

Emotion Regulation Strategies in Offspring of Childhood-Onset Depressed Mothers

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Abstract

Background: This study examines emotion regulation strategies used by children of mothers with childhood-onset depression (COD) and children of never depressed mothers (NCOD).

Methods: Participants were 49 COD offspring (ages 4-7) and 37 NCOD offspring (ages 4-7) and their mothers. Emotion regulation strategies were assessed observationally during a laboratory mood induction paradigm.

Results: COD offspring were more likely to focus on the delay object or task than NCOD offspring. Daughters of COD mothers were also more likely to wait passively and less likely to engage in active distraction than daughters of NCOD mothers. These findings were replicated using number of maternal depressive episodes.

Conclusions: COD offspring, especially daughters, exhibit a more passive style of regulating emotion that may place them at risk for developing psychopathology.

Keywords: maternal depression; emotion regulation; gender differences; parenting; childhood-onset depression.

Abbreviations: COD = Childhood Onset Depression; ER = Emotion Regulation

Emotion Regulation Strategies in Offspring of Childhood-Onset Depressed Mothers

Offspring of depressed parents are at heightened risk for depression and other psychiatric and behavioral problems. Meta-analytic findings suggest that 61% of children of affectively ill parents will develop one or more psychiatric disorders during childhood or adolescence (Beardslee, Versage, & Gladstone, 1998). Despite overwhelming evidence for the existence of this risk, little is known about its underlying mechanisms. Within the past decade, researchers have identified several potential risk mechanisms including genetic transmission; dysfunctional neuroregulatory systems; exposure to negative maternal cognitions, behaviors, and affect; and exposure to stressful life events (Goodman & Gotlib, 1999). Each of these potential mechanisms alters the affective climate of the family and the child's emotional resources and demands. We argue that parental depression may influence child adjustment by disrupting the child's development of emotion regulatory (ER) competence.

Emotion regulation refers to the adaptive modulation of emotional reactions in the service of contextual demands and personal goals. Thompson (1994, pp. 27-28) defines emotion regulation as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals." Across infancy and childhood, children gradually develop the capacity to self-regulate their emotions (Kopp, 1989). Problems in ER have been implicated in a wide variety of indices of adjustment, including poor social competence (e.g. Calkins, Gill, Johnson, & Smith, 1999), depression (e.g. Garber, Braafladt, & Weiss, 1995; Silk, Steinberg, & Morris, 2003), anxiety (e.g. Rubin, Coplan, Fox, & Calkins, 1995), and behavior problems (e.g. Cole, Teti, & Zahn-Waxler, 2003; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002).

Emotion Regulation Strategies

We propose that impairment in the development of ER strategies is an important factor in vulnerability to psychopathology among children of depressed parents (Kovacs, 2004). ER strategies can be conceptualized as having developmental roots in four interrelated domains of functioning: somatic/sensory, cognitive, behavioral, and social interpersonal. In turn, the emergence and adaptive use of regulatory skills and capacities are supported by a physiological infrastructure, including neural circuitries that have been implicated in the processing and experience of emotions.

Emotion regulation in childhood is frequently accomplished through interactions with parents and other supportive adults (Parke, 1994; Thompson, 1994) and research shows that children who utilize more parental support in regulating emotion are more socially competent (Kliewer, Fearnow, & Miller, 1996). Emotion regulatory strategies also include the use of cognitive processes, such as adaptive ways of deploying executive attention to modulate distress. Several studies show that the ability to shift attention away from a distressing stimulus is associated with decreases in distress and lower levels of internalizing and externalizing symptomatology (Buss & Goldsmith, 1998; Eisenberg et al., 2001; Gilliom et al., 2002). In contrast, strategies in which the child directs sustained attention on the source of emotion appear to be maladaptive in regulating emotion and are predictive of depressive symptoms and problem behaviors (Nolen-Hoeksema & Girgus, 1994; Silk et al., 2003). Strategies within the behavioral domain of emotion regulation include actions that are undertaken in order to feel better, such as manipulating the environment or engaging in some activity that provides distraction or emotional relief. The use of active behavioral strategies is associated with decreased distress and better

psychosocial adjustment (Grolnick, Bridges, & Connell, 1996; Herman-Stahl & Petersen, 1996; Garber, Braafladt, & Weiss, 1991).

Emotion Regulation and Maternal History of Depression

Few studies have examined ER strategies among children of depressed parents; however researchers have identified several potential mechanisms of transmission of depression from parents to children that could influence the development of emotion regulatory competence (see Downey & Coyne, 1990; Goodman & Gotlib, 1999). First, children of depressed parents may inherit biological vulnerabilities to dysregulated affect, or may develop biological vulnerabilities as a result of exposure to abnormalities in the fetal environment. Several studies have shown that infants and young children of depressed parents do exhibit biological vulnerabilities to emotion dysregulation, such as elevations in cortisol and heart rate, and hypoactive left frontal brain activity (Ashman, Dawson, Panagiotides, Yamada, & Wilkinson, 2002; Dawson et al., 2001; Field, 1995). Second, problems in the development of ER competence may be related to heightened exposure to stress (Hammen et al., 1987) and marital conflict (Gotlib & Whiffen, 1989) in the homes of children of depressed parents. Exposure to chronic stress and conflict could sensitize children's arousal systems and compromise children's sense of emotional security (Cummings & Davies, 1994).

One of the most important mechanisms in the disruption of ER among children of depressed parents is likely to involve direct interactions between parents and their children. One of the primary ways that children acquire a repertoire of emotion regulation strategies is via interactions with parents (Eisenberg, Cumberland, & Spinrad, 1998; Parke, 1994). Recent studies suggest that emotion-related parenting practices, such as responses to children's emotions (Eisenberg, Fabes, & Murphy, 1996) and "emotion-coaching" (Gottman, Katz, & Hooven, 1996)

are related to children's emotion regulation. For example, Gottman et al. (1996) found that children whose parents provide coaching in regulatory strategies demonstrate improved emotion regulation over three years. Eisenberg (1994) found that parents' supportive and nonsupportive responses to children's negative emotions are related to parent-report and naturalistic observation of children's emotion regulation.

Several researchers have found evidence for gender-typic socialization of emotional behaviors. For example, several studies suggest that parents preferentially reinforce the display of sadness in girls and anger in boys (Block, 1983; Eisenberg et al., 1998; Fuchs & Thelen, 1988). Parents also appear to socialize more relationship-oriented strategies for regulating emotion among girls and more active and instrumental strategies for regulating emotions among boys (Eisenberg et al., 1998; Hops, 1995; Nolen-Hoeksema & Girgus, 1994; Sheeber, Davis, & Hops, 2002). Some evidence suggests that parents encourage distraction and problem solving strategies more for boys than for girls (Eisenberg et al., 1998).

The socialization of emotion regulation has rarely been examined among depressed mothers and their children. Related findings, however, suggest that mechanisms for socializing emotion regulation may be disrupted in families with depressed parents. First, observational studies have shown that depressed mothers display atypical affective interaction patterns with their children (Goodman & Gotlib, 1999). Depressed mothers have been shown to be less responsive to their children's emotional states, less likely to match their children's affect, and to display more anger and sadness and less positive affect than non-depressed mothers (e.g. Field, Healy, Goldstein, & Guthertz, 1990; Hops, Biglan, Sherman, & Arthur, 1987; Weinberg & Tronick, 1998). Second, depressed mothers experience their own deficits in emotion regulation

(Bradley, 2000; Gross & Munoz, 1995), suggesting that they may not have all of the skills needed to model, teach, and reinforce adaptive ways of modulating distress.

Although most studies have categorized parental depression based on categorical diagnoses, evidence suggests that nonspecific features of depressive illness are important in predicting the emotional quality of parent-child interactions. Features of depressive illness that have been related to impairments in affective interactions with children include duration of depression (Campbell, Cohn, & Meyers, 1995), course of depressive symptoms (e.g. Seifer, Dickstein, Sameroff, Magee, & Hayden, 2001), and number of depressive episodes (Dickstein et al., 1998). Mothers who experienced mood disorders as children are especially likely to have difficulties regulating and socializing emotion as a result of disruptions in their own emotional development.

In the only study to directly examine emotion regulation strategies among children of depressed parents, Garber et al. (1991) asked depressed mothers and their children to generate regulatory strategies for hypothetical emotional scenarios. Compared to a control group of never-depressed mothers and their children, depressed mothers and their children nominated fewer potential strategies for regulating emotion, and their strategies were judged by independent raters to be less effective.

The Current Study

The current study examines whether young children of mothers with childhood-onset depression and young children of never-depressed mothers differ in their utilization of ER strategies under laboratory induced distress. The study extends previous research by assessing emotion regulation strategies observationally and by utilizing a delay task to induce mild negative emotion within the laboratory. It is hypothesized that children of depressed mothers,

and children of mothers with more episodes of depression, will utilize less physical comfort, attention refocusing, and information gathering strategies and more passive waiting and focus on delay strategies than children of never-depressed mothers. We hypothesize that these differences will be more pronounced for daughters than for sons.

Method

Participants

Eighty-six children participated in this study, including 49 children of mothers with a history of childhood-onset depression (COD) and 37 children of never-depressed mothers (NCOD). Children and their mothers were participants in a larger Program Project focusing on risk factors for childhood-onset mood disorder. COD mothers met DSM criteria (DSM-III, DSM-IV; American Psychiatric Association, 1980; 1994) for Major Depressive Disorder and/or Dysthymic Disorder (N=26) by age 14, or bipolar spectrum disorder (Bipolar I, Bipolar II, or Cyclothymic Disorder) by age 17 (N=8). NCOD mothers had a lifetime-history free of major psychiatric disorder. Individuals with episodes of circumscribed conditions not associated with functional impairment (e.g., brief period of marijuana use in college; phobia of snakes) were included. All participants were free of preexisting major systemic medical disorders and without evidence of mental retardation.

Children ranged in age from four to seven ($M = 4.76$, $SD = 1.23$) and included 52 males (60%) and 34 females (40%). Demographic characteristics of participants are reported in Table 1. Twenty-nine children in the COD group (61%) participated in the study with a sibling (7 sets of two siblings and 4 sets of three siblings). COD and NCOD groups did not differ in race, marital status, mother's education, child age, or child gender. Children's age was evenly distributed across males and females ($t = .15$, $p = .88$). COD mothers were younger than NCOD

mothers, and, as expected, reported higher current depressive symptomatology on the Beck Depression Inventory (Beck, Rush, Shaw & Emery, 1979). Mother's age and BDI score were unrelated to child emotion regulation, therefore, were not included in subsequent analyses (r 's range from .00 - .20).

Recruitment and Diagnoses

COD mothers were recruited via: a) accessing individuals who had participated in a follow-up study of childhood depression (Kovacs, Obrosky, Gatsonis, & Richards, 1997; N=16), and b) advertising in the general community (N=16). Two mothers were recruited through other means. Diagnostic status was confirmed via administration of standardized, semistructured psychiatric interviews. NCOD participants were recruited by: a) using the Cole Directory, which provides phone numbers for families meeting specific sociodemographic criteria (N=15), b) advertising for volunteers in the general community (N=5), or c) advertising through a local Women, Infants, and Children (WIC) center, a program that provides nutritional services for income-eligible families with young children (N=17).

Procedures

The present study included mothers who met the above criteria for the larger study and who had children aged 1-8 years. Participants completed a 2.5 hour laboratory visit that was video-recorded through a one-way mirror. All visits began with the child playing with toys on his/her own while the mothers completed questionnaires, followed by a series of age-appropriate structured tasks.

The current report focuses on observational data from a delay task completed at ages 4, 5, and 7. The delay task taps children's skills for regulating affect when forced to wait for a desired outcome with little of interest in the immediate environment (e.g. waiting for a parent to finish a

telephone call). During the task, children were required to wait for a cookie (age 4) or toy (age 5 and 7). The laboratory was cleared of all toys and mothers were asked to sit at a table and complete questionnaires. The mother was given a clear bag with a cookie or toy inside of it and asked to keep it within the child's view but out of his or her reach for three (age 4) or seven minutes (ages 5 and 7). At the end of the task, the examiner signaled the mother to give the cookie/toy to the child.

The delay task has been used successfully to elicit negative emotion and parental response to emotion and has been shown to predict later problem behavior and social competence (Gilliom et al., 2002; Martin, 1981). To confirm that the delay task elicited mild negative affect in the present study, we compared observed negative affect during the delay task to observed negative affect during another task in the protocol that was designed to be neutral in affect (e.g. sorting shapes, completing a puzzle). Children's anger and sadness were coded based on vocal, facial, and behavioral cues using a coding system developed by Cole, Zahn-Waxler, and Smith (1994). Facial cues for anger included tightening or narrowing eyelids, tightening or pressing lips, and clenching of teeth. Vocal cues included harsh insistent vocal tone and increased volume and pitch. Facial cues for sadness included down-turned lip corners, depressed lower lip, and drooping eyelids. Vocal cues included soft voice, decreasing volume, and crying. Results of repeated measures ANOVA's indicated that children displayed greater sadness during the delay task ($M = .07$, $SD = .17$) than during the neutral task ($M = .02$, $SD = .06$; $F = 6.01$, $p < .05$), although children did not differ across tasks in anger.

Measures

Maternal depression. The Psychiatric Evaluation Core of the Program Project, staffed by professional-level clinical evaluators and independent best-estimate psychiatrists, conducted all

psychiatric assessments. Interviews were conducted with the mother and a second informant (e.g. a parent or sibling), if available. In addition, childhood psychiatric records were required to verify the onset of disorders. Two senior psychiatrists independently reviewed the assessment results and supporting records and arrived at a final DSM-based consensus diagnoses. Data from these assessments were used to calculate two complementary variables characterizing mothers' depressive status: (1) maternal lifetime diagnostic status (coded as a dichotomous variable with "0" for NCOD and "1" for COD) and (2) lifetime number of depressive episodes (coded as a continuous variable). Number of episodes was coded on a 5 point scale with a "0" indicating "no episodes," a "1" indicating "one episode," a "2" indicating "2 episodes," a "3" indicating "three or more episodes," and a "4" indicating "too many episodes to count." Five COD mothers (15%) reported one episode of depression, 6 (18%) reported two episodes of depression, 16 (47%) reported three or more episodes, and 6 (18% reported too many episodes to count. Data were also collected on current depressive symptomatology using the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979).

Follow-Up Interview Schedule for Adults. COD probands recruited from the follow-up study of childhood depression (Kovacs et al., 1997) were assessed via the Follow-Up Interview Schedule for Adults (FISA), a semi-structured psychiatric interview for adults adapted from the Interview Schedule for Children and Adolescents (Sherrill & Kovacs, 2000). Diagnoses were derived based on symptom ratings and assigned by consensus among the interviewers according to DSM-III criteria. Inter-rater reliabilities are satisfactory, with a mean intra-class correlation of .89 for psychiatric symptoms.

Structured Clinical Interview for DSM-IV Patient Version (SCID). The Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition (SCID, First, Spitzer, Gibbon, &

Williams, 1995) was used to assess lifetime psychiatric disorders among prospectively recruited COD probands and NCOD probands. The SCID is a semi-structured, clinician-administered diagnostic interview that includes modules corresponding to major DSM psychiatric classes. The SCID was expanded to include criteria for selected childhood diagnoses and DSM-III (APA, 1980) current and lifetime criteria for affective disorders.

Behavioral coding of child emotion regulation strategies. Children's emotion regulation strategies were coded using a system adapted by Gilliom et al. (2002) from the work of Grolnick et al. (1996). The presence or absence of each of five mutually exclusive strategies was coded during each 10-s interval. Strategies were: (1) *active distraction* (purposeful behaviors in which the focus of attention is shifted away from the delay object or the task of waiting, including fantasy play, exploration of the room, talking with the mother, singing or dancing, etc.); (2) *focus on delay object or task* (speaking about, looking at, or trying to retrieve the cookie or toy, or speaking about or trying to end the waiting period); (3) *passive waiting* (standing or sitting quietly without engaging in any overt activity); (4) *information gathering* (asking questions aimed at learning more about the waiting situation, but not aimed at changing the situation); and (5) *physical comfort seeking* (touching the mother, requesting to be held). Only 14% of children engaged in any instances of physical comfort seeking; therefore, this strategy was removed from further analyses. All tapes were coded by graduate-level coders who were blind to mothers' diagnostic status. Coders were trained by watching and coding approximately 15 tapes and reviewing discrepancies with an experienced coder. Following training, coders viewed tapes together and assigned codes by consensus. Additionally, coders rated 12 tapes independently to establish reliability for emotion regulation strategy codes (kappas range from = .80 to .97).

Results

Preliminary Analyses

Table 2 presents means, standard deviations, and ranges of emotion regulation strategy variables for the COD and NCOD groups. Scores are represented as proportions of intervals in which the child used the strategy out of the total number of completed intervals. Table 2 indicates that children in both groups were most likely to engage in active distraction, followed by passive waiting, focusing on the delay object, and information gathering. Independent samples *t*-tests revealed that there were no gender or race differences in strategy use, however, expected developmental differences emerged, with older children more likely to engage in active distraction than younger children ($t = -2.13, p < .05$) and less likely to focus on the delay object than younger children ($t = 2.64, p < .05$).

Relationships between Maternal Depression, Child Gender, and Child Emotion Regulation

As shown in Table 2, there were no group differences in active distraction, passive waiting, or information gathering; however, COD children were more likely to focus on the delay object or task than NCOD children. There were no main effects for gender on strategy use. We analyzed interactions between gender and maternal depression using generalized estimating equations (GEE) with family membership as the clustering variable. GEE is a statistical approach based on regression techniques that is used to investigate correlated data, such as data from siblings. GEE models were fit to the responses using an exchangeable working correlation matrix to obtain estimates of the familial correlation and residual variability. Thus, in cases where siblings participated, potential biases created by treating all the subjects as independent are addressed. As shown in Table 2, variability of the responses was comparable within the COD

and control groups. Emotion regulation strategies were scaled as zero to one (quasi-binomial) response variables.

Separate models were tested using mothers' diagnostic category and number of depressive episodes. Table 3 presents the results of both models in predicting each of the emotion regulation strategies. As shown in Table 3, there were significant interactions between maternal diagnostic group and child gender in predicting use of active distraction and passive waiting. These models were also run excluding the eight offspring of mothers with bipolar spectrum disorders, and the same pattern of results emerged. Maternal diagnosis was predictive of daughters' use of active distraction (coefficient = 1.16; $t = 5.70$, $p < .05$, Cohen's $d = .87$) and passive waiting (coefficient = $-.95$; $t = 3.87$, $p < .05$, Cohen's $d = .62$), with COD daughters using less distraction ($M = .59$ vs. $.83$) and more passive waiting ($M = .30$ vs. $.15$) than NCOD daughters. However, for boys, maternal diagnosis was not predictive of active distraction (coefficient = $-.27$; $t = .45$, $p = .15$, Cohen's $d = .21$) or passive waiting (coefficient = $.70$; $t = 2.09$, $p = .15$, Cohen's $d = .44$). There were no interactions in predicting children's use of information gathering or focus on delay.

As shown in Table 3, results for models using number of maternal depressive episodes parallel those for maternal diagnostic category¹. Again, these results were replicated excluding the eight offspring of mothers with bipolar spectrum disorders. There was a significant interaction between number of episodes and child gender in predicting active distraction and passive waiting. As shown in Figures 1 and 2, follow-up analyses revealed that maternal depressive episodes were negatively associated with daughters' use of active distraction (coefficient = $-.45$; $t = 7.33$, $p < .01$, Cohen's $f^2 = .31$) and positively associated with use of passive waiting (coefficient = $.51$; $t = 12.80$, $p < .001$, Cohen's $f^2 = .30$). But for sons, number of

maternal episodes was not predictive of active distraction (coefficient = .03; $t = .07$, $p = .79$, Cohen's $f^2 = .00$) or passive waiting (coefficient = $-.17$; $t = 1.09$, $p = .30$, Cohen's $f^2 = .03$). There were no interactions in predicting children's use of information gathering or focus on delay.

Discussion

The results of this study suggest that offspring of childhood-onset depressed mothers, especially daughters, show early impairments in cognitive and behavioral domains of emotion regulation. Specifically, these daughters engage in more passive and less active strategies for regulating emotion relative to daughters of NCOD mothers during a laboratory delay task. The most common strategy employed by children during this task was to distract themselves from the delay by refocusing their attention. In contrast, daughters of COD mothers were less likely to engage in active distraction and more likely to wait passively for the delayed cookie or toy. The present study also revealed that, regardless of gender, children of COD mothers were more likely than children of NCOD mothers to focus on the delayed toy or cookie, although this effect was attenuated when the interaction between child gender and maternal depression was included in the model. These findings are consistent with the work of Garber et al. (1991) who reported deficits in the emotion regulation strategies nominated by preadolescent and adolescent children of depressed mothers. However, the present study replicates this finding using observational methodology and extends it to a younger sample.

This pattern of emotion regulation among children of depressed mothers is potentially problematic for several reasons. Growing evidence suggests that the use of passive styles of regulating emotion, such as passive waiting or sustained focus on the source of distress, are ineffective in down-regulating negative affect and are associated with increased risk for adjustment problems (Garber et al., 1991, 1995; Silk et al., 2003). The use of active attentional

strategies for regulating emotion, such as active distraction, appears to be more effective in down-regulating negative affect (Buss & Goldsmith, 1998; Grolnick et al., 1996). The present findings suggest that children of depressed parents may have difficulty disengaging attention from a distressing stimulus and may be less flexible in their ability to shift and refocus their attention. These regulatory difficulties may represent a potential diathesis toward depression that can be activated by stressors later in childhood or adolescence.

The present findings are consistent with other research and theory suggesting that children of depressed parents develop difficulties regulating their emotions that in turn, place them at risk for psychopathology (Field, 1994; Tronick & Gianino, 1986). These difficulties in ER likely develop as a result of exposure to several inter-related risk factors, such as chronic stress (Hammen et al., 1987), marital conflict (Gotlib & Whiffen, 1989), and inherited or acquired biological vulnerabilities to dysregulated emotion (Dawson et al., 2001). Furthermore, depressed parents exhibit affective and interpersonal deficits associated with depression (Downey & Coyne, 1990; Goodman & Gotlib, 1999) and limitations in their own emotion regulation skills (e.g. Gross & Munoz, 1995). These limitations have the potential to disrupt mechanisms for socializing emotion regulation in families with depressed parents. For example, depressed mothers may offer less direct teaching about emotion management, may model the use of ineffective strategies, or may respond to children's emotions more negatively or passively.

Consistent with a growing body of research (e.g., Dickstein et al., 1998), findings suggest that recurrence of depression in mothers may affect children's emotion regulation. In the present study, children of COD mothers who had experienced a greater number of depressive episodes were more likely to wait passively for the toy or cookie and less likely to engage in active distraction than children of mothers with fewer or no episodes. Number of maternal depressive

episodes is likely to reflect the frequency and extent of disruption in the affective quality of the parent-child relationship.

Differences in emotion regulation among children of COD and NCOD mothers emerged primarily for daughters, suggesting that maternal depression is more strongly related to emotion regulation for girls than for boys. This finding is consistent with a limited body of research suggesting that maternal depression conveys greater risk for the development of depression among daughters as opposed to sons (Davies & Windle, 1997; Sheeber et al., 2002). There are several potential explanations for this gender difference. First, a number of studies among normative populations suggest that parents may encourage different modes of expressing and regulating negative emotions for girls and boys (see Eisenberg et al., 1998 for a review). Particularly relevant to the present findings are several studies suggesting that parents facilitate more active and independent strategies for regulating emotions among boys than among girls (Eisenberg et al., 1998; Grolnick, Kurowski, McMenemy, Rivkin, & Bridges, 1998). This difference is part of a larger proposed pattern of differential parental reinforcement of gender-typic behavior that reinforces instrumental behavior for boys and relationship-oriented behavior for girls (Block, 1983; Hops, 1995; Keenan & Shaw, 1997). Relatedly, daughters of depressed mothers may be more likely to model parents' depressive styles of regulating emotion than sons. Girls are often encouraged to adopt more relationship-oriented and interpersonal styles of regulating emotion (e.g. Nolen-Hoeksema & Girgus, 1994; Sheeber, Davis, & Hops, 2002), and thus may rely more on mothers for assistance in managing their emotions. They may also be more likely to model maternal ER styles because they are the same gender.

In the present study neither gender nor maternal depression alone was strongly predictive of children's emotion regulation; however, an interaction between the two was evident. This

finding highlights the importance of considering multiple risk factors and contexts in studying children's risk for depression. We believe that other domains of emotion regulation, such as psychophysiological and genetic vulnerabilities to dysregulated emotion, also interact with maternal depression to exacerbate children's risk for psychopathology (Forbes et al., in press). Multidisciplinary research examining interacting domains of emotion regulatory processes is needed to address these questions. Furthermore, child factors beyond gender, such as children's temperament or psychological functioning, may also play a role in children's emotion regulation and in eliciting different types of parental socialization (e.g. Eisenberg, 1994; Hammen, Burge, & Stansbury, 1990). Given that children of depressed parents are likely to have higher levels of psychopathology than children of nondepressed mothers, it will be important for future studies to assess how children's level of symptomatology plays a role in the development of strategies for managing emotion.

There were several limitations in the present study. First, the assessment of emotion regulation was based on a brief time sample and was limited to only five potential strategies. Ideally, observational research on emotion regulation should assess children's behavior in multiple contexts over larger periods of time, including both baseline and recovery periods. Second, given the cross-sectional nature of the data, we were unable to address the directionality of the effects observed or to link children's emotion regulation to long-term outcomes. We are currently collecting follow-up data on the participants in this study that will allow us to address these questions. The relatively wide age range of the children included and the fact that the task presented to the children varied slightly across age groups are also limitations.

The study also raises issues specific to laboratory research on emotion regulation. Although the delay task was successful in eliciting higher levels of negative affect than other

neutral tasks administered during the study protocol, most children still showed relatively low levels of sadness and anger. Ethical demands challenge researchers to design tasks that elicit mild negative affect but do not place children under undue distress. The delay task appears reasonably successful in meeting this challenge, and elicits levels of negative affect comparable to levels reported in other observational studies of young children's emotion regulation (e.g. Cole, Zahn-Waxler, & Smith, 1994; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003).

However, it is important to bear in mind that children's emotion regulation strategies may differ under more highly emotional contexts. Future research conducted outside of the laboratory, using naturalistic observation or experience sampling methods, may help to address this issue.

A related issue is the difficulty in disentangling emotional reactivity and emotion regulation. Using observational methods, it is difficult to infer whether an expression of negative affect is reflective of a child's emotional reactivity or his or her facility at regulating the elicited emotion (see Cole, Martin, & Dennis, 2004 for a discussion of this issue). In this study, we have presumed that a child who has difficulty deploying attention away from a distressing stimulus (e.g. the desired cookie) is displaying difficulties regulating emotion. However, this child could also be viewed as more emotionally reactive to the mood induction. Although this is a very complex problem to address, future research employing multiple measurement approaches to emotional reactivity and regulation, including observational and psychophysiological methods, is needed to make strides in this direction.

Despite these limitations, this study has several notable strengths. Unlike most previous research on coping and ER strategies, this study utilizes observational data collected during a laboratory mood-induction paradigm. Our study is also one of the first to address the deployment of emotion regulatory strategies among young offspring of a carefully delineated clinical sample

of depressed mothers. The results of the present study suggest that children's use of adaptive emotion regulation strategies may be compromised by maternal depression. Future research is needed to evaluate whether emotion regulation may be a candidate mechanism by which vulnerability to depression and other forms of psychopathology are transmitted from parents to children. If the present findings are supported in prospective longitudinal research, they may have important implications for developing prevention and intervention programs for children of depressed parents.

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Footnotes

¹ These models were also tested within the COD group only. The pattern of findings remained the same, with the relationship between number of episodes and ER strategies stronger among girls ($r = .50, p < .05$ for passive waiting; $r = -.34, p = .16$ for distraction), but relatively weak among boys ($r = .09, p = .63$ for passive waiting; $r = -.11, p = .54$ for distraction). However, due to a reduction in sample size for these analyses ($N = 49$), the formal tests of these interaction effects failed to reach statistical significance.

Table 1

Demographic Characteristics of Participants

	NCOD	COD	t/χ^2
Mother's Age			
<i>M</i>	30.90	27.10	3.69***
<i>SD</i>	5.24	3.04	
Mother's Marital Status			
Married (Legal)	20	11	5.71
Married (Common-Law)	6	9	
Divorced/Separated	4	3	
Widowed	1	0	
Single	6	11	
Mother's Education			
< 12 th grade	3	4	3.75
HS grad/GED	11	16	
Some college	20	11	
College grad	3	3	
Mother's Race			
Euro American	24	25	4.21
Afro American	10	9	
Asian	1	0	
Biracial	1	0	
Other	1	0	
Mother's BDI Score			
<i>M</i>	4.27	10.39	-3.24**
<i>SD</i>	4.11	9.92	
Child's Age			
<i>M</i>	4.92	4.56	1.29
<i>SD</i>	1.41	.86	

* $p < .05$; ** $p < .01$; *** $p < .001$.

N=37 NCOD mothers and 34 COD mothers; 37 NCOD children and 49 COD children.

Table 2

Mean Scores (Proportions) and Standard Deviations for Child Emotion Regulation Strategies

	Min	Max	NCOD (N=37)		COD (N=49)		<i>t</i>
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Active Distraction	.00	1.00	.76	.28	.69	.28	1.05
Passive Waiting	.00	1.00	.21	.27	.20	.26	.09
Information Gathering	.00	.29	.04	.06	.04	.06	.54
Focus on Delay Object	.00	.67	.09	.13	.17	.17	-2.16*

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3

Quasi-Binomial Generalized Estimating Equation Models for Child Emotion Regulation Strategies with Family as Clustering Variable

Predictive Model	Distraction		Passive Waiting		Focus on Delay		Information Gathering		
	Coefficient (SE)	T	Coefficient (SE)	T	Coefficient (SE)	T	Coefficient (SE)	T	
<i>Model 1:</i>									
Child Gender	-.49 (.32)	2.41	.81 (.37)	4.81*	-.26 (.45)	.34	-.05 (.52)	.01	
Diagnostic Group	-1.36 (.87)	2.45	2.12 (1.02)	4.29*	-1.39 (.86)	2.59	.10 (1.08)	.01	
Child Gender X Dx Group	1.23 (.57)	4.66*	-1.51 (.63)	5.82*	.51 (.68)	.57	-.01 (.67)	.00	
<i>Model 2:</i>									
Child Gender	-1.62 (.74)	4.80*	2.24 (.77)	8.48**	-.12 (.84)	.02	-.71 (.97)	.53	
Number of Depressive Episodes	-.46 (.29)	2.62	.74 (.35)	4.62*	-.21 (.27)	.58	-.24 (.37)	.41	
Child Gender X Num Episodes	.45 (.20)	5.26*	-.59 (.21)	7.75**	.03 (.21)	.02	.16 (.23)	.52	

N = 86; * $p < .05$; ** $p < .01$; *** $p < .001$. Dx group = Diagnostic group; Num Episodes = Number of Depressive Episodes.

Figure Captions

Figure 1. The relation (slope) between number of maternal lifetime depressive episodes and child's use of active distraction by child gender.

Figure 2. The relation (slope) between number of maternal lifetime depressive episodes and child's use of passive waiting by child gender.

Figure 1.

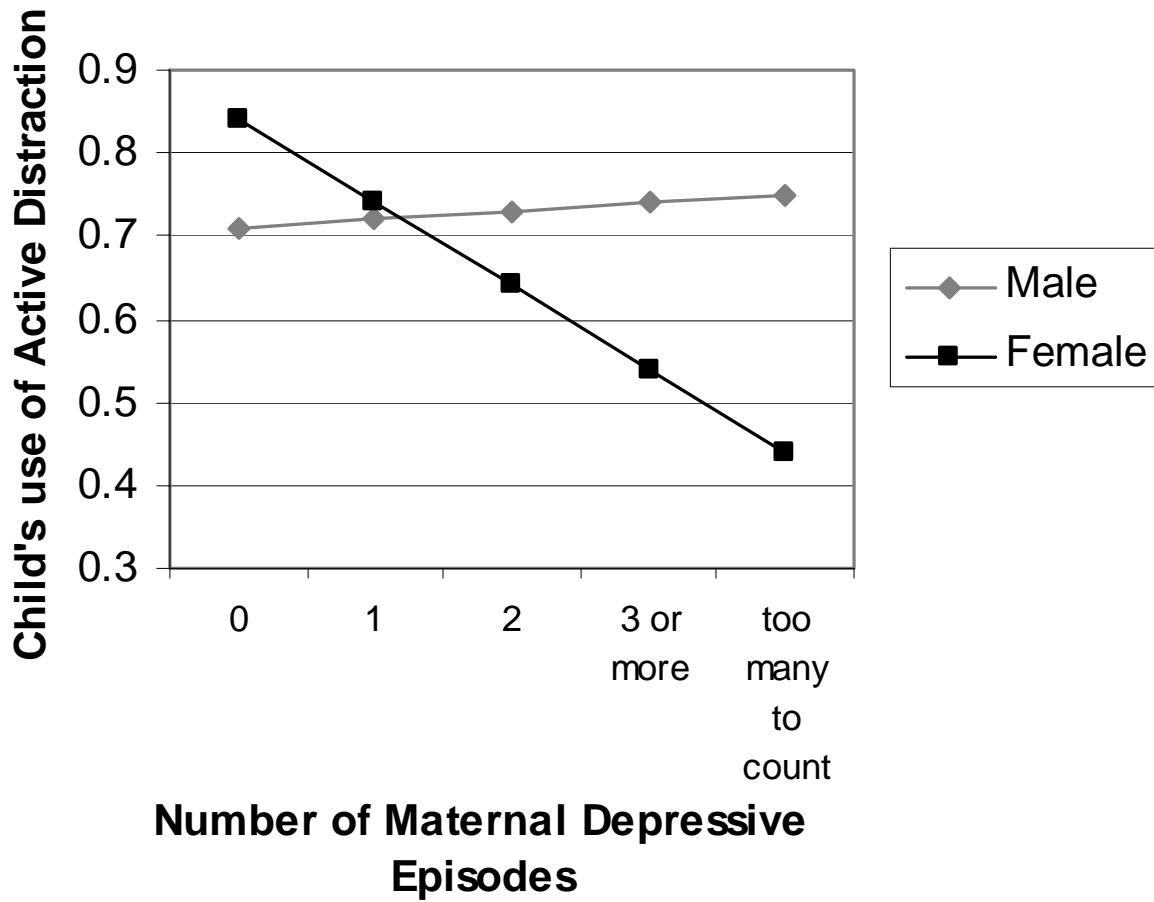


Figure 2.

