INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI

A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor MI 48106-1346 USA
313/761-4700 800/521-0600

Maternal Depression and the Nature of Mother-Toddler Interaction:
Infant Bids for Engagement and Maternal Responsiveness

by

Joanna F. Self

A dissertation submitted in partial fulfillment
of the requirements of the degree of

Doctor of Philosophy

University of Washington

1998

Approved by _____
(Chairperson of the Supervisory Committee)

Program Authorized to Offer Degree Psychology

Date October 19th 1998

In presenting this dissertation in partial fulfillment of the requirements of the Doctoral degree at the University of Washington, I agree that the library shall make its copies freely available for inspection. I further agree that extensive copying of this dissertation is allowable only for scholarly purposes, consistent with the "fair use" as prescribed in the U.S. Copyright Law. Requests for copying or reproduction of this dissertation may be referred to University Microfilms, 1490 Eisenhower Place, P.O. Box 975, Ann Arbor, MI 48106, to whom the author has granted "the right to reproduce and sell (a) copies of the manuscript in microform and/or (b) printed copies of the manuscript made from microform."

Signature Joanna F. Sieff

Date Oct. 19th 1998

University of Washington

Abstract

Maternal Depression and the Nature of Mother-Toddler Interaction:
Infant Bids for Engagement and Maternal Responsiveness

by Joanna F. Self

Chairperson of the Supervisory Committee: Professor Geraldine Dawson
Department of Psychology

Research indicates that children of depressed parents are at heightened risk for emotional and behavioral difficulties, especially affective disorders. However, the processes by which such psychopathology develops are not well understood. Hypotheses include transmission of genetic vulnerability, prenatal effects, and the parenting behavior of depressed parents. While research has investigated behavioral interaction between depressed mothers and young infants (0-6 mos.), little is known regarding interaction between depressed mothers and toddler-aged children. The focus of the current investigation was to characterize the behavior of depressed mothers and toddlers, in a context in which important aspects of their relationship would be drawn out. Mothers and infants engaged in a divided attention task with mothers completing an open-ended questionnaire about their adjustment to the birth of their child, while monitoring their toddler's play. The divided attention paradigm diminished ongoing interaction, highlighting the process by which toddlers gained their mother's attention, as well as mother's responses. The sample was comprised of 142 primarily Caucasian, middle class mothers and their 14-15 month olds. A coding system was developed, and videotaped recordings of the interactions were reliably coded. The main effects of depression to emerge were generally consistent with prior research indicating depressed mothers and children are more negative in interaction with each other, with depressed mothers expressing more negative affect, intrusiveness, and disengaging responses, and toddlers expressing more negative affect. In addition, a distinct pattern emerged indicating severity and chronicity of maternal depression to be associated with different patterns of

responsiveness and emotional expression between mothers and daughters versus sons. The greater the mother's depression, the more responsive she became to daughters, and the more aggression daughters exhibited. In contrast, the greater the mother's depression, the less responsive she became to sons, the more negative feedback she expressed, and the less aggression sons exhibited. These findings suggest daughters and sons are at differential risk with respect to the behavioral manifestations of their mother's depression. This study provides insight regarding patterns of interaction between depressed mothers and toddlers, and provides clues regarding behavioral processes involved in the inter-generational transmission of depression.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

I wish to thank my advisor, Dr. Geraldine Dawson, providing me with the opportunity to study maternal depression, and for her guidance and encouragement along the way. I also wish express my gratitude to my committee members Drs. Karin Frey, Ana Mari Cauce, Liliana Lengua, Phil Dale, and Lewayne Gilchrist for their time, effort, and suggestions reviewing this manuscript. In particular, I would like to acknowledge Dr. Karin Frey with whom I had the good fortune to work closely and learn much about observational coding.

I am also grateful to the Department of Psychology for the departmental dissertation award that helped fund this study. This project was further supported by a grant to Dr. Dawson from the National Institute of Mental Health (No. MH47117).

I would like to express my gratitude to Charlene Forslund and Laura Citron who worked with me to develop the coding system employed in the present study, and who diligently coded the data. I couldn't have worked with more insightful, conscientious, or personable individuals.

My brother, Matthew Self, deserves special thanks for his role in creating a computer program to extract the relevant dimensions from the raw coded data. It was a pleasure to work with my brother. Although we have been compared for our differences, working together, as adults, on an intellectually challenging project, I came to realized how similar we are. I especially appreciated Matthew's keen insight, excellent programming skills, and patience with his sister.

I would like to express my gratitude to Drs. John Miyamoto and Jeff Munson who served critical roles as statistical consultants. In particular, I am indebted to John who went above and beyond the call of duty with his generous time and expertise.

In addition, I would like to acknowledge several individuals who have played important roles in my personal life during graduate school. First, I would like to express my appreciation of my parents, Sidney and Beryl Self, for raising me in an environment

that valued education, and for supporting my pursuit of a Ph.D. I would also like to acknowledge my labmates Dave Hessl and Emily Yamada whose friendship and camaraderie has enriched my graduate school experience. My heartfelt appreciation goes to Beth Cook, Amy Wagner, and John Bishop for providing me with a 'graduate school family.' Their presence, support, and friendship has been invaluable during the past nine years. Finally, I would like acknowledge Lynn Franco for inspiring me to go into the field of psychology, and for helping me believe I was capable of doing so.

Background and Significance

Depression is a prevalent condition. At any given time approximately 8% of mothers suffer from clinical depression (Weissman, et al., 1987), with this percentage increasing to 12% among women who have recently given birth (O'Hara, 1986). Such estimates confirm that a significant number of children will be raised by mothers experiencing depression. Consequently, it is important to understand the effect maternal depression has on parenting behavior and on the parent-child relationship.

Parental Depression and Child Adjustment

The majority of research addressing the functioning of children of affectively ill parents investigates the adjustment of school-aged children and adolescents. These studies vary widely on significant dimensions. Across studies, however, it emerges that children of depressed parents are at increased risk for a range of problems (Downey & Coyne, 1990). Such studies employ two broad categories of child outcome measures, dimensional measures of adjustment, and assessment of childhood disorders. On dimensional measures of adjustment, school-aged children of depressed parents evidence higher levels of both internalizing and externalizing symptoms than comparison children of nondepressed parents (Downey & Coyne, 1990). These findings hold across teacher (Lee & Gotlib, 1989a, 1989b; Richters & Pellegrini, 1989), parent (Billings & Moos, 1983; Breslau et al., 1988; Lee & Gotlib, 1989a, 1989b; Richters & Pellegrini, 1989) and child reports (Breslau et al., 1988; Hirsch et al., 1985). Other indicators of maladjustment in school-aged children include higher incidence of treatment for psychiatric disturbance (Hammen, et al., 1978b; Klein et al., 1988; Klein et al., 1985; Orvaschel et al., 1988; Weissman, 1988), higher levels of functional impairment (Beardslee et al., 1987; Klein et al., 1988, Lee & Gotlib, 1989a; Weissman et al. 1987), and higher proportions of children scoring in the clinical range on symptom checklists (Lee & Gotlib, 1989a). In addition,

these children show deficits in social (Hammen, et al., 1987b; Richters & Pellegrini, 1989) and academic (Billings & Moos, 1983; Hammon, et al. 1987b; Weissman, et al., 1987) competence independent of intellectual ability. Further, it has been reported that children of depressed parents are not as physically healthy as children of control parents (Billings & Moos, 1983; Weissman, et al., 1987)

Although fewer investigations have addressed the adjustment of younger, preschool-age children and infants, the findings of studies that have addressed functioning in younger children suggest that these children also have adjustment difficulties. Early studies employing children of depressed parents as comparison groups in studies of schizophrenia found that preschool-aged children with a depressed parent were more impaired than control children of healthy parents (Downey & Coyne, 1990).

When categorical measures of child outcome were employed, children, adolescents, and young adults of depressed parents were found to be more likely to receive a clinical diagnosis than offspring of healthy controls (Downey & Coyne, 1990). Interestingly, affective disorders were the only diagnoses that children of depressed parents received significantly more often than controls. In fact, the rate of any affective disorder was found to be three times higher in children of unipolar depressed parents than in control children. However, they were found to be at particularly high risk for major depressive disorder with a six fold increase over children of nondepressed control parents (Downey & Coyne, 1990). In addition, although there were no consistent differences across studies between children of depressed and control parents in the prevalence of specific nonaffective disorders, children of depressed parents were, nonetheless, more likely to receive a diagnosis of a nonaffective disorder than offspring of controls (Downey & Coyne, 1990). For example, in some investigations, children of depressed parents evidenced significantly higher rates of conduct disorder (Beardslee et al., 1987; Hammen

et al., 1987b; Klein et al., 1988), higher rates of attention deficit disorder (Orvaschel et al., 1988), and higher rates of substance abuse (Beardslee et al., 1987; Hammen, et al. 1987b; Weissman, 1988). It has also been reported that children of depressed parents are more likely to receive multiple diagnoses than children of healthy parents (Decina et al., 1983, Klein et al., 1988, Orvashel et al., 1988, Weissman et al., 1987).

Issue of specificity. Although evidence suggests that children of depressed parents are at risk for a wide range of problems, it is not entirely clear that children's difficulties are specific to their parents' depression. Indeed, the limited evidence to date suggests that specificity may vary depending on the type of child outcome measure employed (Downey & Coyne, 1990). For instance, three studies employing dimensional measures of child adjustment, as well as a nondepressed psychiatric or medically ill comparison group, found that children of depressed parents were indistinguishable from the children of parents in these high-risk comparison groups (Hammen et al., 1987; Hirsch et al., 1985; Lee & Gotlib, 1989). These findings raise the possibility that adjustment problems in the children of depressed parents may be the result of other factors associated with having a psychiatrically or medically ill parent. Such factors may include aspects of parental psychological functioning other than depression, the availability of the parent, or the parent's interpersonal/social context. In contrast, two studies that assessed child diagnostic status, and which included a psychiatric or medically ill comparison group, found significantly higher rates of affective disorders in children of depressed parents than in offspring of the high-risk comparison groups (Hammen et al., 1987; Klein et al., 1988). Thus, with respect to diagnoses, the data to date suggest that children of depressed parents are at heightened and specific risk for affective disorders.

Explanatory Hypotheses

Several explanatory hypotheses have been proposed to account for the association between parental depression and children's adjustment and risk for affective disorders. One hypothesis proposes that the association between maternal depression and child maladjustment has a genetic basis and is associated with genetically-mediated biological vulnerabilities. Another hypothesis, and the one that has received the most attention, asserts that child problems are the direct result of exposure to a depressed parent, specifically to the depressed individual's parenting behavior. A third hypothesis suggests that the parent's level of psychological functioning, other than impairment specifically due to depression, such as impairment due to a personality disorder, alcohol or drug use, or chronic distress accounts for children's maladjustment. A fourth hypothesis holds that the relation between parental depression and children's adjustment is primarily the result of other adverse social phenomena such as marital conflict, a lack of social support, or stressful life circumstances. Although it is heuristically helpful to isolate these hypotheses, it is probable that aspects of all four explanations contribute to the association between parental depression and children's adjustment.

The notion that children's maladjustment is related directly to poor or suboptimal parenting behavior is appealing given knowledge about the symptoms of depression. Depressed individuals are known to be at risk for exhibiting decreased levels of positive affect, increased levels of negative affect (specifically, sadness, anxiety, irritability, and hostility), lower levels of energy, withdrawn behavior, and difficulty thinking or concentrating (DSM-IV, 1994). Such symptoms suggest that children of depressed parents are not only likely to have parents who are generally less positive and more negative, but are also likely to have parents who are less able to be attentive to their needs,

less emotionally available, less responsive, and less able to provide optimal structure and stimulation for their children.

In order to evaluate the hypothesis that the maladjustment of children of depressed parents is the result of exposure to the parent's behavior, researchers have begun investigating the behavioral interaction of depressed parents and their children. The majority of research in this area has focused on the interaction of mothers and young infants (0 - 6 mos.). Such studies have found depressed mothers and infants to share fewer positive emotional states, as well as an increased matching of negative emotional states (Field et al., 1990). In addition, depressed mothers have been found to respond less contingently to their infants, and to provide less optimal levels of stimulation (Cohn & Tronick, 1989; Cohn et al., 1986; Field et al., 1990; Field et al., 1985, 1988). Further, these studies found that infants of depressed mothers expressed less positive affect, are fussier, less attentive, and less active (Field, 1986; Field et al., 1985, 1988, 1990).

Only a limited number of studies (n = 10) have examined the parenting behavior of depressed mothers in interaction with older, toddler-aged infants (12-30 months). Although these studies vary widely on significant dimensions, results are generally consistent with findings regarding mothers and younger infants. These findings are reviewed below.

Interaction Between Depressed Mothers and Toddlers

Depressed mothers of toddlers have been found to use a less positive tone with their infants (Cox et al., 1987), and to express more negative emotion including more downcast expressions, anxiety, (Radke-Yarrow et al., 1993), and covert hostility (Lyons-Ruth et al., 1986). In contrast to control mothers, depressed mothers were less likely to promote social behavior with a peer in response to their toddler's physical aggression (Zahn-Waxler et al., 1990). Further, these mothers have been found to be less responsive

and less engaged with their toddlers (Cox et al., 1987). They tended to be less likely to pick up on and follow toddler cues, more likely to ignore their toddlers (particularly low intensity requests), and engaged in shorter bouts of interaction with their toddlers (Cox et al., 1987). Further, depressed mothers were found to have less rapport with their toddlers, and to facilitate toddler play less (Stein et al., 1991).

Like their mothers and younger infants, toddlers of depressed mothers were generally found to be less positive, more negative, less responsive, and less engaged. They demonstrated less affective sharing (Stein et al., 1991) and expressed more negative affect (Radke-Yarrow et al., 1993). In addition, they expressed more distress, and when they approached their mothers, the interaction was more likely to turn into a 'distress sequence' (Cox et al., 1987). Further, toddlers of depressed mothers were less likely to pick up on and follow maternal cues (Cox et al., 1987). One study examining aggression found toddlers of depressed mothers to show more physical aggression during interaction with a peer (Zahn-Waxler et al., 1990).

One recent study, examined Tronick's notion of 'interactive coordination,' defined as, participants achieving a joint focus of attention on a mutual goal over the majority of an interaction period (Tronick, 1986). In this study, Jameson et al. (1997) found that depressed mothers were less skillful at maintaining coordinated interaction with toddlers. Interactions were less prolonged, less well integrated, less synchronous, and punctuated by withdrawal into separate activities. Toddlers were less likely to maintain interactions with their depressed mothers, and mothers less frequently adjusted their own goals to match a shift in their child's activity. The depressed dyads in this study engaged in less interactive coordination because toddlers were more likely to shift their focus, and mothers were less likely to attempt to reengage their child.

Although only two studies have examined the physical relationship between depressed mothers and their toddlers, the results are intriguing. Cox et al. (1987) found that depressed mothers and their toddlers engaged in more physical play and affection. Similarly, Radke-Yarrow et al. (1993) found that mothers with more chronic depression showed more tender affection to their sons than mothers with less chronic depression. Some researchers have suggested that depressed mothers may encourage physical contact with their children as a source of comfort. In addition, toddlers may find unresponsive mothers less likely to ignore them, and possibly to respond more positively when they approach them physically. While studies generally find depressed mothers and toddlers to be less engaged, the above results suggest this may not be the case when it comes to physical engagement.

Severity and chronicity of maternal depression. Two of the studies addressing maternal depression and mother-toddler behavioral interaction found significant differences in behavior were associated with the severity and/or chronicity of the mother's depression. For example, one study found that more severely depressed mothers exhibited more total negative affect, as well as more downcast behavior and anxiety than less severely depressed mothers (Radke-Yarrow et al., 1993). With respect to toddler behavior, another study found that the greater the chronicity of the mother's depression, the greater the number of negative responses given by the toddler (Stein et al., 1991).

Child gender. To date, only one study has found significant differences in maternal and toddler behavior associated with the toddler's gender. Radke-Yarrow et al. (1993) found that depressed mothers of daughters evidenced more 'downcast behavior' than control mothers of daughters. In addition, the bouts of negative affect of mothers with more severe depression were associated with their daughter's negative affect, but not their son's. These findings raise the possibility that daughters of depressed mothers are at risk

for being exposed to higher levels of maternal negative affect than sons. In addition, it is possible that mothers and their young daughters may be more affectively responsive to each other when negative affect is expressed. With respect to toddler behavior, the same study found no differences in the total amount of negative affect expressed by boys and girls; however, girls expressed more anxiety, and boys more irritability regardless of maternal depression status.

In summary, although research on the behavioral interaction of depressed mothers and toddlers is limited, and not all investigations have found differences on dimensions of interest, across the studies reviewed, depressed mothers of toddlers have generally been found to be less positive, more negative, less responsive, less engaged, less sensitive, and less able to provide positive structure to toddlers than healthy comparison mothers. Similarly, across studies, the toddlers of depressed mothers have been found to be less positive, more negative, less responsive, and less engaged than the toddlers of nondepressed mothers, with one exception. Dawson et al. (1992) found toddlers of depressed mothers to express less distress during a maternal separation. It is possible that the uniqueness of this finding may be related to the particular nature of the mother-toddler interaction, a separation. Further, although few studies to date have evaluated dimensions such as the severity and chronicity of maternal depression, or the role the child's gender may play, the heterogeneity of depressive disorders, as well as the above reported findings, suggest the value of doing so.

Need for Further Research

Although research on patterns of interaction between depressed mothers and their young children has made progress in recent years, and is developing in sophistication, there remains a need for additional thoughtful and careful investigation. The present study

addressed four issues in an attempt to shed new understanding on the relationships of depressed mothers and young children.

Toddler bids for engagement and maternal responsiveness. First, the present investigation focused on the nature of bids that toddlers make to engage their mothers and the nature of the mothers' responsiveness. Attachment theory asserts that maternal emotional availability and positive responsiveness to infants during the first year of life are crucial to providing the infant with a secure base from which to continue healthy emotional development. The process by which infants make bids for their mothers' attention, and their mothers' responses to those bids are especially relevant during the early toddler period (12 - 18 months). At this time children have recently learned to walk, significantly increasing their mobility. This enables them to venture greater distances from their mother and to explore novel aspects of their environment. During this period of newfound freedom and independence, and as they explore new territory, toddlers need to 'check in' with their mothers from a distance, return to her for 'emotional refueling,' and share new discoveries with her. Thus, the process by which mothers and toddlers become engaged, including the bids toddlers make for their mothers' attention, and their mothers' responsiveness, is particularly salient during this developmental period. As such, it is notable that only two studies to date have addressed the nature of how depressed mothers and toddlers become engaged and respond to each other. The work of Cox and colleagues (1987), described above, investigated toddlers attempts to solicit their mothers' attention (bids), and their mothers' responsiveness to these overtures, in depressed, working class, British mothers and their 2-year-old children. Jameson and colleagues (1997), also described above, evaluated the 'interactive coordination' of depressed mothers and toddlers during a semi-structured play activity.

The divided attention task. The second issue addressed by the present investigation pertains to limitations of the observational situations that have typically been employed. In fact, the lack of research focus on the process of how mothers and toddlers become engaged and respond to each other may be due in part to the greater challenge of evaluating the relevant behaviors in children beyond early infancy. The face-to-face paradigm, frequently employed in studies with young infants, as well as the young infants' more limited behavioral repertoire (including an inability to attend for long periods) facilitates evaluation of engagement/disengagement and contingent responding. These factors simplify the interaction, and provide variability in patterns of mother-infant engagement. In contrast, the majority of studies with toddler-aged children have employed brief semi-structured play interactions or more naturalistic observational situations. Neither of these observational situations is ideal for investigating how mothers and toddlers become engaged, or respond to one another. In brief semi-structured play situations mothers and older infants (who have more complex behavioral repertoires) may remain engaged for substantial portions of interactions, thus minimizing opportunities to observe the process of mothers and toddlers becoming engaged. Thus, any evaluation of toddler bids for engagement or maternal responsiveness must be carried out in the context of more complex behavior and ongoing engagement. Naturalistic situations allow for more variability in whether mothers and toddlers are engaged or disengaged; however, the uncontrolled nature of the interaction makes evaluation challenging. For example, lengthy periods of observation may be necessary in order to adequately sample the behaviors of interest.

In the current investigation, a specific type of observational situation, a divided attention task, was employed to encourage toddlers to seek mothers' attention and to provide opportunities for mothers to respond. To date, few studies evaluating the

interactions between depressed mothers and their toddlers have employed such a task. A divided attention task is not only ecologically valid, but facilitates the investigation of toddler bids for engagement and maternal responsiveness.

Many mothers in our demanding, fast paced culture spend significant portions of time with their attention divided between their infant and other tasks. In this respect, a divided attention task creates mild stress comparable to that encountered in everyday life. For example, recall the last time you had a telephone conversation with the mother of a young child when the child was present! Indeed, one could argue that a divided attention task may be more representative of typical mother-infant interaction than a one-on-one semi-structured play task.

In addition, the fact that a divided attention task requires mothers to attend simultaneously to a task not involving her child, while also monitoring and attending to the needs of her child has several advantages. First, it simplifies the interaction by reducing the amount of ongoing engagement between the mother and child, thus, highlighting the process by which toddlers and mothers become engaged. Second, it facilitates evaluation of the mothers' contingent responsiveness. Does she respond to the child's bid for attention? How long does she take to respond? What type of bids is she responsive to? Third, as the mother's agenda is to attend to another activity, a divided attention task facilitates evaluation of her ability to 'check in' with her infant, and assist them in returning to independent play (scaffolding). Fourth, a divided attention task is of theoretical interest because depressed individuals are at risk for difficulty in thinking and concentrating, both of which involve, attentional processes. Such a task allows investigators to evaluate how depressed mothers negotiate the challenge of dividing their attention between their child and another task. Fifth, a divided attention task also facilitates evaluation of the toddler's contribution to the pattern of interaction. Many observational studies to date have

focused separately on maternal or child behavior, glossing over the transactional nature of the interaction. Finally, when a divided attention task is carried out in an unfamiliar location, at a time when toddlers may be over-stimulated, tired, or bored, they will be likely to want to 'check in' with their mother, creating a situation in which they will attempt to engage their otherwise occupied mothers. Thus, a divided attention task seemed an optimal context in which to evaluate behaviors related to important aspects of the mother and toddler's emotional relationship, as well as behaviors in which depressed mothers were likely to be impaired.

Assessment of depression. A third issue addressed by the present study concerned the assessment of the nature of maternal depression. The majority of studies to date have employed dimensional measures of depression as opposed to clinical diagnoses. Dimensional measures are advantageous in several ways. Foremost, as self-report measures, they provide a quick and easy way to evaluate the severity of depressive symptoms at a given point in time. The disadvantage of dimensional measures is that researchers do not know if subjects meet diagnostic criteria for depressive disorders. In contrast, diagnostic interview measures require trained personnel, and considerably more time to administer. In addition, subjects may find diagnostic interviews more invasive and burdensome. The main advantage of diagnostic measures are that they evaluate whether subjects meet criteria for clinically diagnosable disorders. Further, researchers obtain a more complete picture of the individual's depression status, and thus more confidence in the nature of the individual's depression. In addition, it is important to investigate the comparability of findings employing dimensional and diagnostic measures as this has implications for the generalizability of the findings.

Further, few studies to date have assessed the severity or chronicity of parental depression in relation to parent-child behavioral interaction. Downey and Coyne (1990)

note that, traditionally, it has been assumed that depression occurred as an isolated episode that typically resolved without residual impairment. Emerging conceptions of depression view it as a heterogeneous, episodic disorder, one that is recurrent, with a highly variable course, and varying degrees of residual impairment in functioning between episodes. Given this emerging conception of depression, evaluations of severity and chronicity are called for.

Gender differences. A final issue addressed in the current investigation was to explore the role the child's gender may play in the relations between maternal depression and mother and toddler behavior. While only one study to date (Radke-Yarrow et al., 1993) has found significant differences in the interaction between depressed mothers and young daughters versus sons, the findings suggested daughters and sons may be at differential risk with respect to their mother's depression.

Aims and Hypotheses

The broad aim of this investigation was to understand the relations between maternal depression and the behavioral interaction of mothers and toddlers. This was achieved by observing behaviors relevant to the mother-toddler emotional relationship: focusing on infants' bids for engagement and mothers' responsiveness. The use of a divided attention task facilitated investigation of these behaviors. In addition, both dimensional and diagnostic measures of depression, as well as measures of severity and chronicity of depression were included. Finally, the role of the toddler's gender was explored.

The specific aims of the study were as follows:

I. To compare depressed and nondepressed mothers with respect to the nature of their responsiveness to toddlers' bids for engagement. It was expected that

depressed mothers would demonstrate less optimal parenting behavior than nondepressed mothers. Specifically, it was predicted that:

a) Depressed mothers would ignore toddlers' bids for engagement more often than nondepressed mothers, particularly less intense bids.

b) Compared to nondepressed mothers, depressed mothers would be more likely to respond to versus ignore toddler bids, when toddlers were in proximity or physical contact than when they were at a distance.

c) Depressed mothers would have longer latencies to respond to toddler bids compared to nondepressed mothers, particularly less intense bids.

d) Depressed mothers' interaction style would be generally less effortful than nondepressed mothers; specifically, mothers would provide less scaffolding to encourage toddlers to engage in independent play.

e) Depressed mothers' neutral/positive responses would be of shorter duration than those of nondepressed mothers, particularly when interactions did not involve physical contact.

f) Depressed mothers' responses to toddlers would be more negative than the responses of nondepressed mothers.

g) Mothers experiencing more severe and/or chronic depression would demonstrate less optimal parenting per the above predictions.

Due to a lack of previous work in this area, no specific predictions regarding the relations between maternal behavior and toddler gender were made, however, exploratory analyses comparing daughters versus sons were performed.

II. To compare the behavior of toddlers of depressed and nondepressed mothers with respect to their efforts to engage their mothers.

It should be noted that several of the hypotheses listed below predicted that infants of depressed mothers would demonstrate behavioral differences compared to infants of nondepressed mothers, but did not specify the direction of the prediction. This is because there were sound theoretical rationales to expect either an increase or decrease in toddler behavior. For example, on the one hand, toddlers of depressed mothers may engage in more bidding during the 10 minute task in an effort to solicit responses from depressed mothers who are self-absorbed, and less responsive than nondepressed mothers. On the other hand, toddlers of depressed mothers may engage in less bidding because their efforts have not been rewarded in the past. While toddler behavior clearly exists in relation to maternal behavior, whether maternal depression would engender more or less of particular toddler behaviors was unclear.

Specifically, it was predicted that:

a) Compared to toddlers of nondepressed mothers, toddlers of depressed mothers would engage in either more or less bouts of bidding during the 10 minute task.

b) Compared to toddlers of nondepressed mothers, toddlers of depressed mothers would engage in more bids, and would escalate the intensity of those bids prior to receiving a response.

c) Toddlers of depressed mothers would seek and remain in proximity to mothers either more or less than toddlers of nondepressed mothers.

d) Toddlers of depressed mothers would engage in either more or less physical contact than toddlers of nondepressed mothers.

e) Toddlers of depressed mothers would generally engage in more negative bidding behaviors than toddlers of nondepressed mothers; specifically, they would engage in longer bouts of negative affect.

g) Toddlers of mothers experiencing more severe or chronic depression would demonstrate more extreme behaviors per the above predictions.

Finally, although no specific predictions were made with respect to differences in toddler behavior associated with the infant's gender, the role gender played was explored.

Method

The current investigation was carried out in conjunction with Dr. Geraldine Dawson's larger, longitudinal study exploring the effects of maternal depression on young children's physiological and social/emotional development. The observations of mother-toddler interaction to be used in the present study had already taken place and were stored on videotape. Aspects of the larger study relevant to the current investigation are described below.

Participants

Participants consisted of 142 mothers and their 14-15 month old toddlers. Mothers and infants were recruited from a variety of hospitals, community mental health clinics, and individual health providers, as well as from newspaper advertisements, and the University of Washington's, Psychology Department infant subject pool.

Exclusionary criteria. Mothers were excluded if they met criteria for a diagnosis of bipolar disorder, mania, or psychosis, or if they reported current suicidality. In addition, they were excluded if they reported a serious medical condition, significant pregnancy or birth complications with the target child, use of street drugs, other drug or alcohol abuse, contact by Child Protective Services, or attendance in special education classes.

Toddlers were excluded if they were born more than three weeks early or late, or weighed less than 5 lbs. at birth. In addition, they were excluded if they had a history of chronic seizures, CNS infection, head injury, prolonged hospitalization, surgery, physical malformations, sensory or motor problems, prenatal exposure to maternal drug use, foster care, and/or were taking medications.

Measures of Depression

Three measures of depression were employed in the present study reflecting different sources and types of information: 1) The Center for Epidemiological Studies -

Depression Scale (CES-D), (Radloff, 1977); 2) the Structured Clinical Interview for DSM-III-R (SCID), (Spitzer et al., 1989); and 3) the Longitudinal Interval Follow-up Evaluation (LIFE), (Keller et al., 1982). From these three measures, one grouping variable and two continuous measures evaluating depression were generated for use in the present investigation. A summary of these variables is presented in Table 1.

The CES-D, is a self-report measure in which individuals endorse the number and severity of depressive symptoms they have experienced in the past week. During

Table 1. Depression Variables

Variable	Definition
Depression severity level	
Nondepressed	Scores 8 or below on the initial and second CES-Ds. No depression on the SCID or LIFE.
Symptoms	Scores 16 or above on the initial CES-D, but does not meet criteria for subthreshold level or Major Depression on the SCID.
Subthreshold depression	Scores 16 or above on the initial CES-D, and meets criteria for Subthreshold Depression, Depression In Partial Remission, or Dysthymia on the SCID, but does not meet criteria for Major Depression or Double Depression.
Major depression	Scores 16 or above on the initial CES-D, and meets criteria for Major Depression or Double Depression on the SCID.
Symptom level	Number and severity of self-reported symptoms on the second CES-D for participants scoring 16 or above on the initial CES-D.
Chronicity	Number of months of depression on the LIFE given the number of months assessed, for participants scoring 16 or above on the initial CES-D, including months of Major Depression, Depression In Partial Remission, Subthreshold Depression, Dysthymia, and Double Depression as assessed by the SCID.

recruitment for the larger study, mothers completed an initial CES-D over the telephone. Based on their score they were placed in one of two broad groups. Sixty-two mothers scoring 8 or below on the CES-D were designated as nondepressed, and eighty mothers scoring 16 or above were designated as depressed. A score of 16 is the recommended clinical cut off on the CES-D indicating these mothers were experiencing a clinically significant number of depressive symptoms. Mothers completed a second CES-D during a visit to Dr. Dawson's laboratory at the Center for Human Development and Disability at the University of Washington at which time they participated in the divided attention task. Scores on this second CES-D were employed in the present study, with a few exceptions in which the score of the initial CES-D was substituted when a second CES-D score was not available.

The Structured Clinical Interview for DSM-III-R was employed to evaluate diagnostic status. This interview was administered during an initial visit to the University approximately two weeks prior to the visit in which the divided attention task took place. Portions of the SCID were used to assess clinical depression defined as Major Depression, Depression In Partial Remission, Subthreshold Depression, Dysthymia, or Double Depression. Screenings for mania and psychosis were also carried out. Interviewers were trained by Donna Miller, MD., who was an Associate Clinical Professor of Psychiatry at the University of Washington, and who has extensive experience with the SCID. Inter-interviewer reliability based on independent diagnoses by two raters on 20% of the sample was 100%. Of the 80 mothers who scored 16 or above on the initial CES-D, 55 (69%) also met criteria for a diagnosis of subthreshold level or Major Depression on the SCID. During this interview mothers also reported on past history of psychological and pharmacological treatment, hospitalizations for psychiatric reasons, and family history of psychiatric disorder.

A combination of CES-D and SCID information was used to create a grouping variable consisting of four groups including, one nondepressed control group and three depressed groups reflecting increasing severity of depression. The nondepressed group included the 60 mothers who scored 8 or below on the initial and second CES-Ds and did not meet research criteria for subthreshold level or Major Depression on the SCID. The three depressed groups included 25 mothers who scored 16 or above on the initial CES-D, but did not qualify for subthreshold level or Major Depression on the SCID, 29 who scored 16 or above on the initial CES-D and met criteria for Subthreshold Depression, Depression In Partial Remission, or Dysthymia on the SCID, and 26 mothers who scored 16 or above on the initial CES-D and met criteria for Major Depression, or Double Depression on the SCID.

In addition to the grouping variable, two continuous variables were employed to evaluate the effects of the severity and chronicity of maternal depression within the broadly defined depressed group (initial CES-D scores of 16 or greater). The first variable, evaluating severity of depression, was comprised of the mothers' self-report of the number of depressive symptoms on the second CES-D for mothers scoring at or above the clinical cut-off of 16 symptoms on the initial CES-D. The second variable, evaluating chronicity of depression, was comprised of information collected using an adapted version of the Longitudinal Interval Follow-up Evaluation. The LIFE was administered to assess mothers' longitudinal history of depression. It permitted determination of the number of months since conception that infants were exposed to maternal depression, including exposure to Major Depression, Depression In Partial Remission, Subthreshold Depression, Dysthymia, and Double Depression as defined by the SCID. Specifically, chronicity was calculated as a ratio representing the number of months of depression, given the number of months assessed.

Demographic Characteristics of Participants

Demographic characteristics of the sample as a whole will be described first, followed by characteristics on which the four groups differed significantly. As shown in Table 2, the sample consisted primarily of middle class, Caucasian mothers and their toddlers. Specifically, the sample included 125 Caucasian mothers, 2 Native Americans, 1 Asian American, 1 African American, 2 mothers of multi-racial identity, and 9 participants of unknown ethnic identity. Eighty seven percent of mothers were married, 8% were single, and 5% were separated or divorced. Families were generally middle class as indicated by an average Hollingshead score of 44.51, had an average of 3.76 individuals living in the home. Forty two percent of mothers and 34% of fathers had some college or post high school technical training, while 42% of mothers and 51% of fathers had a college or graduate degree.

The amount of time mothers and toddlers spent together was also assessed due to the possibility that this may influence their behavioral interaction. Fifty six percent of mothers continued to work following their child's birth, working an average of .48 hours per week. Toddlers were found to be in an average of 13 hours of day care per week, with an additional 5 hours per week of care from a baby-sitter.

In addition, nondepressed control mothers and those in the three depressed groups differed significantly on several dimensions. These differences are summarized in Table 3. Mother's age differed between groups, $F(3, 138) = 2.89$, $p < .05$, with more depressed mothers slightly older than less depressed or nondepressed mothers. In addition, mothers' with any depression tended to have more children in the home than nondepressed mothers, $F(3, 138) = 3.08$, $p < .05$. Further, the children of mothers with any depression were generally less likely to have their father living in the home, $F(3, 138) = 3.17$, $p < .05$.

Table 2. Demographics for Sample

	N	%
Mother's Ethnic Group		
African American	1	1
Asian American	1	1
Caucasian	125	89
Native-American	2	1
Multi-ethnic	2	1
Other	2	1
Missing	9	6
Marital Status		
Mothers single	12	8
Mothers married	124	87
Mothers separated or divorced	7	5
Mother's Education Level		
Partial high school	3	2
High school graduate	20	14
Partial college/technical training	59	42
College graduate	46	32
Graduate degree	14	10
Father's Education Level		
Partial high school	1	1
High school graduate	18	14
Partial college/technical training	43	34
College graduate	47	37
Graduate degree	17	14

	Mean	SD
Family Hollingshead Score	44.51	12.25
Individuals in Family	3.76	.96

Mother-Infant Contact	N	%
Mothers currently working.	79	56
Mothers not currently working.	63	44

	Mean	SD
Hours per week mother currently works.	25	14
Average hours per week mother has worked since child's birth.	18	13
Hours per week child is in formal day care.	13	17
Hours per week infant cared for by a baby-sitter.	4	5
Total hours per week child is cared for by someone other than the mother.	17	16

Table 3. Demographic Variables: Group Differences by Depression Severity Level

	Non-depressed		Symptoms		Subthreshold Depression		Major Depression	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mother's age	30.02	4.92	29.92	5.59	31.55	3.92	33.00	4.88
Number of children in home	1.55	.78	1.96	.89	2.14	.99	1.85	1.01
Father living in home?	N	%	N	%	N	%	N	%
Yes	60	97	21	84	22	76	23	88
No	2	3	4	16	7	24	3	12

These characteristics on which the four groups differed significantly were employed as covariates in group difference analyses.

Procedure

Mothers who expressed an interest in participating in the study were screened during a telephone interview at which time the initial CES-D was administered, and demographic and exclusionary data were collected. If mother-infant dyads met criteria for further participation, mothers were sent a packet of self-report questionnaires to complete and to bring with them on a visit to the University of Washington. During the first visit the SCID interview was administered. During a second visit, approximately two weeks later, mothers completed a second CES-D, and mothers and toddlers participated in a series of activities designed to assess the quality of the mother-infant interaction (a freeplay task), self-regulation (a waiting task), and mastery motivation (a puzzle task). Following these activities the divided attention task took place.

Divided attention task. During this 10 minute task mothers were simply instructed to complete as much of an Adjustment Strategies Questionnaire (see Appendix A) as they

were able to do with their toddler present. The toys employed during the freeplay task remained available to infants. However, as they had already had 15 minutes to explore these toys with their mothers, the novelty of the toys may have been wearing off. The Adjustment Strategies Questionnaire was comprised of 11 open-ended questions inquiring about mothers' adjustment to the birth of the target child, including her toddler's preferences, what frustrates her infant, and what calms her child when they are fussy or frustrated. Since this task followed the freeplay task, most mothers were situated on the floor with their toddlers and remained there during the divided attention task, although a chair was available. In addition, this task purposely occurred following approximately an hour of ongoing interaction so that infants were more likely to be fatigued.

Behavioral Coding System

The coding system used in the present study was developed following a decade of involvement with observational coding including 2+ years of experience coding other behavioral constructs with the same data set under the direct supervision of Dr. Karin Frey. This included adapting/developing four coding systems to evaluate the behavior of mothers and 14 and 39-month-old children, coding maternal and child behavior, and supervising four coding groups. Two post-baccalaureate students in psychology assisted in the development and application of the present coding system under the supervision of the doctoral candidate. Video recording of the interaction task incorporated a Vertical Interval Time Code System (VITC), which allowed behavioral codes to be entered directly into a computer, along with temporal information.

The coding system used in the present investigation consisted of four mutually exclusive, exhaustive groups of codes including, 1) infant bid codes, 2) maternal response codes, 3) maternal attention codes, and 4) location codes. The infant bid and maternal response codes were of primary focus in the present investigation, with location codes providing a context for some of the bid and response codes. The attention codes were not examined in the present investigation. The coding system was designed to evaluate the nature of toddlers' attempts to engage their mothers (bidding behavior), and the nature of mothers' responses to toddler bids. Tables 4 and 5 present summaries of the infant bid and maternal response codes including definitions and behavioral examples. A complete copy of the coding system can be obtained from the author upon request. Infant bid codes included aggression, negative affect, reaching for or grabbing the clipboard/questionnaire/pen the mother was using, initiating physical contact, showing or offering an object, vocalizing or gesturing, looking or glancing, and minimal touching. Mother response codes included, negative affect, intrusiveness, disengagement, negative feedback, moving the clipboard/questionnaire/pen away from the infant, initiating physical contact, affection, scaffolding, playing/entertaining/distracting, neutral/positive affect (including talking), and looking/glancing.

Twenty-nine of the 142 videotapes (20%) were coded for reliability purposes. A summary of reliability statistics for the primary infant bid and mother response codes can be found in Table 6. Complete reliability statistics for all behaviors included in the coding system can be found in Appendix B. For infant bids percent agreement across the 29 tapes averaged .97 (range = .92 - .99) and kappa values averaged .73 (range .60 - .89). For mother response codes percent agreement averaged .98 (range = .96 - .99) and kappa values averaged .63 (range = .30 - .95). For attention codes percent agreement averaged .97 (range .96 -.99) and kappa values averaged .87 (range .77 - .97). For location codes

Table 4. Summary of Toddler Bid Codes

Infant Bid Code	Description	Examples
Aggresses	Behaves in an aggressive manner toward self, mother, objects, or room. This behavior occurs in the context of infant presenting as frustrated or angry.	• Bangs head on wall. • Swats mother in face. • Bites mother's leg. • Dumps out container of toys mother offers. • Throws toys.
Negative affect	Negative vocal affect including expressions conveying boredom, frustration, anger, anxiety, and fear.	• Whimpering. • Whining. • Crying. • Screaming.
Clipboard/Questionnaire/Pen	Reaches for, touches, or grabs hold of the clipboard, questionnaire, or pen mother is using to complete Adjustment Strategies Questionnaire.	• Reaches for clipboard and questionnaire. • Grabs hold of clipboard. • Picks up pen mother put down.
Initiates physical contact	Infant's head and/or torso comes in contact with mother's head, torso, or legs.	• Sits on mother's lap. • Nuzzles head into mother. • Leans body on mother.
Show/Offers	Holds out object to show mother, or offers/gives object to mother.	• Holds out toy toward mother. • Holds telephone receiver to mother's ear. • Drops doll in mother's lap.
Vocalizes/Gestures	Vocalizes and/or gestures while looking toward mother.	• Any vocalization/gesture while looking toward mother. • Laughter. • Holds arms up indicating desire to be picked up. • Uses hand gesture to indicate 'All gone.'
Seeks proximity	Approaches from greater than 1 ft. away from mother to within less than 1 ft. from mother.	• Returns to spot next to mother after venturing away from her. • Passes near mother while exploring room.
Looks/Glances	Looks or glances toward mother. If at a distance, looks toward front upper half of mother's body. If in proximity or physical contact, looks toward mother's face.	• Infant with back to mother, turns to look at mother. • Infant sitting in mother's lap tips head back to see mother's face.
Touches	Touches mother.	• Brushes mother while passing by. • Sits with foot touching mother's leg.

Table 5. Summary of Mother Response Codes

Mother Response Code	Description	Examples
Negative affect	Uses a negative tone of voice, conveying irritability, annoyance, frustration, or anger.	• I'm not giving you that pen! • I don't like girls who hit! • No, no, no!
Intrusive	Behaves in an intrusive manner.	• Raps infant's hand with pen. • Places object on infant's head.
Disengages	Withdraws physically, terminating or rejecting physical contact, or by moving infant away.	• Turns body away from infant to work on questionnaire. • Picks up infant and moves him or her away from her.
Negative feedback	Verbal prohibition or threat.	• No, Mommy is busy. • If you can't be gentle you can't play with the toys. • Don't pull on my necklace.
Clipboard/Questionnaire/Pen	Moves clipboard, questionnaire, or pen away from infant.	• Moves clipboard, questionnaire, and pen to other side of body.
Initiates physical contact	Initiates significant physical contact of own accord.	• Picks infant up and places on lap.
Affection	Discrete acts of affection.	• Pats. • Kisses. • Brief hugs.
Scaffolds	Verbally or physically directs infant's attention to object/activity; offers object; models/teaches how to use object; or assists/encourages infant in exploring object. Infant can continue to engage in activity on own.	• Why don't you put everything back in the box? • Rolls turtle toward infant. • Rocks doll and coos. • Where's the baby's nose? • See, this key goes in this hole. • Almost, almost! • Put it in.
Plays/Entertains/Distracts	Plays with, entertains, or distracts infant. Infant cannot engage in activity on own.	• Plays peek-a-boo. • Sings to infant. • Gives horsy ride. • Gives cracker. • Talks to infant about bright lights, microphone, mirror.
Neutral/Positive affect	Expresses neutral or positive affect.	• All verbalizations with neutral/positive affect. • Laughter. • Smiles.
Looks/Glances	Moves head to look or glance toward infant.	• Looks up from questionnaire in response to infant's vocalization.

Table 6. Coding Reliability Statistics

Behavioral Codes	Percent Agreement	Cohen's Kappa	Percent Occurrence of Behavior
Infant Bids			
Aggression	99	67	1
Negative affect	98	89	12
Reaches for clipboard/questionnaire/pen	99	85	8
Shows/offers	99	72	7
Vocalizes/gestures	98	60	16
Looks/glances	97	73	28
Touches	97	61	11
Initiates physical contact	96	80	4
Seeks proximity	89	69	13
No bidding behavior	94	84	
Average across bids	97	73	
Mother Responses			
Negative affect	99	48	1
Intrusiveness	99	77	1
Disengages	99	30	1
Negative feedback	99	60	5
Removes clipboard/questionnaire/pen	99	58	5
Affection	99	74	9
Scaffolds	94	81	19
Plays/entertains/distracts	97	66	6
Neutral/positive affect (includes talk)	96	68	33
Looks/glances	97	66	18
Initiates physical contact	96	57	2
No responding behavior	98	97	
Average across responses	98	63	

Note. Reliability statistics were calculated on 29 cases (20%).
Note. The non-occurrence of bidding and responding behavior was not included in calculations of the percentage of occurrence of individual bid and response codes.

percent agreement averaged .95 (range .89 - .99) and kappa values averaged .62 (range 0 - .96). It should be noted that while not all infrequently occurring behaviors had lower

kappa values, there was a tendency for lower kappas to be associated with behaviors occurring less frequently. This is because infrequently occurring behaviors provided less opportunity for coders to improve reliability.

A computer program was created to extract constructs of interest from the raw coded data. The program also permitted two behaviors included with the location codes during the coding process, 'infant initiates proximity,' 'infant initiates physical contact,' to be evaluated as infant bid codes. In addition, the program permitted one other behavior coded with the location codes, 'mother initiates physical contact in response to an infant bid,' to be evaluated as a response code. These behaviors were included with the location codes during the coding process to avoid double coding of behaviors. In addition, two codes, 'mother initiates engagement' and 'monitors' included with the response codes during the coding process actually reflect behaviors initiated by the mother, as opposed to responses to infant bids. These codes will not be discussed further as they are not central to the focus of the present study on toddlers' efforts to engage their mothers, and because they were not reliably coded.

The basic coding permitted evaluation of the frequency of behaviors as well as the duration of their occurrences. Frequencies were evaluated as ratios representing the number of occurrences of a particular behavior relative to the total number of occurrences of a class of behaviors. For instance, infants' negative affect bids were evaluated by dividing the number of negative affect bids by the total number of bids that occurred during the task. Average durations were created by dividing the total duration of a behavior by the number of occurrences of that behavior.

Several constructs of interest were created by aggregating basic codes. Two variables reflecting the frequency and duration of the mother's neutral/positive responses were created by summing the basic response codes affection, scaffolding, playing/entertaining/distracting, neutral/positive affect, looking/glancing, and the initiation of physical contact. Similarly, two variables reflecting the frequency and duration of mother's active responses were created by summing the basic response codes affection, scaffolding, playing/entertaining/distracting, and initiating physical contact. In addition, two variables reflecting the frequency and duration of the mother's passive responses were created by summing neutral/positive affect (primarily talking), and looking. Three mother negative response codes of theoretical interest, but which occurred infrequently, were also combined, including negative affect, intrusiveness, and disengaging responses.

The computer program also provided for the generation of constructs derived from temporal data. Variables created in this manner included those pertaining to bid and response bouts, mothers' ignoring behavior, and latencies for mothers to respond to toddler bids. Strings of consecutive individual bids were combined to create sustained bouts of bidding, terminated when bidding ceased for at least 5 seconds. The program also permitted distinction between new bid bouts, and continuing bid bouts. A bout of bidding was designated a new bid bout when the bout began in the absence of interaction between the mother and toddler. A bout of bidding was designated as a continuing bid bout when the toddler's bidding continued during and following a response from the mother, and prior to a second response. Analogous to toddler bid bouts, strings of consecutive individual responses were linked to create sustained bouts of responding;

again, a bout was terminated when responding ceased for at least 5 seconds. In addition, the program generated several variables based on the contingency between toddler bids and mother responses. Mothers were determined to have ignored a bid bout if they did not respond during a bid bout or within 5 seconds after bidding ceased. Latencies from the beginning of the infant bid bout to the beginning of the mother's response, representing the length of time mothers took to respond to infant bids, were also generated.

In addition, the program permitted the designation of bid bouts into one of three levels of intensity. A summary of infant bid codes associated with each of the three levels of intensity is presented in Table 7. Low intensity bids included minimal touching of the

Table 7. Toddler Bid Codes by Level of Intensity

Level of Intensity	Toddler Bid Codes
Low intensity bids	Touches Seeks proximity Looks/Glances
Medium intensity bids	Shows/Offers Vocalizes/Gestures
High intensity bids	Aggresses Engages in negative affect Initiates physical contact Reaches for or grabs clipboard/Questionnaire/Pen

mother, seeking proximity to the mother, and looking toward the mother. Medium intensity bids were communicative in nature and included the toddler showing or offering her an object, and vocalizing or gesturing toward the mother. High intensity bids included

the toddler engaging in aggressive behavior or negative affect, initiating significant physical contact, and reaching for or taking hold of the clipboard/questionnaire/pen the mother was using to complete the questionnaire. The designation of bids into three levels of intensity permitted the creation of a variable indicating whether the toddler's bidding escalated in intensity prior to receiving a response. Escalation was determined to occur if the bid occurring at the point at which a response began or occurring immediately prior to the beginning of a response was of a higher level of intensity than the immediately preceding bid.

Finally, the computer program provided for individual behaviors to be evaluated in more complexity through association with a second factor. For instance, mother ignoring behavior and latencies to respond to infant bids were evaluated in relation to the intensity of infant bids. In addition, toddler bids and mother responses were evaluated with respect to the location of the mother and toddler in relation to each other.

Results

Preliminary analyses were conducted on all measures including normalization of skewed distributions and distributions with extreme cases. These will be described initially, followed by descriptive data, and finally by a series of ANCOVAs to address hypotheses regarding differences in the behavior of depressed and nondepressed mother-toddler dyads, and by a series of hierarchical multiple linear regression analyses on mothers experiencing depression to evaluate relations between the severity and chronicity of depression and mother and toddler behavior.

Normalization of Data

SPSS/PC for Windows, V.6.1 and 7.0 were used for analyses. Missing data were excluded listwise. Variables were screened for departures from normality and for extreme cases using a combination of techniques. Right skewed, positive distributions that included scores more than 3 interquartile ranges above the 75th or below the 25th interquartile range, as identified by box plots, were transformed using a started logarithm transformation. Following transformation, box plots indicated that some variables continued to contain extreme values. To evaluate the presence and influence of these extreme cases in multivariate space, a casewise diagnostic procedure, Cook's Distance, was employed in multiple regression analyses. Further, in order to examine the presence and influence of extreme cases in analyses evaluating group differences, the grouping variable was dummy coded and ran as multiple regression to permit the use of the casewise diagnostic procedure. As no variables yielded a Cook's Distance greater than 1, and because no cases were consistently identified as extreme across analyses, no further measures were taken. In addition, for regression analyses in which multicollinearity was an issue, predictor variables were centered and interaction terms were computed using centered variables.

Descriptive Statistics

Maternal depression and the divided attention task. Tables 8, 9, and 10 summarize descriptive data on maternal depression. As indicated in Table 8, nondepressed mothers endorsed an average of 3.73 symptoms of depression on the CES-D, compared to those in the broadly defined depressed group who reported an average of 22.88 symptoms. In addition, depressed mothers reported an overall average of 11.15 months of depression on the LIFE. Table 9 shows mother's symptom level and the chronicity of her depression by depression severity level. Mothers experiencing symptoms endorsed an average of 18.84 items on the CES-D, those with subthreshold level depression endorsed an average of 22.28 symptoms, and mothers with Major Depression endorsed an average of 27.42 symptoms. With respect to the chronicity of maternal depression, mothers experiencing symptoms reported an average of 4.96 months of depression on the LIFE, those experiencing subthreshold level depression reported an average of 14.28 months of depression, and mothers with Major Depression reported an average of 13.62 months of depression. Interestingly, as shown in Table 10, there was no significant correlation between the symptoms (CES-D) mothers endorsed and the chronicity (LIFE) of their depression.

Mothers' responses to the open-ended questions on the Adjustment Strategies Questionnaire regarding their adjustment to the birth of the target child were also evaluated. No significant differences were found between the average number of words per response written by nondepressed mothers or those in any of the three depressed groups. Nor were any significant correlations found between mothers' symptom level or the chronicity of her depression and the amount she wrote on the Adjustment Strategies Questionnaire.

Table 8. Descriptive Statistics for Depression Variables

	Nondepressed Initial CES-D < = 8			Depressed Initial CES-D > = 16		
Variable	N	Mean	SD	N	Mean	SD
Depression severity level						
Nondepressed	62	--	--	--	--	--
Symptoms	--	--	--	25	--	--
Subthreshold	--	--	--	29	--	--
Major depression	--	--	--	26	--	--
Symptom level	62	3.73	2.26	80	22.88	7.74
Chronicity	--	--	--	80	11.15	8.10

Note. Chronicity reported as number of months of depression since child's conception.

Table 9. Relations Between Grouping and Continuous Depression Variables

		Symptom level		Chronicity	
Variable	N	Mean	SD	Mean	SD
Depression severity level					
Nondepressed	62	3.73	2.26	--	--
Symptoms	25	18.84	5.76	4.96	7.01
Subthreshold	29	22.28	6.82	14.28	6.23
Major depression	26	27.42	8.18	13.62	7.78

Note. Chronicity reported as number of months of depression since child's conception.

Table 10. Correlation Between Continuous Depression Variables

	Symptom Level
Chronicity	.17 ^{ns}

Note. Reported for depressed mothers only.

Analytic Strategies

To examine hypotheses regarding group differences in mother and toddler behavior during the divided attention task, a series of ANCOVAs was performed. ANCOVAs examined the effect of maternal depression status (depression severity level)

by toddler gender, controlling for demographic variables. When significant results emerged, follow-up t-tests controlling for demographic variables were performed. To examine hypotheses regarding the effects of the severity and chronicity of maternal depression for mothers experiencing depression (scored > = 16 on the initial CES-D) on mother and toddler behavior, a series of hierarchical multiple linear regression analyses were performed. The gender of the toddler was entered on the first step, followed by maternal depression on the second step (symptom level or chronicity), and finally by the interaction between toddler gender and maternal depression on the third step. When significant interactions resulted, follow-up regressions for daughters and sons separately were performed.

All participants did not engage in all behaviors evaluated, resulting in bi-modal distributions of participants who did and did not engage for some behaviors. In such instances, chi-square analyses were employed to evaluate whether depressed and nondepressed groups differed in their failure to engage in the behavior. Further analyses were then performed on distributions selected for participants who engaged in the behavior at least once. This also resulted in some analyses being conducted on small samples. Such analyses will be noted.

For each hypothesis, findings regarding group differences will be presented first, followed by findings regarding the effects of the severity and chronicity of maternal depression for those mothers experiencing depression. Results regarding mother behavior will be presented first, followed by toddler behavior results.

Analyses of Mother Behavior Derived from Hypotheses

A summary of findings regarding mother behavior is presented in Tables 11 and 12.

Ignoring. It was predicted depressed mothers would ignore toddlers' bids for engagement more often than nondepressed mothers, particularly less intense bids, and that

Table 11. Group Differences: Mother Behavior

Mother Behavior	Depression Severity Level
Average latency to respond to low intensity bids	$F(3, 106) = 3.42^{*i}$
Average duration active responses	$F(1, 128) = 5.29^{*g}$
Likelihood of negative responses	$\chi^2(3) = 8.93^{*d}$

Note. d = groups differ on maternal depression status
g = groups differ on infant gender
i = interaction between maternal depression and infant gender
$^{*}p < .05$.

Table 12. Relations Between Severity and Chronicity of Depression and Mother Behavior

Mother Behavior	Symptom Level	Chronicity
Ignores bids		$\beta = -.27^{*d}, R^2 = .07$
Ignores bids when infant in proximity		$\beta = -.31^{**d}, R^2 = .09$
Latency to respond to high intensity bids	$\beta = .32^{*i}, R^2 = .08$	
Average duration of negative feedback responses	$\beta = .46^{*i}, R^2 = .14$	

Note. d = main effect maternal depression
g = main effect infant gender
i = interaction between maternal depression and infant gender
$^{*}p < .05$, $^{**}p < .01$.

increased depression would be associated with increased ignoring. It was also predicted that, compared to nondepressed mothers, depressed mothers would ignore a greater proportion of toddler bids when infants were at a distance from mothers, as opposed to when they were in proximity or physical contact. In addition, it was predicted that

increased depression would be associated with greater ignoring when toddlers were at a distance, than when they were in proximity or physical contact.

No group differences were found with respect to the proportion of toddler bid bouts mothers ignored. For mothers experiencing depression, there was a significant main effect of chronicity on the proportion of bids ignored, $\beta = -.27$, $p < .05$, accounting for 7% of the variance. As shown in Figure 1, and contrary to expectation, this trend suggests the more chronic the mother's depression, the smaller the proportion of bid bouts she ignored. Thus, no support was found for the hypothesis that depressed mothers would ignore toddlers' bids for engagement more often than nondepressed mothers, or that increased depression would be associated with increased ignoring.

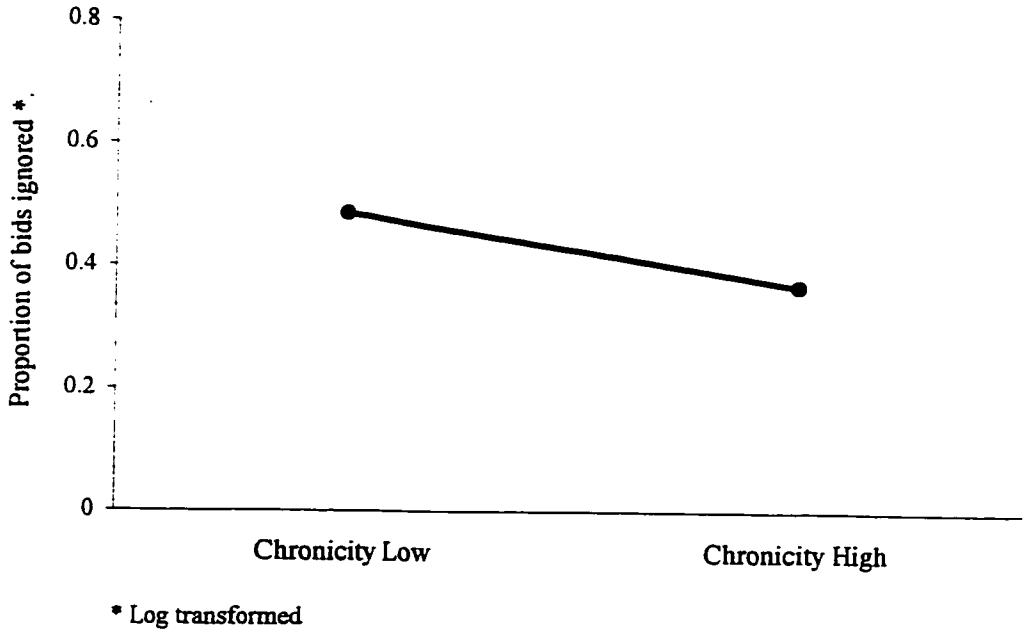


Figure 1. Proportion of Bids Ignored by Chronicity of Maternal Depression

To evaluate whether depressed mothers were particularly likely to ignore less intense toddler bids, ignoring was examined separately for bid bouts of low, medium, and high intensities. Recall, low intensity bids included minimal touching of the mother, seeking proximity to the mother, and looking toward the mother. Medium intensity bids were specifically communicative in nature, and included showing and offering objects to the mothers, and vocalizing or gesturing toward her. High intensity bids included engaging in aggressive behavior or negative affect, initiating physical contact with the mother, and reaching for or grabbing the clipboard, questionnaire, or pen the mother was using.

No group differences or effects of severity or chronicity of were found with respect to mothers' ignoring of low, medium, or high intensity bid bouts. Thus, no evidence was found to support the hypothesis that depressed mothers would be particularly likely to ignore low intensity toddler bids.

To evaluate the hypothesis that, compared to nondepressed mothers, depressed mothers would be more likely to ignore bids made when infants were at a distance from mothers, as compared to those made when infants were in proximity or physical contact, and that increased depression would be associated with an increased likelihood of mothers ignoring bids made from a distance, the proportion of ignoring during distance, proximity, and physical contact was evaluated. As defined in the present study, physical contact included the toddler's head or torso coming into contact with the mother's head, torso, or legs. Proximity was defined as the infant being within 1 ft. of the mother, and distance was defined as the infant being more than 1 ft. from the mother.

No group differences or effects of severity or chronicity of depression were found with respect to the proportion of bid bouts mothers ignored when infants were in physical contact, or at a distance. Further, no group differences were found with respect to the

proportion of bid bouts mothers ignored when infants were in proximity. However, for mothers experiencing depression, a hierarchical multiple regression analysis yielded a significant main effect of chronicity on the proportion of bid bouts ignored, $\beta = -.31$, $p < .01$, when mothers and infants were in proximity accounting for 9% of the variance. As shown in Figure 2, and contrary to expectation, this result suggests the more chronic the mother's depression, the smaller the proportion of toddler bid bouts she ignored when infants were in proximity. This pattern of results does not provide support for the hypotheses that depressed mothers would be more likely to ignore bids made when infants were at a distance from mothers, compared to those made when in proximity or physical contact, or that increased depression would be associated with an increased likelihood of ignoring bids made from a distance.

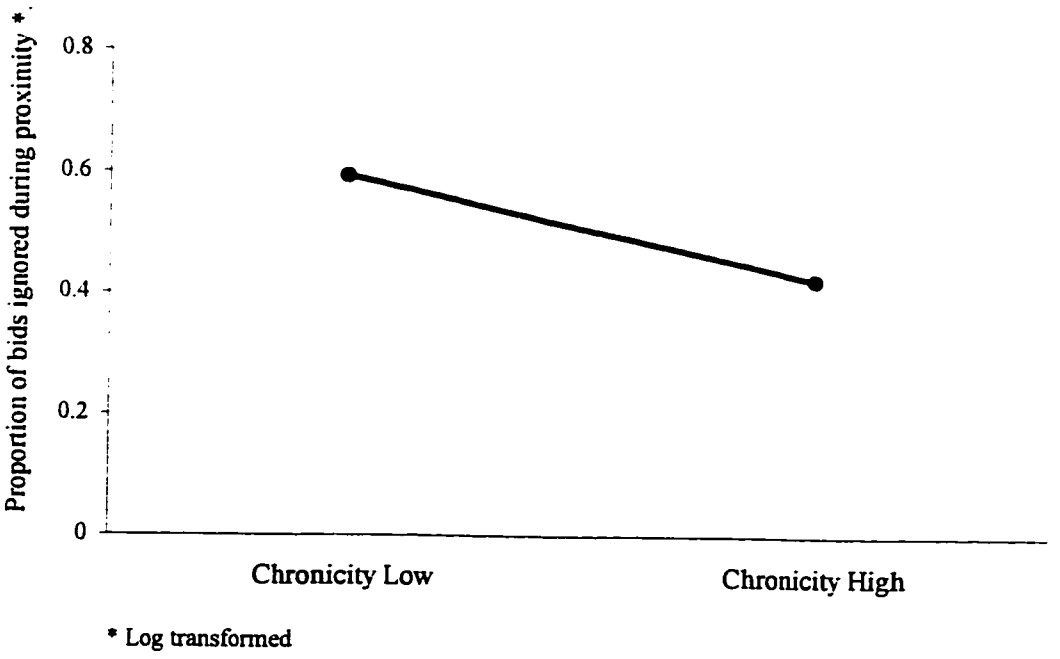


Figure 2. Proportion of Bids Ignored When Toddler is in Proximity to Mother by Chronicity of Maternal Depression

Latency to respond. It was predicted that depressed mothers would have longer latencies to respond to toddler bids than nondepressed mothers, particularly less intense bids, and that increased depression would be associated with increasingly long latencies to respond. Latency to respond was evaluated for both new and continuing bid bouts.

New bid bouts were defined as those that occurred in the absence of interaction between the mother and the toddler. Continuing bid bouts were defined as those that occurred when the toddler's bidding continued during and following a response from the mother, and prior to a second response. No group differences or effects of severity or chronicity of depression for mothers experiencing depression were found with respect to mothers' average latency to respond to new or continuing bid bouts.

To evaluate whether depressed mothers were particularly likely to have longer latencies to respond to less intense infant bids, latencies to new bid bouts were examined separately for bouts of low, medium, and high intensities. Analyses evaluating latencies to respond to continuing bid bouts of varying intensities were not performed as sample sizes became too small.

Recall, low intensity bids included minimal touching of the mother, seeking proximity to the mother, or looking toward the mother. An ANCOVA with maternal depression status and toddler gender as independent variables and the average latency for mothers to respond to low intensity bids as the dependent variable, yielded a significant interaction between depression severity level and toddler gender $F(3, 106) = 3.42$, $p < .05$. As shown in Figure 3, mothers' average latency to respond differed for infant daughters' versus sons' low intensity bids, especially at lower levels of depression. Subsequent t-tests comparing nondepressed mothers and mothers at each of the three depression severity levels were performed for each gender, as well as t-tests comparing mothers of daughters versus sons in each for the four groups. Contrary to expectation, a t-test yielded a trend

suggesting mothers of infant daughters with subthreshold level depression to have shorter average latencies to respond to low intensity bids than nondepressed mothers, $t(106) = 1.75$, $p < .10$, and a significant t-test indicating mothers with subthreshold level depression to have shorter average latencies to respond to daughters' low level bids than mothers reporting depressive symptoms $t(106) = 2.40$, $p < .05$. In line with prediction, significant t-tests also indicate mothers of infant sons with Major Depression, $t(106) = -2.18$, $p < .05$, and those with subthreshold level depression, $t(106) = -2.04$, $p < .05$, have longer average latencies to respond to sons' low intensity bids than mothers reporting depressive symptoms. Contrary to expectation, however, a t-test suggests a trend, $t(106) = 1.81$, $p < .10$, for nondepressed mothers of infant sons to have longer average latencies to respond to sons' low intensity bids than mothers reporting depressive symptoms.

Further, a significant t-test indicates mothers reporting depressive symptoms have longer average latencies to respond to low intensity bids from infant daughters than infant sons, $t(106) = 2.58$, $p < .05$. Finally, a t-test suggests a trend for mothers with subthreshold level depression to have shorter average latencies to respond to low intensity bids from infant daughters than infant sons, $t(106) = -1.82$, $p < .10$. No effects of severity or chronicity of depression were found with respect to mothers' average latency to respond to low intensity infant bids.

Medium intensity bids were specifically communicative in nature and included the toddler showing or offering an object to the mother, or vocalizing or gesturing toward her. No group differences or effects of severity or chronicity of depression were found with respect to mothers' average latency to respond to medium intensity infant bids.

High intensity bids included toddlers engaging in aggression or negative affect, initiating physical contact with mothers, or reaching for or grabbing the clipboard, questionnaire, or pen the mother was using. No group differences were found with

respect to mothers' average latency to respond to high intensity infant bids. However, for mothers experiencing depression, there was a significant interaction between symptom level and toddler gender on the mothers' average latency to respond to high intensity bids. $\beta = .32$, $p < .05$, accounting for 8% of the variance. Figure 4 illustrates the values of mothers' average latency to respond to high intensity bids from daughters and sons generated by the interaction term, using values one standard deviation above and below the mean of symptom level. The plot suggests the more symptoms of depression the mother endorsed, the shorter her average latency to respond to high intensity bids from infant daughters, and the longer her average latency to respond to high intensity bids from infant sons. Subsequent regression analyses for daughters and sons separately yielded a significant main effect of symptom level on mothers' average latency to respond to high intensity bids from daughters, $\beta = -.39$, $p < .05$, accounting for 15% of the variance. There was no significant relation between mothers' report of depressive symptoms, and the average latency for mothers to respond to high intensity bids from sons.

The above results, with significant interactions between maternal depression and toddler gender (between groups for low intensity bids, and for mothers experiencing depression for high intensity bids) on mothers' average latencies to respond to low and high intensity bids, do not provide support for the prediction that depressed mothers would have longer average latencies to respond to low intensity bids versus medium or high intensity bids. Nor does it provide full support for the expectation that increased depression would be associated with increasingly long latencies to respond to low intensity bids. Instead, the above results suggest that mothers respond differentially to infant daughters versus sons, and, in general, the more severe the mother's depression, the shorter her average latency to respond to infant daughters, and the longer her average latency to respond to infant sons regardless of the intensity of infants bids.

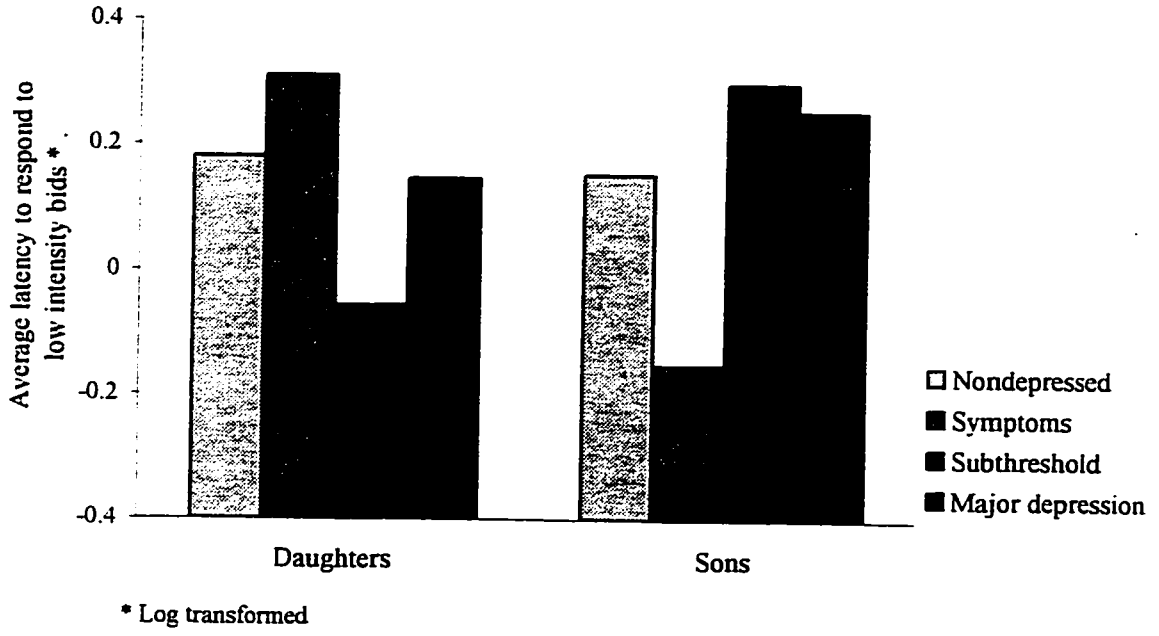


Figure 3. Average Latency to Respond to Low Intensity Infant Bids by Mothers' Depression Severity Level and Infant Gender

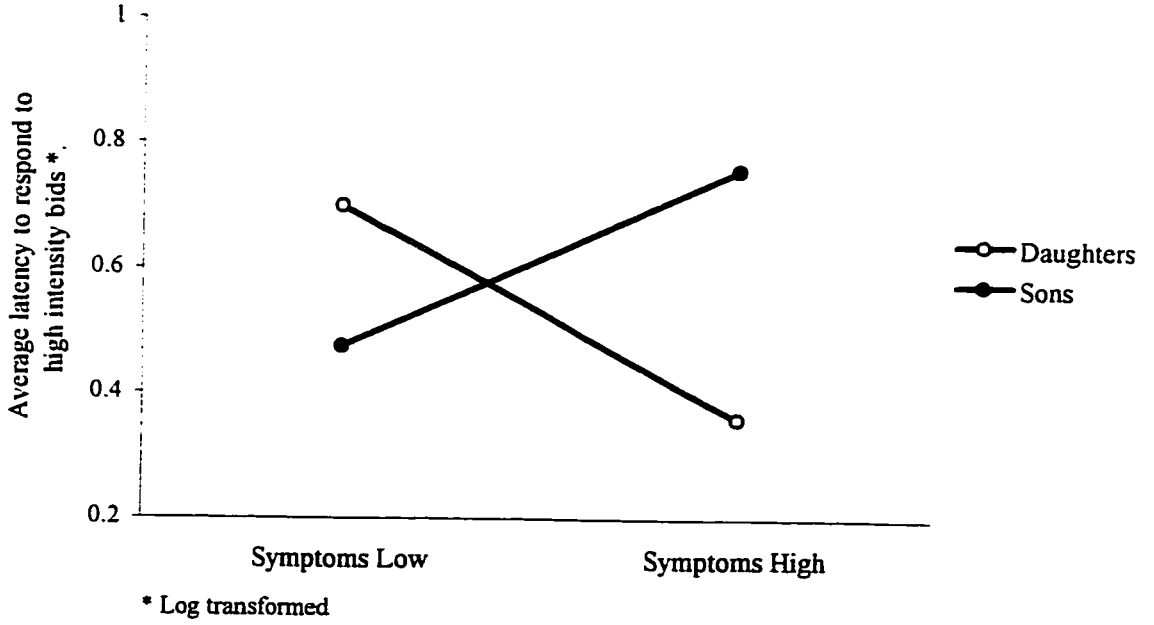


Figure 4. Average Latency to Respond to High Intensity Infant Bids by Mothers' Symptom Level and Infant Gender

Responses less effortful. It was predicted that depressed mothers' interaction style would be generally less effortful than nondepressed mothers, specifically, that depressed mothers would provide less scaffolding to encourage toddlers to engage in independent play than nondepressed mothers. It was also predicted that increased depression would be associated with a decrease in effortful responding and scaffolding. In order to evaluate the effortfulness of mothers' behavior, individual responses were aggregated creating variables representing proportions of active and passive responses. Recall, active responses included initiating physical contact, affection, scaffolding, playing/entertaining/distracting, and seeking proximity. Passive responses included expressing neutral/positive affect, including talking to the infant, and looking/glancing.

No group differences or effects of severity or chronicity of depression were found with respect to the proportion of responses in which mothers responded actively. In addition, no group differences with respect to maternal depression status were found in terms of the average duration of mothers' active responses. However, an ANCOVA with maternal depression status and toddler gender as independent variables, and the average duration of mothers' active responses as the dependent variable, yielded a significant main effect of toddler gender $F(1, 128) = 5.29$, $p < .05$. As shown in Figure 5, this result indicates mothers' active responses to infant daughters were of longer average duration than those to infant sons. No effects of severity or chronicity of depression were found with respect to the average duration of mothers' active responses. In terms of mothers' passive responding and scaffolding behavior, no group differences or effects of severity or chronicity of depression were found.

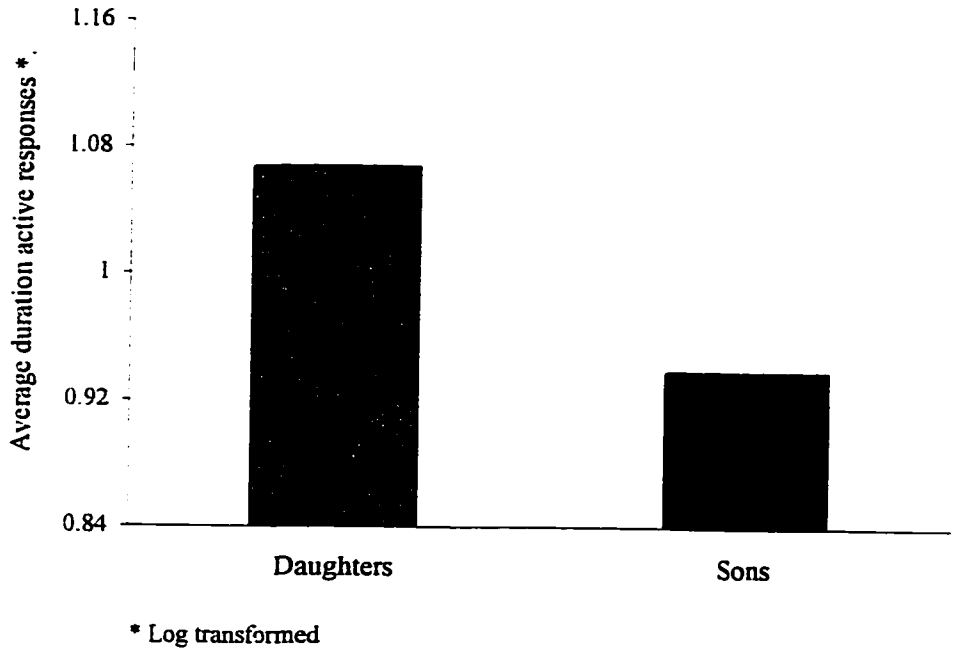


Figure 5. Average Duration of Active Responses by Infant Gender

Thus, no support was found for the hypotheses that depressed mothers interaction style would be less effortful than that of nondepressed mothers, or that depressed mothers would provide less scaffolding. Nor was support found for the hypothesis that increased depression would be associated with a decrease in effortful responding or scaffolding.

Neutral/Positive responses of shorter duration. It was predicted that depressed mothers' neutral/positive responses to toddlers would be of shorter average duration than those of nondepressed mothers, particularly when interactions did not involve physical contact with the infant. In addition, it was predicted increased depression would be associated with a decrease in the average duration of neutral/positive responses. Recall, neutral/positive responses included, initiating physical contact, affection, scaffolding, playing/entertaining/distracting, engaging in neutral/positive affect, seeking proximity, and

looking. Neutral/positive responses were evaluated in two ways, by examining the average duration of bouts of responding including only neutral and positive responses, and by examining the averages of summed durations of individual neutral and positive responses.

No group differences or effects of severity or chronicity of depression were found with respect to the average duration of mothers' response bouts including neutral/positive responses, or with respect to the average duration of mothers' summed individual neutral and positive responses.

In order to evaluate the hypothesis that depressed mothers' neutral and positive responses would be of shorter duration, particularly, when not occurring during physical contact between the mother and the infant, mothers' neutral/positive response bouts were evaluated when mothers and infants were in physical contact with each other, while in proximity to each other, and when at a distance from each other. No group differences or effects of severity or chronicity of depression for mothers experiencing depression were found with respect to neutral/positive response bouts occurring during physical contact, proximity, or at a distance.

Thus, no support was found for the hypothesis that depressed mothers' neutral/positive responses to toddlers would be of shorter duration than those of nondepressed mothers, or that this would be particularly true when these interactions did not involve physical contact with mothers. Nor was support found for the hypothesis that increased depression would be associated with a decrease in the average duration of neutral/positive responses.

Responses more negative. It was predicted that depressed mothers' responses to toddlers would be more negative than those of nondepressed mothers, and that increased depression would be associated with increased negativity. Two negative responses were evaluated. First, three negative responses theoretically relevant to depression, but infrequent in occurrence, negative affect, intrusiveness, and disengagement were aggregated into one variable (hereafter referred to as negative responses). A fourth negative response, negative feedback, consisted primarily of mothers' saying, 'No, no.', to infants. Negative feedback was evaluated separately because it is not as closely linked theoretically to depression as the other negative responses, because limit setting by saying, 'No, no.', to toddler-aged children is common, and because this response occurred frequently enough to permit independent evaluation. In addition, it should be noted that negative behaviors (responses and feedback) occurred less frequently than other responses, with a portion of mothers not engaging in negative behavior and resulting in bi-modal distributions for the proportion of responses. Thus, as indicated above, chi-square analyses were performed to determine whether depressed and nondepressed groups engaged differentially in negative behaviors. These were followed by analyses performed on mothers who engaged in negative behaviors at least once. Findings related to the negative responses will be discussed first, followed by findings related to negative feedback.

As reported in Table 13, chi-square analyses for the occurrence/non-occurrence of negative responses revealed a significant result for mothers' with different depression severity levels, $\chi^2(3) = 8.93$, $p < .05$. As predicted, mothers with subclinical levels of

depression engaged in more negative affect, intrusiveness, and disengaging responses than expected compared to nondepressed mothers. However, contrary to prediction, results also indicate that mothers with subclinical levels of depression engaged in more negative responses than expected compared to mothers with Major Depression.

Table 13. Number of Mothers Who Engaged in Negative Responses by Depression Severity Level

	Nondepressed		Symptoms		Subthreshold Depression		Major Depression	
	N	%	N	%	N	%	N	%
Mother did not engage in negative responses	51	84	14	56	19	66	21	81
Mother engaged in negative responses	10	16	11	44	10	34	5	19

An ANCOVA selected for mothers who engaged in at least one negative response was nonsignificant. Multiple regressions for mothers experiencing depression and selected for occurrences were performed, however, no effects of severity or chronicity of depression were found. In addition, no group differences or effects of severity or chronicity of depression were found with respect to the average duration of mothers' negative responses.

In terms of mothers' negative feedback responses, chi-square analyses evaluating the occurrence/non-occurrence of negative feedback were non-significant, as was an ANCOVA with maternal depression status and toddler gender as independent variables, and the proportion of negative feedback responses, for mothers who engaged in negative feedback at least once, as the dependent variable. There were also no effects of severity or chronicity of depression with respect to the proportion of negative feedback responses.

In terms of the average duration of negative feedback responses, no group differences were found. However, for mothers experiencing depression a hierarchical multiple regression analysis yielded a significant interaction between symptom level and toddler gender on the average duration of mothers' negative feedback responses, $\beta = .46$, $p < 05$, accounting for 14% of the variance. Figure 6 illustrates the values of negative feedback for daughters and sons generated by the interaction term, using values one standard deviation above and below the mean of symptom level. In line with prediction, the plot suggests the more symptoms of depression mothers endorsed, the longer the average duration of negative feedback responses to infant sons, and the shorter the average duration of negative feedback responses to infant daughters.

Subsequent regression analyses performed separately for daughters and sons yielded a significant main effect of symptom level on the average duration of negative

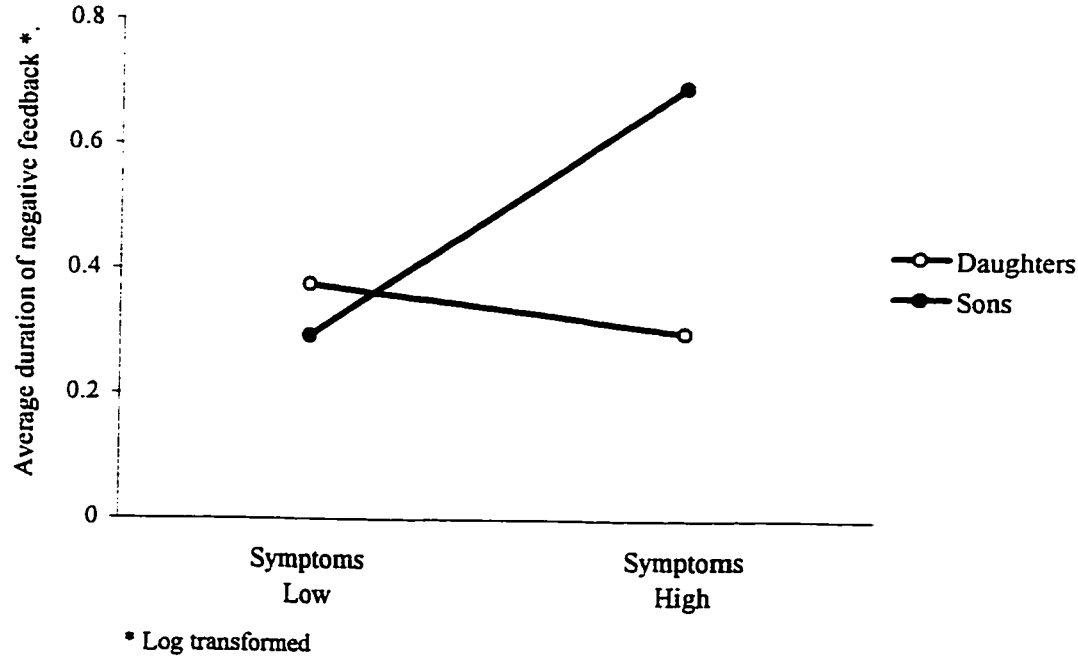


Figure 6. Average Duration of Negative Feedback Responses by Mothers' Symptom Level and Infant Gender

feedback responses for mothers of sons, $\beta = .61$, $p < .01$, accounting for 37% of the variance. There was no significant relation between symptom level and the average duration of mothers' negative feedback responses to infant daughters.

In summary, support was found for the hypothesis that depressed mothers' responses would be more negative than those of nondepressed mothers, and that increased depression would be associated with increased negativity.

Analyses of Toddler Behavior Derived From Hypotheses

A summary of findings related to toddler behavior is presented in Tables 14 and 15.

Bid bouts, bids per bout, and escalation of bid intensity prior to a response. With respect to the amount of infant bidding behavior, it was predicted that toddlers of depressed mothers would engage in more or less bouts of bidding than toddlers of nondepressed mothers, and that increased depression would be associated with an increase or decrease in bid bouts. Recall, a bout of bidding consists of a continuous string of bids that is terminated by a 5 second period in which no bidding occurs. Bid bouts were evaluated for the rate at which they occurred given the length of the task. No group differences or effects of severity or chronicity of depression for toddlers whose mothers were experiencing depression were found with respect to the rate of toddler bid bouts. Thus, no support was found for the above hypotheses.

It was also predicted that, compared to toddlers of nondepressed mothers, toddlers of depressed mothers would engage in more bids per bout prior to receiving a response, and that increased depression would be associated with increased bids per bout. No group

Table 14. Group Differences: Toddler Behavior

Toddler Behavior	Depression Severity Level
Average duration infant remains in proximity to mother	$F(1, 124) = 6.08^{*g}$
Proportion of aggressive bids	$F(3, 13) = 4.70^{**i}$

Note. g = groups differ on infant gender
i = interaction between maternal depression and infant gender
$^{*}p < .05$, $^{**}p < .01$.

Table 15. Relations Between Severity and Chronicity of Maternal Depression and Toddler Behavior

Toddler Behavior	Symptom Level	Chronicity
Average number of bids codes prior to a response		$\beta = .23^{*i}$, $R^2 = .05$
Average duration infants remain in proximity to mothers	$\beta = -.26^{*d}$, $R^2 = .06$ $\beta = -.30^{*g}$, $R^2 = .09$	5 $\beta = -.30^{*g}$, $R^2 = .09$
Proportion of negative affect bids	$\beta = .26^{*d}$, $R^2 = .06$	
Proportion of aggressive bids		$\beta = -.63^{*i}$, $R^2 = .38$
Average duration of aggressive bids		$\beta = -.81^{**i}$, $R^2 = .64$

Note. d = main effect maternal depression
g = main effect infant gender
i = interaction between maternal depression and infant gender
$^{*}p < .05$, $^{**}p < .01$.

differences were found with respect to the average number of infant bids per bout prior to receiving a response. However, for toddlers whose mothers were experiencing depression, a hierarchical multiple regression analysis yielded a significant interaction

between chronicity and toddler gender on the average number of bids per bout, $\beta = .23$, $p < .05$, accounting for 5% of the variance.

Figure 7 illustrates the values of the average number of bids per bout prior to receiving a response for daughters and sons generated by the interaction term, using values one standard deviation above and below the mean of chronicity. As predicted, the plot suggests the more chronic the mother's depression, the more average bids per bout in which infant sons engage prior to receiving a response, and contrary to expectation, the fewer average bids per bout in which infant daughters engage prior to receiving a response.

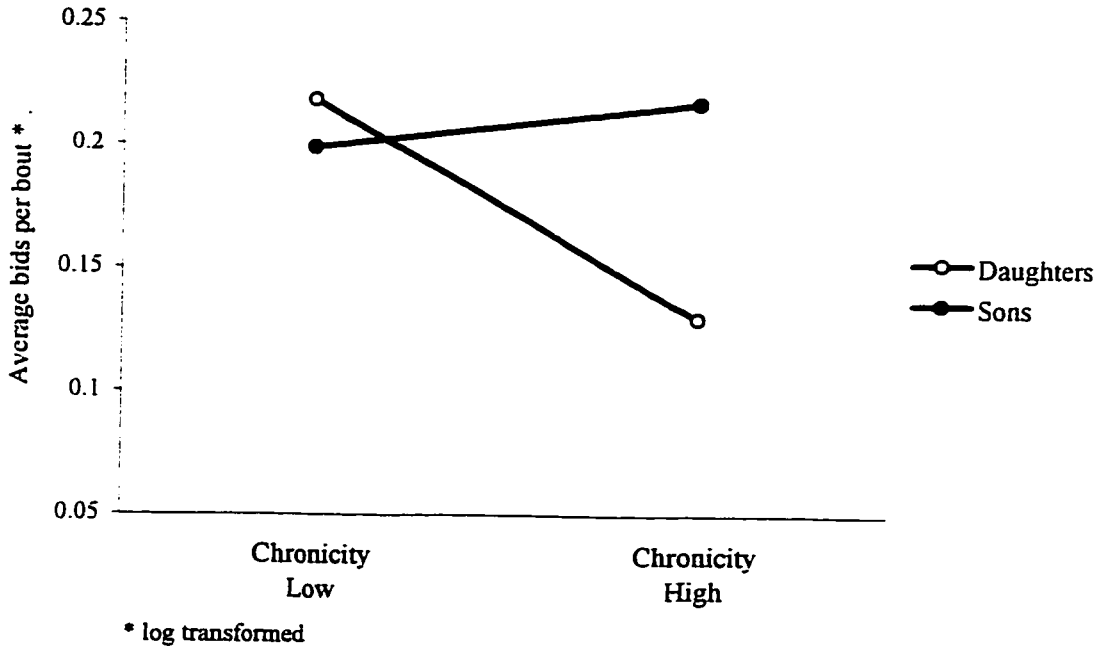


Figure 7. Average Bids Per Bout by Chronicity of Maternal Depression and Infant Gender

Follow-up regression analyses for daughters and sons separately yielded a significant main effect of chronicity on the average bids per bout for infant daughters,

$\beta = -.32$, $p < .05$, accounting for 10% of the variance. There was no significant relation between chronicity of maternal depression and the average bids per bout in which infant sons engaged.

Thus, although no group differences were found with respect to the average bids per bout in which toddlers engaged prior to receiving a response, partial support was found for the hypothesis that increased depression would be associated with increased bids per bout.

It was also predicted that, compared to toddlers of nondepressed mothers, toddlers of depressed mothers would escalate the intensity of bids prior to a receiving a response. Further, it was predicted that increased maternal depression would be associated with an increase in the proportion of bid bouts during which escalation occurred. Escalation, as defined in the present study, occurred if the bid occurring at the point at which a response began, or immediately prior to the beginning of a response, was of a higher level of intensity than the immediately preceding bid.

No group differences or effects of severity or chronicity of maternal depression were found with respect to the escalation of toddler bids. Thus, no support was found for the hypothesis that toddlers of depressed mothers would escalate the intensity of their bids prior to receiving a response, or that severity or chronicity of depression would be positively associated with escalation.

Proximity and physical contact bids. It was predicted that oddlers of depressed mothers would seek and remain in proximity to mothers more or less than toddlers of nondepressed mothers, and that increased depression would be associated with an increase or decrease in infants proximity to mothers. Recall, proximity was defined as toddlers approaching from greater than 1 ft. away from their mother, to within less than 1 ft. from her.

No group differences or effects of severity or chronicity of depression were found with respect to the proportion of bids in which toddlers approached mothers. However, group differences and effects of severity and chronicity of depression were found with respect to the average duration toddlers remained near mothers. An ANCOVA with maternal depression status and toddler gender as independent variables, and the average duration toddlers remained in proximity to mothers as the dependent variable, yielded a significant main effect of toddler gender for mothers of differing depression severity levels, $F(1,124) = 6.08$, $p < .05$. As shown in Figure 8, this result indicates that infant daughters remained in proximity to mothers for longer average durations than infant sons.

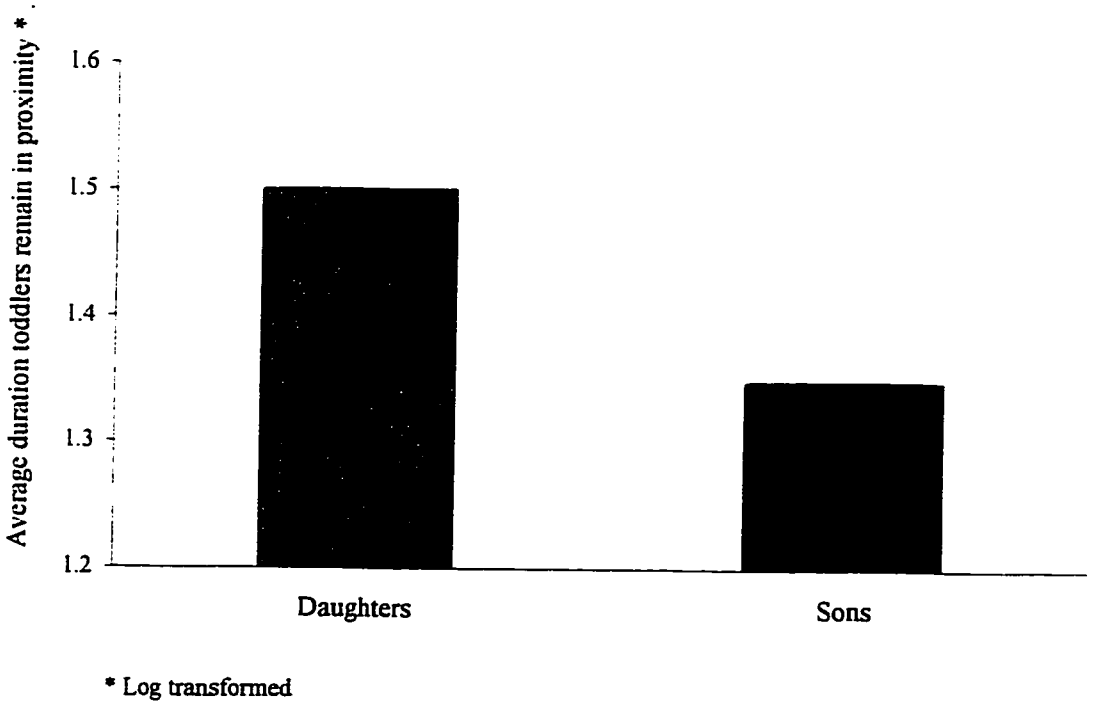


Figure 8. Average Duration Toddlers Remain in Proximity to Mothers by Infant Gender

For toddlers whose mothers were experiencing depression, a hierarchical multiple regression analysis yielded a significant main effect of symptom level on the average

duration toddlers remained near mothers, $\beta = -.26$, $p < .05$, accounting for 6% of the variance. In addition, significant main effects of toddler gender emerged for regression analyses employing symptom level and chronicity, $\beta = -.30$, $p < .05$, each accounting for 9% of the variance. As shown in Figures 9 and 10, these results indicate that the more depressive symptoms mothers endorsed, the shorter the average duration infants remained in proximity to mothers, and that infant daughters remained in proximity for longer average durations than infant sons.

Thus, no support was found for the hypothesis that toddlers of depressed mothers would seek proximity to their mothers more or less often than toddlers of nondepressed mothers, or that proximity seeking would be associated with the degree of maternal depression. Nor was support found for the hypothesis that toddlers of depressed mothers would remain in proximity to mothers for longer or shorter periods. However, support was found for the hypothesis that increased depression would be associated with an increase or decrease in the length of time toddlers remained in proximity to mothers.

It was also predicted that toddlers of depressed mothers would engage in more or less physical contact with mothers than toddlers of nondepressed mothers, and that increased depression would be associated with an increase or decrease in physical contact. In the present study, physical contact was defined as the infant's head or torso coming into contact with the mother's head, torso, or legs, and included the infant leaning on the mother, climbing into the mother's lap, or sitting between and in contact with the mother's legs. It should be noted that a portion of toddlers did not engage in physical contact bids resulting in a bi-modal distribution for the proportion of these bids. Thus, as indicated above, chi-square analyses were performed to determine whether depressed and

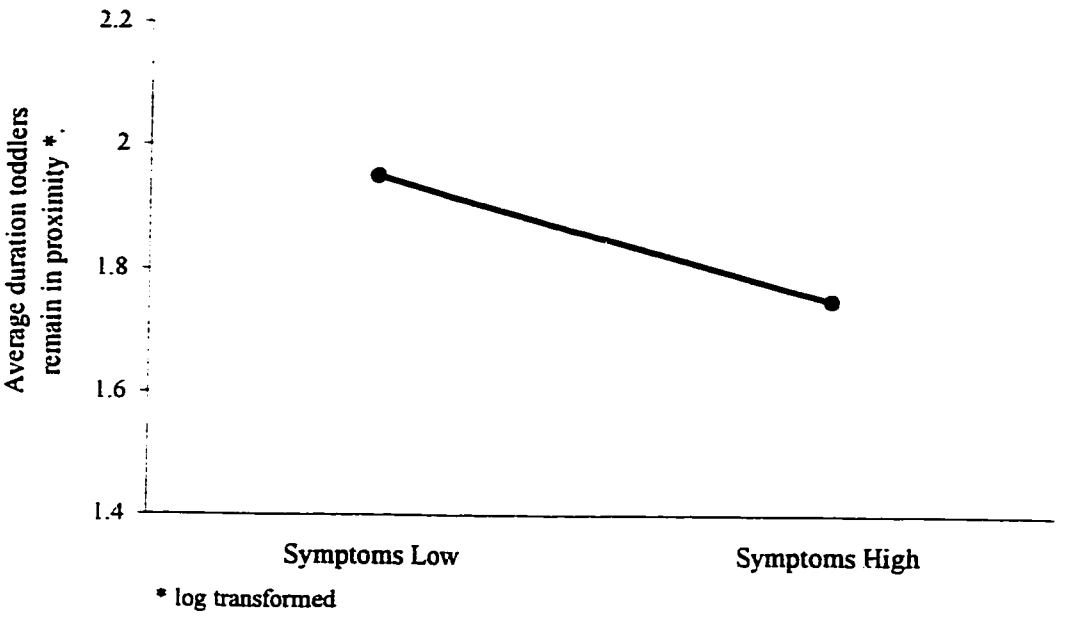


Figure 9. Average Duration Toddlers Remain in Proximity to Mothers by Mothers' Symptom Level

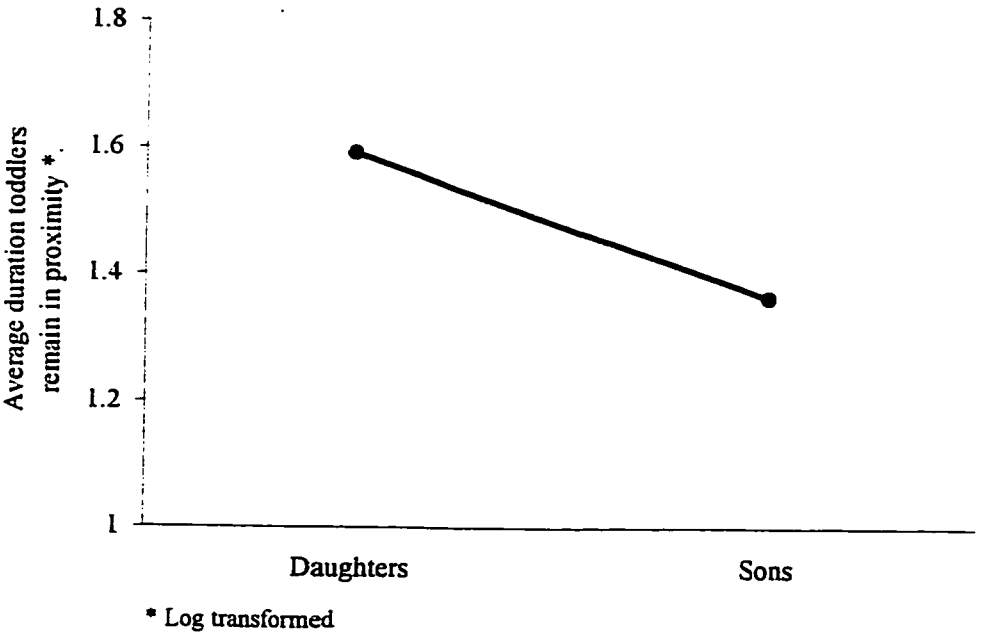


Figure 10. Average Duration Toddlers Remain in Proximity to Mothers by Infant Gender

nondepressed groups differed in their engagement in the behavior. These were followed by analyses performed on infants who engaged in physical contact at least once.

No group differences or effects of severity or chronicity of depression for toddlers whose mothers were experiencing depression were found with respect to toddlers' engagement in physical contact with mothers. Thus, no support was found for the hypotheses that toddlers of depressed mothers would initiate physical contact with mothers more or less often than toddlers of nondepressed mothers, or that increased maternal depression would be associated with an increase or decrease in toddlers' initiation of physical contact.

Negative bids. It was predicted that toddlers of depressed mothers would engage in more negative bidding behavior than toddlers of nondepressed mothers, and that increased depression would be associated with an increase in negative bidding. A specific prediction was that toddlers of depressed mothers would engage in longer average durations of negative affect. Two negative bidding behaviors were evaluated, negative affect and aggressive bids. A portion of infants failed to engage in one or both of these behaviors, resulting in bi-modal distributions for the proportion of the behavior. As indicated above, chi-square analyses were performed to determine whether depressed and nondepressed groups differed in their failure to engage in these negative behaviors. These analyses were followed by analyses performed on participants who engaged in these negative behaviors at least once.

Chi-square analyses evaluating maternal depression status by toddler gender with respect to the occurrence/nonoccurrence of negative affect bids were non-significant. In addition, no group differences were found when an ANCOVA with maternal depression status and toddler gender as independent variables, and the proportion of negative affect bids, for infants who engaged in negative affect at least once, as the dependent variable

were performed. However, for toddlers whose mothers were experiencing depression, a hierarchical multiple regression analysis performed for infants who engaged in negative affect as least once, yielded a significant main effect of symptom level on the proportion of negative affect bids in which infants engaged, $\beta = .26$, $p < .05$, accounting for 6% of the variance. As predicted, and as illustrated in Figure 11, this result indicates that the more symptoms of depression mothers endorsed, the greater the proportion of negative affect bids in which infants engaged.

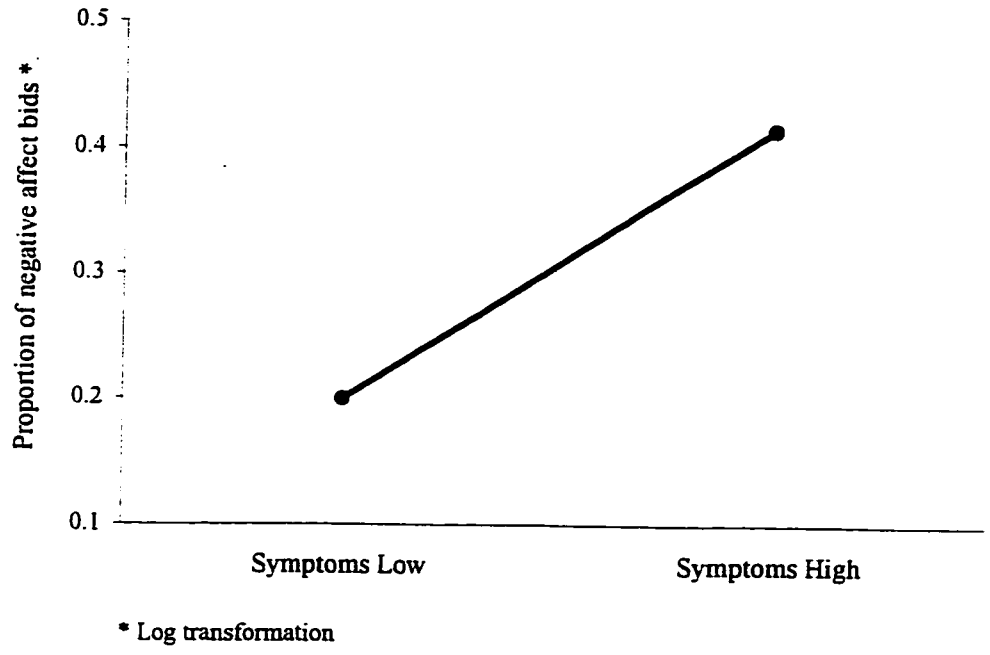


Figure 11. Proportion of Negative Affect Bids by Mothers' Symptom Level

Contrary to expectation, no group differences or effects of severity or chronicity of depression were found with respect to the average duration of toddlers negative affect bids. Thus, no support was found for the hypothesis that toddlers of depressed mothers would engage in more and longer lasting negative affect bids than toddlers of

nondepressed mothers. However, partial support was found for the hypothesis that increased maternal depression would be associated with increased negative affect, with greater maternal symptoms associated with a greater proportion of negative affect bids. However, no support was found for the specific hypothesis that increased depression would be associated with longer average durations of negative affect.

Toddlers' aggressive bids were also evaluated, however, the sample size was small as only 24 (17%) of 142 toddlers engaged in aggressive bids. Chi-square analyses evaluating whether the occurrence/nonoccurrence of aggressive bids varied by maternal depression status were nonsignificant. However, an ANCOVA with maternal depression status and toddler gender as independent variables, and the proportion of aggressive bids, for infants who engaged in at least one aggressive bid, as the dependent variable, yielded a significant interaction between depression severity level and toddler gender, $F(3, 13) = 4.70$, $p < .05$. Subsequent t-tests comparing nondepressed mothers and mothers in one of three depressed groups were performed separately for daughters and sons, as well as t-tests comparing daughters versus sons in each of the four groups. As predicted, and as shown in Figure 12, significant t-tests indicate that infant daughters of mothers with Major Depression engaged in a greater proportion of aggressive bids than daughters of mothers with subthreshold depression, $t(13) = -2.40$, $p < .05$, those reporting symptoms of depression, $t(13) = -2.38$, $p < .05$, and nondepressed mothers, $t(13) = -2.60$, $p < .05$. Also in line with prediction, a significant t-test indicates infant sons of mothers reporting symptoms of depression engaged in a greater proportion of aggressive bids than sons of nondepressed mothers, $t(13) = -3.18$, $p < .01$. However, contrary to prediction, infant sons of mothers reporting symptoms of depression also engaged in a greater proportion of aggressive bids than sons of mother's with Major Depression, $t(13) = 2.95$, $p < .05$.

Further, significant t-tests indicate that infant sons of mothers reporting symptoms of depression engaged in a greater proportion of aggressive bids than infant daughters of mothers reporting symptoms of depression, $t(13) = -2.43$, $p < .05$. Finally, a significant t-test indicates infant daughters of mothers with major depression engaged in a greater proportion of aggressive bids than infant sons of mothers with Major Depression, $t(13) = 2.57$, $p < .05$.

For toddlers whose mothers were experiencing depression, a hierarchical multiple regression analysis yielded a significant interaction between chronicity and toddler gender on the proportion of aggressive bids in which infants engaged, $\beta = -.63$, $p < .05$, accounting for 38% of the variance.

Figure 13 illustrates the values of the proportion of aggressive bids for daughters and sons generated by the interaction term, using values one standard deviation above and below the mean of chronicity. As predicted, the plot suggests that the more chronic the mother's depression, the greater the proportion of aggressive bids in which infant daughters engaged, and contrary to expectation, the smaller the proportion of infant bids in which infant sons engaged.

Follow-up regressions for daughters and sons separately yielded a trend for a main effect of chronicity on the proportion of aggressive bids in which sons engaged, $\beta = -.81$, $p < .10$, accounting for 65% of the variance. A follow-up regression for infant daughters did not yield a significant relation between the chronicity of maternal depression and the proportion of aggressive bids in which daughters engaged.

Thus, partial support was found for the hypotheses that toddlers of depressed mothers would engage in more aggression than toddlers of nondepressed mothers, and that increased maternal depression would be associated with increased toddler aggression.

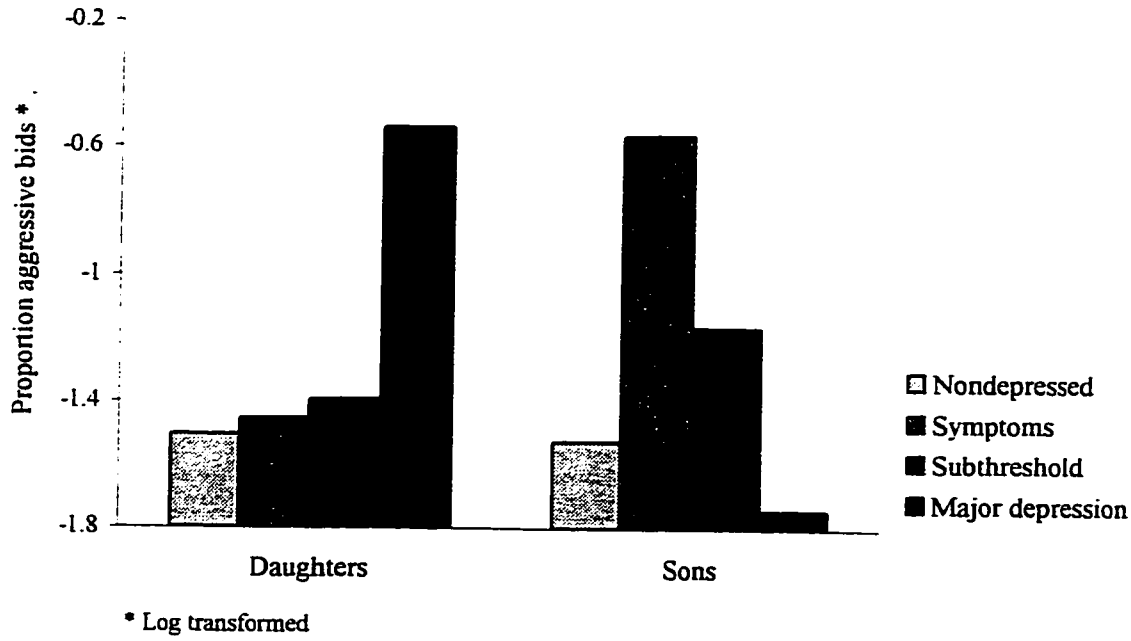


Figure 12. Proportion of Aggressive Bids by Mothers' Depression Severity Level and Infant Gender

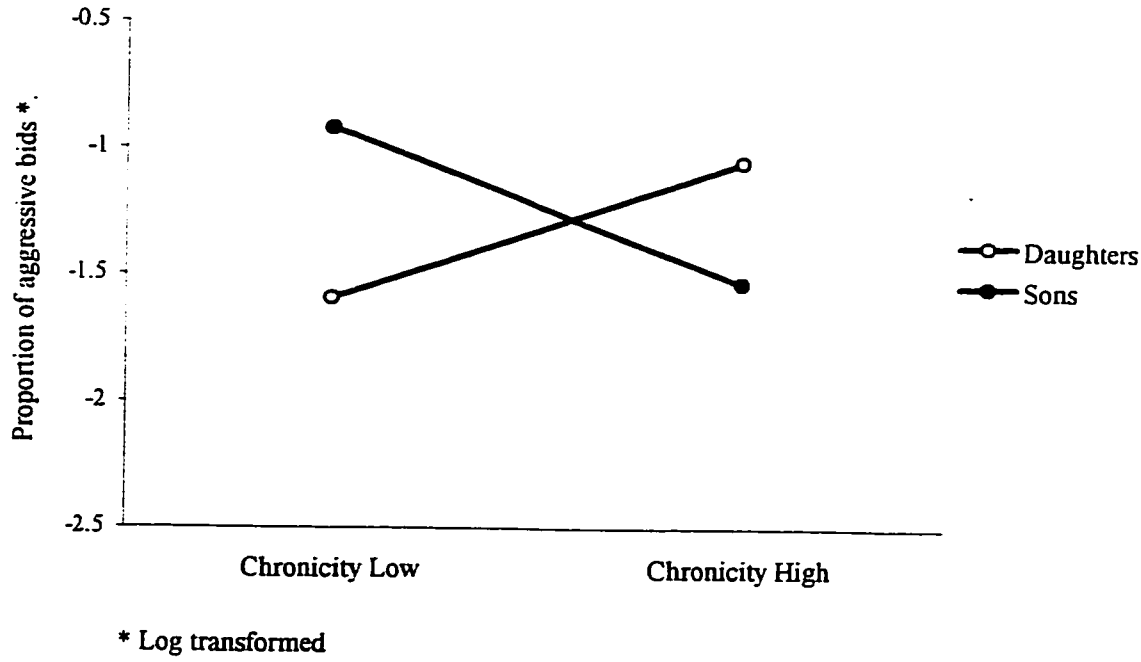


Figure 13. Proportion of Aggressive Bids by Chronicity of Maternal Depression and Infant Gender

The average duration of toddlers aggressive bids was also evaluated. No group differences were found with respect to the average duration of aggressive bids. However, for toddlers whose mothers were experiencing depression, a hierarchical multiple regression analysis, selected for occurrences, yielded a significant interaction between chronicity and toddler gender on the average duration of infants' aggressive bids, $\beta = -.81$, $p < .01$, accounting for 64% of the variance. Figure 14 illustrates the values of the average duration of aggressive bids for daughters and sons generated by the interaction term, using values one standard deviation above and below the mean of chronicity. The plot indicates, the more chronic the mother's depression, the longer the average duration infant daughters engaged in aggressive bids, and the shorter the average duration infant sons engaged in aggressive bids.

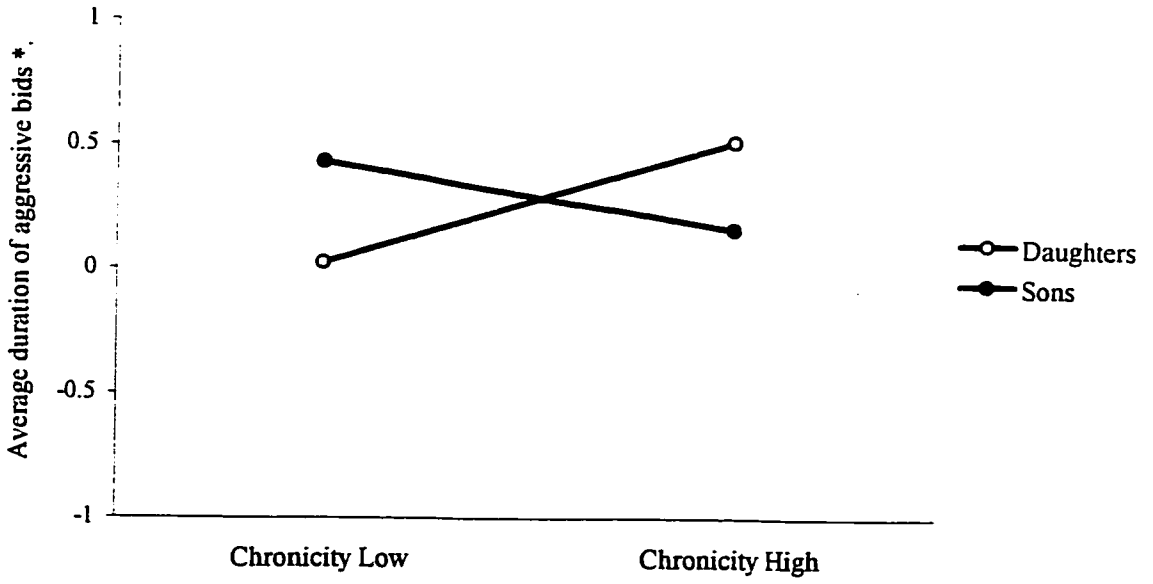


Figure 14. Average Duration of Aggressive Bids by Chronicity of Maternal Depression and Infant Gender

Follow-up regression analyses for chronicity for daughters and sons separately yielded a significant main effect of chronicity on the average duration of aggressive bids for daughters, $\beta = .85$, $p < .01$, and a trend for a main effect of chronicity on the average duration of aggressive bids for sons, $\beta = -.82$, $p < .10$.

Thus, while no support was found for the hypothesis that toddlers of depressed mothers would engage in longer episodes of aggressive behavior than toddlers of nondepressed mothers, partial support was found for the hypothesis that increased maternal depression would be associated with longer episodes of toddler aggression.

Discussion

A wealth of research has documented that children of depressed mothers are at heightened risk for a wide range of emotional and behavioral difficulties. However, less is known about the processes by which such psychopathology develops. Hypotheses regarding such processes include the transmission of genetic vulnerability to mood disorders, prenatal effects, as well as the parenting behavior of depressed parents. While behavioral research has investigated the interaction between depressed mothers and young infants (0-6 mos.), little is known about the interaction between depressed mothers and toddler-aged children. The present study is among a handful to investigate the behavioral interaction between depressed mothers and their toddlers. The focus of the current investigation was to characterize the interaction between depressed mothers and toddlers in a context in which important aspects of their relationship were drawn out, with an eye toward understanding the parenting behavior of depressed mothers, as well as infants' contributions to the interaction. Ultimately, an understanding, across development, of the patterns of interaction between depressed parents and their children will inform knowledge regarding the behavioral processes at work in the inter-generational transmission of affective disorders. In addition, it will provide for the development of effective interventions for depressed mothers. As the findings in the present study indicate, the relations between maternal depression and mother and toddler behavior are complex and intriguing.

Overview

In contrast to previous research on the behavioral interaction between depressed mothers and young children, relatively few differences between nondepressed dyads and dyads in which mothers were experiencing depression emerged in the present study.

However, several effects of the severity and chronicity of mothers' depression on behavior were found.

The paucity of group differences raises the question of whether and how the demographic characteristics of the present sample may have effected findings. Unlike previous studies, the current sample was comprised predominantly of middle class, married, Caucasian mothers and children. These demographic factors may have mitigated to some extent the effect of maternal depression on mothers' behavior by providing important resources and support, thus reducing the stress experienced by these depressed mothers. In addition, these generally more privileged and educated mothers may have been better informed regarding optimal parenting practices. As a result, they may have made an effort to present their best parenting skills in the laboratory, thus diminishing differences between depressed and nondepressed groups.

The main effects of maternal depression on mother and toddler behavior will be discussed first, followed by discussion of the unanticipated pattern of interaction between maternal depression and toddler gender to emerge in the present research.

Main Effects of Maternal of Depression

Mother behavior. One main effect of depression to emerge in the present study involved mothers' negative responses. As predicted, depressed mothers, particularly those with lower levels of depression, were more likely to respond with negative affect, intrusiveness, or to disengage from infants than nondepressed mothers. However, contrary to prediction, mothers with lower levels of depression were also more likely to respond negatively than mothers with Major Depression (refer to Table 13, pg. 49). One explanation is that while both mothers with mild, and those with more severe depression have negative patterns of thinking, mothers with milder depression have more energy to respond negatively, particularly, to behave angrily or intrusively. An alternative

explanation is that milder levels of depression are frequently comorbid with other psychological difficulties, including personality disorders, and that greater likelihood of negative responding among mothers with lower levels of depression reflects depressive symptoms in interaction with other psychopathology. These findings regarding depressed mothers likelihood of responding negatively to toddlers are generally consistent with the work of Radke-Yarrow et al. (1993). They found depressed mothers of toddler-aged children expressed more negative emotion including more downcast expressions, and anxiety. Radke-Yarrow and colleagues also found that more severely depressed mothers exhibited more total negative affect, as well as more downcast behavior and anxiety than less severely depressed mothers. In summary, the mothers in the present study experiencing lower levels of depression, may be characterized as parents who were more likely to respond with negative affect, intrusiveness, or to disengage from their children than nondepressed mothers.

In addition to the above result regarding negative responses, two counter-intuitive main effects of depression involving mothers' ignoring behavior also emerged. One finding indicated the more chronic mothers' depression, the smaller the proportion of infant bids mothers ignored. More specifically, another finding indicated the more chronic mothers' depression, the smaller proportion of bids mothers ignored when infants were in proximity to mothers. The implications of these counter-intuitive effects of depression will be discussed below.

Toddler behavior. Two findings regarding main effects of maternal depression on toddler behavior also emerged in the current investigation. These findings indicated that the more symptoms of depression mothers reported, the greater the proportion of negative affect bids in which toddlers engaged, and the shorter the average duration infants remained in proximity to mothers.

As predicted, a positive association was found between severity of maternal depression and infants' negative affect. Thus, for toddlers who are in the process of learning who to regulate their emotions, having an increasingly severely depressed mother, who likely struggles to some extent with emotion regulation herself, is associated with infants engaging in greater negative affect. This finding is generally consistent with reports by Cox and colleagues (1987) who found toddlers of depressed mothers expressed more distress than toddlers of nondepressed mothers, as well as with reports by Radke-Yarrow et al. (1993) who found children of mothers with unipolar depression spent more time in negative (anxious-sad, irritable-angry, and downcast) bouts than children of control mothers. In addition, although few investigators have evaluated the role of severity and chronicity of maternal depression, the present result parallels a finding in which Stein and colleagues (1991) found chronicity of maternal depression to be positively associated with a greater number of negative responses from toddlers.

To the investigators knowledge, the present investigation is the first to evaluate infant's proximity seeking behavior in the relationship between depressed mothers and their toddler-aged children. In line with prediction, the amount of time toddlers remained in proximity to depressed mothers decreased as the severity of the mothers' depression increased. This suggests it may become increasingly less rewarding for infants to remain near their mothers as the severity of her depression increases.

Together, these main effects of depression suggest that toddlers of increasingly depressed mothers may have increasing reason to become upset, or have increasing difficulty regulating their emotions. Further, it may become increasingly less rewarding for infants to remain near their mothers.

Interactions Between Maternal Depression and Toddler Gender

Sensitivity and responsiveness. In addition to the main effects of depression that generally paralleled previous findings, a central theme to emerge in the present study involved interactions between maternal depression and toddler gender. A distinct pattern of mother-child interaction emerged; specifically, the more severe the mother's depression, the more sensitive and responsive mothers became toward infant daughters, and the less sensitive and responsive they became toward infant sons. Not surprisingly, toddler behavior dove-tailed with that of mothers, with the infant data indicating the more chronic the mother's depression, the harder infant sons had to work in order to obtain their mother's attention, while it became easier for daughters to engage their mothers. To be more specific, the greater the mother's depression, the less time mothers took to respond to low and high intensity bids from infant daughters, and the fewer bids in which infant daughters engaged in prior to receiving a response. In contrast, the greater the mother's depression, the longer mothers took to respond to low and high intensity bids from infant sons, and the more bids per bout in which sons engaged prior to receiving a response.

Although the results regarding relations between maternal depression and mothers' behavior toward daughters may seem counter-intuitive, they parallel results that emerged in a longitudinal study by Radke-Yarrow et al. (1995). Radke-Yarrow and colleagues conducted a study evaluating complex relations between attachment, other stressors including maternal depression, mother-child behavioral interaction, and child outcomes. In an effort to delineate complex and multiple pathways from conditions of varying risk and protection to child outcomes, several subgroups of mothers and children were identified. One subgroup to emerge was characterized by mothers with unipolar depression whose children were securely attached. (It should be noted that both secure and insecure attachments have been found in a wide variety of high risk contexts.) The depressed

mothers in these dyads were found to be highly sensitive, responsive, and warm to their preschool-aged children. In addition, Radke-Yarrow et al. found that these highly sensitive, responsive, and warm mothers were particularly prevalent among mother-daughter dyads (56%) compared to mother-son dyads (6%). Further, Radke-Yarrow and colleagues characterized the children of these mothers as relating predominantly with dependent neediness, affective closeness, and high involvement. They concluded that, to varying degrees, these mothers and children were 'psychologically merged.' Assuming that such a subgroup exists in the present sample, it follows that over-identification and enmeshment between these depressed mothers and children, predominantly daughters, could lead to quick responses from mothers who may perceive daughters as needy or in distress. Interestingly, Radke-Yarrow and colleagues did not identify a subgroup in which depressed mothers were less sensitive or responsive to sons.

In addition, the two previously mentioned counter-intuitive findings, in which chronicity of maternal depression was associated with mothers ignoring a smaller proportion of toddler bids regardless of the infant's gender, can also be understood in terms of Radke-Yarrow's findings. Although Radke-Yarrow and colleagues did not evaluate mothers' ignoring behavior, the negative association between chronicity of maternal depression and mothers' ignoring in the present investigation, is also consistent with the presence of a subgroup of depressed mothers who were highly sensitive and responsive to their toddlers. Further, although the subgroups Radke-Yarrow et al. identified was comprised primarily of mothers and daughters, it was not comprised exclusively of mother-daughter dyads. It is not clear, however, why in the present study, the association between mothers' depression and her ignoring behavior does not vary by infant gender, while the association between maternal depression and mothers' latencies to

respond to toddlers bids differs for daughters versus sons. Further investigation is needed to address this issue.

Emotional expression. The distinct pattern of interaction between mothers and daughters versus mothers and sons becomes more complex when one considers the emotional expression of mothers and infants in interaction with each other (see Table 16).

Table 16. Associations Between Maternal Depression and Mother-Daughter Versus Mother-Son Interaction

Mother-Daughter Interaction
⇧ maternal depression
• mothers respond more quickly
• daughters engage in fewer bids prior to receiving a response
• daughters more aggressive
Mother-Son Interaction
⇧ maternal depression
• mothers respond more slowly
• longer negative feedback responses from mothers
• sons engage in more bids prior to receiving a response
• sons less aggressive

For example, the data in the present study indicate, the more chronic the mother's depression, the greater the proportion of aggressive bids in which infant daughters engaged, and the longer the average duration of those bids. Thus, the greater the mothers' depression, the more sensitive and responsive she became to her infant daughter, while her daughter expressed increasing aggression.

Infant daughters of depressed mothers in the present study may have mothers who are especially sensitive and responsive, however, they may pay a price for this close

association. To the degree that infant daughters are 'psychologically merged' with mothers, they may be more vulnerable to exposure to their mothers' negative emotional states, contributing to difficulty with emotion regulation, and possibly greater aggression. Radke-Yarrow and colleagues (1993) raised this possibility suggesting that, compared to sons, daughters of depressed mothers may be at risk of exposure to higher levels of maternal negative affect. In their research they found that depressed mothers of daughters engaged in more downcast expressions than control mothers of daughters. Additionally, Radke-Yarrow et al. (1993) found that bouts of negative affect of mothers with more severe depression were associated with daughter's negative affect, but not with son's. They further suggested that, compared to mothers and sons, mothers and daughters may be more affectively responsive to each other when negative affect is expressed.

In addition, there is some evidence from the developmental literature that mothers may be generally more emotionally expressive to daughters than sons. In her longitudinal study evaluating emotional expression during the first two years of life, Malatesta et al. (1989) reported that mothers of 2-year-olds showed a greater range of emotional expression to daughters than to sons. Malatesta and colleagues hypothesize that these findings may explain why females have been found to be better at decoding emotional expression in others than males.

While these hypotheses are worthy of further investigation, it should be noted, that the only gender difference in mother's negative expressions documented in the present research was that, more chronic maternal depression was associated with mothers engaging in longer negative feedback responses to sons.

Further, in two other studies of mother-infant interaction by Malatesta employing a separation/reunion paradigm, it was found that daughters and sons displayed similar levels of anger during play, but that daughters displayed more anger during a reunion episode

with mothers following a separation (Malatesta et al. 1989; Malatesta, 1981). Malatesta and colleagues (1989) suggest that there is some evidence (Chodorow, 1978) and much conjecture that, mothers may encourage daughters to remain physically and emotionally closer to them than sons, and that this may cause daughters to have more difficulty tolerating separations. Although no separations of the sort Malatesta was referring to occurred in the present study, it is possible that the depressed mothers' unavailability due to her focus on the questionnaire was experienced by daughters as a type of 'separation,' and may have contributed to greater aggression.

The emotional expression between mothers and infant sons stands in contrast to that of mothers and daughters. As findings in the present study indicate, the more severe the mother's depression, the longer her negative feedback responses to infant sons became, while, the more chronic her depression, the smaller the proportion of aggressive bids in which sons engaged, and the shorter the average duration of those bids. Thus, the greater the mother's depression, the less sensitive and responsive she became and the longer were her negative feedback responses, while her son expressed decreasing aggression.

Negative feedback responses, as defined in this study, consist primarily of mothers setting limits with infants. Thus, the positive association between the severity of maternal depression and the length of mothers' negative feedback responses to infant sons may well be the result of sons engaging in behaviors in which mothers do not want them to engage, in order to gain their preoccupied mothers' attention. Caregivers responsible for toddler and preschool age children know only too well how much energy, enthusiasm, and creativity is required to proactively encourage appropriate behavior in young children. While in the short-run it may seem easier to wait for difficulties to arise and then set limits, caregivers know this is not an optimal long-term strategy. While the depressed mothers in

the present study may have also known this, they may not have had the energy or outlook necessary to direct active toddlers to appropriate activities, particularly sons.

With respect to the negative association between maternal depression and infant son's aggression, one explanation is that sons' aggression may decrease due to sons distancing themselves from their mothers as maternal depression increases. Support for the notion that sons may maintain increasing distance from mothers as maternal depression increases, comes from a previously unreported trend. A regression analysis revealed an interaction between the chronicity of maternal depression and infant gender on the proportion of physical contact bids in which toddlers engaged, $\beta = -.24$, $p < .10$, accounting for 6% of the variance. This trend suggests, the more chronic the mother's depression, the smaller the proportion of bids in which infant sons initiated significant physical contact with mothers, while the greater the proportion of bids in which daughters initiated significant physical contact.

Radke-Yarrow and colleagues (1993) are the only other researchers to have investigated gender differences in the emotional behavior of toddler-aged children of depressed mothers. In contrast to the findings in the present study, they found no differences in the total amount of negative emotion expressed by girls versus boys, however, they found that girls expressed more anxiety, and boys expressed more irritability regardless of maternal depression status.

The findings in the present study regarding the emotional expression of depressed mothers and their children support the notion that, at least in some contexts, depressed mothers and daughters have different patterns of interaction and involvement than depressed mothers and sons. While some hypotheses have been offered regarding these differences, interpretation remains challenging. This challenge is complicated by the fact that only a small proportion of the toddlers engaged in aggression. While it makes sense

that daughters of depressed mothers may be at heightened risk for participating in their mothers' negative emotions, and while this may lead to problems with emotion regulation and greater expression of negative emotion, it is less clear why greater maternal depression would be associated, specifically, with greater aggression from daughters. Similarly, while it makes sense that infant sons of depressed mothers would experience frustration or distress as increasingly depressed mothers became less responsive, and engaged in greater negative feedback toward them, it is less clear why sons would respond with decreasing aggression.

Further, the pattern of interaction between maternal depression and toddler gender to emerge in the present study suggests that, infant daughters and sons of depressed mothers may be placed at differential risk associated with the different ways in which maternal depression plays itself out behaviorally in the mother-daughter versus mother-son relationship. In addition, findings raise the possibility that there may be positive and/or protective as well as negative effects of the behavioral interaction between depressed mothers and their toddlers. While the close and responsive interaction between depressed mothers and daughters may expose daughters to greater negative emotion, and place them at increased risk for difficulty with emotion regulation and the development of emotional and behavioral problems, it is possible that this closeness and responsivity serves a positive role as well. Research suggests that a sensitive and responsive parenting style typifies good mothering (Ainsworth et al., 1978). In addition, a close and responsive relationship may facilitate the development of social-emotional skills such as perspective-taking, empathy, and the accurate decoding of others' emotions, laying a foundation toward later success in interpersonal relationships. In contrast, the less close, and less responsive interactions between depressed mothers and sons may protect sons, to some extent, from exposure to their mother's negative emotional states, however, the effect of the

unavailability of a psychiatrically disturbed parent presents its own risks. To the extent that chronically depressed mothers and sons maintain a distance from each other, this may compromise the development of social-emotional skills in sons. Clearly, the findings to emerge in the present study suggest complex relations between the behavioral manifestations of maternal depression and the possible risks to their young children. Further research investigating these issues is necessary.

Issues Raised

While relatively few main effects of depression emerged in the present study, the results suggest significant differences in the ways in which depressed mothers and daughters versus mothers and sons interact. However, as few studies have reported gender differences in the interaction of depressed mothers and children, it is difficult to know whether the findings to emerge in the present investigation represent broad-based differences in the ways in which depressed mothers and daughters interact versus depressed mothers and sons. It is possible that the findings in the present study reflect subgroups of depressed mothers and children comprised predominantly of infants of one gender or another, that would emerge if a different approach to the data were taken. In their complex and extensive investigation, Radke-Yarrow and colleagues (1995) reported only two significant gender differences associated with maternal depression. In addition to identifying a subgroup of depressed mothers who were highly sensitive, responsive, and warm, predominantly with daughters, they also identified a subgroup of depressed mothers who were 'affectively engulfing' of sons. 'Affectively engulfing' mothers were described as those who used their children's need for nurturance and affection to meet their own needs. While the data in the present study seem to parallel that of Radke-Yarrow and colleagues with respect to depressed mothers being more sensitive and responsive primarily to daughters, no evidence emerged in the current investigation suggesting depressed mothers

were 'affectively engulfing' of sons. This may be a function of hypotheses that did not provide for the analysis of relevant data, it may be the result of not taking a subgrouping approach in data analyses, or it may be that such a pattern does not exist in the present sample. Future analyses may shed light on these issues.

The pattern of findings in the current research also raises the possibility that the association between increasing maternal depression and differential sensitivity and responsiveness to daughters versus sons may represent an accentuation of typical differences in patterns of relating between mothers and daughters versus sons. Recall, the gender differences to emerge in the present study included the findings that mothers engaged in longer active responses with infant daughters, and that daughters remained in proximity to mothers for longer periods than sons. These differences suggest that mothers and infant daughters may be generally more involved with each other than mothers and sons. Assuming this is true, it is possible that mothers and infant daughters may respond to increasingly severe or chronic maternal depression by becoming increasingly attuned to and involved with each other, while mothers and sons may respond to increasing depression by withdrawing from each other. Support for this notion comes from the above reported trend in which chronicity of maternal depression was associated with an interaction between chronicity of depression and infant gender. While chronicity of depression was positively associated with bids for physical contact from daughters, it was negatively associated with such bids from sons. Future investigations may want to explore the hypothesis that the behavioral interaction between depressed mothers and daughters versus sons represents an accentuation of typical differences in patterns of interaction.

Limitations of the Present Study

There are several limitations to the present study. A significant limitation was the relatively large number of analyses conducted, and, at times, the small sample size

employed due to the fact that not all participants engaged in behaviors of interest, thus increasing the probability of chance findings. Nonetheless, it should be noted that some mother behavior results dove-tailed conceptually with toddler behavior results providing convergent validity. For example, both the amount of time it took mothers to respond to toddlers, and the average number of bids per bout in which toddlers engaged prior to receiving a response were associated with increased maternal depression. Nevertheless, the findings in the current investigation should be considered tentative pending replication with a similar sample.

Another important limitation concerns the generizability of the results in the current investigation which apply only to middle-class Caucasian mothers and their toddler-aged children. This is an important consideration as even within this narrow sample, the findings in the present research indicate substantial heterogeneity in the manner in which mothers and toddlers interact. One would expect further variation in families of other ethnic or social groups. Further, research investigating the role of parent-child interaction in the inter-generational transmission of depression will not be complete without studies examining the role fathers play in families with a depressed parent.

A further significant limitation is that the present research did not evaluate the specificity of depression, or the role other psychosocial factors may play in the relations between maternal depression and mother and toddler behavior. This is important, as limited prior research has found that the difficulties of children of depressed parents were no different from those of nondepressed psychiatric or medically ill parents (Hammen & Gordon et al., 1987; Hirsch et al., 1985; Lee & Gotlib, 1989). Such findings raise the possibility that adjustment problems in the children of depressed parents may be the result of other factors associated with having a psychiatric or medically ill parent. These could include the psychological functioning of the parent other than depression, the availability

of the parent, or other aspects of the parents' interpersonal/social context such as marital satisfaction, social support, or significant life events.

A final and important limitation of the present study was the 'main effects' approach to analyzing the data. Although the main effects of depression found in the present study were generally consistent with prior research indicating that depressed mothers exhibit less optimal parenting skills, the pattern of interaction between maternal depression and toddler gender to emerge in the present study indicated that, in some contexts, greater depression is associated with increasing sensitivity and responsiveness. This pattern of interaction, as well as the findings of Radke-Yarrow and colleagues (1995) regarding subgroups of depressed mothers, indicate that important behavioral expressions of depression may be overlooked if investigators simply expect depressed parents to engage in less optimal parenting behavior. Moreover, the current findings as well as those of Radke-Yarrow point to the need for more sophisticated models regarding the relations between depressed parents and their children. Researchers and clinicians alike are increasingly aware that depression is a heterogeneous disorder with a highly variable course, and varying degrees of residual impairment between episodes. Similarly, depression is a disorder that is behaviorally heterogeneous, and one in which researchers should expect to observe diverse behavioral manifestations.

Contributions of the Present Study

The present study is one of the first to investigate the behavioral interaction between depressed mothers and their toddler-aged children, or to focus on depressed mothers' responsiveness to bids from infants to engage them. A strength of the present research was the use of a divided attention task to create a situation in which the ongoing interaction between mothers and toddlers was reduced, and the manner in which mothers and infants became engaged was highlighted. A further strength was the development and

use of a computer program to extract relevant behaviors from the basic coded data, including, maternal ignoring and latencies to respond to infant bids, as well as the number of bids per bout in which infants engaged.

Despite the 'main effects' approach taken in the present study, an important contribution of the present research was the investigation of several dimensions of depression and the mother-child relationship, including the severity and chronicity of the mother's depression, as well as the role of the child's gender. A related factor was the relatively large sample size which permitted examination of these dimensions.

Finally, the findings to emerge in the present study, while tentative, and in need of replication, nonetheless begin to characterize the varied ways in which maternal depression is expressed in the mother-toddler relationship, with increasing maternal depression associated with differential responsiveness and emotional expression between mothers and daughters versus mothers and sons. The current investigation provides insight regarding patterns of interaction, as well as clues regarding the contribution of the behavioral manifestations of maternal depression in placing young children at heightened risk for the development of psychological difficulties, especially affective disorders. This investigation points the way for further exploration of the different faces of depression in the context of the parent-child relationship.

List of References

Beardslee, W., Schultz, L., & Selman, R. (1987). Level of social cognitive development, adaptive functioning and DSM-III diagnoses in adolescent offspring of parents with affective disorders: Implications of the development of the capacity for mutuality. *Developmental Psychology, 23*, 807 - 815.

Billings, A. G. & Moos, R. H. (1983). Comparison of children of depressed and nondepressed parents: A social environment perspective. *Journal of Abnormal Child Psychology, 11*, 483 - 486.

Breslau, N., Davis, G., & Parbuki, K. (1988). Depressed mothers as informants in family history research - Are they accurate? *Psychiatry Research, 24*, 345 - 359.

Breznitz, Z. & Friedman, S. L. (1988). Toddlers' concentration: Does maternal depression make a difference? *Journal of Child Psychology and Psychiatry, 29*, 3, 267 - 279.

Campbell, S. B., Cohn, J. F. & Meyers, T. (1995). Depression in first time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology, 31*, 3, 349-357.

Chodorow, N. (1978). *The reproduction of mothering: Psychoanalysis and the sociology of gender.* Berkeley: University of California Press.

Cohn, J., Matias, R., Tronick, E. Z., Connell, D., & Lyons-Ruth, D. (1986). Face-to-face interactions of depressed mothers and their infants. In E. Z. Tronick and T. Field (Eds.), *Maternal depression and infant disturbance* (pp. 31 - 45). San Francisco: Jossey-Bass.

Conrad, M. & Hammen, C. (1993). Protective and resource factors in high- and low risk children: A comparison of children with unipolar, bipolar, medically ill, and normal mothers, *Development and Psychopathology, 5*, 593 - 607.

Cox, A. D., Puckering, C., Pound, A. & Mills, M. (1987). The impact of maternal depression in young children. *Journal of Child Psychology and Psychiatry, 28*, 6, 917 - 928.

Dawson, G., Grofer Klinger, L., Panagiotides, H., Spieker, S. & Frey, K. (1992). Infants of mothers with depressive symptoms: Electroencephalographic and behavioral findings related to attachment status. *Development and Psychopathology, 4*, 67 - 80.

Derogatis, L. R. & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine, 13*, 595 - 605.

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, D.C., American Psychiatric Association, 1994.

Downey, G. & Coyne, J. C. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin, 108*, 1, 50 - 76.

Fendrich, M, Warner, V. & Weissman, M. W. (1990). Family risk factors, parental depression, and psychopathology in offspring. *Developmental Psychology, 26*, 1, 40 - 50.

Field, T., Healy, B., Goldstein, S., & Guthertz, M. (1990). Behavior-state matching and synchrony in mother-infant interactions of nondepressed versus depressed dyads. *Developmental Psychology, 26*, 7 - 14.

Field, T., Healy, B., Goldstein, S., Perry, S., Bendall, D., Schanberg, S., Zimmerman, E., & Kuhn, C. (1988). Infants of depressed mothers show 'depressed' behavior even with nondepressed adults. *Child Development, 59*, 1569 - 1579.

Field, T. (1986). In E. Z. Tronick & T. Field (Eds.), Maternal depression and infant disturbance. *New Directions for Child Development*, No. 34. San Francisco: Jossey-Bass.

Field, T., Sandberg, D., Garcia, R., Vega-Lahr, N., Goldstein, S., & Guy, L. (1985). Prenatal problems, postpartum depression, and early mother-infant interactions. *Developmental Psychology, 12*, 1152 - 1156.

Gelfand, D. M. & Teti, D. M. (1990). The effects of maternal depression on children. *Clinical Psychology Review, 10*, 329 - 353.

Gelfand, D. M. & Teti, D. M. (1991). Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development, 62*, 918 - 929.

Hall, J. A. (1978). Gender effects in decoding nonverbal cues. *Psychological Bulletin, 85*, 845 - 857.

Hammen, C., Gordon, G., Burge, D., Adrian, C., Jaenicke, C., & Hiroto, G. (1987b). Maternal affective disorders, illness, and stress: Risk for children's psychopathology. *American Journal of Psychiatry, 144*, 736 - 741.

Hirsch, B. J., Moos, R. F., & Reischl, T. M. (1985). Psychosocial adjustment of adolescent children of a depressed, arthritic, or normal parent. *Journal of Abnormal Psychology, 94*, 154 - 164.

Houck, G. M., Booth, C. L. & Barnard, K. E. (1991). Maternal depression and locus of control orientation as predictors of dyadic play behavior. *Infant Mental Health Journal, 12*, 4, 347 - 360.

Jameson, P. B., Gelfand, D. M., Kulcsar, E., & Teti, D. M. (1997). Mother-toddler interaction patterns associated with maternal depression. *Development and Psychopathology, 9*, 537 - 550.

Keller, M. B., Shapiro, R. W., Lavori, P. W., & Wolfe, N. (1982). Recovery in major depressive disorders: Analysis with the life table and regression models. *Archives of General Psychiatry, 39*, 905 - 915.

Klein, D., Clark, D., Dansky, L., & Margolis, E. T. (1988). Dysthymia in the offspring of parents with primary unipolar affective disorder. *Journal of Abnormal Psychology, 94*, 115 - 127.

Kochanska, G., Kuczynski, L. & Maguire, M. (1989). Impact of diagnosed depression and self-reported mood on mothers' control strategies: A longitudinal study. *Journal of Abnormal Child Psychology, 17*, 5, 493 - 511.

Lee, C. & Gotlib, I. (1989a). Clinical status and emotional adjustment of children of depressed mothers. *American Journal of Psychiatry, 146*, 478 - 483.

Lee, C. & Gotlib, I. (1989b). Maternal depression and child adjustment: A longitudinal analysis. *Journal of Abnormal Psychology, 98*, 78 - 85.

Lyons-Ruth, K., Zoll, D., Connell, D. & Grunebaum, H. U. (1986). The depressed mother and her one year old infant: Environment, interaction, attachment, and infant development. In E. Tronick Y T. Fields (Eds.), *Maternal depression and infant disturbance* (pp. 61 - 82). San Francisco, Jossey-Bass.

Malatesta, C. Z., (1981, April). *Separation stress and the differential signaling behaviors of male and female infants.* Paper presented at the meeting of the Eastern Psychological Association, New York.

Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development, 53*, 991 - 1003.

Malatesta, C. Z., Grigoryev, P., Lamb, C., Albin, M., & Culver, C. (1986). Emotion socialization and expressive development in preterm and full term infants. *Child Development, 57*, 316 - 330.

Malatesta, C. Z., Culver, C., Tesman, R. J., & Shepard, B. (1989). The development of emotion expression during the first two years of life. *Monographs of the Society of Research in Child Development, 54*, (1 - 2, Serial No. 219).

O'Hara, M. (1986). Social support, life events, and depression during pregnancy and the puererium. *Archives of General Psychiatry, 43*, 569 - 573.

Orvaschel, H., Welsh-Allis, G., & Weijai, Y. (1988). Psychopathology in children of parents with recurrent depression. *Journal of Abnormal Child Psychology, 16*, 17 - 28.

Radke-Yarrow, M., Nottelmann, E., Belmont, B. & Welsh, J. D. (1993). Affective interactions of depressed and nondepressed mothers and their children. *Journal of Abnormal Child Psychology, 21*, 6, 683 - 695.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385 - 401.

Redding, R. E., Harmon, R. J. & Morgan, G. A. (1990). Relationships between maternal depression and infants mastery behaviors. *Infant Behavior and Development, 13*, 391 - 395.

Richters, J. & Pellegrini, D. (1989). Depressed mothers' judgements about their children: An examination of the depression-distortion hypothesis. *Child Development, 60*, 1068 - 1075.

Rutter, M. (1990). Comentary: Some focus and process considerations in regarding effects of parental depression on children. *Developmental Psychology, 26*, 1, 60 - 67.

Sarason, I. G., Johnson, J. H. Basham, R. B., & Sarason, B. R. (1983). Assessing social support: The social support questionnaire. *The Journal of Personality and Social Psychology, 1*, 127 - 139.

Spanier, G. B. (1976). Measuring Dyadic Adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family, 38*, 15 - 28.

Spitzer, R. L., Williams, J. B., Gibbon, M., & First, M. (1989). Structured Clinical Interview for DSM-III-R (with psychotic screen). Biometric Research Department, New York State Psychiatric Institute, NY: New York.

Stein, A., Gath, D. H., Bucher, J., Bond, A., Day, A. & Cooper, P. J. (1991). The relationship between post-natal depression and mother-child interaction. *British Journal of Psychiatry, 158*, 46 - 52.

Streissguth, A. P., Martin, D. C., Martin, J. C., & Barr, H. M. (1981). The Seattle longitudinal prospective study on alcohol and pregnancy. *Neurobehavioral Toxicology & Teratology, 3*, 223 - 233.

Weissman, M. (1988). Psychopathology in the children of depressed parents: Direct interview studies. In D. L. Dunner, E. S. Gershon, & J. E. Barrett (Eds.), *Relatives at risk for mental disorder* (pp. 143 - 159). New York: Raven Press.

Weissman, M., Gammon, D., John, K., Merikangas, K., Warner, V., Prusoff, B., & Sholomskas, D. (1987). Children of depressed parents. *Archives of General Psychiatry, 44*, 747 - 753.

Weissman, M., Leaf, P., & Bruce, M. L. (1987). Single parent women. *Social Psychiatry, 22*, 29 - 36.

Zahn-Waxler, C, Iannotti, R. J., Cummings, E. M. & Denham, S. (1990). Antecedents of problem behaviors in children of depressed mothers. *Development and Psychopathology, 2*, 271 - 291.

Appendix A.

Adjustment Strategies Questionnaire

1. What are some of the adjustments you've made in your life in the past year?

2. Which of your adjustments were unexpected, or required more of a change than you expected?

3. What aspects of yourself, your baby, or your situation have helped you cope with these adjustments?

4. Are there things you know now that it would have been helpful to know earlier in the past year?

5. What are you baby's favorite toys?

6. What are you baby's favorite activities?

7. Does you baby prefer to persist at a single activity for fairly long periods of time or change activities frequently?

8. What types of situations are most likely to frustrate your baby?

9. What have you found works best to help reduce frustration levels?

10. What have you found works best when your baby is fussy from fatigue or too much stimulation?

11. What do you do when you need to change your baby's behavior?

Appendix B.

Coding System Reliability Statistics

Behavioral Codes	Percent Agreement	Cohen's Kappa	Percent Occurrence of Behavior
Attention			
Questionnaire focus	96	92	37
Child focus	96	91	37
Divided attention	96	79	22
Avoids questionnaire/engages infant	97	77	0
Not visible	99	97	4
Location			
Infant initiates proximity	89	69	34
Mother initiates proximity	93	32	3
Infant initiates physical contact	96	80	9
Mother initiates physical contact	98	0	1
Mother initiates physical contact in response to infant bid	96	57	4
Infant removes self from physical contact	93	54	9
Mother removes infant from physical contact	97	68	3
Infant distances self from mother	93	82	32
Mother distances self from infant	98	78	5
Other	99	96	0
Infant Bids			
Aggression	99	67	1
Negative affect	98	89	9
Reaches for or grabs clipboard/questionnaire/pen	99	85	5
Show/offers	99	72	5
Vocalizes/gestures	98	60	12
Looks/glances	97	73	20
Touches	97	61	8
No bidding behavior	92	80	40
Mother Responses			
Negative affect	99	48	0
Intrusiveness	99	77	0
Disengages	99	30	0
Negative feedback	99	60	2
Removes clipboard/questionnaire/pen	99	58	3
Affection	99	74	5
Scaffolds	94	81	11
Plays/entertains/distracts	97	66	3
Neutral/positive affect (includes talk)	96	68	18
Looks/glances	97	66	10
Mother initiates engagement	96	48	5
Mother monitors	99	55	7
No responding behavior	98	95	36

Note. Table displays information for mutually exclusive, exhaustive groups of codes as they were coded.

VITA

Joanna F. Self

EDUCATION

Ph.D., **University of Washington**, Seattle, WA (1998)

Major: Child-Clinical Psychology
Minor: Developmental Psychology
Dissertation: Maternal Depression and the Nature of Mother-Toddler Interaction: Infant Bids for Engagement and Maternal Responsiveness.
Advisor: Geraldine Dawson, Ph.D.

Postbaccalaureate study, Department of Psychology, **University of California at Berkeley** (1986-1987)

Focus: Clinical Psychology
Advising Professor: Philip Cowan, Ph.D.

Bachelor of Fine Arts, With Distinction, **California College of Arts and Crafts**, Oakland, CA (1984)

CLINICAL EXPERIENCE

Sept. 1997 - June 1998 — **Clinic Intake Staff: Psychological Services and Training Center, Department of Psychology, University of Washington.**
Responsible for screening potential clients and making referrals to graduate student therapists or to more appropriate community resources; provide clinical backup to staff therapists; crisis management; assist in teaching graduate level introductory clinical methods interviewing course; assist in ongoing program evaluation research. Supervisor: Corey Fagan, Ph.D.

Sept. 1996 - Aug. 1997 — **Intern: San Fernando Valley Child Guidance Clinic, Northridge, CA.**
Responsible for service delivery in Outpatient, Day Treatment, and Abuse Service areas. Within Outpatient Services, conducted short and long-term child and family cases; co-led groups for delinquent adolescent girls, and for parents of school-age ADHD children; participated on a family therapy team; completed bi-monthly intakes; carried out comprehensive psychodiagnostic assessments of children and adolescents, and was on call for one 24 hr period per month. Within Day Treatment services, carried long-term therapy cases, co-led short-term structured groups on learning for learning disabled children, anger management, and daily living skills for youth with severe symptoms such as schizophrenic and autistic spectrum disorders; and provided consultation to classroom staff. Within the Abuse Service's Family Stress Program, carried ongoing therapy cases with children having experienced physical and/or sexual abuse, or trauma, and led a group for sexually abused children ages 5-10 yrs. Supervisors: Susan Hall-Marley, Ph.D., Kathleen Welch, Ph.D., Herbert Blaufarb, Ph.D., Dara Vines, Ph.D., Rick Hunnewell, Ph.D., and Linda Damon, Ph.D.

Sept. 1990 - Aug. 1996 **Staff Therapist: Psychological Services and Training Center, Department of Psychology, University of Washington.**

Responsible for assessment, diagnosis, and treatment of children, adolescents, families, and adults in both short and long-term therapy. Clients' presenting problems included depression, anxiety, post-traumatic stress disorder, personality disorder, adjustment disorder, and learning disabilities. Therapeutic orientations employed have included cognitive-behavioral, family systems, psychoanalytic, and play therapy. Supervisors: Ana Mari Cauce, Ph.D., Darrow Chan, Ph.D., Corey Fagan, Ph.D., Kim Kendall, Ph.D., Stanley Mandell, Ph.D., Kent Reade, Ph.D., and Lance Sobel, Ph.D.

June 1993 - June 1996 **Research Assistant: NIMH Maternal Depression Study, Department of Psychology, University of Washington.**

Responsible for differential diagnosis of affective disorders in 86 mothers using the Structured Clinical Interview For DSM-III-R. Responsible for training graduate students in use of the SCID. Supervisor: Karin Frey, Ph.D.

Jan. 1995 - Mar. 1995 **Training in the Rorshach: Department of Psychology, University of Washington.**

Course on projective tests focusing on the administration, scoring and interpretation of the Rorshach using the Exner system. One complete Rorshach administration, 3 protocols scored and interpreted, and 3 protocols scored. Also familiarized with the TAT, Bender Gestalt, Draw-a-Person, and Sentence Completion. Instructor/Supervisor: John Broedel, Ph.D.

Sept. 1992 - Sept. 1993 **Clinical Psychology Practicum: Adolescent Clinic, Children's Hospital Medical Center, Seattle, Washington.**

Responsible for assessment and treatment of adolescents within an individual and family context. Participated in a Milan Family Therapy Team. Clients' presenting problems included attention deficit disorder, oppositional defiant disorder, conduct disorder, school refusal, learning disabilities, enuresis, encopresis, obsessive-compulsive disorder, depression, and suicidality. Participated in weekly didactic series on issues relevant to adolescents. Supervisors: Kim Kendall, Ph.D. and Elizabeth McCauley, Ph.D.

Sept. 1992 - Mar. 1993 **Psychoanalytic Seminar: Psychological Services and Training Center, Department of Psychology, University of Washington.**

Observed a psychologist/supervisor conduct weekly psychoanalytic therapy, participated in ongoing case formulation. Supervisor: Stanley Mandell, Ph.D.

Sept. 1992 - Dec. 1992 **Training in Child Neuropsychological Assessment: Department of Educational Psychology, University of Washington.**

Training in child neuropsychological assessment and intervention. Familiarized with neuropsychological measures including: Neuropsychological Screening Test, Luria-Nebraska Neuropsychological Battery - Children's Revised, Halstead-Reitan Battery, Wide Range Assessment of Memory and Learning, Boston Naming Test, Rey Complex Figure and Recognition Trial, Bender Gestalt, Wisconsin Card Sorting Test, and the Stroop Test. Completed one full child neuropsychological assessment. Instructor/Supervisor: Margaret Semrud-Clikeman, Ph.D.

Mar. - June 1991 & 1992 **Supervisor/Teaching Assistant: Department of Psychology, University of Washington.**

Supervised clinical and developmental graduate students enrolled in an Intellectual Assessment course over two quarters. Responsible for demonstrations of test administration, role play learning sessions, observation of test administrations, feedback sessions to graduate students, and supervision and evaluation of written reports. Supervisors: S. Wayne Duncan, Ph.D. and Kimberly Wolk, Ph.D.

Sept. 1991 - Aug. 1992 **Family Therapy Practicum: Psychological Services and Training Center, Department of Psychology, University of Washington.**

Received training and group supervision while participating in a structural/strategic family therapy team. Supervisors: Corey Fagan, Ph.D. and Lance Sobel, Ph.D.

Sept. 1991 - Apr. 1992 **Clinical Psychology Practicum: Center for Human Development and Disability, University of Washington.**

Participated in multidisciplinary assessment team. Responsible for psychological evaluation of children. Assessment instruments included: Bayley Scales of Infant Development, Stanford-Binet Intelligence Scale: Fourth Edition, WPPSI-R, WISC-R, WRAML, WRAT-R, Diagnostic Reading Scales-Spache, Test of Early Reading Ability, Test of Visual Motor Integration, projective drawings, and evaluative play sessions. Clients' presenting problems included, developmental delay, fetal alcohol syndrome, mental retardation, aphasia, attention deficit/hyperactivity disorder, oppositional defiant disorder, and learning disabilities. Presented psychological test results to a multidisciplinary team including pediatrics, nursing, nutrition, speech and hearing, occupational therapy, and social work. Supervisor: Mimi Acosta, Ph.D.

Sept. 1987 - Aug. 1988 **Intern-Psychotherapist: Therapeutic Nursery School, Early Childhood Mental Health Program, Richmond, California**

Provided weekly individual play therapy sessions to children participating in the nursery school's psychodynamically oriented milieu therapy program. Presenting problems included depression, elective mutism, and pervasive developmental delay. Supervisor: Kathy Sinsheimer, MA., M.F.C.C.

TEACHING EXPERIENCE

Sept. 1989 - Mar. 1993 **Teaching Assistant: Department of Psychology, University of Washington.**
One quarter Introduction to Psychology, four quarters Abnormal Psychology, six quarters Developmental Psychology, and one quarter, graduate course in Clinical Methods - Interviewing.

For undergraduate courses, responsible for weekly didactic and discussion sections, exam reviews, writing and grading exams, grading papers, final course grades, and assisting in the development of syllabi and course assignments.

For graduate course, contributed to lecture material, supervised role plays, and participated in student evaluations.

RESEARCH EXPERIENCE

Apr. 1995 - Oct. 1998

Dissertation Research: Maternal depression and the nature of mother-toddler interaction: Infant bids for engagement and maternal responsiveness.

This study evaluates depressed and nondepressed mothers' interaction with their 14 month old toddlers during a divided attention task focusing on the nature of infants' bids to engage their mothers, and their mothers' responsiveness. Dissertation advisor: Geraldine Dawson, Ph.D.

June 1993 - June 1996

Research Assistant: NIMH Maternal Depression Study, Department of Psychology, University of Washington.

Assisted in longitudinal research investigating the effects of maternal depression on young children's physiological (brain) and social-emotional development. Responsible for ongoing study development, data collection including clinical family history interviews, diagnosis of depression, and EEGs of young children, clinical training of other graduate students, supervision of graduate and undergraduate students conducting observational coding of mother-child interaction, and statistical analyses. Principal investigator: Geraldine Dawson, Ph.D. Consultant: Karin Frey, Ph.D.

Sept. 1990 - Dec. 1990

Research Assistant: Mother-Child Interaction Study, Department of Psychology, University of Washington.

Assisted in observational research investigating conflict and communication between mother's and their 8- 10-year-old children. Responsible for assisting in study design, recruitment, data collection including interviews with children, and administration of WISC-R Vocabulary subtests, data entry, and statistical analyses. Principal investigator: S. Wayne Duncan, Ph.D.

1988

Research Assistant: Ego Development in Differing Classroom Environments: The relationship between Competence and Defense, Department of Psychology, University of California at Berkeley.

Assisted in research examining how differential teacher treatment of high and low achieving students influences children's defensive and ego functioning. Responsible for collecting semi-projective data from 200 elementary school children in San Francisco inner-city public schools. Principal investigator: Meryl Botkin, Ph.D.

1987 - 1988

Research Assistant: Becoming a Family Study, Department of Psychology, University of California at Berkeley.

Assisted in longitudinal research investigating the effects of the transition to parenthood on the marital relationship. Assisted in the development and implementation of the Family Structure and Process Scale (FSAP) designed to evaluate family functioning, as well as how different levels of family process (individual, dyadic, and whole) contribute to functioning. Employed the FSAP scale to code family interaction sessions, entered data, and carried out statistical analyses. Co-principal investigators: Philip Cowan, Ph.D. and Carolyn Pape Cowan, Ph.D.

1986 **Research Assistant: Preschoolers Play in the Context of the Family, Department of Psychology, University of California at Berkeley.**
Assisted in research examining children's symbolic play competence and its relationship to play in the family context. Responsible for observational coding of videotaped sessions of three-year-old children's sandplay alone, with one parent, and with both parents. Principal investigator: Julia Levin, Ph.D.

AWARDS

Self, J. F. (1996, Spring). University of Washington, Department of Psychology, Departmental Dissertation Award. ($900).

PROFESSIONAL AFFILIATIONS

Society for Research in Child Development, student member
American Psychological Association, student member
Washington State Psychological Association, student member
Northwest Alliance for Psychoanalytic Study, student member

PRESENTATIONS AND PUBLICATIONS

Dawson, G., Frey, K., Self, J. F., Panagiotides, H., Hessl, D., Yamada, E., & Rinaldi, J. (In press). Frontal brain electrical activity in infants of depressed and nondepressed mothers: Relations to variations in infant behavior. Development and Psychopathology.

Dawson, G., Frey, K., Hessl, D., Self, J. F., & Panagiotides, H. (1998). Autonomic activity in infants of depressed mothers: Relations to maternal behavior. Manuscript in preparation.

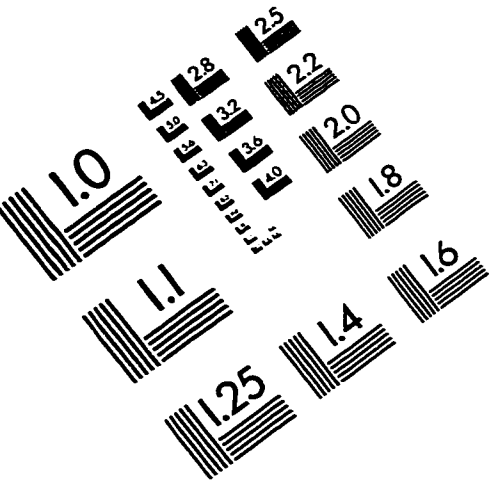
Dawson, G., Frey, K., Hessl, D., Panagiotides, H., & Self, J. F. (1998). Atypical Frontal EEG activity in infants of depressed mothers: Role of maternal behavior. Manuscript in preparation.

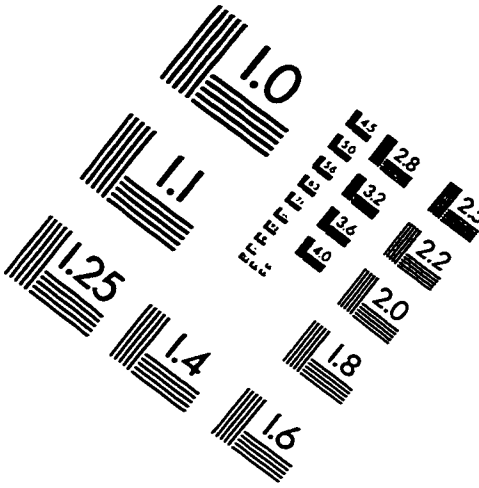
Dawson, G., Frey, K., Hessl, D., Panagiotides, H., & Self, J. F. (1997, April). Atypical Frontal EEG activity in infants of depressed mothers: Role of maternal behavior. Paper presented at the meeting of the Society for Research in Child Development, Washington, D.C.

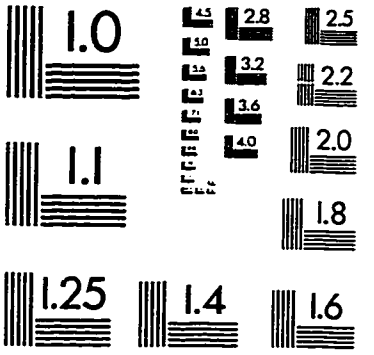
Dawson, G., Frey, K., Hessl, D., Panagiotides, H., & Self, J. F. (1995, April). Infants of depressed mothers exhibit atypical frontal brain activity: A replication of previous findings. Paper presented at the meeting of the Society for Research in Child Development, Indianapolis, Indiana.

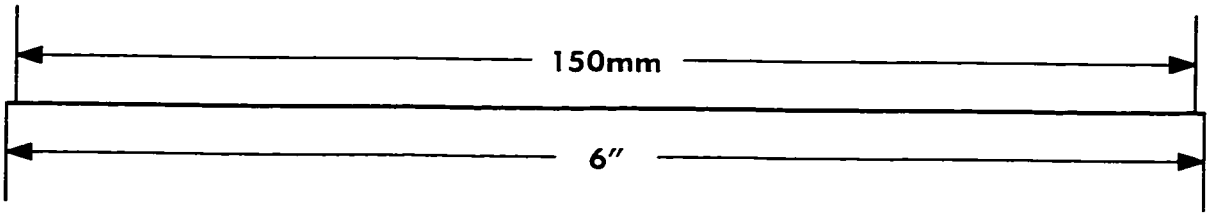
Self, J. F. (1990, August). Mothers and school-aged children: Affective communication and individual differences in adjustment. Poster presented at the meeting of the American Psychological Association, San Francisco, CA.

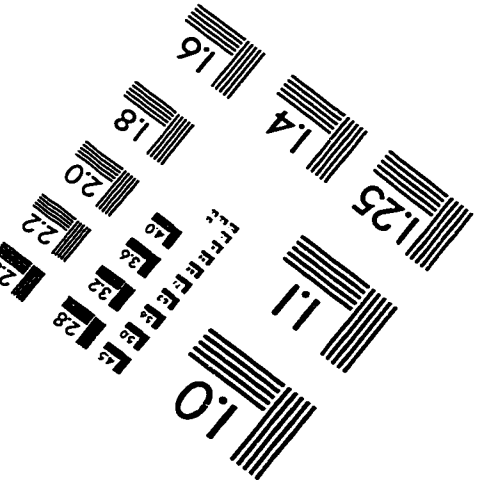
IMAGE EVALUATION TEST TARGET (QA-3)

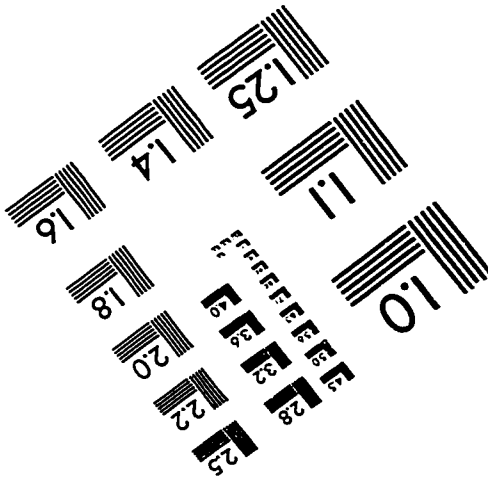












APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989