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**Mother-Child Shared Book Reading and Maternal Mood**

A Dissertation Presented

by

**Samantha Katz**

To

The Graduate School

in Partial Fulfillment of the

Requirements

For the Degree of

**Doctor of Philosophy**

In

**Clinical Psychology**

Stony Brook University

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Abstract of the Dissertation

**Mother-Child Shared Book Reading and Maternal Mood**

By

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**Doctor of Philosophy**

in

**Clinical Psychology**

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Maternal depression significantly influences parent-child interactions. While the existence of this impact is well established during playtime, little research has been conducted on the way that maternal depression relates to shared book reading. This is a particularly important activity because it relates to children's language and literacy development. The present study has two goals. First, it aims to provide a fine-grained analysis of the conversations that take place while parents and children share books. Few studies have evaluated such characteristics. Second, it seeks to determine whether maternal depression or demographics can account for some of the differences in shared book reading. One hundred and five mother-child dyads participated in the study. Maternal depression was assessed by Zimmerman's Diagnostic Inventory of Depression (DID). Videotapes of each parent-child dyad engaging in a book sharing episode were

evaluated. The number of conversational turns taken by the mother and child were recorded and the content of each utterance was coded. In addition, the number of extratextual words uttered by the mothers and the length of reading times were calculated. Dramatic quality of the mothers' reading and fluctuations in pitch were also noted. Analyses revealed that the positive features of shared book reading were highly intercorrelated with one another. Three distinctly different reading styles emerged based on the content of maternal utterances. Further, support was found for the previous findings that depressed mothers are less sensitive and positive and more preoccupied in their interactions with their children. In addition, demographics, particularly maternal education and age, also predicted book reading characteristics. These negative impacts of depression are particularly concerning when considering the important benefits that shared book reading confers on children's literacy and language development. Future work should seek to better understand how shared book reading might mediate the relationship between maternal depression and literacy development.

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## Chapter 1: Introduction

### *Maternal Depression*

Flat affect, psychomotor changes, fatigue, and anhedonia, all common symptoms of depression, can severely impact an individual's parenting abilities. Researchers have found that the interactions of depressed mothers and their children differ from those of women who do not have depression (Hops, Biglan, & Sherman, 1987; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Radke-Yarrow, Nottelmann, Belmont, & Welsh, 1993). In turn, behavioral difficulties and cognitive deficits have been found in children of depressed mothers in numbers disproportionate to expected incidence (Boyle & Pickles, 1997; Jacob & Johnson, 1997; Tronick & Gianino, 1986).

The impact of maternal mood, particularly depression, on parent-child play is a topic that has received a good deal of attention. Typical paradigms with infants involve placing a child in a seat and observing the child and mother interacting together. Maternal interactions with older children are often observed during playtime, either at a laboratory or at home. Few studies have observed parent-child play in the context of shared book reading. This is a particularly important type of interaction to learn more about, as it is a well-documented venue for language and cognitive development. Furthermore, studies have found different patterns of speech among depressed and nondepressed mothers (Alpert 1982; Breznetz & Sherman, 1987). While speech is certainly an important part of any sort of interactive play, it is even more central to book sharing, an activity strongly dependent upon oral language. Therefore, the present study explores the characteristics of mother-child interactions during shared book reading, a topic that has received little scholarly attention.

## *Interactions between Depressed Mothers and their Children*

### *Maternal characteristics.*

Comparisons of interactions of depressed and nondepressed mothers with their children reveal four key differences: exchanges between depressed mothers and their children are marked by (1) less sensitivity, (2) greater amounts of negativity, (3) fewer positive exchanges, and (4) greater maternal preoccupation (Field, Healy, & LeBlanc, 1989; Lovejoy et al., 2000; Murray, Fiori-Cowley, Hooper, & Copper, 1996). These four categories are closely linked; features of some researchers' definitions of sensitivity, such as lack of hostility and expression of maternal warmth, overlap with the greater amounts of negativity and fewer positive exchanges categories. This provides a challenge when evaluating different facets of maternal mood.

Fromm (1956) used an analogy to explain the meaning of the term "maternal sensitivity." He compared a sensitive parent to an automobile owner who is aware of the slightest variation in the sounds of his car, while remaining relaxed and not thinking about these noises. A sensitive mother is in tune with changes in her child's emotional state, without having to consciously focus her attention on detecting these changes. Murray et al. referred to the degree to which a mother responded appropriately to her child's cues as "maternal sensitivity." They also included maternal warmth and acceptance as part of this term. A later NICHD (1999) study of maternal depression used the term "maternal sensitivity" to refer to a mother's sensitivity to nondistress, positive regard, and lack of intrusiveness when mothers interacted with children under the age of 2. When the children were 36-months-of-age, they referred to maternal sensitivity as a measure of maternal supportive presence, respect for the child's autonomy, and absence

of hostility.

Both studies (Murray et al., 1996; NICHD, 1999) found depression to be significantly related to maternal sensitivity. Murray et al. revealed that depressed mothers are significantly less sensitive to their 2-month-old infants than are nondepressed mothers. The NICHD study found that the chronicity of a woman's depression is related to her maternal sensitivity. In particular, women with no history of depression are significantly more sensitive in their interactions with their children than are mothers identified as sometimes or chronically depressed. Chronically depressed mothers show a different pattern than do the other two groups; they demonstrate a greater decline in sensitivity during their children's second year and some recovery when their children are 36 months, indicating that these women may have particular difficulty with their children's negativity, a characteristic which often peaks at about 2-years-of-age.

Not only are depressed mothers less sensitive to their young children's needs, but they also tend to be more negative in their interactions with their children. In their meta-analysis of 46 studies evaluating linkages between depression and parent-child interactions, Lovejoy et al. (2000) found that depressed mothers engage in significantly more negative exchanges with their children than do nondepressed mothers. Negative behaviors that differ between the two groups involve either negative maternal affect or hostile or coercive maternal behavior directed at the child. Increased negative affect, in general, is a key symptom of depression. Behaviors such as sarcastic tone of voice, anxiety in voice, worried look, clenched jaws, slumping, crying, and somber facial expressions are examples of negative affect that are more common among depressed women (Radke-Yarrow et al., 1993). Examples of hostile behaviors are yelling, crying,

negative commands, ignoring, teasing, threatening, and whining (Lovejoy, 1991). In addition to engaging in more negative exchanges with their children, depressed mothers also tend to be more critical of their children's behavior than are nondepressed mothers (Webster-Stratton & Hammond, 1988). In fact, Webster-Stratton and Hammond found that during home observations, depressed mothers made critical statements to their children on average every 90 seconds.

This relationship between maternal depression and negative interactions is found among mothers of children ranging in age from infancy through adolescence. Even when their children are as young as 3-months-of-age, depressed mothers show more frequent negative facial expressions and spend a greater amount of time sharing negative states with their infants than do nondepressed mothers (Field, 1984; Field et al., 1989). Hops et al. (1987) found higher levels of dysphoric affect in depressed mothers of children ranging in age from 3 to 16 years than in nondepressed mothers. In a study of children ranging in age from 10 to 18 years, Jacob and Johnson (1997) also found increased mother-child negativity in the interactions of depressed mothers.

In addition to showing greater amounts of negativity in their interactions with their children, depressed mothers also express fewer positive emotions with their children. Lovejoy et al.'s (2000) meta-analysis revealed a significant relationship between maternal depression and fewer positive exchanges; they noted, however, that this relationship is weaker than the association between maternal depression and negative behaviors. Positive behaviors that are more common in nondepressed mothers include smiles, exaggerated facial expressions, and playful vocalizations (Campbell, Cohn, & Meyers, 1995). Furthermore, higher levels of positive affect, including expressions of

pleasure and enthusiasm and positive facial expressions, are found in the interactions of nondepressed mothers with their children (Field, 1984; Hopps et al., 1987). Livingood, Daen, and Smith (1983) noted that depressed mothers provide their newborns with significantly lower levels of unconditional positive regard. Again, the negative relationship between depression and positive interactions is found in mothers of children ranging in age from infancy through adolescence.

The majority of studies evaluating the links between maternal depression and mother-child interactions compare women with depression to women who do not have this disorder. Another way to observe the impact of depressed mood on mother-child interactions is to induce positive and negative moods within the same women. This eliminates some of the between-subject variability. Jouriles, Murphy, and O'Leary (1989) induced moods by playing music and asking their participants to spend 8 minutes reliving either a positive or negative experience. They noted that when women were in the negative mood condition, they actually directed a fewer number of positive statements toward their children than when they were in the positive mood condition.

Women suffering from depression are also more likely to be preoccupied or distracted when interacting with their children (Lovejoy et al., 2000). In their home observations of 2- and 3-year-old children, Pound, Puckering, Cox, and Mills (1988) found that depressed women spend more time preoccupied and withdrawn from their children. Depressed mothers of infants also spend less time involved with their children than do nondepressed mothers (Field, Healy, Goldstein, & Gurthertz, 1990; Field et al., 1989).

In summary, the interactions between depressed mothers and their children differ

qualitatively from those between nondepressed women and their children. In particular, their interactions are characterized by decreased maternal sensitivity, increased maternal negativity, fewer positive exchanges, and higher levels of maternal preoccupation.

*Child characteristics.*

Not surprisingly, children of depressed and nondepressed women behave differently in their interactions with their mothers. Specifically, children of depressed women tend to be less responsive to their mothers and more negative in their behaviors. Interactions between depressed mothers and their children are marked by less synchrony than are those between nondepressed mother-child dyads. Field et al. (1989) looked at four maternal behavior states, anger, disengage, elicit, and play, and the corresponding four child behavior states, protest, look away, attend, and play. They found that depressed mothers and children engage in less behavior state coherence than do nondepressed mother infant dyads. When depressed mothers and their children do share behavior states, they tend to match negative behavior states more often and positive behavior states less often than do nondepressed dyads (Field et al., 1990).

In order to observe children's response patterns to depressed mothers, several studies have asked mothers to simulate depressed moods. When their mothers appear to be depressed, infants tend to show a pattern of alternating between expressing negative affect and turning away from their mothers, or gazing at them with a wary expression (Cohn & Tronick, 1983). They also respond less contingently to their mothers (Zekoski, O'Hara, & Wills, 1987). Toddlers actually place greater distance between themselves and their mothers and demonstrate more unfocused behavior, when their mothers simulate depression (Seiner & Gelfand, 1995). Children whose mothers are experiencing

depressed mood are less compliant with maternal directives (Jouriles et al., 1989).

In addition to being less responsive and compliant with their mothers' requests, children of depressed women also tend to be more negative in their interactions with their mothers. During such interactions, infants of depressed women often display more frequent negative expressions and less frequent positive expressions (Field, 1984). Toddlers and preschool-aged children who have depressed mothers also display greater amounts of negative affect, including sad or fearful voice tone, crying, and worried looks (Lovejoy, 1991; Radke-Yarrow et al., 1993). When mothers simulate depressed mood, their toddlers became more negative, and are more likely to demonstrate negative physical bids for attention, engaging in destructive or antagonistic behavior (Seiner & Gelfand, 1995).

### *Impacts of Maternal Depression*

#### *Social-emotional impacts.*

Children of depressed mothers appear to have an elevated risk for developing behavioral and emotional problems (Boyle & Pickles, 1997; Downey & Coyne, 1990; Field, 1995; Jacob & Johnson, 1997). Such differences emerge as early as infancy. Infants of dysphoric women interact less with both their own mothers and strangers (Field, Lang, Martinez, Yando, Pickens, et al., 1996). They have inferior orientation skills, lower activity levels, lower endurance, and are more excitable than are infants of nondepressed mothers (Lundy, Field, & Pickens 1996). They also show more irritability, lethargy, and stress behaviors when given an assessment of infant behavior (Abrams, Field, Scafidi, & Prodromidis, 1995). Six-month-old infants of depressed women have lower vagal tone than do infants of nondepressed women (Field, Fox, Pickens, &

Nawrocki, 1995). As was previously noted, infants of depressed mothers display more negative behavior in their interactions (Field, 1984; Radke-Yarrow et al., 1993). Such differences may have a biological underpinning. Infants of depressed mothers show reduced activity in the left frontal region of their brains, an area associated with positive emotions, when interacting both with their mothers and with another nondepressed adult (Dawson et al., 1999). While sitting in their mothers' laps and watching a researcher shake a rattle, infants of depressed mothers are more likely to display right frontal EEG asymmetry than are infants of nondepressed women; this pattern of activation is similar to that found at baseline in chronically depressed adults (Field, Fox, Pickens, Nawrocki, 1995).

Toddlers and preschool-aged children of depressed women also show behavioral and emotional problems including anxiety, withdrawal, and hyperactivity (Alpern & Lyons-Ruth, 1993). Two-year-old children of depressed mothers engage in greater amounts of aggression than do children of nondepressed mothers (Zahn-Waxler, Iannotti, Cummings, & Denham, 1990). Preschoolers of depressed women are more likely to display externalizing problems, eating difficulties, problems in relationships with parents or peers, attention problems, and overactivity (Cox, Puckering, Pound, & Mills, 1987; Zahn-Waxler et al., 1990). As with infants, neurological differences also differentiate the children of depressed and nondepressed women. Three-year-old children of chronically depressed mothers show less activation in the frontal and parietal regions of the brain than do children of nondepressed women (Dawson et al., 2003). Such a pattern of brain activation is suggestive of reduced attentiveness, which is likely to impact parent-child interactions.

This increase in behavioral and emotional difficulties displayed by children of depressed women continues through the school years. Teacher, parent, and child reports indicate that school-aged children of depressed women display internalizing and externalizing problems more frequently than do control children (Downey & Coyne, 1990; Hirsch, Moos, & Reischl, 1985; Jacob & Johnson, 1997; Lee & Gotlib, 1989). During adolescence and adulthood, children of mothers with major depression are at an elevated risk for developing this disorder themselves (Klein, Lewinsohn, Rohde, Seeley, & Olino, 2005).

*Cognitive impacts.*

Studies have consistently shown that maternal depression has a small but significant effect on children's cognitive development, and the relationship appears to be stronger in boys than in girls (Grace, Evindar, & Stewart, 2003). The majority of research conducted in this area, however, focuses on women suffering from postpartum depression. Whereas the prevalence of major depression is about 5%, postpartum depression affects between 10-15% of women (Warner, Appleby, Whitton, & Faragher, 1996). Most women recover by 6 months postpartum, although some continue to experience depression one year after their infants' birth (Campbell & Cohn, 1997).

The cognitive effects of postpartum depression can be seen in infants as young as 3-months-of-age (Galler, Harrison, Ramsey, Forde, & Buttler, 2000). Galler et al. found a significant association between maternal depression at 7 weeks postpartum, as measured by the Zung Depression Scale (Zung, 1965), and children's total scores on the Griffiths Mental Development Scales (Griffiths, 1954), which measure children's motor development, personal-social development, hearing and speech development, eye-hand

coordination, and performance. Significant differences between children of depressed and nondepressed women were found on the total Griffiths score as well as on the performance and personal-social scales.

Interestingly, infants whose mothers suffered from postpartum depression are more likely to fail Piaget's object concept task at 9 months than are control infants. At 18 months, children are more likely to fail these tasks if their mother had either postpartum depression or a history of major depression (Murray, 1992). In a subsequent study evaluating the relationship between maternal depression and children's cognitive development, Murray et al. (1996) failed to find a main effect for the influence of depression on the cognitive development of 18-month-old infants. Murray et al. did note a significant interaction, such that sons of women who had postpartum depression performed worse on the Bayley Mental Development Index (Bayley, 1969) than did sons of women who did not have postpartum depression.

While Murray et al. (1996) focused on postpartum depression, a later study (Cornish et al., 2005) evaluated how the chronicity of maternal depression impacts infants' cognitive development. They noted that chronic maternal depression was related to 15-month-old infants' scores on the Bayley Scales: Mental Development Index, such that infants of chronically depressed mothers were 3.36 times more likely to receive a non-optimal score on this measure than were infants of never-depressed women.

The impact of maternal depression on children's cognitive development appears to extend well past infancy. An NICHD (1999) study compared three groups of women: those who were chronically depressed, those who were sometimes depressed, and those who were never depressed. Children of mothers who were either chronically or

sometimes depressed had significantly lower school readiness scores on the Bracken Basic Concept Scale (Bracken, 1984) and verbal comprehension scores on the Reynell Developmental Language Scale (Reynell, 1991) than did children of never depressed women. Children of mothers who were chronically depressed had lower expressive language scores on the Reynell Developmental Language Scale than did children whose mothers were never or sometimes depressed.

Petterson and Albers (2001) also studied the impact of maternal depression on children's cognitions, and obtained similar results to the NICHD (1999) study. Children's cognitive development, assessed between 28 and 50 months was negatively related to their mothers' depression status. The cognitive skills of children of chronically depressed women showed the largest deficits. In a similar study, Brennan et al. (2000) evaluated the relationship between maternal depression and children's scores on the Peabody Picture Vocabulary Test-Revised (PPVT; Dunn & Dunn, 1981). They found that the chronicity and severity of women's depression was negatively related to their 5-year-old children's receptive language scores, such that the more severe the depression, the lower the child's receptive vocabulary score.

While Peterson and Albers (2001) and Brennan et al. (2000) focused on children of women with major depression, Sharp et al. (1995) investigated the impact of postpartum depression on 3-year-old children. They observed that boys, but not girls, whose mothers suffered from postpartum depression scored significantly lower on the perceptual, motor, and verbal subscales of the McCarthy Scales of Children's Abilities (McCarthy, 1972) than did children whose mothers did not have postpartum depression.

In a longitudinal study of children ranging in age from 20 months through 6 years, Kurstjens and Wolke (2001) set out to evaluate how maternal depression and children's cognitive development interact over time. Unlike Cornish et al. (2005) or the NICHD (1999) studies, children's cognitive test scores at 20-months and 4.8-years-of-age did not differ based on their mothers' depressive status. A significant interaction of child's gender and chronicity of maternal depression was found when children were 6-years-old. Boys born to chronically depressed mothers obtained lower Achievement Scores on the Kaufman Assessment Battery for Children (Kaufman & Kaufman, 1983).

While Kurstjens and Wolke (2001) followed their sample of children for over 6 years, Hay et al. (2001) tracked their sample for 11 years; the former study also evaluated the chronicity of depression while the latter one focused solely on postpartum depression. Hay et al. found that 11-year-old children of women who suffered from postpartum depression when their children were 3-months-old, had lower IQ scores on the Wechsler Intelligence Scales for Children – III (WISC-III<sup>UK</sup>; Wechsler, 1992). These children also demonstrated mathematic reasoning difficulties on the Wechsler Objective Numerical Dimension and attentional problems on the Continuous Performance Test (Taylor, Sandberg, Thorley, & Giles, 1991). Postpartum depression had a greater impact on the cognitive development of boys, and gender differences were strongest on the Performance scale of the WISC-III<sup>UK</sup>. Noting the impact of maternal depression on children's cognitive development, Hay et al. evaluated whether parental IQ, social disadvantage, or mother's later mental illnesses mediated the relationship between postpartum depression and children's intellectual abilities. None of these factors, however, were found to be significant mediators.

These studies indicate a link between maternal depression and children's cognitive development. This relationship appears to be stronger for boys than for girls (Murray and Cooper, 1997). In addition, the impacts of postpartum depression can be seen in the cognitive development of children ranging in age from infancy through preadolescence.

*Pathways.*

A critical question is why children of depressed women show these cognitive deficits. Several possible pathways to cognitive outcomes can be considered. One possibility may be that in their interactions with their children, depressed women initiate and terminate attention to objects more frequently than do nondepressed women (Breznitz & Friedman, 1988). When their mothers display such a pattern, children attend to more objects for shorter amounts of time. This is likely to inhibit children's ability to learn from objects in their surroundings.

Another factor that may account for these differing patterns of cognitive development is the alternate patterns of task-focused behavior exhibited by depressed and nondepressed women. Maternal depression is related to less task involvement in women's interactions with their school-aged children (Burge & Hammen, 1991). When depressed mothers are engaged in a task with their children, they may offer their children support less adroitly than do nondepressed women. Murray, et al. (2006) observed that when focused on completing homework with their children, depressed women offer their children poorer quality of support.

To evaluate whether infants learn equally well from depressed and nondepressed women, Kaplan, Bachorowski, and Zarlengo-Strouse (1999) tape-recorded the child-

directed speech of both types of women. Four-month-olds who heard nondepressed women's speech as their conditioned stimuli demonstrated significantly better associative learning than did infants for whom depressed women's speech acted as conditioned stimuli. The finding that the child-directed speech of depressed women is inferior at promoting children's associative learning, suggests that children of depressed women are at a disadvantage in terms of engagement with their learning environment. This experiment, however, did not compare the patterns of learning shown by children of depressed and nondepressed women.

To fill in this gap, in a subsequent study, Kaplan, Bachorowski, Smoski, and Hudenko (2002) again used the voices of depressed and nondepressed women as conditioned stimuli. This time, they compared how 4-month-old infants learned in response to their own mothers' speech as well as to the speech of other women. They found that infants of nondepressed mothers readily learned in response to their own mothers' speech. Infants of depressed mothers, however, failed to learn when their mothers' voices acted as the conditioned stimulus. Interestingly, they readily learned when the voice of an unfamiliar nondepressed woman was the conditioned stimuli, indicating that they are generally competent learners, except when interacting with their mothers. This is particularly problematic, however, as infants' main interactive partners are often their mothers. Thus, the cognitive deficits that are observed in children of depressed women may be related to the decreased effectiveness of their mothers' infant-directed speech.

### *Differences in Speech of Depressed and Nondepressed Women*

Maternal speech is one of the key features that distinguishes between the interactions of depressed and nondepressed women with their children. When talking to infants, adults typically alter their speech into “motherese,” or “infant-directed speech,” a syntactically, semantically, and phonologically distinct way of speaking (Snow, 1977). This speech tends to be simple and highly repetitive (Kavanaugh & Jirkovsky, 1982; Messer 1980; Snow, 1972). It is also characterized by a higher pitch than adult-directed speech and by exaggerated intonations (Jacobson, Boersma, Fields, & Olson, 1983; Stern & Gibbon, 1979). Greater pitch excursions, shorter utterances, longer pauses, and slower articulation rates are all part of infant-directed speech (Fernald & Simon, 1984). In addition, the majority of infant-directed speech utterances are consistent with prosodic patterns of either expanded pitch contours or whispering, two patterns that occur rarely in speech directed at adults (Fernald & Simon, 1984). Expanded contours can be classified as rising, falling, level, bell shaped, or complex. Infants prefer to listen to infant-directed rather than adult-directed speech (Fernald, 1985).

The speech patterns of depressed women, however, do not follow the typical patterns of infant-directed speech. Fundamental frequency refers to the “quasiperiodic vocal-fold vibration during phonation that corresponds to the perception of pitch” (Kaplan, Bachorowski, Smoski, & Zinser, 2001). While nondepressed women adjust the average fundamental frequency to match their speech content, the fundamental frequency of depressed women’s speech is unaffected by the content of their words (Breznitz, 1992). In addition, when interacting with their infants, the speech of depressed women shows less variation in fundamental frequency than does that of nondepressed women

(Kaplan et al., 2001). Lacking acoustic elements that are typically part of infant-directed speech, the speech of depressed women is likely to be inferior at holding infants' attention. This may contribute to the difficulty in associative learning displayed by children of depressed women (Kaplan et al., 1999; Kaplan et al., 2002).

Not only does the infant-directed speech of depressed women show a narrower range in fundamental frequency, but it also lacks the exaggerated intonation that is a key part of motherese. Bettes (1988) used the Beck Depression Inventory (BDI, 1969) to differentiate between depressed and nondepressed women. She found that 88% of the nondepressed women's utterances were accompanied by either the exaggerated rising, falling, level, bell shaped, or complex contours described by Fernald and Simon (1984); only 12% of these women's utterances lacked an exaggerated contour. In contrast, 25% of the utterances of depressed women lacked an exaggerated contour, and falling and bell-shaped contours were used less frequently by these women than by their nondepressed counterparts.

Temporal patterns of vocalizations and silences also vary in the speech of depressed and nondepressed women. The utterances of depressed women tend to be shorter in duration than are those of nondepressed women, and significantly longer pauses separate the vocalizations of depressed women (Alpert, 1982; Breznitz, 1992). These differences carry over into the conversations of depressed women with their children. When interacting with their infants, depressed mothers speak with longer pauses than do nondepressed women (Breznitz, 1997). They also show greater variation in the duration of their pauses, creating a less predictable speech pattern for their infants (Zlochower & Cohn, 1996). Breznitz and Sherman (1997) found that depressed women

pause longer between utterances in their conversations with 2- to 3-year-old children than do nondepressed women.

In addition to taking longer pauses between utterances, depressed women take greater amounts of time to respond to their children. Depressed mothers require almost twice as long to respond to their infants than do nondepressed mothers; their response latencies are also more variable (Bettes, 1988). When interacting with their 3-year-old children, depressed women respond more slowly to the cessation of their children's speech (Breznitz & Sherman, 1987). Such long response latencies are likely to interrupt the flow of conversation, rendering it more difficult for children of depressed women to converse with their mothers.

While the quality of the interactions between depressed women and their children is impeded by these long response latencies, several other factors further damage the reciprocal quality of their interactions. Depressed women typically take fewer turns during their conversations with their young children (Breznitz & Sherman, 1997). They also tend to produce less speech during such interactions (Rowe, Pan, & Ayoub, 2005). This pattern of interactions is particularly problematic as it leads children to learn to minimize their verbal interactions (Breznitz & Sherman, 1987).

When depressed mood is induced in nondepressed women, these same effects are seen. After negative moods were induced in a group of mothers of 4- to 5-year-old children, mothers engaged in less general verbal interaction than when they were in a positive mood (Jouriles et al., 1989). Jouriles et al. suggest that the negative mood that often accompanies depression may play a key role in the link between maternal depression and reduction in speech.

Depressed mothers have trouble modifying their own speech in response to the vocalizations of their infants. The utterances of nondepressed women are shorter and the pauses briefer if the maternal utterance follows an infant vocalization than if it does not. Such differences are not evident in the speech of depressed women (Bettes, 1988).

While the speech of nondepressed women varies as a function of their children's ages, the speech of depressed women tends to remain more constant. Herrera, Reissland, and Shepherd (2004) compared the affective features within women's speech.

Nondepressed women use affect-salient speech such as encouragements, greetings, and endearments more often with their 6-month-old infants than with their 10-month-old children. Depressed women show comparable amounts of affect-salient speech when their children were both 6- and 10-months-old. In addition, when speaking to 10-month-old infants, the mean length utterance (MLU) of nondepressed women is longer than their MLU when interacting with 6-month-old infants (Reissland, Shepherd, & Herrera, 2003). Thus, nondepressed women increase the length of their vocalizations to match their children's linguistic development. Reissland et al., however, noted that depressed women show no difference in their MLU regardless of whether their infants were 6- or 10-months-of-age. This may indicate that such women are less attuned to their children's development.

In addition to having trouble modifying their speech to their children's development, the speech of depressed women focuses less on their infants' experiences than does the speech of nondepressed women; instead it is more focused on the mother's own agenda or on topics beyond the scope of the mother-infant interaction (Murray, Kempton, Woolgar, & Hooper, 1993). Depressed women are also less likely to make

comments that put their young children's current experiences into context (Cox et al., 1987). These comments, more common among nondepressed women, can help maintain children's attention.

With all of these variations in the speech of depressed mothers, such women often have children who show expressive language difficulties (Field, 1984; Pan, Rowe, Singer, & Snow, 2005). Field (1984) observed that infants of nondepressed women vocalize more in their interactions with their mothers than do infants of depressed women. Two-year-old children of depressed mothers also show delays in their expressive language when compared to children of nondepressed women (Cox et al., 1987). Interestingly, maternal depression is a negative predictor of toddler's vocabulary growth (Pan et al., 2005). In their evaluation of preschoolers with specific language impairments, La Paro, Justice, Skibbe, and Pianta (2004) focused on factors that predict the persistence of language problems. They noted that children of depressed women were less likely to resolve their language impairment than were children of nondepressed women.

These findings suggest that children's interactions with their mothers play a key role in their own language and vocabulary development. The atypicalities in vocal features, amount of speech produced, and attunement to children's needs that characterize depressed women's speech may impede their children's development.

#### *Child Temperament and Parent-Child Interactions*

Although it is tempting to conclude that maternal depression impacts parent-child interactions, which then affects children's development, the bidirectionality of influence cannot be ignored. Children are also likely to influence their relationships with their parents. In particular, researchers have found that differences in child temperament

impact maternal mood and parenting behaviors (Clark, Kochanska, & Ready, 2000; Putnam, Sanson, & Rothbart, 2002).

Temperament is a notoriously difficult construct to define. In a roundtable focused on this topic, Thomas and Chess explained that they conceptualize temperament as describing the “stylistic components of behavior” (Goldsmith et al., 1987). Their New York Longitudinal Study, the most comprehensive study of temperament to date, identified nine dimensions of temperament (Thomas & Chess, 1977). These include activity level, rhythmicity, distractibility, approach/withdrawal, adaptability, attention span, intensity of reaction, threshold of responsiveness, and quality of mood. While this model of temperament is still used today, several other models of temperament have also been developed. For example, Derryberry and Rothbart (1984) define temperament as “relatively stable, primarily biologically based individual differences in reaction and self-regulation.” They focus on six dimensions of temperament: activity level, soothability, attention span, fearful distress, irritable distress, and positive affect.

Different aspects of child temperament have been related to maternal depression. Infant difficultness, assessed through maternal report, crying diaries, and observation of crying, is related to postpartum depression (Cutrona & Troutman, 1986). Low positive emotionality in preschoolers is significantly associated with maternal mood disorders (Durbin, Klein, Hayden, Buckley, & Moerk, 2005).

In addition, child temperament impacts parenting behaviors. Clark et al. (2000) observed that child negative emotionality, observed at 8 to 10 months, is associated with increased maternal power assertion at 13 to 15 months. Perez and Gauvain (2005) focused on the emotional intensity of second-grade children. They found that mothers

who indicate that their children are higher on emotional intensity, use more directive behavior and show more negative affect when interacting with their children.

The research described above suggests that maternal depression impacts children and parent-child interactions, and that child temperament has an effect on mothers and parent-child interactions. Rather than occurring sequentially, however, these influences occur simultaneously, making them especially difficult to tease apart. In their transactional model, Sameroff and Chandler (1975) suggest that children develop through the continuous dynamic interplay between child behavior, parent responses, and environmental factors. Building on Sameroff and Chandler's work, Van Doesum and Riksen-Walraven (2005) suggest a transactional model to explain how children of depressed mothers achieve either healthy or maladaptive long-term outcomes. They focus on maternal characteristics including depressive symptoms, feelings of parental incompetence, and severity of the depression. Child characteristics they consider include temperament, gender, and genetic and neurobiological features. Child developmental outcomes, particularly insecure or secure attachment, and cognitive delays or competence are both a result of early mother-child interactions, and contribute to these interactions. Contextual stressors such as marital discord and economic disadvantages, and social support including spouse and friends are also included in this model. In a dynamic fashion, these maternal characteristics, child characteristics, and developmental outcomes all impact mother-child interactions and contribute in determining the child's long term developmental outcomes.

Fathers, like mothers, play an important role in their children's development; however, only a small body of research focusing on depression in fathers exists (Sherr,

Dave, Lucas, Senior, & Nazareth, 2006). Even less is known about father-child shared book reading, although some recent studies suggest significant differences in shared book reading interactions that are based on parental gender (Anderson, Anderson, Lynch, & Shapiro, 2004; Schwartz, 2004). Because the proposed study seeks to evaluate rarely studied facets of shared book reading, including pitch, it will include only women reading to their children. This will limit between-subject variability based solely on gender.

### *Shared Book Reading*

The most prominent focus of research on the relationship between maternal depression and parent-child relationships has included an array of social-emotional and cognitive interactions, but has rarely directly addressed shared book reading. Shared book reading has unique characteristics of interest to the body of literature focused on the impacts of maternal depression. First, it is a rich language experience that is typically intensely positive. Second, while sharing books with their children, mothers are reading text instead of speaking spontaneously; as such, maternal voice characteristics may or may not align with the comparative findings described above. Therefore, it is of interest to further pursue the way that maternal mood interacts with shared book reading.

Studies have repeatedly found that parent-child shared book reading throughout infancy and the early childhood years impacts children's literacy and language skills (Aram & Levin, 2002; National Early Literacy Panel, 2008; Sénéchal, LeFevre, Hudson, & Lawson, 1996; Whitehurst et al., 1994a,b). Approximately 5% of the daily speech of 24-month-old infants occurs during story-time (Wells, 1985a). Shared book reading has been linked to children's expressive and receptive vocabularies, phonological awareness, oral language, print knowledge, later reading skillfulness, and interest in reading. The National Early Literacy Panel (2008) conducted a meta-analysis of experimental and

quasi-experimental studies that focused on children's early literacy development. They noted that shared book reading interventions had statistically significant moderate sized effects on children's print knowledge (.73) and oral language skills (.50). In their earlier meta-analysis of studies that evaluated the relationship between book reading and language skills, emergent literacy knowledge, or reading achievement, Bus, van IJzendoorn, and Pellegrini (1995) found an overall effect size of .59. This indicated that shared book reading explains 8% of the variance in these outcome measures.

Shared book reading is closely tied to children's vocabulary acquisition. Books introduce children to new words that they may be unlikely to hear in ordinary conversation. Remarkably, Hayes and Ahrens (1988) found that children's books include 50% more rare words than do either prime-time television or undergraduates' conversations. Children's books, such as *Brown Bear, Brown Bear, What do You See*, by Bill Martin Jr. and Eric Carle, and *Good Night Moon*, by Margaret Wise Brown, typically use repetitions, making it even easier for young children to learn new words.

The frequency with which children read with their parents is related to their receptive vocabulary. This association is apparent in children as young as 2-years-of-age. Crain-Thoreson and Dale (1992) found that the regularity with which 24-month-old children and their parents read is related to these children's vocabulary at 2.5-years-of-age. Similar findings have been observed among preschoolers. Sénéchal (1997) introduced a book to 3- and 4-year-old children which contained ten target words that were assumed to be unknown to the children. Children who read the book three times with their parents understood significantly more of these words than did children who

read the book only once. Sénéchal and Cornell (1993) found that even a single shared reading of a book could boost children's receptive vocabulary.

Bus, van Ijzendoorn, & Pellegrini(1995) noted methodological difficulties inherent in asking parents how frequently they read with their children; not only are social desirability biases high when parents respond to this question, but parents may be inconsistent in their interpretation of this question. To address this problem, Sénéchal et al. (1996) used parents' and children's knowledge of storybooks as a proxy for parental report of the frequency of shared book reading. Sénéchal et al. assumed that parents and children who spend more time reading, have a greater knowledge of children's books. They found a significant positive correlation between both parent and child knowledge of children's books and children's receptive vocabulary.

In addition to enhancing children's receptive vocabulary, shared book reading also increases their expressive vocabulary. Sénéchal et al. (1996) found that children's knowledge of storybooks is linked to their expressive vocabulary scores on the Expressive One-Word Picture Vocabulary Test-Revised (EOWPVT-R; Gardner, 1990). Children's expressive vocabulary shows particular improvement when their parents or teachers elicit their active participation in reading. Sénéchal (1997) noted that when children are asked to answer questions during repeated reading of a picture book, their expressive vocabularies are enhanced.

Intervention programs have specifically used parent-child shared book reading as a method for improving children's vocabulary. For example, Whitehurst et al. (1988) developed dialogic reading as a way to increase children's active involvement in reading and enhance language growth. Parents and teachers using dialogic reading are

encouraged to prompt children in ways that will help them become tellers of the story. Completion or fill-in-the blank prompts, recall prompts to help children understand the story's plot, open-ended questions, wh-questions, and distancing prompts that ask children to relate the story to their own experiences are used. Dialogic reading has repeatedly been found to improve children's expressive language skills (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Hargrave & Sénéchal, 2000; Huebner, 2000; Lonigan & Whitehurst, 1998; Valdez-Menchaca & Whitehurst, 1992; Whitehurst et al., 1988; Whitehurst et al., 1994a; Whitehurst et al., 1994b).

Shared book reading also improves children's verbal abilities. Whitehurst et al. (1988) found that dialogic reading enhances children's mean length of utterances (MLU). Storybook reading is also related to teachers' assessments of their kindergarten children's verbal skills (Wells, 1985b).

Furthermore, shared book reading enhances children's phonological awareness. Burgess (1997) found that among 4- and 5-year-old children, shared book reading accounts for 9% of the variance in phonological awareness, even after taking the effects of age, phonological awareness skills at pre-test, and oral language abilities into account. Sénéchal, LeFevre, Thomas, and Daley (1998) noted that frequency of shared book reading is related to child oral-language skills, including phonological awareness.

Not only are the impacts of shared book reading observable during the preschool period, but they extend into the school years. Children's reading abilities in elementary school are related to their early patterns of shared book reading. Scarborough, Dobrich, and Hager (1991) observed that children who are poorer readers in second grade, read less frequently with their parents during the preschool years than did children who

became better readers. Similarly, Wells (1985b) found that the frequency of listening to stories at ages 1 and 3 is related to reading comprehension at 7-years-of-age.

Finally, shared book reading during early childhood is related to children's interest in reading. Even in children as young as 2-years-of age, interest in books is linked to frequency of shared book reading with parents (Lyytinen, Laakso, and Poikkeus, 1998). Preschoolers who spend more time interacting with books and stories during free play are read to more often than are children who spend less time engaging in these activities (Lomax, 1977). In contrast to children with low interest in reading, kindergarten-aged children who demonstrate high interest in reading, are read to more often (Morrow 1983).

### *Reading Styles*

Parents use different styles and techniques when reading to their children. Researchers have developed various methods for classifying parental reading styles. Frequently, they develop coding schemes to classify parental utterances. For example, Penfold and Bacharach (1988) evaluated whether each maternal utterance was a wh-question, a specifying question, direct notice, indirect notice, notice of a relationship, repetition, anaphoric reference, ellipses, pointing, or request for action. In a later study, Anderson-Yockel and Haynes (1994) recorded whether each maternal utterance was a wh-question, a yes/no question, a directive/request, labeling, description, feedback, attentional vocative, attentional gesture, or pause.

Researchers often focus on parents' distancing strategies (Sigel, 1982). High distancing remarks, also called nonimmediate talk, require children to think about topics that are not directly presented in books, whereas low distancing strategies, also known as

immediate talk, center around the text and illustrations of books (Zaslow & Eldred, 1998). In their sample of low-income mothers, Zaslow and Eldred observed that nonimmediate talk was relatively rare, constituting only 3.45% of the mothers' total talk.

High distancing remarks have been linked to early literacy development. Beals and DeTemple (1993) recorded the amount and proportion of nonimmediate talk that mothers participated in during shared book reading with their 3- and 4-year-old children. Non-immediate talk predicted children's print skills and ability to produce an independent narrative when they are 5-years-of-age. Lesman and de Jong (1998) noted the quality of parental instruction during shared book reading, defined as the proportion of nonimmediate to immediate talk, when children were 4-years-old. They found a statistically significant link between instruction quality and children's word decoding skills at age 7.

Through coding parental utterances, researchers have attempted to classify reading styles. For example, in an early study of shared book reading styles among mother-infant dyads, Ninio (1980) used cluster analysis and observed the existence of three approaches to reading. The first focused on label-eliciting, the second on gesture-eliciting, and the third on maternal labeling. In a subsequent analysis, Britto, Brooks-Gunn and Griffin (2006) found two reading styles. They described story-reader mothers who did not speak much to their children during the reading activity, and story-tellers who used more decontextualized language, asked more labeling questions, offered more positive feedback, and used more expressive language.

In a later study of preschool teachers reading to their classes, Dickinson and Smith (1994) noted whether utterances were made before, during, or after reading of the

text, and whether the utterances were requests for information, responses to requests, or spontaneous offers of information. They then coded the content of the utterances into cognitively challenging talk, talk with lower cognitive demands, and talk focused on managing the interaction. Cognitively challenging talk included predictions, analysis of characters, and evaluating responses to the story. Talk with lower cognitive demands focused on labeling objects or direct recall of text, and talk focused on managing the interaction revolved around organizing the task, requesting children's attention, and providing them with general feedback. Cluster analysis revealed the existence of three reading styles. Teachers using the constructive style engage their children in cognitively challenging conversations, while teachers using the didactic-interactional style encourage their children to answer questions about factual textual details. While much of the discussion using these two styles occurs during the actual reading of the book, teachers who use the performance-oriented style provide only limited discussion while reading the text, but partake in an extended conversation about the book after finishing the initial read.

In a similar study focusing on maternal reading style, Haden, Reese, and Fivush (1996) recorded whether each extratextual maternal utterance focused on a description, prediction/inference, general knowledge, print knowledge, confirmation, or other category. Cluster analysis revealed three reading styles: describers, collaborators, and comprehenders. Describers provide proportionally more descriptions and seem to be emphasizing vocabulary and expository language. Comprehenders focus more on print knowledge, and appear to engage in more high-level talk, showing greater concern for their children's knowledge of the reading process. Collaborators make more

confirmations than other mothers, and seem to be eliciting their children's comments about the story and to be showing their support for these comments. As their children grow older, these mothers reduce their amount of confirmations and increase their inferences.

Reading styles have been linked to children's cognitive outcomes. Dickinson and Smith (1994) found that children who were in the performance-oriented classrooms when they were 4-years-old, score significantly higher on the PPVT-R when they are age 5 than do children who were in the didactic-interactional classrooms. Haden et al. (1996) evaluated the relationship between maternal reading style when children were 40- and 58-months-old, and children's literacy skills when they were 70-months-of-age. They noted that mothers who read an unfamiliar book using a comprehender style, have children who score higher on the PPVT-R and on story comprehension than do children in the other two groups. Children of mothers who read an unfamiliar book using the collaborator style score significantly higher on the Wide-Range Achievement Test (WRAT reading portion; Jastak & Jastak, 1978).

Reese and Cox (1999) set out to experimentally manipulate the way that adults read to children, in order to evaluate the effects that these reading styles have on children's literacy development. An adult read 32 books over a course of 6 weeks to each 4-year-old participant using either a describer, comprehender, or performance-oriented style. They found that children read to in a describer style, showed greater vocabulary gains than did children in the performance-oriented condition. Children with higher vocabulary scores prior to the intervention, however, improved their vocabulary significantly more if in the performance-oriented condition rather than in the describer

condition. Children in the describer condition showed greater gains in print skills than did those in the comprehender condition.

While researchers have shown that adults employ different styles when reading to children (Heath, 1982; Reese, Cox, Harte, & McAnally, 2003), the reasons that individuals adopt a particular style remain unclear. Therefore, Britto, Brooks-Gunn, and Griffin (2006) charge future researchers to determine why parents select a particular reading style. One possibility is that affect, a defining feature of depression, contributes to the determination of an individual's reading style. To date, very few studies have evaluated the impact of maternal depression on shared book reading. Reissland, Shepherd, and Herrera (2003) found that while nondepressed mothers have a smaller MLU when reading with younger babies than when reading with older ones, depressed mothers' MLU is not related to infants' age. In this study, depressed mothers also spoke with a higher pitch and had more pitch modulations than did nondepressed mothers.

In another study of the effects of depression on shared book reading, Bigatti, Cronan, and Anaya (2001) measured maternal depression using the Generalized Contentment Scale. They assessed maternal reading behavior through a questionnaire that included questions on length of time spent reading, and how often they used dialogic reading techniques with their children. When compared with nondepressed women, depressed mothers asked their children fewer questions while reading, and read to their children for shorter amounts of time.

In addition to maternal depression, mother and child demographics may also be related to differences in reading styles. Although this has received little attention to date, several studies have focused on relationships between demographics and frequency of

shared book reading. Scarborough and Dobrich (1994) pointed out that low SES families engage in shared book reading activities less frequently than do families from middle SES backgrounds. Even among middle class families, mothers with higher incomes read more with their children than do those with lower incomes (Karrass, VanDeventer, Braungart-Rieker, 2003). They are also likely to use more words when reading (Ninio, 1980). Mothers with greater amounts of education spend more time reading with their children than do mothers with less education (Kuo, Franke, Regalado, & Halfon, 2004; Westerlund & Lagerberg, 2007).

Child demographics may also be of importance to the frequency of shared book reading. First born children participate in more shared book reading than do their later born counterparts (Westerlund & Lagerberg, 2007). Child's sex, however, does not appear to be related to literacy-promoting behaviors in the home (High et al., 1999) or to the amount of time that a child spends reading (Anand & Krosnick, 2005).

Child's age is also related to frequency of shared book reading. In their study Kuo et al. (2004) split children into three groups based on age. Children in the oldest age group (19-35 months) were read to more often than children in the younger two groups (4-9 months and 10-18 months). In their study of children ages 6 through 16, Anand and Krosnick (2005) found age to be significantly positively correlated with amount of time children spent reading.

These studies indicate that mother and child demographics are related to frequency of book reading (Anand & Krosnick, 2005; Westerlund & Lagerberg, 2007). Furthermore the research of Bigatti et al. (2001) and Reissland et al. (2003) clearly indicates differences in the reading patterns of depressed and nondepressed mothers. The

present study attempts to build on this research, and to focus on preschoolers rather than infants during a story reading task. The preschool age group is a particularly important one for acquiring the skills of emergent literacy and readiness for eventual formal reading instruction in elementary school.

Since little research exists on characteristics of shared book reading interactions as a function of maternal mood, differences in patterns of shared book reading will be evaluated initially, followed by examination of ways in which maternal mood and mother and child demographics might relate to these differences. Further, the present study will include assessments of maternal fundamental frequency and extratextual speech because this has virtually never been addressed, and yet differences have been found in the speech patterns of depressed and nondepressed women.

#### *Purpose of the Study*

The present study has two primary goals. First, it aims to further explore characteristics of shared book reading, because a paucity of research has studied this language-based interaction. Average amount of time spent reading a book will be calculated. Variance in maternal pitch and synchrony of the interaction will be observed. The total number of extratextual words uttered, as well as the content of remarks, will be evaluated. The current study will also analyze correlative relationships among these characteristics of maternal reading.

The second main goal is to determine whether maternal depression can account for some of the differences in reading style. Patterns of speech vary greatly between the interactions of depressed and nondepressed women with their children (Breznetz & Sherman, 1997). Since reading is an activity entirely grounded in language, these

differences may be particularly salient during shared book reading. The study will also evaluate how mother and child demographics are related to these differences.

In particular, depression and demographics will be associated with three different sets of book reading characteristics: those that reflect maternal energy expended, those associated with patterns of conversational chains, and those indicative of the actual content of the extratextual remarks. Since depression is associated with fatigue, it is hypothesized that the higher a mother's DID score, the more poorly she will perform on the energy expended reading characteristics, including number of extratextual words and time spent reading. Further, the association between depression and a reduction in pitch fluctuations (Kaplan et al., 2001), suggests that mothers with higher DID scores will display lower variation in pitch (as measured by standard deviation of pitch). Previous research has noted that depressed women take fewer turns when conversing with their young children (Breznitz & Sherman, 1997). Therefore, higher depression is also expected to be associated with decreased conversational turns that are relevant to the reading task. Higher DID scores are predicted, however, to be related to increased irrelevant turns, as maternal depression is associated with greater preoccupation (Lovejoy et al., 2000). In addition, the difficulty that depressed women display putting their children's experiences into context (Cox et al., 1987) leads to the hypothesis that depression will be associated with fewer high distancing remarks. Since mothers who are depressed are expected to read differently with their children, it is further predicted that children will respond to their depressed mothers' altered reading patterns with increased negativity and hostility.

Although demographics have not been related to the quality of shared book reading, they are associated with the frequency of shared book reading (Westerlund & Lagerberg, 2007). Mothers who completed more years of education tend to read more frequently with their children than do those who completed fewer years of school (Kuo et al., 2004). It is, therefore, hypothesized that the readings of mothers who completed higher levels of education will be associated with the positive characteristics of shared book reading being evaluated. Furthermore, since the fewer children a mother has, the more time she can likely spend individually with each child, it is predicted that mothers with fewer children will demonstrate more of the positive features of sharing a book when reading with their children.

## Chapter 2: Method

### *Participants*

One hundred and five mother-child dyads were selected for this study from a larger sample of 366 dyads. These families participated in a study focused on child temperament. Mailing lists of families living within a 20-mile radius of Stony Brook who had a 3-year-old child were used to recruit the participants. Maternal depression was assessed using the Diagnostic Inventory for Depression (Zimmerman, Sheeran, & Young, 2004). This instrument evaluates whether individuals have met the DSM-IV criteria for each symptom of depression: low mood, anhedonia, appetite/weight, sleep, psychomotor, fatigue, worthless/guilt, concentration/indecisive, thoughts of death/suicide, or impairment. Based on Zimmerman et al.'s (2004) guidelines for discriminating between levels of depression severity, the study included the 22 highest scoring mothers, whose scores ranged between the borderline and moderately depressed categories. It also included the next highest scoring 33 mothers whose scores ranged between the borderline

and nondepressed categories. It then randomly sampled 49 mothers among the remaining 311 participants in the larger study on child temperament. Average DID score was 9.06 with a standard deviation of 7.04.

Mothers ranged in age from 20 to 49 years, with a mean of 36.29 and a standard deviation of 4.35. Children's ages ranged from 36 months to 47 months. Average age was 41.85 months (SD = 3.20). The children were overwhelmingly Caucasian (95.24%); 0.95% of the children were Asian, 0% were African American, and 3.81% were of another race. The Hollingshead Index of Social Position uses demographic information to assign an SES rating from 1 (lowest stratum) to 5 (highest stratum). The average family social stratum was 2.37 (SD = .98). Amount of education completed by mothers was split into eight levels, ranging from completed 6<sup>th</sup> grade or less to completed graduate/professional school. Average maternal education was 5.59 (between graduated from a two year and a four year college) with a standard deviation of 1.61. Among participants in the study, the lowest amount of education completed was graduated high school and the highest was completed graduate/professional school. Children averaged 1.41 siblings (SD = 0.99), with a range from 0 to 6. On average, the target child was the 1.97<sup>th</sup> child born into the family (SD = 1.00, range from 1 to 7). Male children comprised 60.37% of the participants, and the remaining 39.36% were female.

### *Procedure*

Each mother and child sat together in a room that contained only a small table and two chairs. They were instructed to remain seated in their chairs throughout the observation session. Prior to beginning the shared book reading session, mothers were asked whether their children were familiar with the book *If You Give a Mouse a Cookie*, by Laura Numeroff. If they responded negatively, they were asked to read this book with

their children, just as they do at home. If their children were familiar with this book, they were given the same directions but were asked to read Laura Numeroff's *If You Take a Mouse to School*. Children familiar with both books were able to select the one that they preferred to read. The books are both 28 pages long and share the same story structure. They describe a chain of whimsical and fictitious events that may unfold if you give a mouse a cookie or if you take a mouse to school.

### *Coding*

Each shared book reading session was transcribed verbatim. Child remarks were sometimes difficult to understand, and in such cases, transcribers noted that an inaudible child utterance was stated. Transcripts were separated into two parts: a book reading phase and a discussion phase. The book reading phase started as soon as the research assistant placed the box containing the book on the table and concluded when the mother read the last word of the text. The discussion phase consisted of the first 50 seconds of discussion immediately following the conclusion of the book. Only extratextual talk, or talk that is not direct reading of the text, was evaluated. Two advanced level college students and one doctoral student coded the transcripts. When disagreements arose, the coders reached consensus.

The codes were organized into three differing sets of reading behaviors. The first group of codes described characteristics of energy expended by the parent. This included dramatic quality of the reading, length of reading time, number of extratextual words, and standard deviation of the fundamental frequency. A second group of reading characteristics, those focused on turn-taking and the context of extratextual conversation, might be summarized as codes related to conversation chains. These considered whether each mother and child turn was relevant or irrelevant. The third group of codes evaluated

the content of each extratextual remark. The focus of each remark was assigned to one of twenty-two codes.

### *Energy Expended Codes*

A 5-point-scale was used to evaluate the dramatic quality of the mother's reading. Features that made a reading dramatic included fluctuating voice tone, variation of loudness of reading, facial enthusiasm, laughter, and interjections. A reading that was low in drama showed little variation in tone or volume, and lacked varied facial exclamations and exclamations. The voice of a mother who read in a highly dramatic fashion frequently varied in tone and in loudness. Such a mother conveyed facial enthusiasm, laughed, or made exclamations.

In addition to this observational code, the total amount of time the mother spent reading the book was calculated. Coders also counted the total number of extratextual words stated by each mother during the book reading and discussion phases.

Four phrases were selected for fundamental frequency analyses. Two criteria were used to select phrases; they had to reflect exciting parts of the story, and the phrases had to have counterparts in the other book that were similar in sentence structure and included many of the same words. The fundamental frequencies of each mother reading the four phrases were analyzed using Sinusoidal Partial Editing Analysis and Resynthesis software (Klingbeil, 2006).

Human pitch perception is logarithmic and frequency must increase exponentially for people to hear a linear increase. Therefore, in order to analyze the pitch data, a logarithmic transformation was necessary. The commonly used Musical Instrument Digital Interface (MIDI) tuning standard was used. In order to obtain the MIDI standard

values, the following equation, in which  $p$  represents a real number and  $f$  a fundamental frequency, was used:  $p = 69 + 12 \times \log_2 (f/440\text{hz})$ . This creates a pitch space where octaves have size 12, semitones have size 1, and A440 is assigned number 69. For the purpose of the analyses, the mean pitch and standard deviation of pitch were calculated by averaging fundamental frequency data across the four episodes.

#### *Conversational Chain Codes*

Each time the mother or child took an extratextual conversational turn with a verbal remark, sound, or, gesture, the relevance of the turn was noted. Relevant turns were either related to the book or to the book reading task. Mothers' instructions for handling the book were viewed as relevant. In contrast, irrelevant turns were those not related to the book or the task. Attempts to control children's misbehaviors or discussions of off-task topics, like the colors of the room, were coded as irrelevant. For each mother and child, the total number of relevant remarks, irrelevant remarks, relevant sounds, irrelevant sounds, relevant gestures, irrelevant gestures, and inaudible remarks were calculated. Occasionally, a conversational turn included relevant and irrelevant components. In such cases, the different parts of the turn were coded separately.

#### *Content of Remark Codes*

The conversational turn codes focused only on the relevancy of the remarks, gestures, and sounds to the book reading task. The actual content of each maternal verbal remark was evaluated as well. Each mother remark was first coded as a prompt, which attempted to elicit information or a gesture from a child, or as a comment, which did not aim to draw a response. Prompts and comments were then coded into one of the following categories.

1. **Content** – The mother’s remark focused on the content of the story (either text or illustrations). For example, after noticing that the child was experiencing difficulty following the text, the mother may have elaborated on the events that were occurring. Labeling remarks were coded here.
2. **Inference** – The parent’s remark drew an inference. In particular, the remark focused on imagining the motivations or feelings of a character or making predictions for future events. The content of the remark had to go beyond the text or illustrations of the story.
3. **Application to child’s life** – The parent applied the story to the child’s or mother’s own life and experiences. For example, when seeing a lunchbox, the parent said, “The child has a lunchbox, just like you do.”
4. **General Knowledge** – The parent used the story to further the child’s general knowledge. For example, the parent explained that mice, like humans, are mammals. Any discussion of colors or numbers was coded here.
5. **Book/print knowledge** – The parent’s utterance focused on print or book knowledge. For example, the parent stated that pages are turned from left to right, or discussed the job of the author.
6. **Orienting Prompts** – The intent of these statements was to prompt the child to attend to a part of the book or to point to something in the book. For example, the mother remarked, “See the mouse” or “Point to the volcano.” In addition, questions like “do you see it?” or statements like “over here,” when the mother is pointing something out, were considered orienting prompts.

7. **Confirmation** – The purpose of the parent’s utterance was to give confirmation or encouragement to the child. For example, the parent said, “You’re right” or “What a wonderful thought.”
8. **Repetition Confirmation** – If the mother repeated the essence of the child’s remark as a way of confirming the child’s ideas, her remark was coded here. For example the child may have said, “a beautiful picture” and the mother may have replied “beautiful picture.”
9. **Child’s Opinion** – These remarks aimed to elicit the child’s opinion on a given topic, or to comment on the child’s opinion. For example, the mother asked, “Did you like the book?” or “Do you think that’s a cute mouse?”
10. **Mom’s Own Opinion** – These utterances conveyed the mother’s opinion about something related to the task. The mother may have said, “My favorite part of the story was when the mouse built a house,” or “That was really cool.”
11. **Book Reading Support** – The remark was related to the book reading task, but was not directly linked to the material presented in the story. For example, the mother exclaimed “It’s a book,” when first presented with the task. Upon finishing the story, she stated, “the end.” Discussions of other books by Laura Numeroff or comparisons between this and other books were coded here.
12. **Interjection** – Interjections were defined as exclamations, often one word, used to convey emotion. For example, “Wow” “Cool” “O Boy” or “My goodness” were coded here.

13. **Managing the Book-Focused Task** – These remarks set up the book reading interaction for the child. For example, the mother might say, “We’re going to read now” or “Open the book.”
14. **Grammar Correction** – These remarks focused on correcting a child’s grammar. A child might have said, “Look the boy runned,” and the mother may have responded “You mean he ran.”
15. **Semantic Correction** – The mother’s remark intended to correct a conceptual mistake made by the child. For example, the child said, “That’s a red crayon,” and the mother responded, “It’s an orange one.”
16. **Articulation Correction** – These remarks focused on correcting the child’s pronunciation. For example, the child said “psghetti,” and the mom replied “spaghetti.”
17. **Clarification** – The purpose of these remarks were to clarify something the child had said. For example, as a result of failing to understand her child’s utterance, a mother may have asked “What did you say?”
18. **I Don’t Know Closure** – If the mother stated “I don’t know” in a way that was intended to end the conversation, her remark was coded here. For example, the child may have asked the mother what the mouse was holding, and the mother may have responded “I don’t know.”
19. **Word Fillers Solo** – These are words like “okay” and “you know” which are not intended to convey any particular meaning. Word fillers were not coded if they were part of a larger remark.

20. **Nonword Solo** – These arose when a parent’s conversational turn consisted solely of a nonword sound such as “mmm”, or “oh.” Nonwords, were not coded if they were part of a larger remark.

21. **Task irrelevant** – Remarks, such as we’re eating pasta for dinner, that were irrelevant to the shared book reading task were coded here.

22. **Box Task Irrelevant** – These are task irrelevant utterances specifically related to the box. Comments like, “There are diamonds on the box” or “What a beautiful box” should be coded in this category.

Each portion of the mothers’ remarks that represented a new code was coded separately.

The 22 categories of maternal utterances were combined into four composites: reading-focused, nonreading-focused, high distancing, and total confirmations. Each maternal remark was determined to be either a reading-focused remark (content, inference, application to child’s life, general knowledge, book knowledge, book support, orienting prompt, confirmation, repetition confirmation, child’s opinion, mother’s opinion, interjection, corrections, clarification, and don’t know closure) or nonreading-focused remark (word filler, nonword solo, managing task, task irrelevant, and box irrelevant). Two other composite codes were also calculated. Total number of high distancing remarks was based on the work of Sigel (1982) and Haden, Reese, and Fivush (1996). This combined utterances that fell into the inference, application to child’s life, and general knowledge categories. Total confirmations was calculated by combining number of confirmations and repetition confirmations.

### *Behavior Codes*

The coding of additional mother and child behaviors was adopted without modification from the data in the larger study of child temperament. The following codes used a five-point scale.

1. **Mother Supportive Presence** – The level of positive regard and emotional support that the mother offered to the child.
2. **Maternal Intrusiveness** – The degree to which the mother failed to recognize the child's efforts to gain autonomy.
3. **Maternal Hostility** – A mother's expression of anger or rejection of a child.
4. **Maternal Quality of Instruction** – The mother's skillfulness at structuring the task for the child and providing supports that were clear and sensitive to the child.
5. **Child Persistence** – The degree to which the child was task-focused and actively engaged, not merely compliant to the mother's directions.
6. **Child Interest/Engagement** – The level of vigor, confidence, and eagerness displayed by the child.
7. **Child Positive Affect** – The frequency and intensity of the child's expression of positive affect.
8. **Child Negativity towards Parent** – The extent to which the child displayed anger and hostility to the mother.
9. **Child Negative Affect** – The frequency and intensity of the child's expression of negative affect.
10. **Child Compliance** – The extent to which the child showed willingness to listen to the mother and adapts behavior to mother's directions.

11. **Quality of the Relationship** – The sense of relatedness and mutual engagement between mother and child.

Three-point scales were used to assess the following maternal factors.

12. **Maternal Confidence** – The extent to which the mother appeared to believe that she could work successfully with the child and that the child would behave appropriately.

13. **Maternal Positive Affect** – The frequency and intensity of the mother’s expression of positive affect.

14. **Maternal Negative Affect** – The frequency and intensity of the mother’s negative affect.

## Chapter 3: Results

### *Overview*

Results will be laid out in the following sequence. First measurement reliabilities will be discussed. Next, frequencies and relationships between the different characteristics of maternal reading will be described. These relationships will be followed by an exploratory cluster analysis that identified three distinct maternal reading styles. This section will conclude with linkages between these three groups and reading behaviors.

In the next section, relationships between depression, demographics, and the three groups of reading characteristics (energy expended, conversational turns, and content of remarks) will be discussed. Mother and child behaviors will also be linked to depression and the reading characteristics

### *Coding Reliabilities*

Intraclass correlation coefficients (ICC) were calculated, in order to assess the inter-rater reliability of each of the codes. A two-way mixed model was selected, in

which raters were seen as fixed effects and targets were seen as random. Absolute agreement was specified, and the single measure version of ICC was used. There were very few examples of irrelevant gestures, grammar corrections, or box task irrelevant remarks. Therefore, among the transcripts that were coded by two raters, not enough variability existed to calculate an ICC for these codes. In such cases, raters conferred with one another prior to assigning these three codes. There were no instances of articulation corrections.

Thirty-one transcripts were randomly selected to be coded by two raters for the conversational chains codes. ICCs were 1.0 for relevant remarks, 1.0 for irrelevant remarks, .95 for relevant sounds, .96 for irrelevant sounds, 1.0 for relevant gestures, .97 for text prompts, and .66 for inaudible remarks.

For the content of remarks codes, 29 transcripts were randomly selected to be coded for reliability. ICCs for the different types of remarks were as follows: .99 for content, .96 for inference, .96 for application to child's life, .95 for general knowledge, .90 for book knowledge, 1.0 for orienting prompt, .99 for confirmation, .95 for repetition confirmation, .99 for child's opinion, .94 for mother's opinion, .98 for book support, .99 for interjection, .99 for managing the task, .56 for semantic correction, .79 for word filler, 1.0 for nonword filler, 1.0 for task irrelevant, .82 for clarification, and 1.0 for don't know closure. In addition, the ICC of .91 for the dramatic quality of maternal reading, was based on the videos of 21 dyads.

#### *Exploration of Reading Characteristics*

Means and standard deviations were calculated for the 22 types of maternal utterances and for the four composites. Table 1 presents these values both during the book reading and discussion phases. While reading the book, content remarks were the

most frequent type of utterances. There were more than three times as many content utterances (10.09) produced than the next most frequent utterance, orienting prompts (3.30). During the book discussion, content utterances were again the most frequent remarks, with an average of 3.74 uttered. This was followed by repetition confirmations, (Mean = 2.26) and with remarks focused on the child's opinions (Mean = 1.88). In general, the percentages of different types of remarks made were very similar during the book reading and discussion phases. Very few corrections were made during either phase. Regarding the composites, there were far more reading-focused remarks than nonreading-focused remarks uttered. High distancing remarks comprised only 14% of utterances during the reading phase and 12% during the discussion period. A significant difference emerged, however, in the total confirmations uttered during the book reading and discussion phases ( $t(95) = 3.11, p < .01$ ), with more confirmations occurring during the discussion.

Prompts were abundant both during book reading and discussion phases. While reading the text of the book, mothers averaged 15.86 prompts ( $SD = 13.26$ ), and 18.61 comments ( $SD = 4.37$ ). During the discussion, mothers averaged 9.41 prompts ( $SD = 3.08$ ), and 6.92 comments ( $SD = 3.65$ ). Thus, prompts comprised 46.01% of maternal remarks during the book reading phase, and 57.62% of mothers' utterances during the discussion phase.

Synchrony in chains of conversations was analyzed by looking at conversational turns. Table 2 displays the means and standard deviations for the number of remarks/gestures made by mothers and children. During the book reading phase, mothers ( $t(104) = -8.71, p < .001$ ) and children ( $t(104) = -11.57, p < .001$ ) both took more

relevant turns than irrelevant ones. This was true for the discussion stage as well ( $t(95) = -19.66, p < .001$  for mothers and  $t(95) = -13.11, p < .001$  for children). The average mother took a greater number of turns than the average child during the book reading phase ( $t(104) = 8.97, p < .001$ ). The same was true during the discussion period, ( $t(95) = 8.89, p < .001$ ). Mothers took more verbal remark turns than children during the reading ( $t(104) = -9.57, p < .001$ ) and discussion ( $t(95) = -10.33, p < .001$ ) phases. Children, however, took more sound turns in conversational chains ( $t(104) = -3.70, p < .001$  for the book reading and  $t(95) = -5.50, p < .001$  for the discussion phases). Children also took more gesture turns in conversational chains ( $t(104) = -4.10, p < .001$  for the book reading, and  $t(95) = -5.03, p < .001$  for the discussion phases).

While reading the books, mothers initiated far more interruptions of their reading than did their children ( $t(104) = 7.28, p < .001$ ). On average, mothers interrupted the text 9.09 times to speak with their children, while children only interrupted 3.93 times. Mothers and children, however, responded to each other's remarks at almost equal rates. Mothers averaged 12.60 responses during the book reading, while children averaged 12.09 responses. Number of times mothers and children spoke were highly correlated ( $r = .90, p < .001$ ). In addition, number of child relevant remarks and of mother relevant remarks were highly correlated ( $r = .90, p < .001$ ), and the number of mother and child irrelevant remarks were also highly correlated ( $r = .98, p < .001$ ).

Of the 105 mothers who participated in this study, all but two progressed as expected from completing the book to discussing its text. Two, however, were prompted by the experimenter to stop reading after a lengthy interval and to begin speaking about the book. Because the amount of time they would have spent reading is unknown, these

two were excluded from analyses involving length of reading time. All other dyads concluded the book without experimenter interruption. Average reading time for these remaining 103 mother-child dyads was 233.08 seconds with a standard deviation of 67.46 seconds. Reading time ranged from 433 seconds to 134 seconds.

Correlations were then used to assess relationships between the following six reading characteristics: standard deviation of pitch, dramatic quality of the reading, extratextual words, length of reading time, and turns taken by mother and child. As indicated in Table 3, these variables were correlated with each other. In fact, dramatic quality of the reading and extratextual words were positively correlated with all five other variables. Correlations were also calculated between these six variables and percentages of all maternal remarks that fell into the four content of remark composites (reading-focused, nonreading-focused, confirmations, and high distancing) during the reading and discussion phases combined. Standard deviation of pitch, a measure of the variability of pitch, was the sole measure related to these composites. It was positively correlated with the percentages of reading-focused ( $r = .22$ ) and high distancing ( $r = .23$ ) remarks uttered.

### *Cluster Analysis*

Cluster analysis was used to explore and describe potentially different ways in which mothers read. The analysis grouped mothers together based on the reading-focused remarks that they made during the reading phase. The percentages of different types of reading-focused remarks that the mothers uttered were used to build and explore group differences. Initially, the Tree Clustering method was used. Each mother was placed in a unique group of one. Gradually, the threshold for determining whether two mothers

belong to the same group was lowered until all mothers were grouped into increasingly similar clusters. Eventually, in the last step of the Tree Clustering method, all mothers were joined together. This method relies on Euclidean distances (similarities), which are sets of rules serving as criteria for linking together or separating variables. Ward's Method was used to establish whether groups of closely related variables were similar enough to be linked together. Using an analysis of variance approach to determining clusters, Ward's method seeks to minimize the sums of squares of any two possible clusters that can be formed (StatSoft, Inc., 2001). The joining tree shown in Figure 1 displays the three distinct clusters that emerged from this evaluation.

Once the existence of three clusters was established, k-Means Clustering was performed. This method requires the number of clusters to be specified, and it optimally partitions the items into  $k$  number of clusters by minimizing the within-cluster variance and maximizing the between cluster variance. The mothers belonging to the three clusters demonstrated three distinctly different ways of reading. The twelve mothers in the first cluster appeared to spend most of their extratextual utterances getting their children's attention. The majority of their comments were orienting prompts (.21) and content-focused remarks (.20). Among the 27 mothers in the second group, the highest percentage of utterances focused on content of the stories (.44). The 66 mothers in the third group were more evenly distributed in the percentages of different remarks uttered. Still the majority of their utterances focused on the content of the books (.16). Figure 2 displays the mean percentages of each utterance type for the three groups. The first cluster of mothers will be labeled the *attention-getters*, the second the *content-focused readers*, and the third the *evenly-distributed readers*. While frequencies of occurrence of various types

of remarks differentiated these three groups, analysis of variance revealed that maternal DID scores did not differ significantly among the three groups.

*Relationships between the three clusters and reading characteristics.*

The cluster analyses sorted mothers solely on the percentages of their total reading-focused remarks that fell into each of the codes. Subsequent analyses were run to establish whether mothers in the three groups differed from one another in other aspects of their reading. In particular, analyses of variance were used to determine whether maternal pitch, number of conversational turns, time spent reading, and absolute number of remarks belonging to the four composites (reading-focused, nonreading-focused, high distancing, and total confirmations) differed among the mothers as a function of their reading style group.

A MANOVA was conducted in which the maternal reading cluster (attention getter, content-focused reader, or evenly-distributed reader) served as the independent variable and the dependent variables were mean pitch and standard deviation while reading. The groups differed significantly in mean pitch and pitch standard deviation, *Wilks*  $F(4,198) = 2.90, p < .05$ . The univariate analyses for the mean pitch ( $F(2,100) = 3.74, p < .05$ ) was significant, while a trend emerged for the univariate standard deviation of pitch analysis ( $F(2,100) = 2.85, p = .06$ ). Figures 3 and 4 display the standard deviation and mean pitch for each group. The attention-getter cluster of mothers read with the lowest pitch while the evenly-distributed mothers had the highest pitch. A post-hoc Scheffé analysis revealed that the difference between these two groups (but not the difference between the content-focused mothers and either of the other groups) was significant ( $p < .05$ ). The attention-getting mothers tended to read with more pitch

fluctuations while the evenly-distributed readers had less fluctuation in pitch. The content-focused mothers had pitches that were intermediate both in mean and in pitch fluctuations. Scheffé analysis indicated that these differences were not significant.

An additional MANOVA was performed, again using reading cluster as the independent variable, and using total number of conversational turns (including remarks, gestures, and sounds) taken by mother and child as the dependant variables. The overall MANOVA was significant ( $F(4,202) = 34.11, p < .001$ ) as was the univariate analysis for mother conversational turns ( $F(2,102) = 77.45, p < .001$ ) and child turns ( $F(2,102) = 30.98, p < .001$ ). Results of this MANOVA are illustrated in Figure 5. Attention-getting mothers and their children both took the greatest number of turns, while evenly-distributed mothers took the fewest turns. Once again, content-focused mothers and children were intermediate in their conversational turns. Scheffé analyses revealed significant differences in child and mother turn taking between all three clusters of mothers.

Analyses of variance were also used to evaluate the relationship between reading clusters and amount and types of verbal production. An ANOVA revealed a significant difference in the amount of time mothers in the three groups spent reading ( $F(2,102) = 49.78, p < .001$ ). Figure 6 displays the mean reading times of the three groups. Attention-getters read for the longest amounts of time, evenly-distributed mothers read for the shortest periods, and content-focused mothers were intermediate in their reading times. Scheffé tests indicate that the differences between the three groups were all significant.

Once this difference in time spent reading was noted, the relationship between reading styles and the four content of remarks composites was explored. Cluster was

again the independent variable in MANOVA, and number of utterances belonging to the four composites was the dependent variable. The overall MANOVA was significant ( $F(8, 198) = 31.61, p < .001$ ), as were the univariate analyses for reading-focused remarks ( $F(2,102) = 157.44, p < .001$ ), for high distancing utterances ( $F(2,102) = 22.68, p < .001$ ), and for total confirmations ( $F(2,102) = 27.60, p < .001$ ). The univariate analysis for nonreading-focused remarks was not significant ( $F(2,102) = 1.34, p = \text{NS}$ ). Table 4 lays out the differences in pitch, turn taking, and verbal production shown by the three clusters of readers. Scheffé tests were run to analyze the specific differences between the groups. For both total number of high distancing remarks and total number of reading-focused remarks, attention-getting mothers uttered more remarks than content-focused mothers, who uttered more remarks than the evenly-distributed readers. Regarding total confirmations, content-focused mothers uttered more remarks than evenly-distributed mothers, but the difference between content-focused readers and attention-getters was not significant.

*Links between Reading Characteristics, Depression, Demographics, and Behaviors*  
*Overview*

Next, findings describing the relationships between the three sets of reading characteristics, maternal depression, demographics, and behaviors are explored. The first set of characteristics reflected the energy expended by the mother while reading. This was assessed by the standard deviation of mother's pitch, dramatic quality of the reading, length of time spent reading, and number of extratextual words. The second group of reading characteristics focused on conversational turns taken by the mother and by the child. Conversational turns were divided into those that were relevant to the reading task

and those that were irrelevant to the task. The content of remark characteristics focused on the 22 types of remarks and the four composites (reading-focused, nonreading-focused, high distancing, and confirmation remarks).

Both mother and child demographics were considered. Mother's age and education and child's age, sex, number of siblings, and birth order were included in the analyses.

Correlations, followed by hierarchical regression analyses were used to link the three sets of reading characteristics to maternal depression and mother and child demographics. Interactions between maternal demographics and DID scores predicting these reading factors were routinely tested for. Significant interactions are reported. In addition, correlations were used to determine how the 14 mother and child behaviors described in the methods section were related to book reading characteristics.

#### *Preliminary Correlations*

Before depression and demographics could be linked to the reading characteristics, correlations were calculated to determine the interrelatedness of these variables. Table 5 presents the correlations between DID scores, maternal demographics of age and education, and child demographics of age, sex, birth order, and number of siblings. As would be expected, child birth order was significantly correlated with both number of siblings ( $r = .85$ ) and maternal age ( $r = .31$ ). In addition, DID score was negatively correlated with maternal education ( $r = -.20$ ) and positively correlated with child's sex ( $r = .21$ ), such that the more depressed the mother, the less education she was likely to have completed and the greater her likelihood of having a girl.

In addition, correlations were calculated between DID scores and mother and child behaviors. Table 6 displays the correlations between DID score and these behaviors. Mothers with higher depression scores displayed increased intrusiveness ( $r = .24$ ) and hostility ( $r = .21$ ). Significant positive correlations also existed between maternal depression and child negativity toward parent ( $r = .20$ ) and child negative affect ( $r = .21$ ); negative correlations were found between depression and child compliance ( $r = -.22$ ) and relationship quality ( $r = -.22$ ).

#### *Maternal Energy Expended*

The relationships between the four energy expended reading characteristics (length of reading time, extratextual words, dramatic quality of the reading, standard deviation of pitch) and the potential predictors of DID and demographics were evaluated through correlations and hierarchical regression analyses. Details of each step in the hierarchical regression analyses are depicted in Table 7.

The first reading characteristics, *length of time spent reading*, was significantly correlated with maternal depression, as measured by the DID ( $r = .21, p < .05$ ). A hierarchical regression was run to determine if addition of information regarding mother's education and age, and child's age, number of siblings, birth order, and sex improved predictions of length of reading time beyond that afforded by maternal depression. Overall  $R^2$  was only significantly different from 0 at the end of the first step, with only DID score in the equation,  $R^2 = .05, F(1,97) = 4.63, p < .05$ .

The next reading characteristic, *extratextual words*, was correlated solely with maternal age ( $r = .29, p < .01$ ). Again, a hierarchical stepwise regression was run using the same 7 potential predictors in which the dependant variable was extratextual words.

$R^2$  was significantly different from 0 at the end of all steps except for the first two, which included only DID score and maternal education. At the end of step 7, when all the independent variables were included in the equation,  $R^2 = .17$ ,  $F(7,91) = 2.72$ ,  $p < .05$ . Only step 3, which added maternal age, resulted in a significant increment in,  $R^2$ , accounting for an additional 10% in the variance of extratextual words,  $F_{inc}(1,95) = 10.55$ ,  $p < .01$ . Trends toward significant increments were found in step 1, which included only DID score, and in step 7, which added child's sex to the equation.

Maternal education was the only factor correlated with the next reading characteristic: *dramatic quality of the reading* ( $r = .27$ ,  $p < .01$ ). Another hierarchical regression was run with dramatic quality of the reading as the dependent variable and with the same potential predictors. Overall  $R^2$  was only significantly different from 0 at the end of the fourth step. With maternal DID score, education, and age, and child's age in the equation,  $R^2 = .10$ ,  $F(4, 94) = 2.52$ ,  $p < .05$ . Again, only one of the predictors, mother's education, resulted in a significant increment in  $R^2$ , accounting for 6% of the variance in dramatic quality of the reading,  $F_{inc}(1,96) = 5.85$ ,  $p < .05$

The last of these four reading characteristics, *standard deviation of pitch*, was found to correlate significantly with maternal age and education ( $rs = .22$ ,  $p < .05$ ). Hierarchical regression revealed 4 steps in which  $R^2$  was significantly different from 0. In step 3, which included maternal DID, education, and age,  $R^2 = .11$ ,  $F(3,93) = 3.74$ ,  $p < .05$ . In step 4, which added child's age,  $R^2 = .13$ ,  $F(4,92) = 3.47$ ,  $p < .05$ , and in step 5, with the addition of number of siblings,  $R^2 = .13$ ,  $F(5,91) = 2.75$ ,  $p < .05$ . Finally, in step 6, which also included child's birth order,  $R^2 = .14$ ,  $F(6,90) = 2.36$ ,  $p < .05$ . Both the addition of maternal education and maternal age resulted in a significant increment in  $R^2$

( $R^2 = .05$ ,  $F_{inc}(1,94) = 5.04$ ,  $p < .05$  for maternal education and  $R^2 = .11$ ,  $F_{inc}(1,93) = 5.91$ ,  $p < .05$  for maternal age).

In summary, of these four reading characteristics, maternal depression accounted for a significant amount of the variance of length of time reading. It did not significantly predict number of extratextual words, dramatic quality of the reading, or standard deviation of pitch. Mother's education added a significant increment to the prediction of both dramatic quality of the reading and standard deviation of pitch. Mother's age contributed significantly to the prediction of extratextual words and standard deviation of pitch. None of the child demographics added significant increments to these regression equations.

*Energy expended characteristics and mother and child behaviors.*

Correlations were run between these four characteristics and mother and child behaviors. The results of these analyses are depicted in Table 6. Mothers who read with more drama and had greater pitch inflection also showed greater amounts of positive affect. More dramatic readings were also associated with less maternal negative affect. Increased reading times and extratextual words were related to higher levels of mother hostility and intrusion and child negativity to parent.

*Conversational Turns*

*Numbers of conversational turns.*

The number of conversational turns taken by mother and child were calculated separately for the reading and discussion phases. Correlations and hierarchical regression analyses were used to assess the relationship between these turns, and the independent variables of DID scores and demographics.

First, the relationships between number of turns taken by the mothers and children with demographics and DID scores were analyzed during the book reading phase. Maternal turns were significantly correlated with maternal age ( $r = .23, p < .05$ ) and with child's birth order ( $r = .20, p < .05$ ). The older the mother and the younger her child's position in the family, the more conversational turns that mother was likely to take. A hierarchical regression was run using the same seven potential predictors in which number of maternal conversational turns was the dependent variable. Overall  $R^2$  was significantly different from zero at the end of the third step. At this point, with DID score, maternal education, and maternal age included in the equation,  $R^2 = .08, F(3,95) = 2.88, p < .05$ . Addition of maternal age contributed a significant increment in  $R^2$ , indicating that older mothers took greater numbers of conversational turns, ( $R^2 = .08, F_{inc}(1,96) = 6.16, p < .05$ ). Number of child's conversational turns was not correlated to the independent variables and hierarchical regression revealed that the potential predictors did not significantly predict number of child turns.

Regarding the discussion phase, there were no significant correlations between absolute number of mother or child conversational turns and demographics or DID scores. Hierarchical regression analyses revealed that the seven potential predictors did not combine to significantly predict number of mother or child conversational turns.

*Irrelevant turns.*

After evaluating the total number of conversational turns taken by mother and child, the number of turns that were irrelevant to the reading task was isolated and analyzed. Irrelevant turns taken during the book reading and discussion phases were combined, because of the relatively small amount of irrelevant turns. Maternal

demographics were related to the number of irrelevant turns taken by the mother. Specifically, mothers' irrelevant conversational turns were significantly related to their levels of education ( $r = -.31, p < .01$ ) and DID score ( $r = .21, p < .05$ ). Children's irrelevant turns were also related to their mothers' education ( $r = -.32, p < .01$ ) and DID scores ( $r = .23, p < .05$ ). Thus, the lower the mother's level of education and the higher her DID score, the greater number of irrelevant conversational turns she and her child took.

Two hierarchical regression analyses were conducted using the same seven potential predictors; for the first mother irrelevant turns was the dependant variable, and in the second child irrelevant turns was the dependant variable. With mother irrelevant turns as the dependant variable, overall  $R^2$  was significantly different from zero at the end of each step. After step 7, with all the independent variables in the equation,  $R^2 = .17, F(7, 82) = 2.31, p < .05$ . Results of the hierarchical regression are displayed in Table 8. As can be seen in the table, step 1 and step 2 added significant increments in  $R^2$ . After step 1, with maternal DID in the equation,  $R^2 = .04, F_{inc}(1,88) = 4.09, p < .05$ . After step 2, with maternal education added to the predictor of maternal irrelevant conversational turns over and above that contributed by DID score,  $R^2 = .12, F_{inc}(1,87) = 7.89, p < .01$ . This indicates that higher maternal DID scores and lower maternal education were associated with increased maternal irrelevant conversational turns.

Similarly, hierarchical regression revealed that with child irrelevant turns as the dependant variable and with the same seven predictors as the independent variables,  $R^2$  was significantly different from zero at the end of each step. After step 7,  $R^2 = .20, F(7,89) = 2.88, p < .05$ . As indicated in Table 8, steps 1, 2, and 4 resulted in significant

increments in  $R^2$ . After step 1, with DID score in the equation,  $R^2 = .06$ ,  $F_{inc}(1,88) = 5.31$ ,  $p < .05$ . After step 2, with maternal education added to the prediction of child irrelevant turns over and above that contributed by DID score,  $R^2 = .14$ ,  $F_{inc}(1,87) = 8.12$ ,  $p < .01$ . After step 4, with child's age added to the prediction of irrelevant turns, above that predicted by DID score, maternal education, and maternal age,  $R^2 = .18$ ,  $F_{inc}(1,85) = 4.08$ ,  $p < .05$ . Higher maternal DID scores, lower maternal education, and younger child ages were associated with increased child irrelevant conversational turns.

A significant interaction was found between maternal education and DID scores predicting number of irrelevant conversational turns taken by mothers during the reading and discussion phases combined. The predictor variables were DID scores and maternal education (both centered) and their product, and the criterion variable was mother's irrelevant conversational turns. The interaction was significant, as indicated by the product term having a significant unique effect,  $t(91) = -3.07$ ,  $p < .01$ , effect size =  $-.30$ . Figure 7 displays this interaction. For mothers with low levels of education, greater numbers of irrelevant conversational turns were associated with higher DID scores and fewer irrelevant turns were associated with lower DID scores. This pattern was not found among mothers who completed more years of education. At high levels of depression, mothers who completed high, medium, and low levels of education differed significantly from one another in the number of irrelevant conversational turns they take. At this point, mothers who completed few years of education took the greatest number of irrelevant turns, mothers who completed many years of education took the fewest number of irrelevant turns, and mothers intermediate in amount of education completed were also intermediate in number of irrelevant conversational turns. As can be seen in the figure,

there was also a main effect of maternal education ( $t(91) = -2.84, p < .01$ , effect size =  $-.29$ ), such that the higher the education, the fewer the irrelevant turns. There was no main effect for depression,  $t < 1$ . The overall regression equation was  $t(3,91) = 7.54, p < .001, R^2 = .20$ .

The same interaction pattern was found when the predictors remained the same, but the dependent variable became child's irrelevant conversational turns. The product term, again, had a significant unique effect,  $t(91) = -3.24, p < .01$ , effect size =  $-.32$ . Once again there was a main effect for education ( $t(91) = -2.93, p < .01$ , effect size =  $-.29$ ).

*Patterns of interspersing conversational turns among lines of text.*

While reading the books, mothers interspersed their utterances among direct readings of lines of text. The number of times that the child made the last utterance before the mother returned to the text, and the number of times that the mother made the last utterance was calculated. Mother's DID score was significantly correlated with mother's making the last remark ( $r = .20, p < .05$ ), such that more depressed mothers tended to make the final utterances in conversational chains. A hierarchical regression was run with the same potential predictors using number of times the mother made the last utterance as the dependant variable. Overall,  $R^2$  was significantly different from zero at the end of each step except for the second, in which a trend toward significance was found. At the end of step 7,  $R^2 = .17, (7,92) = 2.49, p < .05$ . As is noted in Table 8, steps 1 and 3 resulted in significant increments in  $R^2$ . At the end of step 1, with DID in the equation,  $R^2 = .05, F_{inc}(1,97) = 5.05, p < .05$ . At the end of step 3, with maternal age added to the prediction of mother's last remarks,  $R^2 = .11, F_{inc}(1,95) = 6.59, p < .05$ . Older mothers and mothers with higher DID scores were related to mother's making the

concluding remarks in conversational chains. Child concluding remarks were not associated with the seven potential predictors.

In addition to calculating whether the final remark was made by mother or child, number of times that mother and child each interrupted the text with a remark was assessed. Both mother's age ( $r = .27, p < .01$ ) and child's birth order ( $r = .24, p < .05$ ) correlated significantly with interruptions that were made by the mother. A hierarchical regression analysis was conducted using the same potential predictors in which number of maternal interruptions was the dependent variable. Overall  $R^2$  was significantly different from zero for steps 3 through 7. At the end of step 7,  $R^2 = .18, F(7,91) = 2.78, p < .05$ . As can be seen in Table 8, only step 3 resulted in a significant increment in  $R^2$ . At the end of this step, when maternal age was added to the prediction of maternal interruptions over and above that contributed by maternal education and DID score,  $R^2 = .11, F_{inc}(1,95) = 8.93, p < .01$ . Maternal age was related to an increase in interruptions. Number of child interruptions was not associated with any of the potential predictors.

*Conversational turns and mother and child behaviors.*

Mother and child behaviors were closely related to patterns of conversational chains. Table 6 displays the correlations between the total irrelevant conversational turns (including remarks, sounds, and gestures), made by mother and child during the reading and discussion phases, and behavioral codes. Irrelevant turns taken by both mother and child were related to decreased maternal support, child persistence, child interest, and child compliance, and poorer relationship quality, and to increased negativity towards mother, negative affect, mother intrusiveness, and mother hostility.

### *Content of Remarks*

Bivariate correlations were run between the 22 content of remark codes and maternal DID and demographics. During the reading phase, maternal DID score was significantly correlated with number of clarifications ( $r = .23, p < .05$ ) and with percentage of clarifications ( $r = .24, p < .05$ ), such that mothers with higher depression scores requested a greater number of clarifications. In addition, the number of semantic, articulation, and grammar corrections combined was positively related to maternal age ( $r = .20, p < .05$ ), such that the older the mother, the more corrections uttered during the reading session.

During the discussion period, depression covaried negatively and significantly with total confirmations ( $r = -.24, p < .05$ ), such that the higher the mother's DID score the fewer confirmations uttered. Unlike in the book reading phase, depression was not significantly related to clarifications, and maternal age was not significantly correlated with corrections.

The relationship between demographics, DID scores, and percentages of total maternal utterances that fell into each of the four composites (reading-focused, total confirmations, and high distancing) was then explored, first through correlations and then through hierarchical regression analyses. Note that the correlation between percentages of reading-focused and nonreading-focused codes is -1.00. Therefore, analyses of nonreading-focused remarks would be redundant and were not performed.

The percentage of *reading-focused remarks* during the book reading phase was significantly related to both maternal age ( $r = .26, p < .01$ ) and child's birth order ( $r = .24, p < .05$ ). A hierarchical regression analysis was conducted in which percent of

*reading-focused remarks* during the reading phase was the dependent variable. Overall  $R^2$  was significantly different from zero at the end of each step, except for the first. After step 7, with all of the independent variables included in the equation,  $R^2 = .15$ ,  $F(7, 91) = 2.35$ ,  $p < .05$ . As can be seen in Table 9, step 2 resulted in a significant increment in  $R^2$ . At the end of this step, with maternal education added to the prediction of reading-focused remarks over and above that contributed by maternal DID score,  $R^2 = .11$ ,  $F_{inc}(1, 96) = 9.22$ ,  $p < .01$ . Higher levels of maternal education predicted greater percentages of reading-focused remarks.

The percentage of *confirmations* during the book reading phase was correlated with child's sex ( $r = .20$ ,  $p < .05$ ). Hierarchical regression revealed that the seven potential predictors did not combine to meaningfully predict percentage of confirmations.

In addition, the percentage of *high distancing* remarks during book reading was negatively correlated with child's age ( $r = -.20$ ,  $p < .05$ ). Again, hierarchical regression indicated that the independent variables did not significantly predict percentage of high distancing remarks.

The same series of analyses were run for the discussion phase, but hierarchical regression did not yield any significant results.

#### *Interactions between depression and demographics predicting content of remarks.*

In order to evaluate whether maternal DID scores interacted with any of the mother demographics to predict percentages of reading-focused remarks, confirmations, or high distancing remarks, multiple regression analyses were performed. Two significant interactions were found. Maternal education interacted with DID scores to predict

percentage of reading-focused remarks, and maternal age interacted with DID scores to predict percentage of total confirmations.

When mother's DID score and education (both centered) and their product were the predictor variables, and percentage of reading-focused remarks uttered was the criterion variable, the product term had a significant unique effect  $t(100) = 3.31, p < .01$ , effect size = .31. Among mothers who completed fewer years of education, low maternal depression was associated with higher percentages of reading-focused remarks, and high maternal depression was associated with lower percentages of these remarks. This pattern was not found among mothers who completed more years of education. At high levels of depression, percentage of reading-focused remarks differed significantly among mothers who completed high, medium, and low levels of education. When DID scores were high, mothers who completed more education made the highest percentage of reading-focused remarks, mothers who completed less education made the lowest percentage of reading-focused remarks, and mothers who completed intermediate amounts of education, were intermediate in the percentage of reading-focused remarks uttered. Figure 8 illustrates this pattern by showing the regression lines for maternal education predicting reading-focused remarks at the mean and one standard deviation above and below the mean on depression. As can be seen in the figure, there is also a significant main effect of education, such that mothers who completed higher levels of education made more reading-focused remarks than mothers who completed lower levels education,  $t(100) = 3.14, p < .001$ . There was no main effect for depression level,  $t < 1$ . The overall regression equation was  $t(3,100) = 7.96, p < .001, R^2 = .19$ .

In the interaction between maternal age and DID scores predicting percentage of confirmations, the product term had a significant unique effect,  $t(100) = -2.19, p < .05$ , effect size = .22. Among older mothers, at lower levels of depression a greater percentage of confirmations was uttered, and at higher levels of depression a lower percentage of confirmations was uttered. The reverse was true among younger mothers, such that at lower levels of depression, a lower percentage of confirmations was uttered and at higher levels of depression, a greater percentage of confirmations was uttered. At high levels of depression, mothers of the three age groups differed significantly from one another. At this point, older mothers uttered a lower percentage of confirmations, younger mothers uttered a higher percentage of confirmations, and mothers intermediate in age were intermediate in percentage of confirmations uttered. Figure 9 illustrates this pattern by showing the regression lines (based on solving the overall regression equations) for mother's age predicting percentage of confirmations at one standard deviation above and below the mean on depression. There was no indication of a main effect for mother's age or DID score,  $t < 1$ . The overall regression equation was  $t(3,100) = 2.79, p < .05, R^2 = .08$ .

*Content of remarks and mother and child behaviors.*

Percentages of maternal utterances that fell into each of the four composites were further analyzed. This time, the correlations between these percentages and mother and child behaviors were calculated. Table 10 displays the correlations. In general, percentages of reading-focused remarks were most closely related to the behavior codes and percentages of high distancing comments were least related. During the reading phase, percentage of reading-focused remarks was positively correlated with maternal support ( $r = .23$ ), child persistence ( $r = .49$ ), interest ( $r = .50$ ), and compliance ( $r = .38$ )

and negatively correlated with child's negative affect ( $r = -.40$ ), negativity towards parent ( $r = -.20$ ) and maternal hostility ( $r = -.32$ ). These correlations were not significant during the postreading discussion, although reading-focused remarks were correlated with maternal instruction ( $r = .20$ ). During the reading phase, percentage of maternal confirmations was significantly correlated with child persistence ( $r = .19$ ), interest ( $r = .31$ ), child positive affect ( $r = .35$ ), compliance ( $r = .20$ ), quality of relationship ( $r = .23$ ), mother support ( $r = .26$ ) and mother instruction ( $r = .28$ ). Only the correlation between confirmations and child persistence was significant during the discussion phase. High distancing comments correlated inversely with mother's hostility ( $r = -.22$ ) and child's negative affect ( $r = -.21$ ) during the reading phase, and correlated positively with mother's instruction ( $r = .20$ ) and mother's positive affect ( $r = .23$ ) during the discussion period.

## Chapter 4: Discussion

### *Summary of Findings*

#### *Overview*

The present study aimed to describe characteristics of shared book reading, and to explore the links between these book reading factors, maternal mood, and mother and child demographics. Many of the positive characteristics of shared book reading were linked together. In particular, mothers who read for longer times and spoke more, were more likely to read in a lively dramatic fashion. Three distinctly different reading styles differentiated among the mothers. Depression emerged as a negative prognostic factor for quality of reading. Mothers who were more depressed were more preoccupied and less positive while reading. They also took more irrelevant conversational turns and both they

and their children exhibited more difficult behaviors. Maternal education, however, appeared to buffer some of the negative effects of depression. Demographics, particularly maternal education and age, were also related to the quality of the shared book reading interactions.

### *Characteristics of Shared Book Reading*

By far, the most common maternal utterance during both the reading and discussion periods, focused on content of the book. During the book reading phase, mothers uttered almost three times as many content remarks as the next most frequent type of remark, orienting prompts. Orienting prompts are a very important component of shared book reading, as they allow parents to direct their children's attention to a specific part of the book. Over 80% of the remarks made by mothers were relevant to the book reading task, yet only 14% of the total remarks used high distancing strategies. This percentage is considerably higher than the 3.45% of high distancing talk found by Zaslow and Eldred (1998). Zaslow and Eldred's study, however, focused on low-income families, while the participants in the current study came mainly from middle-class backgrounds.

Positive characteristics of shared book reading were highly associated with one another. For example, significant correlations were found between dramatic quality of the reading, standard deviation of pitch, mother and child conversational turns, length of time spent reading, and extratextual words. This suggests that not only do mothers who spend longer amounts of time reading remark more frequently, but they also tend to read in a more exciting manner. Children of such readers, also remark more when sharing a book with their mothers.

Mothers took many more verbal conversational turns than did their children, but children took more turns consisting of gestures or sounds. While reading the book, the number of conversational turns taken by mothers and their children were highly correlated. Mothers were almost three times more likely than children to interrupt reading of the text with a remark. Perhaps, mothers interspersed their remarks among the text's sentences as a way to engage their children in conversation. In addition, by interrupting the text with questions, mothers were able to gauge their children's understanding of the story and tailor their comments to their children's comprehension level.

Children's behavior during book reading was significantly correlated with both maternal DID score and with the number of irrelevant conversational turns taken by mother and child. Altered patterns of behavior have previously been found among children of depressed mothers (Field, 1984; Zekoski et al., 1987). In the present study, the decreases in compliance and increases in negativity and negative affect that were seen in children of more depressed women were consistent with previous findings. The causal factor in the relationship between irrelevant conversational turns and problematic child behaviors is unknown. One might speculate about two distinctly different pathways. Children who discuss off-task topics with their mothers may quickly tire of the reading task and begin to act out. Alternatively, less compliant and more negative children may withdraw from the task, resulting in off-task remarks.

#### *Reading styles.*

Three distinctly different reading styles emerged. A small group of mothers (11% of the sample) were *attention-getters*. The majority of their utterances were orienting prompts and content remarks. Forty-four percent of the utterances made by the *content-*

*focused readers*, belonged to the content category. The majority of mothers, however, were *evenly-distributed readers*, whose comments were more evenly spread among the different content of remark codes.

Earlier studies have relied on cluster analyses to assess whether mother's read in distinctly different ways (Brito et al., 2006; Haden et al., 1996; Ninio, 1980). These three studies and the current study, all considered different factors when grouping the mothers, resulting in different groups of reading styles. Ninio (1980) describes electing, where questions, and information giving styles, and draws sharp distinctions between mothers who rely more on prompts and those who use more comments. Britto, Brooks-Gunn, and Griffin (2006) differentiate between story readers, whose comments come primarily after concluding the text of a book, and story tellers who spread their comment throughout the book-reading activity and used more high distancing comments. Haden, Reese, and Fivush (1996) comment on three stylistic groups: describers who offer many descriptions, comprehenders who focus more on high distancing remarks, and collaborators who offer many confirmations to their children.

Previous studies of mothers' reading styles have also looked at absolute numbers of remarks that belong to each code of interest. In the present study, however, percentages of the mothers' total remarks that fall into each of the codes were analyzed. This decision was made as amount of verbal production varied greatly among the mothers. A mother who makes only five remarks during the book reading, but includes a high distancing comment, seems to be placing greater emphasis on higher distancing strategies than does a mother who also states one high distancing remark, but who makes fifty additional utterances. A subsequent MANOVA was used, however, to observe

whether the clusters of mothers also differed in the absolute number of remarks made that fell into each of the four composites. Similar to the studies of Haden, Reese, and Fivush (1996) and Britto, Brooks-Gunn, and Griffin (2006), the present study also noted group differences in number of high distancing remarks used. In the current study, attention-getting mothers offered the most such remarks and evenly-distributed mothers uttered the least. Additionally, attention-getting mothers uttered the most reading-focused remarks and evenly-distributed mothers made the fewest reading-focused remarks.

Mothers in the three different reading clusters differed from one another in other aspects of their reading. Regarding pitch, for example, attention-getters used a lower pitch and evenly-distributed mothers used a higher average pitch. A trend emerged suggesting that attention-getting mothers showed the greatest pitch fluctuations, while evenly-distributed mothers had the least fluctuations. In addition, attention-getting mothers and their children took the greatest number of conversational turns and read for the longest amounts of time, and evenly-distributed mothers took the fewest turns and read for shorter times. Content-focused mothers were intermediate in all analyses. Together, these findings suggest that the attention-getting mothers, who have a high percentage of orienting prompts and comment remarks, try particularly hard to keep their children interested in reading. Such mothers also demonstrate large pitch fluctuations, take many conversational turns, and spend long amounts of time reading.

#### *Links between Shared Book Reading, Depression, and Demographics*

##### *Depression and shared book reading.*

Previous research reveals four key differences in the interactions of depressed and nondepressed women with their children. In particular, depressed women are more

preoccupied, less positive, less sensitive, and more negative when interacting with their children (Field, Healy, & LeBlanc, 1989; Lovejoy et al., 2000; Murray et al., 1996). The present study finds differences in the first three of these four categories as a function of maternal DID score. The fourth key difference, increased negativity, was not found. The current study, however, included only a single measure of maternal negativity: mother's negative affect.

During the shared book reading episodes, maternal preoccupation was related to depression. Higher DID scores were associated with greater numbers of maternal requests for children's clarifications. Perhaps these mothers' thoughts wandered to topics unrelated to the task at-hand, increasing the likelihood that they would miss their children's remarks. Therefore, depressed mothers were more likely to ask their children to repeat themselves. This preoccupation was further observable as maternal depression was associated with increased irrelevant conversational turns taken by mothers and children. Mothers who were depressed and their children were both more likely to stray from the shared book reading task and discuss other topics. The preoccupation that is associated with depression, may have led them to topics that were not relevant to the book reading task. Thus, support was offered for the hypothesis that maternal depression would be associated with increased irrelevant turns.

Interactions between depressed mothers and children were not only marked by increased maternal preoccupation; lack of positive behaviors also distinguished the interactions between depressed women and their children. Confirmations were more commonly offered during the discussion phase than during the reading period. Interestingly, during the discussion phase, increases in DID scores were negatively

associated with maternal confirmations, such that the higher the mother's score, the fewer confirmations she gave her child. When mothers offer their children confirmations, they are likely to be experiencing a positive emotion. This may conflict with the feelings of sadness associated with depression, rendering it more difficult for depressed women to praise their children.

Maternal sensitivity was also related to depression. The NICHD study (1999) included mother's absence of hostility as a key feature of maternal sensitivity. In the current study, DID score was positively related to maternal hostility. Mothers who were more depressed, were more hostile and intrusive in their interactions with their children. Their feelings of sadness and hopelessness may have contributed to their increased hostility.

Depression was associated with several other negative characteristics of shared book reading. The more depressed the mother, the more likely she was to make final statements in conversational chains. This is consistent with the finding that depressed women terminate attention to objects more frequently than do nondepressed women (Breznitz & Friedman, 1988). Rather than taking the time to discuss a given part of the story with their children, depressed women were more likely than nondepressed mothers to make a final comment and return to the book's text. Bigatti et al. (2001) noted that depressed women ask their children fewer questions while reading. Although the present study did not find an association between number of prompts and depression, the fact that depressed mothers were more likely to conclude a conversation suggests that many of their comments did not invite child responses.

With the altered patterns of shared book reading displayed by depressed women

and their children, it is not unexpected that higher DID scores were also related to decreased child persistence and compliance and to increased child negativity toward parent and negative affect. Increases in maternal preoccupation and decreases in maternal sensitivity and positive exchanges are likely to have rendered the shared book reading experience less enjoyable for children of depressed mothers. This may have contributed to their negative behaviors.

These findings are consistent with the results of previous studies that suggest a reduction in synchrony in the interactions of depressed mothers with their children (Field et al. 1989). Not only have prior studies repeatedly noted the four key differences in the interactions of depressed mothers and their children, but they have also indicated differences in the way that children of depressed women interact with their mothers. Children of depressed mothers display greater amounts of negative affect in their interactions with their mothers (Lovejoy, 1991; Radke-Yarrow et al., 1993). They also engage in more antagonistic and less compliant behavior when their mothers appeared to be in negative moods (Jouriles et al., 1989; Seiner & Gelfand, 1995). The present study indicates that these altered interactive patterns are also found in the context of shared book reading.

Maternal depression was associated with longer amounts of time spent reading. This is an unexpected finding, in light of the fatigue and anhedonia that are associated with depression. Interestingly, although depressed mothers spent more time reading with their children, they did not utter more extratextual words. Earlier studies have described longer pauses in the speech of depressed women (Breznitz, 1997). Furthermore, depressed women respond more slowly to the speech of their children (Bettes, 1988;

Breznitz & Sherman, 1987). Similar latencies or slowness of completing extratextual utterances, may account for the positive correlation between depression and length of reading time.

Although the present study identified significant relationships between maternal depression, mother and child behaviors, and remarks made while sharing books, relationships between DID scores and maternal fundamental frequency were not found. Prior research has noted reduced exaggerated contours and narrower ranges in the fundamental frequency of depressed women's speech (Bettes, 1988; Breznitz, 1992). In the present study, maternal education and age predicted standard deviation of pitch.

The hypothesis that DID score would also be predictive of maternal pitch was guided by previous research; this, however, was not the case here. The majority of studies of maternal pitch focus on speech directed at infants (e.g., Jacobson et al., 1983), while the current study included older children. In the context of depression, perhaps pitch is impacted by child age. One would need to vary child ages to explore this possibility more directly. Furthermore, shared book reading differs significantly from other parent child interactions in the highly scripted nature of reading a book. While successful interactions typically require parents to rely on their own creativity when conversing with their children, books offer a ready-made script for parents to read. Their text and illustrations provide many topics for extratextual discussions. In some ways, books may neutralize the differences in speech patterns of depressed and nondepressed women, as they lessen the cognitive demands inherent to conversation.

*Interactions between depression and demographics.*

Depression and maternal education interacted to predict the number of irrelevant

conversational turns taken by the mother and child. Among mothers who completed lesser amounts of education, higher DID scores were associated with greater numbers of irrelevant turns. This was not the case for mothers who completed greater amounts of education. When mothers were split into three groups, based upon the number of years of schooling completed, the three groups differed significantly in the number of irrelevant turns taken when mothers scored high on the DID. Among this depressed group, mothers who completed few years of education took the greatest number of irrelevant turns while mothers with more education took the fewest such turns. Mothers intermediate in the amount of education completed, took an intermediate number of irrelevant turns.

Maternal depression also interacted with education to predict the percentage of all maternal remarks that were reading-focused. For mothers with less education, higher levels of depression were related to lower percentages of reading-focused remarks, and lower depression levels were associated with greater percentages of these remarks. This was not the case for mothers who completed greater amounts of education. At high levels of depression, percentage of reading-focused remarks differed significantly among mothers who completed high, medium, and low levels of education. With high DID scores, mothers who completed the most education made the highest percentage of reading-focused remarks, while mothers who completed the least education made the lowest percentage of such remarks. Again, mothers who completed intermediate amounts of education were intermediate in the percentage of reading-focused remarks uttered.

Taken together, these interactions suggest that education may act as a buffer, helping to prevent depressed mothers from losing focus during their conversations with their children and insuring that they continue to discuss reading-focused information. As

such, mothers who completed fewer years of education showed the expected pattern: higher DID scores were associated with more irrelevant conversational turns and with lower percentages of reading-focused remarks. Maternal education is positively related to high expectations for children's educational attainment and to more frequent verbal and nonverbal activities shared between parent and child (Suizzo & Stapleton, 2007). Perhaps these high expectations propel mothers to move beyond their feelings of sadness and interact with their children in a manner which will contribute to their educational success. In fact, the awareness of negative effects of their depression may cause them to consciously think about the remarks they make when reading, leading to even more focused book reading behaviors. In both of these interactions, a main effect was found for education. Regardless of depression status, mothers with more education took fewer irrelevant turns and uttered a higher percentage of reading-focused remarks than did mothers with less education.

Maternal age also interacted with depression to predict percentage of all maternal remarks that were confirmations or repetition confirmations. This time, however, there was no main effect of age. For older mothers, higher DID scores were related to lower percentages of confirmations, while for younger mothers, higher DID scores were associated with greater percentages of confirmations. Since depression is associated with a reduction in positive exchanges between parent and child (Lovejoy et al., 2002), one might expect to observe the pattern demonstrated by the older mothers. The association between greater percentages of confirmations and elevated DID scores displayed by the younger mothers was unexpected. Perhaps confirmations served them well as fillers, but why this would differentiate younger from older mothers is not clear. Further research is

necessary to confirm this finding.

*Demographics and shared book reading.*

**Maternal education** – Mothers who completed greater amounts of education read in a more dramatic fashion and showed greater pitch fluctuations. Both they and their children took fewer irrelevant conversational turns. Maternal education predicted the percentages of all remarks that were reading-focused. Thus, the hypothesis that maternal education would be associated with the positive shared book reading characteristics was supported.

Highly educated mothers in this study tended to remain on task with their children while reading together. Such mothers typically spend more time reading with their children (Kuo et al., 2004), which may provide them with the practice needed to become more skillful readers. In addition, mothers who completed much education themselves are likely to value their children's education. Since reading is linked to children's expressive and receptive vocabularies, verbal skills, and interest in reading (Bus et al., 1995; Lyytinen, 1998; Mol, Bus, de Jong, & Smeets, 2008; Whitehurst et al., 1988), highly educated parents may be particularly enthusiastic about reading with their children. This may lead them to read in an engaging fashion and to stay focused on the topic of discussion.

**Maternal Age** – Mother's age contributed significantly to predicting the number of extratextual words uttered by the mother as well as the standard deviation of maternal pitch. In addition, it also accounted for significant percentages of the variance in maternal conversational turns, maternal interruptions of the text with a remark, and maternal concluding remarks. Regarding the content of maternal remarks, maternal age was associated with the percentage of all remarks that were reading-focused.

Previous studies have not evaluated the relationship between maternal age and shared book reading. The current findings suggest that older mothers speak more with their children while reading. They also fluctuate their speech more than do younger mothers. Researchers have long observed the wide variations in pitch that mothers commonly use; they have hypothesized that one of the purposes of these fluctuations is to capture children's attention (Warren-Leubecker & Bohannon, 1984). Several factors may account for the engaging way that these older mothers read with their children. As mothers grow older and observe the wide disparity in children's educational achievements, they may place greater importance on activities such as shared book reading, that can improve their children's success. Older mothers, who are perhaps likely to have more job and economic security, may also experience fewer stressors than younger mothers. This may allow them to spend greater amounts of time reading with their children and enable them to fine-tune their reading methods.

**Child Age** – Child's age accounted for a significant percentage of the variance of number of irrelevant conversational turns taken by the child. The younger the child, the greater the number of irrelevant turns taken. As children grow, their language skills develop as well. Younger children may have had difficulty sustaining interest in the language-based shared book reading task, and were therefore more likely to stray to different topics.

In addition, child's age was negatively correlated with percentage of maternal remarks that were high distancing in nature. This negative association is puzzling, since older children, with increasing cognitive capacities, should have an easier time with more challenging high distancing discussions. However, frequent use of high distancing remarks might be an alternative way to engage children's attention, in which case it may

serve more relevantly for the younger children. Subsequent research is needed to confirm and interpret this finding.

**Birth Order and Number of Siblings** – Several correlations were observed between birth order and shared book reading characteristics. The younger a child's position in a family, the more conversational turns a mother was likely to take and the more interruptions she was likely to make during the book reading phase. Birth order was also associated with percentage of reading-focused remarks, such that the younger the child's familial position, the greater the percentage of such remarks. Number of siblings was not significantly related to the reading characteristics evaluated, and the hypothesis that number of siblings would be inversely related to positive shared book reading was not supported.

Although Westerlund and Lagerberg (2008) noted that parents read more frequently with first born children than they do with later borns, little is known about how birth order is actually related to characteristics of shared book reading. Merely reading the text of a book is the simplest way to share a book. The more remarks a mother makes while reading, the richer her interaction with her child. Parents of younger born children may have had time to practice many different aspects of parenting with their older children. The reading experiences they had with their older born children may make it easier for them to generate conversations with their younger children while sharing a book.

In the present study, siblings played little role in predicting shared book reading characteristics. While the presence of more than one child in a household is associated with lower odds of daily reading (Kuo et al., 2004), previous research has not evaluated

how characteristics of shared book reading episodes are related to number of siblings.

**Child's Sex** – Child's sex was significantly correlated with the percentage of maternal remarks that were confirmations. Specifically, female children received a greater percentage of confirmations. This is highly consistent with the earlier finding that parents offer their daughters more praise than they give their sons (Fagot, 1974).

Previous research has noted that the relationship between maternal depression and children's cognitive development is stronger for boys than for girls (Grace et al., 1999). The present study, however, did not find any interactions between maternal depression and child's sex that predicted characteristics of shared book reading. Thus, reading may not be a mechanism that contributes to these differential cognitive effects for boys and girls.

### *Implications*

Previous studies of shared book reading have focused primarily on benefits of reading with children, effectiveness of reading interventions, and, to a lesser extent, on reading styles. The present study, however, analyzed shared book reading on a more molecular level, concentrating on the individual phrases uttered and conversational turns taken while reading. This fine-grained analysis allowed for a comparison of the reading interactions of depressed and nondepressed women.

Depression was correlated with many of the characteristics of shared book reading. During the book reading phase, depressed women requested more clarifications, pointing to higher levels of distractibility, and during the discussion phase they uttered fewer confirmations, suggestive of a reduction in positive interactions. Furthermore, depressed mothers and their children exchanged more irrelevant conversational turns, and women with higher DID scores were more likely to conclude conversational chains,

leaving less room for child responses. Finally, children of depressed mothers showed increased negativity and decreased compliance and persistence in their interactions with their mothers. Although subtle and nuanced, these findings are particularly concerning in light of the broader context of strong benefits that shared book reading confers to children.

Shared book reading is related to children's expressive and receptive vocabularies, phonological awareness, later reading abilities, and interest in reading (Aram & Levin, 2002; Sénéchal et al., 1997; Whitehurst et al., 1994a,b). The altered patterns of shared book reading displayed by depressed mothers are particularly disturbing. Not only are their actual reading interactions marked by greater negativity, but children of depressed mothers may not obtain the benefits of shared reading as effectively as children of nondepressed mothers. These differences are likely to impact early literacy development.

High levels of maternal education appear to mitigate some of these negative effects of depression. In particular, at higher levels of depression, less educated mothers showed greater percentages of irrelevant conversation turns and lower percentages of reading-focused remarks. The reverse was true for mothers who completed greater amounts of education. In this case, at higher levels of depression, more educated mothers showed lower percentages of irrelevant conversational turn and greater percentages of reading-focused remarks. Perhaps because of the high value they place on their children's education, women who completed greater amounts of education were able to move beyond their feelings of sadness and remain focused on reading with their children, even

when experiencing depressive symptoms. Education on the importance of shared book reading is needed to help women who completed fewer years of education do the same.

Types of conversational turns and remarks were related to children's behaviors. Child and mother irrelevant turns were associated with decreased child persistence, interest, compliance, and maternal support, and to increased child negative affect, negativity towards parent, maternal intrusion, and maternal hostility. In addition, reading-focused remarks and, to a lesser extent, confirmations and high distancing remarks, were also linked to mother and child behaviors. Although these findings are correlative and do not imply causation, maternal utterances appear to be very closely linked to child behaviors. These data suggest that offering children confirmations, discussing the book in a broader context, and keeping conversation focused on the actual book, may be ways to engage children's interest and increase their positive behavior while reading together.

Interestingly, only 14% of all remarks were high distancing. The lack of high distancing utterances is of concern as previous studies have linked these types of discussions to positive child outcomes. In particular, Beals and DeTemple (1993) found an association between high distancing remarks and children's print skills and abilities to produce independent narratives. Lesman and de Jong(1998) described a relationship between such remarks and children's word decoding skills. Psychologists and educators should work to educate parents on the importance of high distancing remarks to children's early literacy skills.

This study revealed three reading styles, which were distinguished from one another in the percentages of different types of remarks uttered. The attention-getters, whose remarks primarily fell into the content and orienting prompt categories,

demonstrated many of the positive reading characteristics evaluated by the present study. Their pitch fluctuated highly, they exchanged many conversational turns with their children, spent long amounts of time reading, and uttered more high distancing and reading-focused remarks than did mothers from other two groups. Only 12 mothers, however, belonged to this cluster. Perhaps parent education is also needed to demonstrate the beneficial aspects of shared book reading that are intrinsic to this reading style.

#### *Limitations and Future Directions*

Limitations of the present study deserve mention, as the characteristics and relationships studied have little precedent to date in the literature, and the field merits careful and ongoing attention. First, although the present study evaluates the relationships between depression and shared book reading, the range of depression that participants experienced was somewhat restricted. The 22 highest scoring mothers ranged between Zimmerman's (2004) moderately and borderline categories. None of the participants belonged to the severely depressed category, and the vast majority fell into the nondepressed range. This study also focuses on current depressive symptoms. Some of the mothers in the nondepressed groups may have had a history of depression, and it is unclear how the chronicity and recency of depression may have affected their shared book reading.

In order to participate in the present study, mothers had to make several trips into a laboratory located on the Stony Brook University Campus. The lab setting allowed for greater control of the reading environment. Commuting to the campus, however, would have been effortful for severely depressed women to complete. Despite this restricted group of mothers, depression was linked to many of the characteristics of shared book reading. Future research might record shared book reading sessions located inside of

families' homes, perhaps positively impacting the recruitment of a sample with more severely depressed participants. Contextualizing shared reading in the family home instead of the laboratory might also clarify some of the puzzling results including the relationship between depression and length of reading time, and the interaction between DID score, maternal age, and confirmations.

Despite the restricted range of depression experienced by the participants in the present study, maternal DID scores were related to many of the characteristics of shared book reading. Future studies can evaluate whether such links remain consistent when mothers read to children of different ages. To do so, would require a replication of the present study that would include children of a wide range of ages. Since the topics of interest and cognitive skills differ greatly between infants, preschoolers, and kindergarten-aged children, demands placed on mothers during shared book reading episodes differ as a function of their children's ages. Perhaps differences in negative interactions as a result of maternal depression would be most evident when the children who participate are toddlers, in the middle of the "no" years. Disparities in the pitch of depressed and nondepressed women may be strongest when children are infants, as infant-directed speech is commonly used by nondepressed mothers.

This study observed only a single episode of shared book reading. Hunger, fatigue, and anxiety about a new setting are all factors that might influence a child's behavior. To increase the strength of the current findings, it might be useful to observe dyads reading together on more than one occasion.

All of the findings of the current study are correlative and cannot imply causation. As such, the directionality of influence is not evident. For example, the percentage of all

maternal remarks that are confirmations is related to child's interest in the reading task. Parental confirmations may increase a child's interest, or, upon noting a child's interest, a parent may offer confirmations. Future work is needed to better clarify the directionality of the findings.

Shared book reading and maternal depression are related to children's literacy development in opposite ways; while reading enhances children's early literacy skills (Bus et al., 1995), maternal depression is likely to hinder the development of these skills (Brenan et al., 2000; NICHD, 1999). The present study demonstrated that the shared book interactions of depressed women and their children differ in a variety of ways from those of nondepressed women. Longitudinally evaluating the early literacy skills of the children who participated was beyond the scope of the study, but might be an important next step in our understanding of the impact of depression as it relates to the pathways to literacy development. Now that these differences in shared book reading have been established, future work might strive to ascertain the relationships and impacts of maternal depression, shared book reading, early literacy skills, and formal reading skills. This would afford researchers, educators, and clinicians a careful look at whether shared book reading mediates the relationship between maternal depression and children's literacy development.

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Table 1

*Means and standard deviations for maternal utterances*

	Reading				Discussion			
	Totals		Percentages of Total		Totals		Percentages of Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Content	10.09	10.04	28	.16	3.74	3.33	23	.20
Inference	1.97	2.63	06	.08	.40	1.10	03	.06
Application	2.48	4.08	06	.09	1.25	2.08	07	.11
General Know.	.95	1.60	03	.04	.35	.85	02	.05
Book Know.	.20	.63	01	.03	.04	.25	0	.01
Orienting Promp.	3.30	4.14	10	.10	.38	.73	02	.07
Confirmation	2.52	3.24	07	.08	1.00	1.39	06	.07
Rep. Confirmation	2.70	3.22	07	.07	2.26	1.52	14	.08
Child's Opinion	.30	.59	01	.03	1.88	1.69	12	.11
Mother's Opinion	.92	1.31	04	.08	.55	.93	03	.05
Book Support	.73	1.15	03	.05	1.09	2.10	07	.00
Interjection	1.39	1.85	04	.05	.20	.52	01	.03
Managing Task	3.08	4.13	10	.12	1.38	1.78	09	.13
Gram. Corrections	0.00	0.00	0	0.00	.01	.10	0	.00
Sem. Corrections	.48	.99	01	.02	.23	.59	01	.04
Art. Corrections	0.00	0.00	0	0.00	0.00	0.00	0	0.00
Word Fillers	.36	.65	02	.04	.03	.17	0	.01
Non-words	.08	.30	0	.02	.01	.10	0	.01
Task Irrelevant	2.04	5.92	05	.10	.86	1.86	05	.10
Box Irrelevant	.02	.14	0	.00	.07	.44	01	.04
Clarrifications	.76	1.41	02	.05	.61	.85	04	.05
Don't Know	.07	.29	0	.02	0.00	0.00	0	0.00
High Distancing	5.40	6.09	14	.13	2.00	2.41	12	.13
Confirmations	5.23	5.68	15	.12	3.26	2.17	20	.11
Reading-focused	28.87	23.78	83	.18	13.99	5.15	85	.18
Nonrd.- focused	5.57	9.08	17	.18	2.35	2.78	15	.18

Table 2

*Means and standard deviations for types of conversational turns taken by mothers and children*

	Reading				Discussion			
	Mother		Child		Mother		Child	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Relevant Remarks	19.03	13.89	11.30	10.38	9.06	3.56	6.60	3.18
Irrelevant Remarks	2.12	5.15	2.13	5.37	1.05	1.80	1.28	2.17
Relevant Sounds	0.48	0.98	1.05	1.58	0.08	0.28	0.75	1.22
Irrelevant Sounds	0.04	0.27	0.15	0.83	0.01	0.10	0.03	0.17
Relevant Gestures	0.02	0.20	1.37	3.42	0.00	0.00	0.53	1.03
Irrelevant Gestures	0.00	0.00	0.02	0.14	0.00	0.00	0.02	0.20
Inaudible Remarks	0.00	0.00	0.02	0.14	0.00	0.00	0.03	0.17

Table 3

*Correlations between characteristics of shared book reading*

	Extratext. Words	Drama	Pitch	Time Reading	Child Turns	Mother turns
Extratext Words	--	.37***	.21*	.85**	.73***	.89***
Drama	--	--	.53***	.29**	.22*	.35***
Pitch	--	--	--	.16	.08	.23*
Time Reading	--	--	--	--	.80***	.86***
Child Turns	--	--	--	--	--	.90***
Mother Turns	--	--	--	--	--	--
Mean	149.03	3.07	3.64	234.60	16.04	21.70
SD	124.85	.90	.63	66.04	12.65	14.92

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 4

*Relationship between mothers' reading styles and their pitches, conversational turns, reading times, and types of remarks*

Cluster	Average Pitch	Pitch Fluctuations	Mother & Child Turns	Time Spent Reading	Read.-focused, High Dis. & Confirm. Remarks
Attention-getters	Low	High	High	Most	Most
Content-focused	Middle	Middle	Middle	Middle	Middle
Evenly-distributed	High	Low	Low	Least	Least

Table 5

*Correlations between DID scores, maternal demographics, and child demographics*

	DID	M. Age	M. Edu	C. Age	C. Sex	Birth Order	Siblings
DID	--	.02	-.20*	-.03	.21*	.08	.04
M. Age	--	--	-.02	.11	-.03	.31**	.11
M. Edu	--	--	--	-.03	.15	-.15	-.18
C. Age	--	--	--	--	-.10	-.11	-.08
C. Sex	--	--	--	--	--	.09	.11
Birth Order	--	--	--	--	--	--	.85***
Siblings	--	--	--	--	--	--	--
Mean	9.06	36.29	5.59	41.85	1.39	1.97	1.41
SD	7.04	4.35	1.61	3.20	.49	1.00	.99

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 6

*Correlations between child and mother behaviors with DID scores, energy expended reading characteristics, and irrelevant conversational turns*

Behavior Code	Mother DID	Extra. Words	Drama	SD Pitch	Time Read	Child Irrelev.	Mother Irrelev.
M. Support	-.17	.02	.21	.23*	.02	-.26*	-.28**
M. Intrusion	.24*	.20*	-.03	-0.00	.20*	.22*	.23*
M. Hostility	.21*	.25*	-.21*	-.18	.23*	.41***	.42***
M. Instruction	.02	.06	.07	.08	.07	-.02	-.03
M. Confident	-.07	-0.00	-.08	-.03	-.03	-.07	-.07
M. Pos. Aff.	.01	.09	.35***	.26*	.01	.02	.01
M. Neg. Aff.	.01	-.19	-.26**	-.06	.15	.08	.08
C. Persistence	-.26**	-.10	-0.00	.24*	-0.00	-.46***	-.49***
C. Interest	-.17	-.15	.02	.16	-.08	-.45***	-.50***
C. Pos. Affect	-.00	-0.00	.17	.06	.03	-.14	-.15
C. Neg. Parent	.20*	.25*	.12	-.10	.25*	.24*	.34***
C. Neg. Affect	.21*	.20*	.03	-.24	.12	.64***	.67***
C. Compliant	-.22*	.21*	-.07	.18	-.15	-.45***	-.49***
Qual. Relatin.	-.22*	-.16	.15	.18	.12	-.31**	-.34***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 7

*Hierarchical regression analyses for predictors of reading time, extratextual words, dramatic quality of reading, and standard deviation of pitch*

Length of Reading Time

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.05	4.63*	.05	4.63*
Step 2: M. Education	.06	.06	.01	1.20
Step 3: M. Age	.08	.06	.02	1.80
Step 4: C. Age	.08	.11	.00	.09
Step 5: C. Siblings	.08	.18	.00	.10
Step 6: C. Birth Order	.08	.27	.00	.05
Step 7: C. Sex	.08	.31	.01	.71

Extratextual Words

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.03	3.27	.03	3.26
Step 2: M. Education	.04	2.00	.01	.74
Step 3: M. Age	.14	4.98**	.10	10.55**
Step 4: C. Age	.14	3.76**	.00	.23
Step 5: C. Siblings	.14	3.04*	.00	.27
Step 6: C. Birth Order	.14	2.57*	.00	.34
Step 7: C. Sex	.17	2.72*	.03	3.28

Dramatic Quality of Reading

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.00	.01	.00	.01
Step 2: M. Education	.06	2.93	.06	5.85*
Step 3: M. Age	.08	2.61	.02	1.91
Step 4: C. Age	.10	2.52*	.02	2.14
Step 5: C. Siblings	.10	2.00	.00	.01
Step 6: C. Birth Order	.11	1.97	.02	1.79
Step 7: C. Sex	.12	1.84	.01	1.01

Standard Deviation of Pitch

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.00	.01	.00	.01
Step 2: M. Education	.05	2.53	.05	5.04*
Step 3: M. Age	.11	3.74*	.06	5.91*
Step 4: C. Age	.13	3.47*	.02	2.48
Step 5: C. Siblings	.13	2.75*	.00	.00
Step 6: C. Birth Order	.14	2.36*	.01	.49
Step 7: C. Sex	.14	2.06	.09	.34

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 8

*Hierarchical regression analyses for predictors of conversational turns taken by mother and child*

Mother Irrelevant Turns

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.04	4.09*	.04	4.09*
Step 2: M. Education	.12	6.15**	.08	7.85**
Step 3: M. Age	.12	4.07**	.00	.05
Step 4: C. Age	.15	3.83**	.03	2.84
Step 5: C. Siblings	.15	3.03*	.00	.00
Step 6: C. Birth Order	.15	2.50*	.00	.04
Step 7: C. Sex	.17	2.31*	.01	1.15

Child Irrelevant Turns

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.06	5.31*	.06	5.31*
Step 2: M. Education	.14	6.93**	.08	8.12**
Step 3: M. Age	.14	4.57**	.00	.01
Step 4: C. Age	.18	4.57**	.04	4.08*
Step 5: C. Siblings	.18	3.61**	.00	.00
Step 6: C. Birth Order	.18	3.05*	.00	.37
Step 7: C. Sex	.20	2.88*	.02	1.69

Mother Last Turns

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.05	5.05*	.05	5.05*
Step 2: M. Education	.05	2.61	.00	.21
Step 3: M. Age	.11	4.04**	.06	6.59*
Step 4: C. Age	.13	3.49*	.02	1.77
Step 5: C. Siblings	.13	2.77*	.00	.03
Step 6: C. Birth Order	.15	2.62*	.02	1.75
Step 7: C. Sex	.16	2.49*	.02	1.58

Mother Interruptions

Variable	Overall		Increment	
	<u>R<sup>2</sup></u>	<u>F</u>	<u>R<sup>2</sup></u>	<u>F</u>
Step 1: M. DID	.02	2.05	.02	2.05
Step 2: M. Education	.03	1.31	.01	.58
Step 3: M. Age	.11	3.92*	.08	8.93**
Step 4: C. Age	.11	3.00*	.00	.34
Step 5: C. Siblings	.13	2.68*	.01	1.34
Step 6: C. Birth Order	.16	2.81*	.03	3.16
Step 7: C. Sex	.18	2.78*	.02	2.32

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 9

*Hierarchical regression analysis for predictors of reading-focused remarks*

Variable	Overall		Increment	
	$R^2$	F	$R^2$	F
Step 1: M. DID	.02	1.93	.02	1.93
Step 2: M. Education	.10	5.65**	.09	9.22**
Step 3: M. Age	.11	3.78*	.00	.13
Step 4: C. Age	.12	3.17*	.01	1.30
Step 5: C. Siblings	.14	3.10*	.02	2.60
Step 6: C. Birth Order	.14	2.59*	.00	.17
Step 7: C. Sex	.15	2.35*	.01	.93

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 10

*Correlations between child and mother behaviors with content of remark composite codes*

	Reading-Focused Remarks Reading	Reading-Focused Remarks Discussion	Confirms. Reading	Confirms. Discussion	High Distancing Reading	High Distancing Discussion
M. Support	.23*	-.20	.26**	.12	.19	.14
M. Intrusive	-.08	.05	-.06	.08	-.07	.02
M. Hostility	-.32**	-.14	-.13	-.14	-.22*	.04
M. Instruction	.04	.20*	.28**	.10	-.18	.20*
M. Confidence	.06	.08	.08	-.01	-.07	.07
M. Pos. Affect	-.20	.03	.01	.07	-.06	.23*
M. Neg. Affect	-.07	-.10	-.05	-.18	-.09	.08
C. Persistence	.49***	.18	.19*	.28*	.10	-.01
C. Interest	.50***	.12	.31**	.19	.10	.06
C. Pos. Affect	.21*	-.04	.35***	.19	.04	.07
C. Neg. to Par.	-.20*	.03	-.07	.01	-.13	.00
C. Neg. Affect	-.40***	-.08	-.14	-.19	-.21*	.01
C. Compliance	.38***	-.02	.20*	.13	.15	.06
Qual. of Relat.	.29**	-.01	.23*	.17	.01	-.13

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Figure 1

*Tree diagram of three groups of mothers*

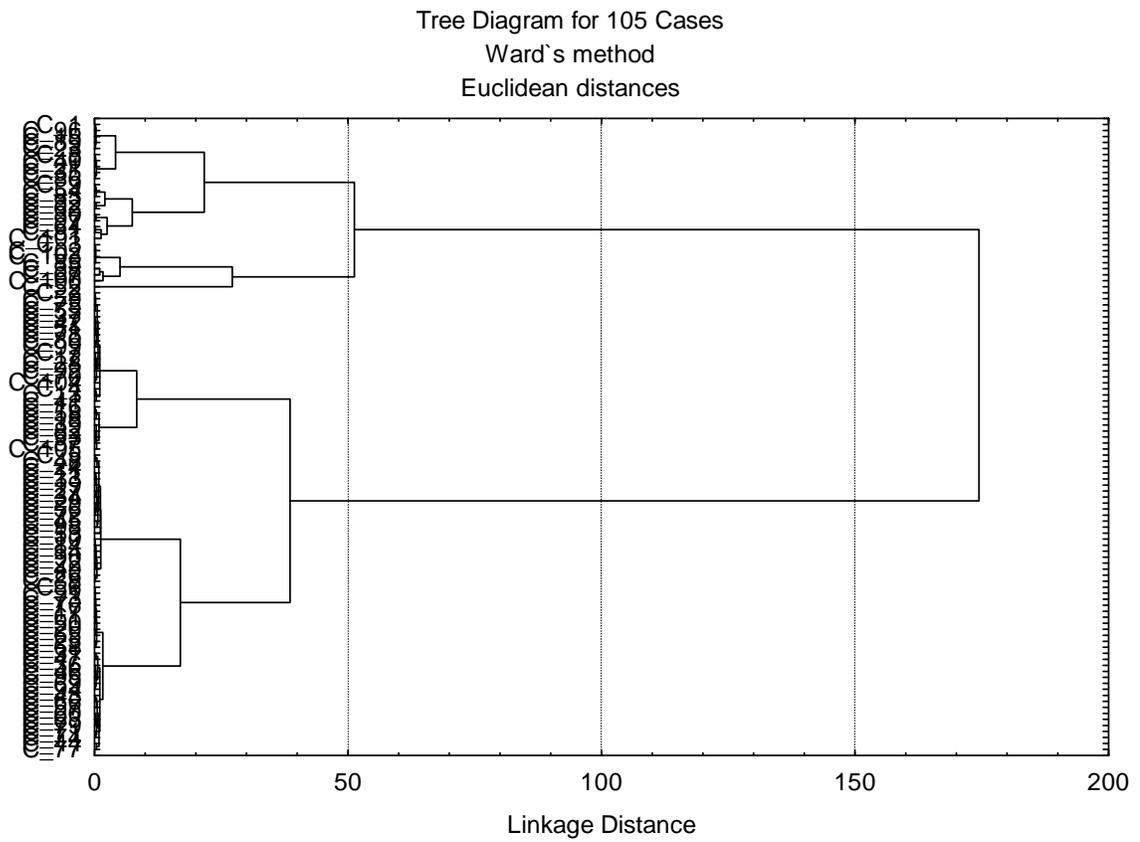


Figure 2

Plot of means for the three clusters (1 = attention-getters, 2 = content-focused, and 3 = evenly-distributed readers)

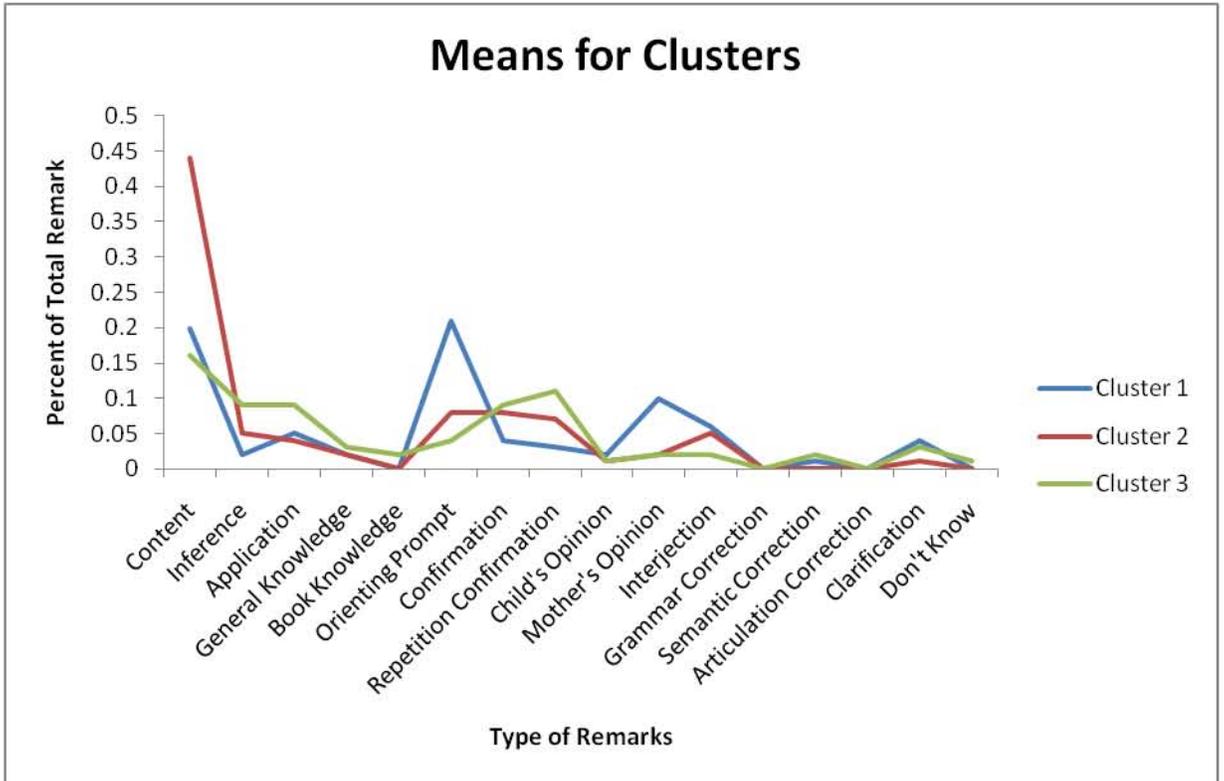


Figure 3

*Standard deviation of pitch for the three clusters (1 = attention-getters, 2 = content-focused, and 3 = evenly-distributed readers)*

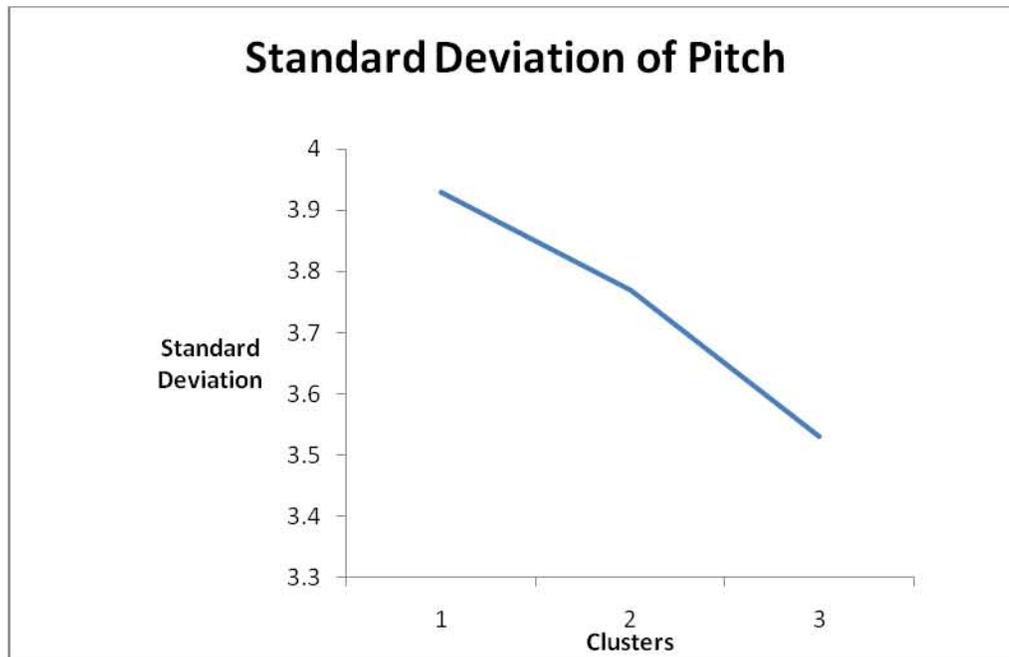


Figure 4

*Mean pitch for the three clusters (1 = attention-getters, 2 = content-focused, and 3 = evenly-distributed readers)*

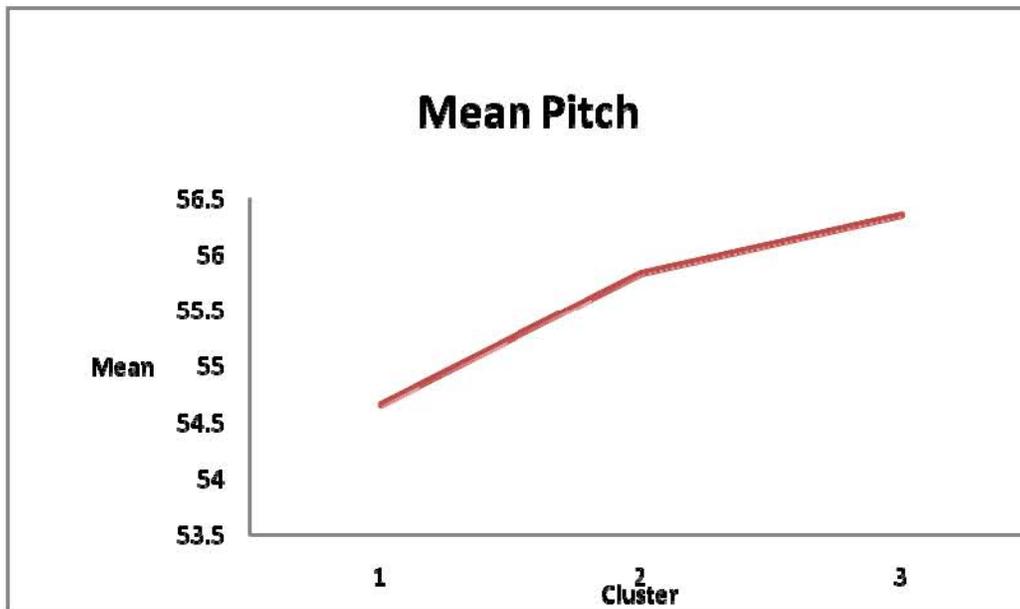


Figure 5

*Number of conversational turns taken by mothers and children for the three clusters (1 = attention-getters, 2 = content-focused, and 3 = evenly- distributed readers)*

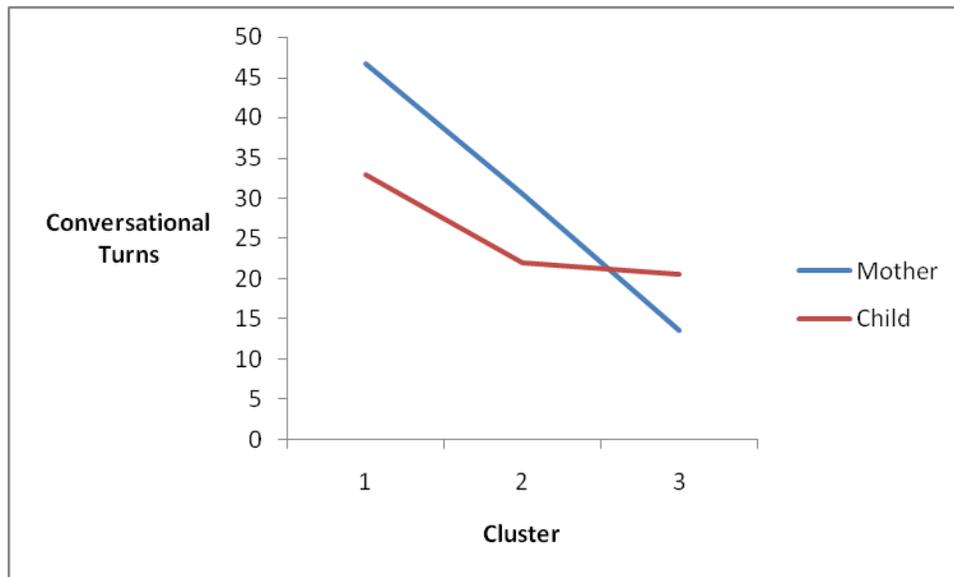


Figure 6

*Length of time spent reading for the three clusters (1 = attention-getters, 2 = content-focused, and 3 = evenly-distributed readers)*

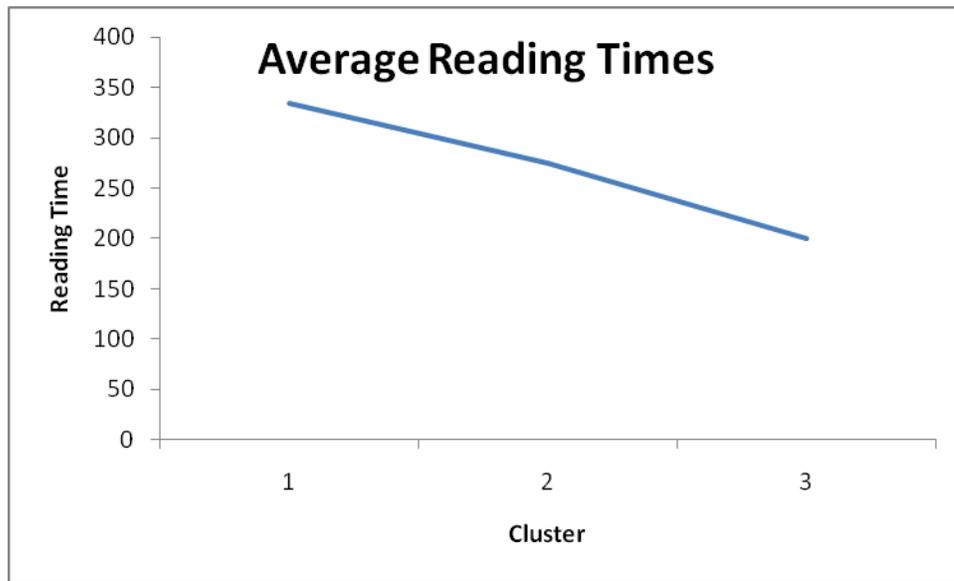


Figure 7

*Interaction of maternal depression and education predicting number of irrelevant conversational turns*

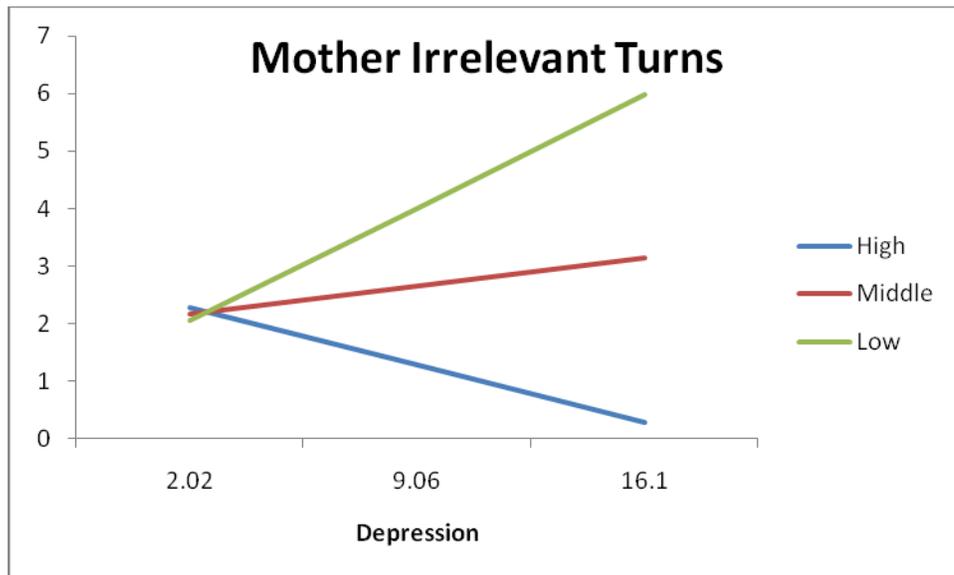


Figure 8

*Interaction of maternal depression and education predicting percentage of maternal reading-focused remarks*

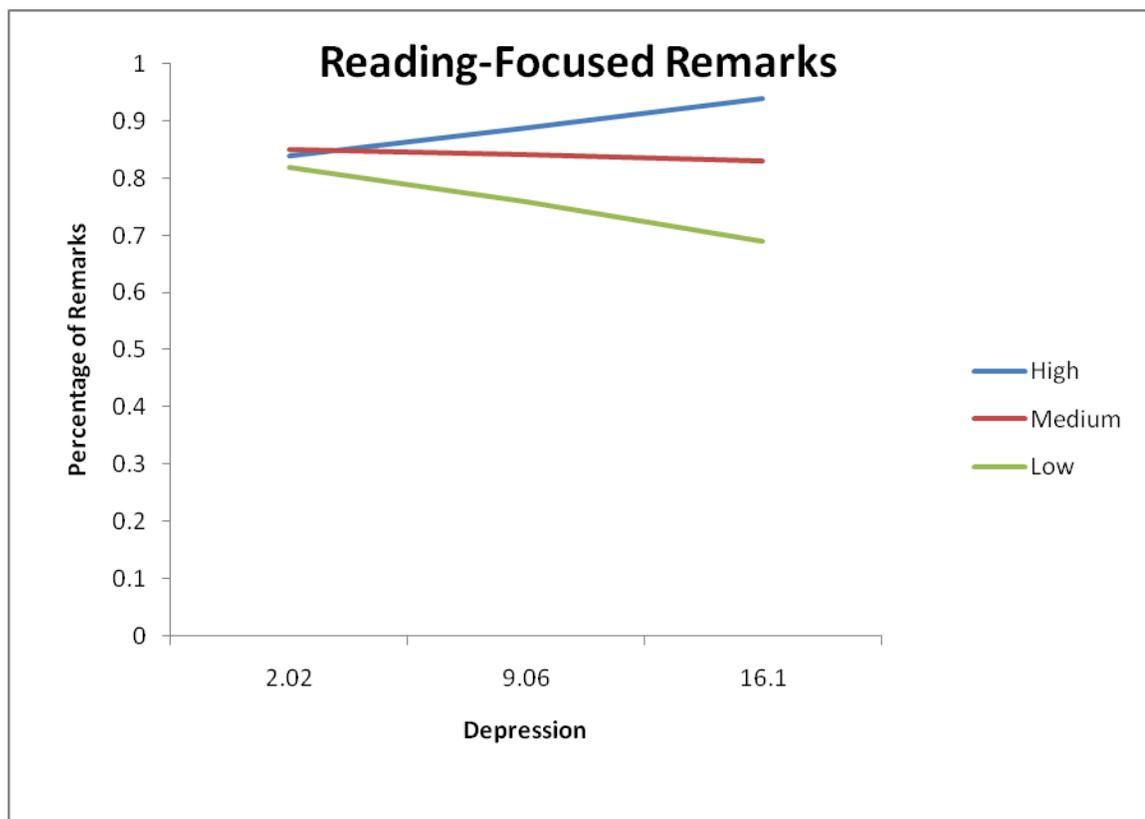


Figure 9

*Interaction of maternal depression and maternal age predicting percentage of maternal confirmations*

