostic interview (Endicott & Spitzer, 1978). The SADS-L was expanded to permit *Diagnostic and Statistical Manual of Mental Disorders*, third edition, revised (DSM-III-R; American Psychiatric Association, 1987) as well as Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1978) diagnoses. Freshmen were excluded from participation in the CVD Project if they met either DSM-III-R or RDC criteria for any current Axis I disorder, current psychotic symptoms, past history of any bipolar spectrum disorder, or any serious medical illness that would preclude participation in a longitudinal study. Freshmen who had a past unipolar depressive disorder but had remitted for a minimum of 2 months were retained so as not to result in an unrepresentative sample of HR participants (see Alloy & Abramson, 1999, and Alloy et al., 2000, for a more detailed rationale). The final CVD Project sample consisted of 173 HR and 176 LR participants. Demographic and cognitive style characteristics of the final sample have been presented elsewhere (Alloy et al., 2000). The final sample was quite representative of the original Phase I screening sample on demographics (Alloy et al., 2000).

Participants in the final sample completed a Time 1 assessment that included measures of Axis II personality disorders and dimensions, self-referent information processing, cognitive styles (CSQ, DAS, sociotropy-autonomy, dependency-self-criticism, self-consciousness), coping styles (rumination-distraction), social support, negative life events (with a combination questionnaire and semistructured interview modeled after Brown and Harris [1978]), and hypothesized mediating cognitions (inferences for actual negative events experienced and negative view of self, world, and future/hopelessness). Following completion of the Time 1 assessment, participants were followed every 6 weeks for 2.5 years and then every 16 weeks for an additional 3 years with questionnaire and interview assessments of the occurrence of negative life events, inferences for these events, negative views of the self, world, and future/hopelessness, coping styles, social support, and the onset and offset of symptoms and diagnosable episodes of depression, the subtype of HD, and other disorders. On a yearly basis, participants also completed reassessments of their inferential styles, dysfunctional attitudes, and self-referent information processing (see Alloy & Abramson, 1999, for further details of the project assessments).

During the first year of the prospective follow-up phase of the CVD Project, student participants were asked for written permission to contact their parents to ask them to participate in the Parent Study portion of the project. Parents for whom permission was granted were contacted and invited to participate, with the only exclusion criteria for parents being inability to speak English and inability to be contacted after repeated efforts. Of approximately 400 contacted parents, 335 (104 mothers of HR students; 113 mothers of LR students; 62 fathers of HR students; 56 fathers of LR students) agreed to participate in the Parent Study and completed at least some of the study measures. Demographic characteristics of the parent sample are presented elsewhere (Alloy et al., 2001).

Parents who participated were asked to complete a lifetime diagnostic interview (the expanded SADS-L) and an interview to assess Axis II personality disorders and dimensions, as well as questionnaires assessing their cognitive styles (CSQ and DAS), their styles for providing inferential feedback regarding the causes and consequences of negative events in their child's life (the child who was a CVD Project participant), their parenting styles, and their child's history of early negative life events. In addition, CVD Project student participants also reported on their parents' inferential feedback and parenting styles, as well as their own history of maltreatment experiences (emotional, physical, and sexual) both from their parents and from nonrelatives (i.e., strangers, peers, nonfamily adults, and boyfriends/girlfriends). Before turning to the CVD Project findings relevant to the developmental origins of cognitive

vulnerability to depression, we first briefly present the evidence that negative cognitive styles, negative self-referent information processing, and rumination do, in fact, provide vulnerability to depression.

### DO NEGATIVE COGNITIVE STYLES, NEGATIVE SELF-REFERENT INFORMATION PROCESSING, AND RUMINATION CONFER VULNERABILITY TO DEPRESSION?

According to the cognitive vulnerability hypotheses of Hopelessness (Abramson et al., 1989) and Beck's (1967, 1987) theories of depression, individuals who exhibit negative inferential styles and dysfunctional attitudes, respectively, should be at increased risk for developing episodes of depression compared to those who do not exhibit these negative cognitive styles. Recent studies using or approximating a behavioral HR design to test this cognitive vulnerability hypothesis have provided substantial support for the hypothesis (see Alloy, Abramson, Safford, & Gibb, in press, for a review).

In the CVD Project, the cognitive vulnerability hypothesis of Hopelessness and Beck's theories was tested both retrospectively and prospectively. In the retrospective test of the hypothesis, Alloy and colleagues (2000) reported that controlling statistically for current levels of depressive symptoms, cognitively HR participants exhibited higher lifetime rates of DSM-III-R and RDC major depression (MD) and HD than did LR participants, as well as marginally higher lifetime rates of RDC minor depression. Indeed, HR participants were approximately three times more likely to have experienced MD and almost five times as likely to have experienced HD than were LR participants. The HR-LR differences in lifetime prevalence rates of MD and HD were maintained even when other hypothesized risk factors for depression were controlled statistically (i.e., inferential style for positive events, sociotropy, autonomy, self-consciousness, stress-reactive rumination). Indicating possible specificity of cognitive vulnerability to depressive disorders, Alloy and colleagues (2000) found that there were no risk group differences in lifetime history of anxiety disorders, substance use disorders, or other psychiatric disorders. In a follow-up to the study of Alloy and colleagues (2000), Haefel and colleagues (2003) used a new sample of unselected undergraduates to examine the unique associations between negative inferential styles and dysfunctional attitudes and lifetime history of depressive and other disorders. Haefel and colleagues found that negative inferential styles were more strongly and consistently associated with lifetime history of RDC MD and HD than were dysfunctional attitudes, suggesting that negative inferential styles, as assessed by the CSQ, may have been a particularly potent component of the "generic" cognitive vulnerability effect in Alloy and colleagues' (2000) study using CVD Project data.

Although suggestive, an important limitation of the retrospective tests of the cognitive vulnerability hypothesis is that the findings are as supportive of the alternative hypothesis that negative cognitive styles are a consequence or "scar" left by the past experience of depression (see Lewinsohn, Steinmetz, Larson, & Franklin, 1981) as they are of the hypothesis that negative cognitive styles provide vulnerability to depression. Thus, data from the prospective portion of the CVD Project provide a more crucial test of the cognitive vulnerability hypothesis. Results from the first 2.5 years of follow-up in the CVD Project indicate that negative cognitive styles did indeed predict prospectively both first onsets and recurrences of depressive disorders (Abramson et al., 1999; Alloy et al., 1999, 2004). Alloy and colleagues (2004) reported that among participants with no prior history of depression, and controlling for current depressive symptoms at the outset of the prospective follow-up, HR individuals were more likely than LR individuals to experience a first lifetime onset of MD (16.2% vs. 2.7%), minor depression (45.9% vs. 14.4%), and HD (35.1% vs. 3.6%). There

were no significant risk group differences in the likelihood of first onsets of anxiety or other psychiatric disorders. These findings provide especially strong support for the cognitive vulnerability hypothesis because they are based on a truly prospective test, uncontaminated by prior history of depression.

Inasmuch as depression is a highly recurrent disorder (e.g., Judd, 1997), it is important to examine whether negative cognitive styles provide vulnerability to recurrences of depression as well. Among participants with a past history of depression, controlling for current depressive symptom levels, HR participants also were more likely than LR participants to have a recurrence of MD (28.6% vs. 9.4%), minor depression (56.1% vs. 32.8%), and HD (50.0% vs. 18.8%) in the first 2.5 years of follow-up (Alloy et al., 2004). Again, there were no significant risk group differences in the rates of anxiety and other psychiatric disorders among the recurrence subsample. Interestingly, in the full sample, cognitive risk status did predict onsets of anxiety disorders comorbid with depression, but not anxiety disorders alone (Alloy et al., 2004). The CVD Project findings suggest that, at least in part, similar cognitive vulnerabilities may play a role in risk for both the first and subsequent episodes of depressive disorders.

Negative cognitive styles also provided vulnerability to suicidal ideation and attempts in the CVD Project. Abramson and colleagues (1998) found that HR participants were more likely than LR participants to have had a past history of suicidality (suicidal ideation and attempts), as well as higher levels of suicidality (ideation and attempts; no participant in the CVD Project actually completed suicide) across the 2.5 years of prospective follow-up, and this relation was mediated by participants' mean levels of hopelessness across the 2.5-year follow-up. Moreover, the predictive association between cognitive risk status and prospective levels of suicidality was maintained even after controlling statistically for participants' prior history of suicidality and for other risk factors for suicidality (i.e., prior history of MD and minor depression, borderline and antisocial personality dysfunction, and parental history of depression).

The cognitive theories of depression also include the hypothesis that individuals who are cognitively vulnerable to depression tend to engage in negative information processing about themselves. Specifically, according to Beck's theory (Beck, 1967, 1987; Clark, Beck, & Alford, 1999), depression-prone individuals possess negative self-schemata that negatively bias their perception, interpretation, and memory of personally relevant experiences. Using data from the Self-Referent Information Processing (SRIP) Task Battery administered at Time 1 of the CVD Project, Alloy, Abramson, Murray, Whitehouse, and Hogan (1997) compared the self-referent information processing of HR and LR participants. As predicted, they found that compared to LR participants, HR participants exhibited preferential processing for negative depression-relevant material (e.g., words such as "failure," "passive," and "useless") as evidenced by relatively greater endorsement, faster processing, greater accessibility, better recall, and higher predictive certainty of this material. In addition, HR participants were less likely than LR individuals to process positive depression-relevant stimuli (e.g., words such as "resourceful," "energetic," and "important"). Importantly, all of the risk group differences in self-referent information processing were maintained when participants' levels of depressive symptoms were statistically controlled. These findings are important because they demonstrate that the information processing biases previously observed in currently depressed individuals also are found in nondepressed individuals who are at cognitive risk for depression.

However, does negative self-referent information processing actually act as an additional cognitive vulnerability factor for depression? Steinberg, Oelrich, Alloy, and Abramson (2004) examined whether negative self-referent information processing exacerbated the predictive association between negative cognitive styles and both first onsets and recurrences of depressive disorders during the first 2.5 years of prospective follow-up in the CVD Project. We found that the interaction of cognitive risk status and negative self-referent information processing (based on a composite of the five dependent measures from the SRIP Task Battery for negative

depression-relevant stimuli) predicted first onsets of any episodic depression (major and minor depressive episodes combined) and HD significantly, even when initial depressive symptom levels were controlled statistically. Among HR participants, those who also engaged in negative self-referent processing were most likely to have a first onset of MD, minor depression, and HD, whereas among LR participants, there was no association between negative self-referent processing and first onsets of depression. In contrast, negative self-referent information processing did not interact with cognitive risk to predict recurrences of depressive disorders.

Finally, according to the response styles theory (Nolen-Hoeksema, 1991), individuals who tend to ruminate in response to depressed mood are also vulnerable to longer and more severe depressive episodes compared to individuals who tend to distract themselves from dysphoria. Is this the case? Using CVD Project data, Spasojevic and Alloy (2001) found that a depressive ruminative response style assessed at Time 1 predicted prospective onsets of MD during the 2.5-year follow-up (see also Just & Alloy, 1997; Nolen-Hoeksema, 2000). Abramson and colleagues (2002) argued that negative cognitive styles, by their very nature, should increase the likelihood of rumination because cognitively vulnerable individuals have difficulty disengaging their attention from the self-implications of negative life events. In accord with this idea, depressive rumination should serve as a mediator of the predictive association between negative cognitive styles and prospective onsets of depressive episodes. Indeed, Spasojevic and Alloy (2001) found that a tendency to ruminate about one's dysphoria served as a proximal mechanism (mediator) linking several more general depressive risk factors (negative cognitive styles, dependency, self-criticism, neediness, and past history of depression) to prospective onsets of MD episodes.

Expanding upon Nolen-Hoeksema's (1991) response styles theory, Robinson and Alloy (2003) hypothesized that individuals who exhibit negative cognitive styles and who also tend to ruminate about these negative cognitions in response to the occurrence of stressful life events ("stress-reactive rumination" as opposed to "depressive rumination") may be more likely to develop episodes of depression in the first place. They reasoned that negative cognitive styles provide negative inferences for stressful events, but these interpretations are more likely to actually be depressogenic when they are "on one's mind" and repetitively rehearsed through rumination. Thus, Robinson and Alloy (2003) hypothesized that stress-reactive rumination would exacerbate the association between negative cognitive styles and onsets of depressive episodes. Consistent with this hypothesis, they found that cognitive risk status and stress-reactive rumination measured at Time 1 of the CVD Project did indeed interact to predict onsets of MD and HD. Among HR participants, those who were also high in the tendency to ruminate following stressful events evidenced higher lifetime prevalence (Alloy et al., 2000) and prospective incidence (Robinson & Alloy, 2003) of MD and HD than those who did not tend to ruminate in response to stressors. LR participants exhibited low rates of past and future MD and HD, regardless of their levels of stress-reactive rumination.

Future studies need to clarify the relationship between stress-reactive rumination, which occurs prior to the onset of depressed mood, and depressive rumination (as described by Nolen-Hoeksema, 1991), which occurs in response to depressed mood. Spasojevic and colleagues (2003) suggested that insofar as both kinds of rumination appear to act as vulnerabilities for clinically significant depression, there may be a latent depressive rumination style that captures a general tendency to ruminate at various stages of a depressogenic cycle.

In sum, we believe that the prospective findings from the CVD Project are very exciting! To our knowledge, they are the first and clearest demonstration that negative cognitive styles, negative self-referent information processing, and a ruminative response style may indeed confer vulnerability for full-blown, clinically significant depressive disorders (and suicidality). Moreover, the results provide construct validity for the hypothesized subtype of HD. Finally, the risk conferred by negative cognitive styles may have specificity to depressive

disorders insofar as we did not obtain risk group differences in onsets of anxiety or other disorders. Given this evidence for cognitive vulnerability to depression, we turn now to the developmentally relevant findings from the CVD Project regarding the potential origins of cognitive vulnerability to depression.

## POTENTIAL DEVELOPMENTAL ORIGINS OF COGNITIVE VULNERABILITY TO DEPRESSION

Recent reviews of the developmental antecedents of depression and cognitive vulnerability to depression (e.g., Garber & Flynn, 1998; Gibb, 2002; Goodman & Gotlib, 1999; Haines, Metalsky, Cardamone, & Joiner, 1999; Rose & Abramson, 1992) suggest that genetic, neurochemical, social learning, and early traumatic processes all contribute to the development of negative cognitive styles that, in turn, increase risk for depression. In the CVD Project, we focused on exploring in some detail the social learning and early traumatic mechanisms that may contribute to the development of cognitive vulnerabilities and risk for depression. Specifically, we examined the role of parental depression, modeling of parents' cognitive styles, direct learning from parents' inferential feedback regarding the causes and consequences of negative events in their child's life, negative parenting practices, early childhood life events in general, and childhood maltreatment experiences in particular in the potential development of negative cognitive styles, negative self-referent information processing, and a ruminative response style among our CVD Project participants.

### Parental Depression

Prior research has found that children of depressed parents are at increased risk for developing depression themselves (e.g., Downey & Coyne, 1990; Goodman & Gotlib, 1999) as well as negative attributional styles that confer risk for depression (e.g., Garber & Flynn, 2001; Hammen, 1992). We used data from the CVD Project to further examine the association between parental history of depression and participants' cognitive risk status (Abramson et al., 2004). Parental history of depression was assessed both from interviews of participants using the family history RDC method (Andreason, Endicott, Spitzer, & Winokur, 1977) and from direct interviews of their parents using the expanded SADS-L interview.

HR participants' mothers were significantly more likely than LR participants' mothers to have a history of depression, based on both participants' reports and on the direct interviews of their mothers. Fathers of HR participants were marginally more likely than fathers of LR participants to have had a history of depression based on the participants' reports, but did not differ based on the direct interviews of the fathers. These findings combine with those of prior studies (e.g., Garber & Flynn, 2001; Hammen, 1992) to demonstrate a relation between parents', particularly mothers', histories of depression and the cognitive styles of their offspring. They also are suggestive of the possibility that negative cognitive styles may be a mediator of the association between parental depression and offspring's vulnerability to depression.

### Modeling of Parents' Cognitive Styles and Parental Inferential Feedback

Social learning may play a role in the development of cognitive vulnerability to depression. Two such social learning mechanisms are modeling of parents' negative cognitive styles for events in the parents' lives and incorporating negative inferential feedback from parents regarding the causes and consequences of negative life events in their child's life.

Children may learn their cognitive styles in part by observing and modeling the attributions and inferences their parents make when negative events happen to the parents (Abramson et al., 1999; Alloy et al., 1999; Garber & Flynn, 1998; Haines et al., 1999). If the



modeling hypothesis is correct, then children's cognitive styles should correlate with those of their mothers or fathers. Studies of modeling of cognitive styles have obtained mixed results, with some studies finding a relationship between mothers', but not fathers', and children's attributional styles (Seligman et al., 1984) and negative cognitions (Stark, Schmidt, & Joiner, 1996) and others showing no association between parents' and their offspring's cognitive styles (Garber & Flynn, 2001; Kaslow, Rehm, Pollack, & Siegel, 1988; Oliver & Berger, 1992; Turk & Bry, 1992).

Alloy and colleagues (2001) tested the modeling hypothesis using CVD Project data. Specifically, parents of HR and LR participants completed a parent version of the CSQ and DAS, the same measures of cognitive style that their sons or daughters completed. Alloy and colleagues (2001) found that mothers of HR participants had significantly more dysfunctional attitudes and marginally more negative inferential styles than mothers of LR participants, controlling statistically for the mothers' levels of depressive symptoms. In contrast, there were no risk group differences in fathers' dysfunctional attitudes or inferential styles. Thus, to the extent that modeling of parents' cognitive styles contributes to the development of cognitive vulnerability to depression in offspring, the CVD Project findings combined with those from other studies suggest that it is mothers' cognitive styles that are modeled. If mothers are the primary caretakers of their children, as is likely, then the greater similarity of offspring's cognitive styles to those of their mothers than of their fathers could be the result of greater exposure to mothers during the formative years.

Another way in which children may learn their cognitive styles is through inferential feedback from their parents. Parents may communicate their own inferences about the causes and consequences of negative events in their child's life such that the child develops an inferential style consistent with the parental feedback. If the feedback hypothesis is correct, then offspring's inferential styles should correlate with the usual attributional and consequence feedback they received from their parents. Prior studies, though small in number, consistently support the parental feedback hypothesis for attributional styles (Fincham & Cain, 1986; Garber & Flynn, 2001; Turk & Bry, 1992). In addition, Dweck, Davidson, Nelson, and Enna (1978) have shown that children's attributions for academic performance outcomes are influenced by the attributional feedback they receive from their teachers.

Alloy and colleagues (2001) tested the parental inferential feedback hypothesis using CVD Project data. We examined the inferential feedback styles of the parents of the HR and LR participants as reported by both the parents and the participants on the Parental Attributions for Children's Events Questionnaire (PACE; Alloy et al., 2001). The PACE contains 12 hypothetical negative events. Following each event, there are four attributional statements presented in random order that parents might communicate to their child: (a) internal, stable, global; (b) external, stable, global; (c) internal, unstable, specific; and (d) external, unstable, specific. These are followed by two consequence statements, positive versus negative. HR and LR participants rated the likelihood that their mothers and fathers, and parents rated the likelihood that they themselves, would say each attribution and each consequence statement to their child when he or she was growing up on 0% to 100% probability scales. Internal consistencies of the PACE subscales ranged from .77 to .82 for the participant reports and from .57 to .77 for the parent reports.

Alloy and colleagues (2001) found that according to both participants' and their parents' reports on the PACE, both mothers and fathers of HR individuals provided more stable, global attributional feedback for negative events in their child's life than did mothers and fathers of LR individuals. In addition, mothers of HR participants also provided more negative consequence feedback for negative events in their child's life than did mothers of LR participants according to both respondents' reports, as did fathers of HR participants according to the participants' reports. Most, but not all, of these associations were maintained when the depressive

symptom levels of the respondent were controlled statistically. Thus, negative cognitive styles among offspring were associated with negative inferential feedback from parents. Indeed, the association of participants' cognitive risk status with negative inferential feedback from their parents was stronger than the association of their cognitive risk with their parents' cognitive styles. Moreover, mothers' stable, global attributional feedback predicted onsets of HD in their offspring during the 2.5-year prospective follow-up, mediated by the offspring's cognitive risk status. In addition, mothers' negative consequence feedback marginally predicted and fathers' negative consequence feedback significantly predicted onsets of MD and minor depression in their offspring during the follow-up, mediated in part by participants' cognitive risk.

Also using CVD Project data, Crossfield, Alloy, Abramson, and Gibb (2002) found that maternal inferential feedback moderated the relationship between parents' reports of their children's negative childhood life events and cognitive risk status. Specifically, high levels of negative childhood events in interaction with negative maternal inferential feedback were associated with participants' HR status. Thus, the CVD Project findings suggest that parents might contribute to the development of negative cognitive styles and vulnerability to depression in their children, not so much by modeling negative inferences for events in their own lives, but more by communicating negative attributional and consequence feedback to their children for negative events in the children's lives.

### Parenting Styles

Parents may contribute to the development of cognitive vulnerability to depression in their children not only by providing negative inferential feedback for stressful events in their children's lives, but also by engaging in generally negative parenting practices. Numerous studies have found that parenting characterized by lack of warmth and caring and by negative psychological control (criticism, intrusiveness, and guilt-induction), a pattern referred to as "affectionless control" by Parker (1983), is associated with both depression and negative cognitive styles in offspring (Brewin, Firth-Cozens, Furnham, & McManus, 1992; Garber & Flynn, 2001; Goodman, Adamson, Riniti, & Cole, 1994; Ingram & Ritter, 2000; Jaenicke et al., 1987; Koestner, Zuroff, & Powers, 1991; Litovsky & Dusek, 1985; Parker, 1983, 1993; Radke-Yarrow, Belmont, Nottelman, & Bottomly, 1990; Randolph & Dykman, 1998; Stark et al., 1996; Whisman & Kwon, 1992; Whisman & McGarvey, 1995; but see Oliver & Berger, 1992, for an exception). In the CVD Project, Alloy and colleagues (2001) further explored the negative parenting hypothesis by examining the parenting behaviors of cognitively HR and LR participants' parents as reported by both the participants and their parents on the Children's Report of Parental Behavior Inventory (CRPBI; Schaeffer, 1965). The CRPBI yields scores on three dimensions of parenting: emotional warmth or acceptance, psychological control, and lax discipline. Internal consistencies for these CRPBI subscales for mothers and fathers in the CVD Project ranged from .61 to .87.

Consistent with the lack of emotional warmth part of the "affectionless control" pattern, Alloy and colleagues (2001) found that the fathers of HR participants exhibited less warmth and acceptance than did fathers of LR participants, as reported by both the participants and their fathers. Based on the fathers' reports, this relationship remained significant even when the fathers' levels of depressive symptoms were statistically controlled, suggesting that the association between fathers' lack of warmth and their offspring's negative cognitive styles cannot be attributed to fathers' depressed mood or reporting biases that may arise from depressed mood. There were no risk group differences, however, for fathers' levels of psychological or lax control or for mothers' parenting on any

of the dimensions. In addition, low warmth or acceptance from fathers predicted prospective onsets of MD, minor depression, and HD in their children during the 2.5-year follow-up, but only the onset of HD was mediated by the offspring's cognitive risk status. The relationship between fathers' lack of acceptance and their sons' or daughters' cognitive vulnerability suggests that despite the predominance of mothers as primary caretakers, fathers too may be important in their offspring's development of positive versus negative cognitive styles.

Interestingly, although only paternal lack of warmth and acceptance was related to participants' cognitive risk status based on negative inferential styles and dysfunctional attitudes, the negative psychological control part of the "affectionless control" pattern was related to participants' ruminative response styles (Spasojevic & Alloy, 2002). Specifically, Spasojevic and Alloy (2002) found that psychologically overcontrolling parenting by both mothers and fathers was significantly associated with a greater tendency to ruminate by their young adult children, controlling statistically for the young adult's cognitive risk status and current depressive symptoms. In contrast, parental emotional warmth/acceptance was unrelated to a ruminative response style in their offspring. In addition, a ruminative response style fully mediated the association between psychologically controlling parenting and prospective onsets of MD in the college-aged offspring. Consequently, data from the CVD Project suggest that both lack of emotional warmth and psychologically controlling parenting may be related to offspring's development of cognitive vulnerability to depression, through the alternative mechanisms of negative cognitive styles and a ruminative response style, respectively.

### History of Childhood Maltreatment

In extending the etiological chain of the Hopelessness Theory, Rose and Abramson (1992) proposed a developmental pathway by which negative events in childhood, particularly childhood maltreatment, may contribute to the development of negative cognitive styles, which, in turn, increase individuals' vulnerability to developing hopelessness and both symptoms and episodes of depression. Specifically, Rose and Abramson (1992) suggested that when a negative event such as maltreatment occurs, children attempt to explain its occurrence in a way that will maintain their sense of hopefulness that the event will not recur (hopefulness-inducing attributions). For example, if a child's father beats him or her, the child may initially explain the maltreatment by saying it happened because his or her dad was in a bad mood that day (external, unstable, specific). If the maltreatment is chronic or widespread, however, the child's hopefulness-inducing attributions will meet with repeated disconfirmation and the child may begin to make hopelessness-inducing attributions. For example, the child may begin to explain the maltreatment by thinking, "I'm such a bad kid, I deserve all the bad things that happen to me" (internal, stable, global). Over time, these types of causal attributions may generalize to other negative life events, crystallizing into a negative cognitive style.

Rose and Abramson (1992) predicted that childhood emotional maltreatment should be more likely to contribute to the development of negative cognitive styles than either childhood physical or sexual maltreatment. This is because with emotional abuse, the depressotypic cognitions (e.g., "You're so stupid; you'll never amount to anything") are directly supplied to the child by the abuser. In contrast, with physical or sexual maltreatment, the child must supply his or her own attributions and has an opportunity to make more benign interpretations.

In a qualitative and quantitative review of studies examining the relation between childhood maltreatment and cognitive vulnerability to depression, Gibb (2002) found that histories of both sexual and emotional maltreatment, but not physical maltreatment, were

associated with negative cognitive styles. We more fully explored the validity of Rose and Abramson's maltreatment model based on CVD Project participants' reports of their histories of childhood (prior to age 15) emotional, physical, and sexual maltreatment on the Life Experiences Questionnaire (LEQ; Gibb et al., 2001a). The LEQ was modeled on Cicchetti's (1989) Child Maltreatment Interview, and consistent with the suggestions of Brewin, Andrews, and Gotlib (1993), the LEQ assessed a broad range of specific events rather than asking individuals for global estimates of maltreatment. Forms of childhood emotional maltreatment assessed included humiliation, rejection, extortion, and teasing. Forms of physical maltreatment assessed included being hit with an object or fist, being choked, and being the victim of deliberate physical pain. Forms of sexual maltreatment assessed included unwanted exposure to pornography, exhibitionism, fondling, and attempted and completed rape. Internal consistencies for the three LEQ subscales were good, with alphas of = .85, .67, and .80 for emotional, physical, and sexual maltreatment, respectively (Gibb et al., 2001a).

Consistent with Rose and Abramson's hypothesis that childhood emotional maltreatment would be more strongly related to negative cognitive styles than either childhood physical or sexual maltreatment, Gibb and colleagues (2001a) found that HR individuals reported more emotional, but not physical or sexual, maltreatment than did LR individuals, even after their depressive symptom levels and the effects of the other two forms of maltreatment were statistically controlled. Participants' cognitive risk status and average levels of hopelessness partially mediated the relation between reports of childhood emotional maltreatment and prospective onsets of HD during the 2.5-year follow-up. Also, cognitive risk status fully mediated the relation between emotional maltreatment and nonendogenous MD. Childhood emotional maltreatment was also associated with prospective levels of suicidality. Gibb and associates (2001b) found that reports of childhood emotional, but not physical or sexual, maltreatment were predictive of participants' average levels of suicidal ideation and attempts during the 2.5-year follow-up period and this relation was also partially mediated by participants' cognitive risk status and average levels of hopelessness.

Despite the strengths of these studies, a number of questions remained. First, was the association of childhood emotional maltreatment with negative cognitive styles due to the maltreatment itself or to some as yet unaccounted for third variable, such as genetic influences or negative family environment more generally? A behavior geneticist might suggest that developmental maltreatment by parents does not actually contribute directly to the formation of cognitive vulnerability to depression in their offspring. Instead, it may be that the genes that maltreating parents pass on to their offspring contribute both to the parents abusing their offspring and to the formation of cognitive vulnerability among the offspring. To address this issue, Gibb, Abramson, and Alloy (2004) also examined the relationship between maltreatment by non-relatives (i.e., peers, non-family adults, strangers, and boyfriends/girlfriends) during development and cognitive vulnerability to depression in adulthood with the CVD project data. Gibb, Abramson, and Alloy (2004) found that even when parental variables such as parental history of psychopathology and maltreatment by parents were statistically controlled, emotional maltreatment by nonrelatives still was significantly associated with cognitive vulnerability.

It was also unclear from the CVD Project findings whether the relations between childhood emotional maltreatment and negative cognitive styles and depression were due to specific behavioral experiences, participants' interpretation of their experiences (i.e., global beliefs that they were maltreated in childhood), or both. To address this ambiguity, Gibb, Alloy, and Abramson (2003) assessed an unselected sample of undergraduates' histories of childhood emotional, physical, and sexual maltreatment in two ways. First, on the LEQ, participants were asked if they had experienced a broad range of specific behaviors considered to constitute maltreatment. Second, participants were asked more globally if they believed

they had been emotionally, physically, and/or sexually maltreated as children. Gibb, Alloy and Abramson (2003) found that reported specific instances of childhood emotional maltreatment remained significantly related to participants' dysfunctional attitudes even after their global reports of childhood emotional maltreatment were statistically controlled. In combination, therefore, these additional studies support the hypothesis that the relation between reported childhood emotional maltreatment and negative cognitive styles was attributable to the actual experience of emotionally abusive behaviors and was not due to purely genetic influences, general negative family environment, and global reporting biases.

A second question that remained regarding the CVD Project findings on the role of maltreatment was whether a childhood history of emotional maltreatment is related to negative inferential styles, dysfunctional attitudes, or both. Similarly, is a history of emotional maltreatment associated with other cognitive vulnerabilities, such as a ruminative response style or negative information processing about oneself, as well? Given that cognitive risk status in the CVD Project was based on both negative inferential styles and dysfunctional attitudes, it is difficult to tease apart their separate associations with emotional maltreatment. Two follow-up studies conducted in unselected samples of undergraduates indicated that reported levels of childhood emotional maltreatment were related to both negative inferential styles (Gibb, Alloy, Abramson, & Marx, 2003) and dysfunctional attitudes (Gibb, Alloy, & Abramson, 2003). In addition, using CVD Project data, Spasojevic and Alloy (2002) found that a ruminative response style was also related to a childhood history of maltreatment. Specifically, Spasojevic and Alloy (2002) found that a reported history of childhood emotional maltreatment and, for women, of childhood sexual maltreatment on the LEQ were significantly related to a ruminative response style, even when participants' cognitive risk status and current depressive symptoms were statistically controlled. Moreover, the tendency to ruminate partially mediated the predictive association between emotional maltreatment history and prospective onsets of MD episodes and, for women, fully mediated the relationship between sexual maltreatment history and prospective MD onsets. Finally, also using data from the CVD Project, Steinberg, Gibb, Alloy, and Abramson (2003) found that a reported history of childhood emotional maltreatment was also associated with negative self-referent information processing. Specifically, Steinberg, Gibb, and colleagues (2003) found that cognitive risk mediated the relation between reports of childhood emotional maltreatment and the presence of self-referent information processing biases. In addition, these biases mediated the relation between childhood emotional maltreatment and cognitive risk for depression, suggesting the possibility of a transactional relationship between cognitive styles and self-referent information processing, with emotional maltreatment serving as a common developmental contributor to both.

Another issue is the process by which childhood emotional maltreatment contributes to the development of negative cognitive styles. That is, although the CVD Project findings supported Rose and Abramson's (1992) hypothesis that levels of emotional maltreatment would be significantly related to individuals' cognitive styles, the study did not evaluate their hypothesis that inferences about specific maltreatment experiences would mediate this relation. To test this hypothesis, Gibb, Alloy, Abramson, and Marx (2003) conducted a cross-sectional evaluation of a sample of unselected undergraduates' reports of childhood maltreatment, inferences for specific maltreatment experiences, inferential styles, levels of hopelessness, and symptoms of HD. Gibb, Alloy, Abramson, and Marx (2003) found that participants' inferences for specific experiences of emotional maltreatment fully mediated the relation between childhood emotional maltreatment and participants' inferential styles. In addition, participants' inferences about specific instances of emotional maltreatment and their general inferential styles partially mediated the relation between emotional maltreatment and hopelessness, and hopelessness partially mediated the relation between inferential styles and HD.

Of course, all of these findings regarding the role of childhood emotional maltreatment in the development of negative cognitive styles are based on cross-sectional or retrospective reports of participants. Thus, a final issue left unanswered by the CVD Project findings and our related studies is whether emotional maltreatment actually contributes causally to the formation of negative cognitive styles. As a first step in providing support for a causal role of emotional maltreatment in the development of negative cognitive styles, Gibb, Alloy, and colleagues (2004) conducted a prospective study of the development of negative attributional styles in fourth- and fifth-grade children. Gibb, Alloy, and colleagues (2004) and Gibb and Alloy (2004) examined the role of emotional maltreatment, as well as other factors, in predicting change in attributional style and depressive symptoms over a 6-month period in fourth and fifth graders. Emotional maltreatment occurring during the 6-month follow-up, as well as emotional maltreatment occurring in the 6 months prior to Time 1, predicted change in children's attributional styles over the follow-up (Gibb, Alloy, et al., 2004). Only emotional maltreatment occurring during the 6-month follow-up predicted change in children's depressive symptoms over the follow-up (Gibb & Alloy, 2004). The more emotional abuse a child experienced, the more negative his or her attributional style became and the more depressive symptoms he or she developed over the follow-up. The Gibb, Alloy, and colleagues (2004) and Gibb and Alloy (2003) findings suggest that emotional maltreatment may be predictive of and, at least, show temporal precedence with respect to the development of some negative cognitive styles and depressive symptoms.

## CONCLUSION

### The Continuum of Emotional Feedback in the Development of Cognitive Vulnerability to Depression

To summarize, three main developmental factors were associated with negative cognitive styles and vulnerability to depression in the CVD Project: a history of childhood emotional maltreatment; negative inferential feedback from parents regarding the causes and consequences of negative events in their child's life; and parenting characterized by low emotional warmth and psychological control. These three developmental variables may be seen as falling on a continuum of emotional feedback (Alloy et al., 2001). For example, low emotional acceptance or warmth as measured by the CRPBI (e.g., "Tells me how much he loves me" or "Gives me a lot of care and attention" rated as "not like" one's parent), high psychological control as measured by the CRPBI (e.g., "Wouldn't talk to me when I displeased him" or "Said that some day I'd be sorry that I wasn't better as a child" rated as "like" one's parent) and negative inferential feedback as assessed on the PACE (e.g., "Of course you weren't invited. You aren't easy to get along with"; "Now you'll be identified as an outcast and people won't invite you to other parties either") could be viewed as milder ends of a continuum that also includes outright emotional abuse (e.g., humiliation, rejection, extortion, and teasing) at the more severe end.

Thus, emotional criticism and rejection from significant others, such as parents, teachers, and peers, may provide a psychological environment that promotes the development of depressogenic cognitions whether it is expressed indirectly through provision of negative inferential feedback or lack of affection or directly through explicitly abusive language (Alloy et al., 2001; Garber & Flynn, 1998). Consistent with the idea of a continuum of emotional feedback, in the CVD Project, we found that the more extreme end of the continuum reflected in emotional maltreatment was more strongly and consistently related to our participants' negative cognitive styles and ruminative tendencies, as well as their actual likelihood of developing MD and HD episodes, than was the milder end of the continuum

represented by parents' emotional warmth, psychological control, and inferential feedback. The findings from the CVD Project and related studies reviewed herein suggest that the old childhood adage, "Sticks and stones may break my bones, but words will never hurt me," may be patently untrue (Gibb, Alloy, et al., 2004). Negative emotional feedback, ranging from lack of warmth and negative inferential communications to psychological abuse, may be particularly virulent in promoting cognitive vulnerability to depression and depression itself.

As we indicated at the outset, with the exception of the studies by Gibb, Alloy, and colleagues (2004) and Gibb and Alloy (2004), the developmentally relevant findings from the CVD Project are retrospective. Thus, they may be seen as providing a conceptual and empirical basis for further investigations of the development of cognitive vulnerability to depression. Future studies, particularly prospective studies beginning earlier in childhood, should devote considerable attention to this potential continuum of emotional feedback, ranging from mildly negative parenting practices and feedback to emotional abuse, as an important contributor to the development of cognitive vulnerability to depression and to depression itself.

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**Offprints.** Requests for offprints should be directed to Lauren B. Alloy, PhD, Department of Psychology, Temple University, Weiss Hall, 1701 N. 13th St., Philadelphia, PA 19122. E-mail: lalloy@temple.edu