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**MATERNAL DEPRESSIVE SYMPTOMS AND PARENTING BEHAVIOR:  
CHILD BEHAVIOR AS AN ACTIVATOR OF MATERNAL  
RESPONSIVENESS**

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RESPONSIVENESS**

by

**Leah Justine Meunier, B.S.; M.A.**

**Dissertation**

Presented to the Faculty of the Graduate School of

the University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Doctor of Philosophy**

The University of Texas at Austin

May 2007

Dedicated to my family,  
Thomas and Wren Yelin

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Publication No. \_\_\_\_\_

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The University of Texas at Austin, 2007

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Maternal depression is an important correlate of parental competence and child outcomes. The relationships among maternal depression and both parent and child outcome variables have been empirically validated. However, the mechanisms through which depression exerts its influence on maternal responsiveness have received less scrutiny. 137 mother-toddler dyads from a non-clinical sample were observed during a 20-minute interaction. Results showed that low child emotional expressiveness and behavioral assertiveness both result from and contribute to the unsupportive parenting of mothers high in depressive symptoms. The presence of both child effects and parent effects implies a bidirectional system of mother-child influence in the regulation of supportive interactions.

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## Introduction

Maternal depression is an important determinant of parental competence and developmental outcomes in children (for reviews, see Cummings & Davies, 1994; Downey & Coyne, 1990). The presence of depressive symptoms is associated with maladaptive maternal behavior. Depressed mothers are less likely to display positive behaviors toward their children (Lyons-Ruth, Wolfe, & Lyubchik, 2000) or to respond contingently or sensitively to their children's needs (Dix, 1991; Dix, Gershoff, Meunier, & Miller, 2004; Harnish, Dodge, & Valente, 1995). Depressed mothers are more likely to become mentally disengaged and to display hostile and irritable behaviors with their children (Cox, Puckering, Pound, & Mills, 1987; Downey & Coyne, 1990). While interacting with their toddlers, depressed mothers are more likely to be rigid, insensitive, disengaged, and unaffectionate (Albright & Tamis-LeMonda, 2002). Maternal depression is also a risk factor for physical child abuse (Burke, 2003). Although the consequences of depression for maternal behavior are well established, the pathways through which depression exerts its influence remain relatively unexplored. This paper examines whether mothers high in depressive symptoms are less responsive in part because their children are less emotionally expressive and behaviorally assertive.

### *Developmental Correlates of Maternal Depression*

The significance of maternal depression is underscored by the poor developmental outcomes of the children of depressed mothers. From infancy through adolescence, they display more social, behavioral, and cognitive impairment than the children of nondepressed mothers (Lyons-Ruth et al., 2000). The school-age children of

depressed parents exhibit more internalizing and externalizing symptoms and are at risk for developing affective disorders themselves (Downey & Coyne, 1990). Even the language development and physical health of children appear to be compromised by parental depression (Burke, 2003; Downey & Coyne, 1990; La Paro, Justice, Skibbe, & Pianta, 2004).

### *Models of Maternal Depression and Parental Competence*

Various models have been proposed to explain why depression affects parental competence. These models have suggested a variety of pathways that could lead from depression to less sensitive parenting (Cummings & Davies, 1994). The exact mechanisms or processes involved in each model vary. According to cognitive models, it is how mothers think during interactions with their children that translates their depression into less competent parenting behavior. Cognitive models stress, for example, that depression undermines parenting self-efficacy (e.g., Jackson & Huang, 2000; Teti & Gelfand, 1991); reduces attention to relevant stimuli (e.g., Brody & Forehand, 1986; Fisher, Kokes, Harder, & Jones, 1980; Wahler & Dumas, 1989); negatively biases perceptions of child behavior (e.g., Chi & Hinshaw, 2002; Johnston & Short, 1993; Panaccione & Wahler, 1986); and makes attributions for child misbehavior more negative (e.g., Bolton et al., 2003; White & Barrowclough, 1998). According to models of emotional mediation, depression undermines parenting behavior because it fosters negative affective states. Emotional models stress, for example, that depressed mothers display more negative affect during mother-child interactions (e.g., Cohn,

Campbell, Matias, & Hopkins, 1990) and are generally more unhappy and tense than nondepressed mothers (e.g., Davenport, Zahn-Waxler, Adland, & Mayfield, 1984).

One approach, little studied, focuses on how depression changes *children* in ways that perpetuate poor parenting. A child effects model implies that, over time, parents produce changes in their children that in turn evoke changes in parenting (Bell & Chapman, 1986). Unlike simple unidirectional models, child effects models acknowledge the bidirectional nature of parent-child interaction and development. Both parent and child are viewed as possessing agency and power in their relationship. Therefore, each contributes to the mutual regulation of their interactions (Dodge, 1990; Kuczynski, 2003; Kuczynski, Lollis, & Koguchi, 2003). This paper examines a model of maternal depressive symptoms and insensitive parenting that emphasizes how an absence of eliciting properties in children's behavior contributes to low maternal responsiveness. According to this model, children's emotional expressiveness, behavioral assertiveness, and temperaments could act as intervening variables between maternal depressive symptoms and low supportive behavior (see Figure 1).

*Control system theory.* In order to understand how children may regulate mothers' behavior, Bell and Chapman (1986) proposed a control system model. According to this model, a child's behavior elicits a predictable reaction from his or her mother based on the mother's tolerance for the intensity and frequency of the child's behavior. When a mother's upper limit of tolerance is reached (e.g., by aggressive child behavior), she acts to either reduce or redirect the undesired behavior. Conversely, when a mother's lower limit of tolerance is reached (e.g., by lethargic child behavior),

her goal is to stimulate a desired behavior. Over time, a predictable, balanced dyadic system between mother and child is established. However, disequilibrium in the system can occur when one member behaves either too intensely and frequently or too weakly and infrequently during the interaction, therefore violating the expectations of the other. When the system becomes destabilized, both partners re-evaluate their expectations for each other, their demands on each other, and the role of their behavior in the system. In a system marked by maternal depressive symptoms, the unresponsiveness of either the mother or the child could violate the other's expectations for lower limit behaviors, resulting in disequilibrium. Conversely, the aggressiveness or intrusiveness of either the mother or the child could violate the other's expectations for upper limit behaviors, creating disequilibrium in a system affected by maternal depressive symptoms.

Child effects studies reveal relationships between individual differences in child eliciting behaviors and parental responsiveness that are consistent with this model (Bell & Chapman, 1986). Parents are less directive when their children are independent, and they provide less attention, praise, and helping when their children are emotionally unresponsive or low in person-orientation. These studies have also shown that mothers low in parenting self-efficacy do not react with lower limit control behaviors while interacting with unresponsive children. Instead, they make no effort to stimulate more engaging child behavior and, consequently, unresponsive children remain unresponsive throughout the interaction. Given that depressed mothers tend to be low in parenting self-efficacy (Jackson & Huang, 2000; Teti & Gelfand, 1991) and their children tend to be more withdrawn and less emotionally communicative (Cohn & Tronick, 1983;

Cummings & Davies, 1994), Bell and Chapman's model would predict that the behavior of children whose mothers are high in depressive symptoms will elicit unresponsive parenting behavior that further enhances and maintains children's withdrawn behaviors.

*Reciprocal effects model.* Bugental (1992) proposed a child effects model in which the child is seen as both "a potential system stressor as well as the ultimate recipient of parental response patterns" (p. 226). Beginning in infancy, child characteristics and behaviors are critical stimuli that either elicit, or fail to elicit, parental responsiveness (Bugental, 2003). When infants can predictably engage their parents in coordinated forms of interaction, they are able to master the communication skills they need to engage in the broader social context. Bugental's reciprocal effects model moves beyond the bidirectional influences of parent and child behavior to include parent cognitions that may moderate the effects of children's behavior on mothers' behavioral responses (Bugental, 1992; Bugental, Blue, & Cruzcosa, 1989). This model stresses that two mothers may respond differently to identical child behaviors because they interpret differently the extent to which they can control those behaviors. When confronted with difficult child behavior, for example, mothers who feel they have little control over these behaviors will be more likely to react with negative affect and defensive behavior. Children, in turn, tend to respond to this maternal negativity with increased avoidance and unresponsiveness, confirming the maternal schema of helplessness. Over time, mothers become less likely to initiate interactions.

Bugental's model underscores the need to understand how the eliciting properties of child behavior interact with maternal cognitions to shape maternal behavior. When mothers perceive their children as easy to control, they are more likely to engage them with responsive, supportive behavior. Depressed mothers, however, tend to lack a sense of efficacy or control in parenting contexts. This is likely to increase the chance that they will react negatively to children or ignore them (Jackson & Huang, 2000; Teti & Gelfand, 1991). When children withdraw in the face of this maternal behavior, they fail to emit the emotional or behavioral communication that elicits maternal responsiveness.

*Mutual regulation model.* In his mutual regulation model, Tronick (1998) acknowledges the bidirectional nature of parent-child influence. He assumes that both parents and children are active participants in a mutually regulated interaction. Central to the regulatory process are the child's affective displays and the ability of the parent to accurately interpret them. As in Ainsworth's attachment model, Tronick's model stresses the importance of children sending clear emotional signals in order for parents to display sensitive, responsive behavior (Ainsworth, Bell, & Stayton, 1974). Effective parents are able to create an infant-caregiver dyadic system that both increases positive affective states and decreases negative affective states in children. When children send emotional signals that parents can accurately interpret, parents can then help children regulate their emotions and reduce their negative arousal.

According to this theory, maternal depression can compromise maternal affective responsiveness, limiting the degree of "active engagement" that infants

experience with their mothers (Weinberg & Tronick, 1998, p. 53). As early as two months old, infants of depressed mothers exhibit lower levels of activity, gaze less at their mothers, and engage in fewer interactions, both with their mothers and with objects (Weinberg & Tronick, 1998). In order for a mutually regulated dyadic system to be established, both mother and child must actively communicate their emotions to one another and respond to those signals. This “social-emotional process of communication” (Tronick, 1998, p. 290) can be disrupted when children with depressed mothers withdraw and emit fewer emotional signals, therefore interfering with the emerging abilities of children to regulate their own affect and function in social settings (Tronick, 1998).

#### *Coercive Interaction and Withdrawal in Depressed Mother-Toddler Dyads*

The effects of maternal depression are pervasive. Over time, changes occur not only within mother-child dyads, but within children themselves. The children of depressed mothers exhibit more negative and flat affective behaviors (Field, Healy, & LeBlanc, 1989; Field, Healy, Goldstein, & Guthertz, 1990) and engage in more aversive behaviors (Downey & Coyne, 1990; Richters, 1992; Richters & Pellegrini, 1989). As a result of these cues, depressed mothers are more likely to evaluate their children negatively (Cummings & Davies, 1994; Johnston & Short, 1993; Webster-Stratton & Hammond, 1988) and to respond to them harshly (Brody & Forehand, 1986; Christensen, Phillips, Glasgow, & Johnson, 1983; Conrad & Hammen, 1989), thereby inciting child negativism. In this way a “mutually coercive pattern of engagement” is perpetuated (Leadbeater, Bishop, & Raver, 1996, p. 281).

However, a pattern of “mutual withdrawal from contingent interactions” (Leadbeater et al., 1996, p. 281) has also been posited to explain the negative interaction cycles that can become established between depressed mothers and their children. Dyads of depressed mothers and their toddlers achieve less interactive coordination because these children are more likely to withdraw from the interaction and their mothers are less likely to attempt to reengage them (Jameson, Gelfand, Kulcsar, & Teti, 1997). Because they are not benefiting from the increased attentiveness, praise, and helping that responsive children receive from adults, children who have withdrawn may be placed at a developmental disadvantage (Bell & Chapman, 1986). The parenting behavior of mothers is based on the emotional and behavioral cues provided by their children. This signaling system can become compromised by a pattern of withdrawn mother-child interactions. This paper tests the hypothesis that maternal depressive symptoms undermine responsive parenting behavior in part because the children of mothers who exhibit depressive symptoms fail to emit frequent communicative signals and assertive behaviors. According to this hypothesis, when the toddler-age children of mothers higher in depressive symptoms communicate less emotionally and engage in fewer acts of self-assertion (both positive and negative), they are less likely to provide mothers the information they need to formulate supportive responses.

#### *Child Passivity and Withdrawal*

This cycle of mutual withdrawal between depressed mothers and their children can be viewed in terms of a learned helplessness model (Nolen-Hoeksema, Girgus, & Seligman, 1986; Peterson & Seligman, 1983; Seligman, 1975). Faced with less



contingently responsive mothers, over time children may begin to feel powerless during mother-child interactions. Eventually, the children of depressed mothers may withdraw as a means of coping with this unresponsive, unpredictable maternal behavior (Cohn & Tronick, 1983; Cummings & Davies, 1994). Even when three months old, infants structure behavior differently during interactions involving simulated maternal depression (Cohn & Tronick, 1983). The still-face procedure captures on videotape an infant's response to normal mother-child interaction followed by a 3-minute period in which the mother is instructed to remain "completely unresponsive, with a flat expressionless face" (Adamson & Frick, 2003, p. 452). When first confronted with an unresponsive still-face mother, infants attempt to restore a normal interaction by briefly engaging in positive behavior. After their bids are unsuccessful, infants become negative and disengage. Given the intensity with which infants react to even a short "break of intersubjectivity" (Tronick, 1998, p. 292), the cumulative impact of genuine maternal depression over time could be significant. The pattern of child helplessness and withdrawal could become ingrained in the dyadic system. If children become less assertive, expressive, and engaging, then mothers have fewer and more ambiguous emotional and behavioral child signals to which to respond. Consequently, maternal behavior becomes poorly matched to ongoing changes in children's needs and interests because children are not directing behavior toward their mothers or clearly signaling their needs and interests.

### *Low Child Emotional Expressiveness*

If the children of depressed mothers have learned that their emotional communications will not yield contingent responses from their mothers, they may transmit fewer emotional cues during mother-child interactions. If child behavior acts as an activator of maternal responsiveness, then the lack of frequent and expressive emotional signaling from children could be responsible in part for lower maternal sensitivity in depressed mothers. The early mother-child relationship is built upon the ability of mothers to recognize, interpret, and respond to children's signaling behaviors (Ainsworth et al., 1974; Tronick, 1998). Even before mothers and infants communicate through language, "they communicate and share experiences through emotional exchanges" (Saarni, Mumme, & Campos, 1998, p. 250). Concurrently and longitudinally, the ability of mothers to correctly identify and respond to children's emotional expressions predicts children's emotional and social competence (Biringen, 2000; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997). Maternal depression increases the likelihood that children will withdraw (Cohn & Tronick, 1983; Cummings & Davies, 1994; Jameson et al., 1997) and display more negative and flat affect (Field et al., 1989). Given the developmental significance of emotional communication between mothers and children, the absence of emotional signaling due to child withdrawal may be one pathway through which maternal depressive symptoms undermine maternal support. When children are less emotionally expressive, it may be more difficult for mothers with depressive symptoms to accurately interpret children's needs and goals and regulate supportive interactions. This paper examines whether it is

in part because their children emit fewer facial displays of emotion than mothers with depressive symptoms display less supportive parenting behavior.

*Low Child Behavioral Assertiveness*

Just as children's emotional expressions are stimuli that often control parenting behavior, so are children's behaviors with mothers. Children's behavior communicates their goals, needs, and evaluations of events and is an eliciting stimulus for mothers' actions (Bell & Chapman, 1986). Assertive child behavior provides the signals mothers need to coordinate interactions that support children's goals and needs. The children of depressed mothers, however, tend to emit fewer behaviors toward mothers and behaviors that are more passive (Cohn & Tronick, 1983; Cummings & Davies, 1994; Goodman, 1992). Such behaviors may have weaker eliciting properties, communicate less clearly what children want, and thus make sensitive coordination of parent-child interactions difficult. Consequently, these children may be less likely to receive contingent, supportive behavior from their mothers (Bell & Chapman, 1986).

*Child initiation of positive interactions.* As children are becoming more autonomous during their second year, they are learning to initiate positive social interactions with others. The ability to initiate and maintain mutually enjoyable interactions with their mothers is critical because these interactions provide children with a rich learning context. When children are able to choose when and with whom to interact, as well as the topic about which to engage, they are less cognitively taxed (Rocissano, Slade, & Lynch, 1987) and more motivated to achieve their goals (Dix et al., 2004). Furthermore, when these interactions are successful, they reinforce children's

emerging sense of autonomy and competence (Kuczynski & Kochanska, 1990) and help develop a mother-child mutually responsive orientation that is known to correlate with healthy socialization outcomes (Kochanska, 1997; Kochanska, 2002; Kochanska & Murray, 2000).

One study suggests that maternal depression may interfere with the ability of young children to initiate positive interactions with their mothers (Dix, Cheng, & Day, under review). Toddlers whose mothers were high in depressive symptoms displayed fewer social smiles and initiated interactions with their mothers less frequently. Moreover, in contrast to children of mothers low in depressive symptoms, age did not predict a developmental increase in behavioral initiating for the children of more depressed mothers across their second year of life.

When children fail to engage their mothers, it may be more challenging for mothers to formulate sensitive, appropriate responses to child behavior. For example, it is easy for a depressed mother to ignore an undemanding child who is quietly occupying himself with a toy. It is more difficult for her to ignore a child who is offering a toy and inviting her to participate in play. Depression taxes both the energy (Cummings & Davies, 1994; Goldsmith & Rogoff, 1995) and cognitive capacity of individuals (Bower, 1981; Ellis & Ashbrook, 1988). Therefore, it is more likely that, when presented with less assertive, engaging child behavior, depressed mothers will disengage, rather than trying to repair the interaction with supportive behavior (Jameson et al., 1997). Faced with unresponsive maternal behavior, children in turn will be less likely to attempt to initiate contact with their mothers in the future. This paper examines

whether it is in part because their children initiate positive social contact with them less frequently than mothers who report depressive symptoms display unsupportive parenting behavior.

*Child active resistance to control.* The transition from the first to the second year of life is typically marked by the emergence of autonomy and self-assertion (Erikson, 1963; Kopp, 1982). Children are learning how to assert their independence and control their negative emotions (Stifter, Spinard, & Braungart-Rieker, 1999), and their attempts are not yet skillful. Therefore, as children enter the toddler years, an increase in non-cooperation and conflict is typical, even within normally functioning families (Dubin & Dubin, 1963). At this age, active resistance to control may reflect typical, rather than problematic, development (Dix et al., in press; Dunn & Munn, 1987).

Although historically child compliance was conceptualized as children passively receiving parental influence, it is now viewed in more bidirectional terms. The role of children as active “agents of influence in their own right” can be seen in the fact that as children age, they display more sophisticated forms of resistance in response to parental control (Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987, p. 799). They are less likely to directly defy or ignore a parental request and more likely to negotiate with parents or simply refuse the request (Kuczynski & Kochanska, 1990). Rather than overemphasizing the importance of automatic child compliance as a socialization goal (Kuczynski & Kochanska, 1990), this view emphasizes that children *at this age* are displaying a healthy, developmentally appropriate competence as they

learn how to resist parental requests and goals (Crockenberg & Litman, 1990). Just as positive social interactions provide a rich learning context for children (Rocissano, Slade, & Lynch, 1987), so do interactions involving conflict and resistance. Through these interactions children learn the behavioral skills they need to handle conflict appropriately and successfully (Dunn & Munn, 1987). When children either passively comply or passively fail to comply with maternal commands, they are not practicing the interpersonal skills necessary for resolving conflicts that arise between their own internal goals and the goals of others (Valsiner & Cairns, 1992).

In fact, one study demonstrated that active resistance to maternal control, at this developmental stage, may best be conceptualized as healthy self-assertion (Dix, Stewart, Gershoff, & Day, in press). In a non-clinical sample of mothers and their toddlers, they found an association between higher levels of depressive symptoms and *reduced* child resistance to maternal control. When faced with maternal requests, the toddlers of more depressed mothers were more passive and less defiant. This trend was more pronounced at 24 months than earlier, even though age should have predicted more competent, autonomous responses. In fact, it was the children of *sensitive* mothers who tended to resist when complying and become defiant when failing to comply. Rather than reflecting a dysfunctional mother-child relationship, children's active resistance to control may actually reflect competent, autonomy-granting parenting that allows children to assert their demands. While a pattern of extreme child negativism may certainly indicate a problem, children's demands for care at this age are still immature and are often negative. The more sensitive parents may have realized that

children at this developmental stage are in the process of learning more positive and mature ways of expressing their desires and they need to be granted the opportunity to practice those skills. These findings suggest that, although it is typically viewed as a negative form of self-assertion, defiance may actually represent a healthy reaction to being controlled, particularly as it emerges for the first time during the second year.

Additional research has demonstrated that the children of severely, chronically depressed mothers are less likely to resist parental control in behaviorally assertive ways that would demonstrate age-appropriate competence (Kuczynski & Kochanska, 1990). Instead, they are more likely to exhibit passive noncompliance (i.e., ignore maternal directives). Furthermore, defiant noncompliance in young toddlers does not correlate with defiance at age 5, as children tend to develop more “skillful forms of resistance” (Kuczynski & Kochanska, 1990, p. 398) as they mature. These findings further support the hypothesis that, at a young age, active resistance to maternal control is neither indicative of a poor parent-child relationship nor predictive of future behavior problems.

If the children of depressed mothers are generally more withdrawn and less communicative (Cohn & Tronick, 1983; Cummings & Davies, 1994; Goodman, 1992), then they may respond to maternal attempts at control with behavior that is more passive (e.g., ignoring directives) and less assertive (e.g., overtly defying). Thus, their behavior may be less likely to demand mothers’ responses. For children with depressed mothers, whose responses may be unpredictable, passive resistance may feel safer than active defiance. If children passively ignore maternal requests, their mothers may

eventually abandon their demands. If they actively defy their mothers, however, they may face harsh punishments. When the children of depressed mothers choose forms of resistance that are less assertive, they are exhibiting behaviors that are weaker and more passive. These behaviors have weaker eliciting properties and do not present a compelling stimulus to which mothers must respond and can use to coordinate responsive interactions. In fact, they present a stimulus that can easily be ignored. This paper tests the hypothesis that it is in part because the children of mothers high in depressive symptoms are more passively and less actively resistant to maternal control that they are less likely to activate sensitive, supportive responses from their mothers.

This hypothesis is in contrast with theories that emphasize the developmental importance of a “mutually responsive, binding, reciprocal orientation” (Kochanska, 1997, p. 94) between mothers and their young children. These theories would predict more, not less, defiant self-assertion from the children of depressed, unresponsive mothers. According to these theories, children with responsive mothers are more likely to internalize their mothers’ values and rules, and to comply without their parents having to exert strong pressure (Kochanska, 1997; Kochanska & Murray, 2000). However, the majority of this research has involved slightly older participants (e.g., 26-56-month-olds), who are presumably more skillful at asserting their independence while controlling their negative emotions (Kochanska, 1997). Moreover, a developmentally normal period of heightened negativism and self-assertion in early toddlerhood may not undermine an *overall* responsive orientation between mother and child. Long term, a mother-child relationship based on shared cooperation, responsiveness, and positive



affect does predict healthy socialization outcomes (Kochanska, 2002; Kochanska & Murray, 2000), but it may not eliminate active resistance to maternal control during the early years.

### *Maternal Perceptions of Child Temperament*

Child temperament is an important regulator of parenting behavior (Sanson & Rothbart, 1995; Thomas & Chess, 1977). Children differ from one another not only in terms of the emotional and behavioral signals they communicate, but in terms of stable temperamental traits. A mother's perception of her child's unique disposition or "reactivity to internal and external stimulation" (Sanson & Rothbart, 1995, p. 299) may partially regulate the effect that depressive symptoms have on her parenting behavior. In an unfamiliar laboratory setting, children who are perceived as fearful and reserved may elicit different parenting responses than children who are perceived as quick to anger and aggression. This study tests whether maternal perceptions of child temperament partially mediate the relationship between maternal depressive symptoms and low supportive behavior (Goldsmith, 1996). Specifically, it examines whether children who vary on maternal ratings of four dimensions of temperament (fear, anger, pleasure, and activity) elicit different degrees of responsiveness from mothers with depressive symptoms. This approach is unique in that most temperament research has considered aggregated, global constructs rather than discrete temperament traits (Bates, 1987; Crockenberg, 1986; Sanson & Rothbart, 1995).

Maternal reports of child temperament are related to maternal depression. Mothers higher in depressive symptoms are more likely to rate their infants as

temperamentally difficult (Edhborg, Seimyr, Lundh, & Widstrom, 2000; Ventura & Stevenson, 1986; Whiffen, 1990). Furthermore, perceptions of negative temperament characteristics in children are associated with reduced maternal responsiveness (Crockenberg, 1986; Sanson & Rothbart, 1995; Webster-Stratton & Eyberg, 1982). This paper examines whether children who are perceived as having particular temperamental traits activate less responsiveness from mothers with depressive symptoms.

Although these tests are exploratory, several possibilities can be advanced (see Goldsmith & Harman, 1994; Webster-Stratton & Eyberg, 1982). If mothers perceive their children as fearful, they may expect them to be apprehensive and clingy during the interaction and respond with increased maternal attention. Therefore, fearful children may receive more maternal responsiveness. If mothers see their children as angry or active, they may expect them to need more redirection during play. Therefore, these children may elicit greater restrictiveness and less responsiveness. If mothers perceive that their children are generally positive, they may find them easier to ignore, and engage in less supportive and less restrictive behavior. This paper tests the hypothesis that the children of mothers with depressive symptoms receive less supportive maternal behavior in part because of mothers' perceptions of their temperaments.

### *Hypotheses*

The following hypotheses will be tested: (1) Children of mothers higher in depressive symptoms communicate fewer facial displays of emotion. (2) The relation of maternal depressive symptoms to low supportive behavior is partially mediated by low child emotional expressiveness. (3) The relation of maternal depressive symptoms to

low supportive behavior is partially mediated by low child behavioral assertiveness, including positive (social initiating) and negative (active resistance to control) behaviors. (4) Bidirectional paths exist between low child emotional expressiveness and the unsupportive behavior of mothers high in depressive symptoms. Bidirectional paths also exist between low child behavioral assertiveness and the unsupportive behavior of mothers high in depressive symptoms. Two exploratory hypotheses will also be tested: (1) Maternal depressive symptoms are related to negative perceptions of children on four dimensions of child temperament: fear, anger, activity, and pleasure. (2) Maternal perceptions of child temperament partially mediate the relation of maternal depressive symptoms to low supportive behavior. Finally, in order to ensure that findings do not simply reflect differences in social class, child gender, or child age, we control for these variables.

## Method

### *Participants*

Participants were 137 mothers and their 14- to 27- month-old toddlers. Mothers ranged from 18 to 43 years old, with a mean age of 31 years. The sample included 90% Anglo American and 10% African American mothers. All mothers were either married and living with their spouse or unmarried and living with the same partner for over six months. On average, mothers had completed 14 years of education. Sixty-four percent of the sample worked outside of the home, averaging 19 hours of paid work per week. The average annual family income reported by participants was “\$30,000 to \$39,000”. According to Hollingshead’s (1975) four-factor index of socioeconomic status, 39% of families were working class, 40% were middle class, and 21% were upper-middle to upper class. The toddler sample was 53% male and 47% female (mean age = 20 months). Participants were recruited from local birth announcements and advertisements in a free newspaper. Mothers received \$15 after participating in the first session and \$20 after the second session.

### *Procedure*

Each mother-child dyad participated in a 20-minute interaction in a laboratory playroom. The interaction consisted of three parts. For the first 5 minutes, the mother was asked to complete a demographic questionnaire. No toys were provided for the child. Instead, the room contained a number of distracting items (e.g., a water pitcher, a stack of videotapes). After the initial 5-minute period, for the next 10 minutes, the mother was allowed to play with her child, but was not explicitly instructed to do so. A

number of toys were provided; however, the mother was told that four attractive toys were “off-limits” to the child. The last 5 minutes consisted of a clean-up period. The mother was asked to put the toys back into a box with the help of her child.

Dyads were permitted to move about freely, allowing their emotions and behaviors to be coded when they naturally occurred. Two video cameras recorded the interaction from behind a one-way observation mirror. One camera provided a view of the entire mother-child interaction. In order to code facial expressions in detail, the other camera provided a close-up view of the child’s face. After completing the interaction, mothers completed a series of questionnaires.

### *Measures*

*Maternal depressive symptoms.* To assess depressive symptoms, mothers completed the Center for Epidemiological Study Depression Inventory (CES-D; Radloff, 1977; see Appendix A). The CES-D elicits ratings of the extent to which 20 statements characterized mothers over the last week (e.g., “I had crying spells”, “My sleep was restless”, “I felt lonely”, “I felt that people dislike me”). This measure has demonstrated both split-half reliability (.78) and Spearman-Brown reliability (.88).

*Maternal supportive behavior.* A behavioral coding system (see Appendix B) was developed to measure the “extent to which mothers are interacting with young children in ways that are connected to and supportive of the child’s focus and interest” (Dix, Meunier, & Wang, 2002, p.1). The supportive behavior code was applied to the 10-minute unstructured play period that occurred during the 20-minute mother-child interaction. Trained coders watched the videotaped interactions and assigned each 5-

second interval one of five main codes: *asynchrony*, *high synchrony*, *restrictiveness*, *low synchrony*, or *watching*.

An *asynchronous* interval is characterized by maternal actions that appear unconnected or contrary to the child's immediate interests, feelings, or behaviors. Examples of asynchronous behavior include failing to respond to the child's verbal or nonverbal signals, focusing on a different activity than the child, attempting to change the child's focus of attention, and criticizing the child. In order for an interval to be classified as *highly synchronous*, the mother's attention and behavior must be closely connected to the child's feelings and activity. The interaction between the mother and child must be mutual and well-coordinated. Examples of high synchrony behaviors include commenting on the child's exact activity, inquiring about the child's thoughts and feelings, responding contingently to the child's verbal or nonverbal signals, and expressing positive affect toward the child (e.g., smiling, praising). *Restrictive* intervals involve verbal commands or nonverbal restraints meant to teach or enforce social norms and rules. Typical restrictions include keeping things clean, avoiding forbidden toys, and playing gently with toys. In order for the code to be mutually exclusive and exhaustive, *low synchrony* and *watching* were also coded, but did not appear informative about the mother's level of skill in regulating an interaction.

Three coders were trained to use the supportive behavior code. In order to assess inter-rater reliability, 20% of the videotapes were independently coded by two observers. Cohen's Kappa was acceptable at .71.

*Children's facial emotions.* Izard's AFFEX facial coding system (Izard, Dougherty, & Hembree, 1983) was used to assess children's facial emotions across the 20-minute interaction. The AFFEX system is well validated and widely used. Eight coders assessed the facial musculature of two zones of the face (upper and lower) and then combined these codes to create facial emotion codes. In order to assess inter-rater reliability, 22% of the videotapes were independently coded. Average real time agreement between coders was good at 84%. In order to ensure the accuracy of emotion coding, only instances in which both zones of the child's face were clearly visible and could be assigned a valid code were analyzed. These instances are referred to as *total codeable data points*. Instances in which the same emotion was conveyed in both the upper and lower zones of the face were coded *pure emotions*. Instances in which the child's face was either half-obscured or fully obscured were excluded from data analysis (see Table 1 for descriptive data on the excluded facial displays). This study is unique in that facial emotions were precisely coded while participants were allowed to move freely about the room.

*Children's resistance to control.* Children's resistance to maternal control was coded during each 5-second interval following a maternal request to clean up or avoid the forbidden toys (see Appendix C). Four primary codes were assigned: eager compliance, passive noncompliance, simple refusal, and defiant noncompliance. *Eager compliance* was coded when children complied willingly (i.e., without protest, negative affect, or asking their mothers to share the job). *Passive noncompliance* was coded when children completely ignored their mothers' requests. *Simple refusal* was coded

when children indicated that they had heard and understood their mothers' requests, but failed to comply. *Defiant noncompliance* was coded when children refused their mothers' requests and did so with anger, aggression, or negative affect. Inter-rater agreement for this code was good, with Kappa = .65.

*Children's behavioral initiations.* A code was developed to assess the frequency of children's attempts to initiate interactions with their mothers (see Appendix D). This code captured child behaviors that indicated the child's interest in including the mother when her participation was not necessary. Neither responding to mothers' verbalizations nor requesting mothers' help was coded as an initiation. Examples of behavioral initiations include children commenting on toys, sharing activities, or holding toys out to their mothers. The presence or absence of a child initiation was assessed during each of the four 5-second intervals following the mother's response to a child's smile. To assess inter-rater reliability, 25% of the tapes were coded by at least two coders. Agreement between the coders was good, with Kappa = .80.

*Perceptions of child temperament.* To assess child temperament, mothers were asked to complete the Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996; see Appendix E). The TBAQ is a 109-item questionnaire that assesses five discrete dimensions of temperament in toddlers. Four of these dimensions were used in this study: *anger*, *positive-pleasure*, *activity level*, and *social fearfulness*. Using 7-point scales, the questions on the TBAQ measure the prevalence of temperament-relevant behaviors in common situations. Internal consistency reliability estimates typically



exceed .80 for each scale. The TBAQ has also demonstrated convergent validity with other established temperament questionnaires (Goldsmith, 1996).

*Demographic variables.* Five demographic variables were examined: child's age, child's sex, maternal education, family income, and socioeconomic status (SES). SES was assessed using Hollingshead's (1975) four-factor system.

## Results

### *Descriptive Data*

Descriptive statistics for maternal and child variables are reported in Table 2. Appendices F-I demonstrate how each variable relates to every other variable within the same measure. The majority (58%) of mother-child interactions were highly synchronous. Fewer intervals were asynchronous (9%) or restrictive (9%). During compliance-related exchanges, eager compliance was the most common child behavior (31%), followed by simple refusal (23%), passive noncompliance (20%), and defiant noncompliance (8%). On average, children initiated positive social contact with their mothers 10 times during smile-related interactions.

Descriptive statistics for child facial emotions are displayed in Table 3. Descriptive statistics for both individual and aggregated emotions are reported. Child facial emotions were aggregated into three main variables. First, a *pure emotions* aggregate was created by adding the frequencies of all emotions coded pure (including interest). Second, because the two negative emotions, sadness and anger, were strongly related ( $B = 22.10 [3.15], p < .001$ ), their frequencies were additively combined to form a *negative emotions* aggregate. Third, by summing frequencies, a *total expressed emotions* aggregate was created to reflect all instances in which an emotion other than interest (i.e., flat affect) was expressed in at least one zone of the face. We originally planned to create an *ambiguous emotions* aggregate to assess facial displays in which one zone expressed an emotion while the other zone was neutral or flat. However, 84% of ambiguous displays consisted of flat affect paired with joy (see Table 1). Thus,

ambiguous emotions did not capture indistinct facial communications so much as lower-level joy. Therefore, it was excluded from data analysis. Sixty-five percent of children's facial displays were neutral or flat (i.e., coded interest). Of the remaining emotions, 17% were coded joy, 1.23% anger, 1.05% surprise, 1.05% sadness, .31% disgust, .15% fear, .09% pain, and .04% startle. The residual 12.97% of emotions were coded ambiguous (i.e., one zone showed emotion while the other zone was neutral or flat). Any emotion that reflected less than .5% of the total was not analyzed. The following emotions were excluded from analysis due to the low frequency with which they occurred: disgust, fear, pain, and startle. Surprise was also eliminated due to its low frequency of occurrence (see Appendix G) and unclear theoretical significance. Surprise appeared to capture a brief startle reaction that was neither clearly positive nor clearly negative. It did not appear to function as an interpretable emotional signal and was therefore excluded from analysis.

### *Overview of Analyses*

Because the majority of variables used in this study are frequencies or counts (and, predictably, do not conform to a normal distribution), Poisson regressions were utilized. Count data are most appropriately analyzed using a Poisson technique (List, 2001). In fact, it has been described as “the benchmark model” for the analysis of count data (Cameron & Trivedi, 1990). Each participant had a different number of opportunities to obtain each score on the dependent variables. Therefore, this total number of opportunities was controlled for in each analysis by entering it as the exposure correction in the Poisson regression. For example, when predicting the

number of highly synchronous intervals, we controlled for the total number of intervals during which each dyad was videotaped interacting without visual obstruction. When predicting the number of times children eagerly complied, we controlled for the total number of compliance-related mother-child exchanges. Furthermore, because participants emitted different numbers of emotions and behaviors, percentages were used when these variables were entered as predictors. Because it is inappropriate to standardize Poisson regression coefficients, all results are reported as unstandardized coefficients. Two-tailed tests of significance were used,  $p < .05$ .

Simultaneous bivariate regressions were used. All tests contained the five demographic covariates (SES, income, maternal education, child age, and child sex) entered as controls. Results are organized according to the two types of regression analyses that were conducted: (a) tests of direct effects and (b) tests of mediational and indirect effects. In order to test for direct effects, maternal depressive symptoms were entered as the independent variable predicting each child emotion, temperament, and behavior in a separate regression analysis. Next, each child emotion, temperament, and behavior was entered as the independent variable predicting each maternal supportive behavior in a separate regression analysis. In order to test for mediational and indirect effects, maternal depressive symptoms were entered as the independent variable predicting each supportive behavior in a separate analysis. In each analysis, one child emotion, temperament, or behavior was entered as the mediating variable.

### *Direct Effects*

*Depressive symptoms predicting child facial emotions.* Table 4 presents relations among maternal depressive symptoms and children's facial emotions. As predicted, children of mothers higher in depressive symptoms expressed fewer facial emotions: their facial displays were more likely to be flat (i.e., interest). In order to determine which specific emotions were expressed less frequently, children's facial emotions were then analyzed individually, controlling for the total number of emotions expressed. Children whose mothers reported more depressive symptoms expressed less joy and less sadness.

*Depressive symptoms predicting perceptions of child temperament.* Depressive symptoms were unrelated to mothers' perceptions of child temperament (see Table 4).

*Child facial emotions predicting maternal supportive behavior.* Table 5 displays relations among child facial emotions and maternal supportive behavior. The hypothesis that supportive mothers would have children who communicate more facial emotions was supported. Children who expressed more emotions (i.e., conveyed less flat affect) tended to have mothers who engaged in more highly synchronous and less asynchronous behavior. Despite the general tendency for child emotional expressiveness to relate to supportive maternal behavior, different relations arose when child emotions were analyzed individually (see Table 5). Consistent with the overall trend, the expression of joy was related to more highly synchronous, less asynchronous, and less restrictive maternal behavior. Furthermore, sadness was related to less asynchrony. However, for other emotions, *fewer* expressions of the emotion were

related to supportive maternal behavior. Children who expressed fewer negative emotions tended to have less restrictive mothers. Children who expressed less anger tended to have more highly synchronous and less restrictive mothers.

### *Mediational and Indirect Effects*

Two types of indirect effects were assessed. First, to test hypotheses regarding mediation, Baron and Kenny's (1986) regression procedure was used. It relies on a series of regression analyses that indicate whether the relationship between the independent variable and the dependent variable might be mediated by a third variable. Mediation is inferred if, first, co-linearity exists among independent, dependent, and mediating variables and, second, the relationship between the independent variable and the dependent variable significantly declines when controlling for the mediating variable. Third, the relationship between the mediating variable and the dependent variable remains significant even when the independent variable is entered into the regression equation. When data patterns supported mediational paths, Sobel tests were performed to determine their significance (Preacher & Leonardelli, 2001).

Second, indirect, but not mediational, paths were also assessed. In order to fully capture the indirect paths connecting the independent and dependent variables, Sobel tests were conducted even if adding the mediating variable to the regression equation did not cause a drop in the direct relationship between the independent and dependent variables. Following recommendations by MacKinnon, Lockwood, and Hoffman (2002), Sobel tests were performed when, first, the independent variable predicted the dependent variable; second, the independent variable predicted the

mediating variable; and third, the mediating variable predicted the dependent variable even when the independent variable was entered into the regression equation. These criteria allowed us to test for the presence of indirect paths even when the Baron and Kenny (1986) criteria for mediation were not met, that is, even when the mediating variable did not reduce the direct effect of the independent variable on the dependent variable.

#### *Mediational and Indirect Paths Due to Child Variables*

*Indirect effects involving child facial emotions.* We tested the hypothesis that the relation of maternal depressive symptoms to low supportive behavior was mediated by the frequency of children's facial emotions (see Table 6). Specifically, we proposed that mothers higher in depressive symptoms are less highly synchronous, more asynchronous, and more restrictive in part because their children communicate fewer facial emotions. First, we verified the direct relations between maternal depressive symptoms and supportive behavior. More depressive symptoms were associated with less high synchrony, more asynchrony, and more restrictiveness (see also Dix et al., 2004).

The hypothesis was supported for two of the three maternal behaviors. As predicted, the frequency of children's expressed emotions partially mediated the association between maternal depressive symptoms and high synchrony. When the frequency of expressed emotions was added to the regression model, the negative association between depressive symptoms and high synchrony decreased. Because the relation of depressive symptoms to asynchrony did not drop when the frequency of

expressed emotions was added to the regression model, the traditional conditions for mediation were not met (Baron & Kenny, 1986). However, there does appear to be a significant indirect path from depressive symptoms to asynchrony through low rates of child emotional expression (see MacKinnon, Lockwood, & Hoffman, 2002). Thus, the data support two indirect paths linking depressive symptoms to low maternal support through low emotional expressiveness.

When the three individual emotions (joy, anger, and sadness) were examined, results showed that these indirect effects were due primarily to the fact that the children of mothers with depressive symptoms displayed less facial joy (see Table 6). Low expression of joy partially mediated the negative association between depressive symptoms and high synchrony and fully mediated the positive association between depressive symptoms and restrictiveness. A significant indirect path also emerged between depressive symptoms and asynchrony through children's expression of less joy. Therefore, it appears that the indirect paths that link maternal depressive symptoms to less supportive behavior through low emotional expressiveness emerge because the children of more depressed mothers communicate less joy during mother-child interactions.

*Indirect effects involving low child initiation.* We tested the hypothesis that low child initiation of positive social contact mediates the relation of maternal depressive symptoms to the three behaviors related to support. First, we verified the direct relations among depression, initiation, and supportive behavior (see Dix, Cheng, & Day, under review; see Appendices J & K for coefficients). Table 7 presents the results of these



analyses. Although Baron and Kenny (1986) conditions for mediation were not met, there was a significant indirect path from depressive symptoms to asynchrony through low child initiation.

*Indirect effects involving child active resistance to control.* We tested the hypothesis that low active resistance to control mediates the relationship between maternal depressive symptoms and low supportive behavior (see Table 7). In order to test for the presence of indirect effects, we first verified the direct relations among depressive symptoms, resistance to control, and supportive behavior (see Dix, Stewart, Gershoff, & Day, in press; see Appendices J & K for coefficients). We hypothesized that mothers with depressive symptoms were less supportive in part because their children were less actively resistant (i.e., more passive and less defiant) in the face of maternal requests. As predicted, a significant indirect path emerged from depressive symptoms to asynchrony through increased rates of passive noncompliance. Although we predicted that passive noncompliance would be associated with less support, we also predicted that, given its non-confrontational nature, it would be associated with less restrictiveness. As predicted, passive noncompliance partially mediated the relationship between depressive symptoms and restrictiveness. Therefore, these data support a model in which passive, rather than active, resistance to control is influential in how mothers with depressive symptoms behave toward children.

*Indirect effects involving perceptions of child temperament.* Maternal perceptions of child temperament were related to maternal behavior (as reported in Bryan & Dix, under review; see Appendix L for coefficients). However, maternal

depressive symptoms were unrelated to mothers' perceptions of child temperament; therefore, tests of mediation could not be conducted.

#### *Mediational and Indirect Paths Due to Maternal Behavior*

Initial tests of mediational and indirect paths indicated that children's emotional expressiveness and behavioral assertiveness can influence the relationship between maternal depressive symptoms and supportive behavior. Mothers higher in depressive symptoms appear to be less supportive in part because their children express fewer emotions and display more passive behaviors. However, it is also possible that the relationship between child behavior and the behavior of mothers with depressive symptoms is one of mutual influence. That is, children may be less emotionally expressive and behaviorally assertive because of a history of maternal unresponsiveness. For example, initial results indicated that more depressed mothers were less highly synchronous in part because their children emitted fewer expressions of joy during play. It may also be that these children expressed less joy in part because their mothers were less highly synchronous. Therefore, in order to establish whether the effects of mother and child behavior were bidirectional, we re-analyzed the data. All tests that indicated a significant mediational or indirect path from depressive symptoms to low support through child behavior were performed using maternal support as the mediating variable and child behavior as the dependent variable (see Figure 2). This allowed us to determine if the behavior displayed by children was in part a result of the behavior emitted by mothers.

*Maternal supportive behavior influencing child emotional expressiveness.* We originally hypothesized that mothers who report more depressive symptoms would be less supportive of their children in part because their children express fewer facial emotions. Tests of mediational and indirect paths revealed support for this hypothesis (see Table 6). In order to determine if children's low emotional expressiveness was partially due to the unsupportive behavior of mothers with depressive symptoms, we conducted follow-up analyses entering maternal supportive behavior as the mediating variable and children's facial emotions as the dependent variable. Results of these analyses are presented in Table 8.

Follow-up analyses revealed that the negative association between maternal depressive symptoms and child emotional expressiveness was partially mediated by low maternal support. Children of mothers with depressive symptoms expressed fewer facial emotions in part because their mothers were less highly synchronous and more asynchronous. According to follow-up analyses of individual facial emotions, children of mothers with depressive symptoms expressed less joy in part because their mothers were less highly synchronous. Moreover, the relation of depressive symptoms to low child joy was fully mediated by maternal asynchrony. A significant indirect path emerged between maternal depressive symptoms and low child joy through high maternal restrictiveness. These findings indicate that the relationship between child emotional expressiveness and maternal supportiveness may be bidirectional. Mothers who report more depressive symptoms are less supportive with children who display

fewer facial emotions, and specifically, who display fewer expressions of joy. Likewise, children become less emotionally expressive when their mothers are unsupportive.

*Maternal supportive behavior influencing child behavioral assertiveness.* Our original hypotheses predicted that mothers who report more depressive symptoms are less supportive in part because their children are more passive and less positively initiating. Initial tests of mediational and indirect paths confirmed that low social initiation and high passive noncompliance both contributed to the association between depressive symptoms and unsupportive maternal behavior (see Table 7). We then conducted follow-up analyses to determine whether the behavior of mothers with depressive symptoms influenced how often children initiated positive social contact and passively ignored maternal requests. In these regression analyses, maternal supportive behavior was entered as the mediating variable and child behavior as the dependent variable (see Table 9 for results).

According to these analyses, children of mothers high in depressive symptoms were more passively noncompliant in part because their mothers were more asynchronous. Furthermore, the relation of depressive symptoms to low initiation was fully mediated by asynchrony. These findings indicate that, for mothers with depressive symptoms, there may be a bidirectional relationship between child behavioral assertiveness and supportive behavior. Mothers experiencing depressive symptoms are less supportive when their children make fewer attempts at positive social contact and respond more passively to their commands. Moreover, children become less assertive

when their mothers fail to provide support. For a complete summary of all mediational and indirect paths, see Table 10.

## Discussion

This study examined whether child behavior contributes to the unsupportive parenting of mothers with depressive symptoms. Based on the present findings, four noteworthy conclusions can be drawn. First, children of mothers with depressive symptoms communicated less emotion during mother-child interactions. Overall, they expressed fewer facial emotions, specifically, less joy and sadness. Second, children's emotional expressiveness partially mediated the relation of depressive symptoms to low supportive behavior. It was with children who communicated less emotionally, specifically less joy, that mothers with depressive symptoms were less supportive. Third, a lack of assertive child behavior was an indirect path through which maternal depressive symptoms were associated with low supportive behavior. Children were less likely to initiate positive social contact with mothers with depressive symptoms and were more likely to respond to their requests with passive noncompliance. These behaviors, in turn, were associated with less responsive support from mothers. Fourth, parent effects also contributed to the role of depressive symptoms in the regulation of mother-child interactions. Low maternal support partially mediated the association between maternal depressive symptoms and low child emotional expressiveness as well as the association between maternal depressive symptoms and low child behavioral assertiveness. Thus, the findings support a model in which changes in child emotional communication and action toward mothers provide one possible mechanism through which mothers' depressive symptoms influence their supportive behavior.

### *Child Emotional Expressiveness*

In order to assess children's disengagement from depressed mothers, prior research has primarily observed gaze patterns, negative affect, and flat affect in infants (Cohn & Tronick, 1983; Field et al., 1989). This study is unique in that participants were older (1 and 2 years old) and were freely interacting during the observation period. This allowed for the analysis of four naturally occurring facial emotions. It also enabled us to observe whether children beyond infancy withdraw emotionally from mothers with depressive symptoms. Furthermore, this study was unique in that it demonstrated relations between maternal depressive symptoms and the reduction of not just positive or negative emotion in general, but of specific child emotional displays.

*Emotional expressiveness as a correlate of maternal depressive symptoms.* The present data show that children with mothers high in depressive symptoms communicate fewer facial emotions. They express fewer negative (sadness) and positive (joy) emotions and more flat affect. These findings are consistent with general patterns of withdrawal and unresponsiveness in children interacting with their depressed mothers in previous studies (e.g., Field, 1995; Field et al., 1990; Jameson et al., 1997; Tronick, 1998). Two different models can explain why children of depressed mothers communicate less emotionally. Contingency models predict that when mothers fail to respond contingently to children's emotional signals, those signals become ineffective, and, thus, may extinguish over time. Alternatively, suppression models predict that when mothers respond negatively to children's emotional signals, those signals are punished, and thus, may be suppressed over time. Either extinction or suppression

might occur because sensitive and contingent responses to children's emotions may be particularly effortful for parents experiencing emotional distress and its concomitant fatigue (Cunningham, Benness, & Siegel, 1988; Gizynski, 1985). Positive child emotions, ignored by mothers, may have been extinguished while negative child emotions, punished by mothers, may have been suppressed.

In the present study, mothers who reported more depressive symptoms tended to be unsupportive and restrictive. However, their children did not communicate a level of negative emotionality commensurate to this lack of support. In fact, their children communicated less sadness. Given that a reduction in signaling was present for both positive and negative child emotions, the data do not appear to reflect simply the poor quality of the interaction. Rather, they imply that the affective signaling of both joy and sadness has been withdrawn.

Alternatively, it is possible that children of mothers with depressive symptoms are not just *signaling* fewer emotions but are actually *experiencing* fewer emotions. If mothers with depressive symptoms regulate interactions poorly, their children may experience less joy. However, if felt emotions are based solely on the quality or pleasantness of interactions, it is not likely that children of mothers with depressive symptoms would also experience *less* sadness. If the expression of any emotion leads to unfulfilling or painful experiences with mothers exhibiting depressive symptoms, it is possible that children develop a blunted affect such that their experience of all emotions is weaker. Blunted affect in children may also reflect the lack of emotion that their mothers, who are exhibiting the symptoms of depression, may be experiencing or



communicating. Blunted affect is characteristic of individuals diagnosed with depressive and related psychological disorders (*DSM-IV-TR*, 2000; Streit, Greene, Cogan, & Davis, 1993) and has been proposed to undermine the use of emotional coping mechanisms like crying (Winkler et al., 2004), the formation of interpersonal relationships, and judgments about risk taking behavior (Kelly, 2006).

In the present study, the association between maternal depressive symptoms and children's affective expressions emerged in a non-clinical sample. This suggests that, even at levels common in the general population, maternal depression may exert a dampening effect on child emotional expressiveness. If toddlers are experiencing or communicating fewer emotions, there are two possible implications for development. First, children may not develop positive feelings of personal efficacy. Emotional expression is a powerful communicative tool for very young children who have limited control over their environments (Saarni et al., 1998). It allows children to voice their needs and goals so that their caretakers can help meet them. If children do not communicate emotionally, they may not benefit from the experience of expressing their needs and goals and having them met successfully. Consequently, they may not develop a sense of efficacy during the developmental period when personal autonomy and independence begin to emerge (Bandura, 1997; Erikson, 1963; Kopp, 1982). Second, if children activate fewer emotions, which are critical organizers of adaptive functioning, their development could be undermined. The experience of both positive and negative emotions is adaptive because all emotions activate corresponding response systems. When triggered, emotions help regulate behavioral responses to the eliciting stimuli

(Frijda, 1986; Izard, 1991; Lazarus, 1991). Thus, the absence of strong affective experiences could prevent toddlers from fully engaging their environments and, thereby, enhancing their behavioral repertoires.

*Emotional expressiveness as an activator of maternal responsiveness.* Tests of mediational and indirect paths provide support for the hypothesis that children's facial emotions partially mediate the relation of maternal depressive symptoms to supportive behavior. Although the data are correlational, and therefore do not permit causal conclusions, they show associations consistent with the prediction that children's low emotional expressiveness elicits low maternal support. It was among the children who signaled fewer emotions overall that maternal depressive symptoms were associated with low responsiveness. This could promote a cycle in which children do not communicate their emotions, do not receive positive and contingent maternal responses, and thus withdraw further from their mothers, making synchronous interactions in the future even less likely (Cummings & Davies, 1994; Jameson et al., 1997; Leadbeater et al., 1996). Although sequential analysis of the data was not possible, child emotional expressiveness and maternal behavior were measured close in time within a given interaction. The data collected under these conditions provided support for a model in which maternal behavior is regulated in part by children's immediate emotional cues.

Analyzing individual emotions revealed that mothers with depressive symptoms were less supportive with children who expressed low facial joy. Furthermore, low expressions of facial joy fully mediated the relation of maternal depressive symptoms to restrictiveness. Children who fail to communicate emotionally, and in particular who

fail to communicate joy, do not provide mothers information about their interests and reactions. That information typically guides responsive maternal behavior (Bugental, 2003; Tronick, 1998). For example, when children display facial joy, they communicate what is pleasing about an interaction. In this way, children indicate how mothers can further support their interests. Researchers emphasize that maternal behavior is regulated by children's emotional signals and the ability of mothers to accurately read those signals (Ainsworth et al., 1974; Saarni et al., 1998; Tronick, 1998). Without children's emotional signals to guide their behavior, it may be more difficult for mothers with depressive symptoms to respond to children in mutually contingent, positive ways.

Alternatively, given that these are not sequential findings, it is possible that they do not reflect contemporaneous maternal reactions to specific child affective signals. They could reflect, instead, the overall quality of the mother-child relationship or of the child's development. Mothers with depressive symptoms may be generally unsupportive, not just unsupportive at moments of low child signaling. They may be less supportive with children who express less emotion, and particularly less joy, because depression, low signaling, and insensitivity all co-occur with a third variable. Thus, these findings could reflect more global qualities of the mother-child relationship, such as high levels of conflict (Burke, 2003) or attachment insecurity (Murray, 1992; Radke-Yarrow, Cummings, Kuczyski, & Chapman, 1985; Teti, Gelfand, Messinger, & Isabella, 1995). Rather than being elicited by particular child signals, unsupportive maternal behavior could also be in response to global traits that are characteristic of the

children of depressed mothers. These children are more likely to have difficult temperaments (Cummings & Davies, 1994), social skill deficits (Lyons-Ruth et al., 2000), and difficulty maintaining social interactions (Burke, 2003; Jameson et al., 1997). These characteristics may co-occur with low emotional signaling in children and low maternal support. Therefore, the present findings could reflect a tendency for mothers with depressive symptoms to be unsupportive, not just as a reaction to immediate child signals, but as a reaction to emotions and behaviors evidenced throughout the mother-child relationship. However, it is noteworthy that in the present sample, maternal depressive symptoms did not correlate with negative perceptions of child temperament. This suggests that the poorly regulated behavior of mothers with depressive symptoms, rather than the temperamental characteristics of their children, may be responsible for instigating uncoordinated patterns of mother-child exchanges. Over time, however, these types of exchanges may become more entrenched and produce subsequent changes in child traits.

Unlike children's expressions of joy, children's expressions of sadness did not mediate the relationship between maternal depressive symptoms and supportive behavior. In the particular type of mother-child interaction studied here, children rarely expressed sadness. Therefore, there may not have been sufficient statistical power to detect any indirect relations involving sadness. Overall, the expression of more child sadness was associated with less depressed and more supportive mothers. However, these may represent general relationship tendencies rather than the tendency for child sadness to regulate depression's effects on a moment-to-moment basis.

Regardless of depression, one negative child emotion (sadness) correlated with more responsiveness from mothers, while another (anger) correlated with less responsiveness and more restrictiveness. This indicates that emotional expressiveness, although generally a useful communicative tool, does not always result in positive and supportive mother-child exchanges. Emotions, even those that are negative, provide mothers the information they need to accurately interpret their children's goals and interests. Sadness, for example, helps mothers recognize that children are disappointed and tends to elicit an empathic response (Izard, 1991). An empathic response enables and encourages mothers to better regulate interactions that meet children's needs and promote their positive affect. Because of the behavioral tendencies that they activate in children, other negative emotions may be less likely to promote supportive behavior in mothers. Anger, for example, is an emotion associated with overcoming opposition (Frijda, 1986; Izard, 1991; Lazarus, 1991). Children who express anger are reacting against their mothers, often because mothers are attempting to promote goals that children do not seek. Therefore, anger tends to reflect and elicit disapproval, restraint, and other unsupportive actions that are meant to extinguish its expression.

#### *Child Behavioral Assertiveness*

In the present sample, maternal depressive symptoms were associated with child behaviors that were less assertive. Low assertiveness was evident in both positive (social initiation) and negative (low resistance to control) behaviors. Consistent with models emphasizing child withdrawal (Cummings & Davies, 1994; Jameson et al., 1997; Leadbeater et al., 1996), the data are consistent with the proposal that a reduction

in assertive child behavior provides one path through which maternal depressive symptoms can undermine supportive behavior. Analyses showed that children positively engaged mothers with depressive symptoms less often and reacted more passively to their commands. This created significant indirect paths through assertive behavior from depressive symptoms to asynchrony. This provides support for the view that assertive child behavior is a regulator of maternal support. Whether children are positively inviting mothers into their play or actively defying them, they are eliciting maternal behavior. When children behave passively, they are not drawing mothers into exchanges and, thus, can be more easily ignored. Mothers with depressive symptoms are more likely to ignore children, rather than encourage their bids or socialize their misbehavior, because ignoring is a less effortful or onerous response (Cunningham et al., 1988; Gizynski, 1985). However, if mothers disengage in part because their participation is not being elicited, it becomes less likely that children will try to draw them back into their play. When both partners feel that the other is indifferent and that their initiations will not yield contingent responses, a cycle of mutual withdrawal may occur and well-coordinated interactions may become less likely (Bell & Chapman, 1986; Cohn & Tronick, 1983; Jameson et al., 1997).

The interpretive possibilities for these findings are similar to those for the findings related to emotional expressiveness. The paths linking depressive symptoms to unsupportive behavior through low child assertiveness could reflect moment-to-moment associations. Alternatively, they could reflect general disturbances in the mother-child relationship or in the child's development that co-occur with depression, low child

assertiveness, and maternal insensitivity. Less assertive children may be in a relationship characterized by conflict (Burke, 2003) or insecure attachment (Murray, 1992). They may demonstrate social skill deficits that make well-coordinated interactions more difficult to maintain (Lyons-Ruth et al., 2000). Thus, rather than regulating maternal support on a moment-to-moment basis, assertive child behaviors may be correlated with overall relationship conditions or child characteristics that elicit less responsive parenting.

### *General Implications*

Given that children communicate fewer emotions and are more passive with mothers who report depressive symptoms, it is important to know whether these tendencies are general or specific to the mother-child relationship. Mother-child relationships often serve as models for relationships with other individuals (Ainsworth et al., 1974; Bowlby, 1973; Macfie, McElwain, & Houts, 2005). Therefore, children may signal less and behave more passively even when they interact with peers or adults outside the family. If so, they may continue to receive less attentive responsiveness to their agendas. Conversely, low emotional signaling and behavioral assertiveness may occur only with mothers and not with other individuals. If children are frequently ignored by mothers experiencing depressive symptoms, they have few opportunities to communicate, either emotionally or behaviorally. However, when peers or other adults engage them and provide opportunities for communication, these children may respond with more emotional signals and assertive behaviors.

Because the children of mothers with depressive symptoms were more passive and expressed fewer emotions, the findings of this study do not support models in which depressive symptoms are purported to undermine parenting behavior through high rates of aversive child behavior (Conrad & Hammen, 1989; Downey & Coyne, 1990; Hammen, Burge, & Stansbury, 1990). When children are older, mothers with depressive symptoms may be less supportive because their children are more defiant and negative. These paths of influence between depression and parenting behavior may be more common with children who develop externalizing disorders, which are prevalent among the children of depressed mothers (Brody & Forehand, 1986; Conrad & Hammen, 1989). However, with very young children, it appears that supportive behavior can be undermined through *low* rates of aversive child behavior and emotional expression. These paths of influence between depression and parenting behavior may be more prominent with children who develop internalizing disorders, which are also more prevalent among the children of depressed mothers (Conrad & Hammen, 1989; Downey & Coyne, 1990).

#### *Parent Effects and a Bidirectional Model*

The child effects findings in this study are balanced by the presence of reverse paths, or parent effects. Low emotional expressiveness in children partially mediated the relation of depressive symptoms to unsupportive maternal behavior, demonstrating a child effect. At the same time, it appeared that children's lack of emotional expressiveness, in particular joy, was partially due to the unsupportive behavior of mothers higher in depressive symptoms, demonstrating a parent effect. Similarly,



children's passive noncompliance and low positive initiation both provided indirect paths through which depressive symptoms could exert their influence on maternal support, a child effect. At the same time, children's lack of behavioral assertiveness appeared to be partially due to the asynchronous behavior of mothers higher in depressive symptoms, a parent effect. Thus, it appears that when mothers reported depressive symptoms, their children responded more passively and less emotionally in part because their mothers' behavior was not as focused on and supportive of their interests. When maternal behavior indicated to children that their emotional signals and assertive behaviors would be unlikely to elicit desirable results, child bids became less frequent.

Given the presence of both child and parent effects, a complete analysis of the relationship between depressive symptoms and supportive behavior must acknowledge mutual influences. Researchers should recognize that the influence of depressive symptoms on mother-child interactions is due to the mutual influence that mother and child have on one another. The existence of bidirectional paths is consistent with reciprocal effects models (Bugental, 1992, 2003; Bugental et al., 1989; Hammen, Burge, & Stansbury, 1990; Tronick, 1998) in which the behavior of each partner in a dyadic interaction is seen to affect the behavior of the other. Bidirectional influences are also highlighted in mutual regulation models, which emphasize that both mother and child must actively communicate their needs and emotions to one another and respond appropriately to those signals (Hammen et al., 1990; Tronick, 1998). When either participant cannot predictably engage the other in coordinated forms of interaction, a

breakdown can occur in the dyadic system. This can limit the degree to which interactions are positive and mutually coordinated. The present findings support the proposal that both mothers and children contribute actively to the regulation of their interactions (Dodge, 1990; Kuczynski, 2003; Kuczynski et al., 2003). This may be one reason why a disconnected pattern of exchanges between children and mothers with depressive symptoms can be so difficult to break.

## Conclusion

The regulation of supportive maternal behavior is facilitated when children communicate emotions and engage in assertive relational behaviors. When mothers exhibit depressive symptoms, children are less likely to demonstrate these signals and behaviors. In fact, it is the children of mothers with depressive symptoms who display fewer emotions and more passive behaviors who experience less supportive mother-child exchanges. However, the paths of influence are bidirectional. It is also the case that, when mothers high in depressive symptoms are unsupportive, children tend to express less emotion and respond less assertively. These findings imply that maternal depressive symptoms do not just change maternal behavior. They change the emotional regulation processes and behavioral characteristics of children in ways that may exacerbate mothers' tendencies to be unsupportive. Furthermore, these child effects and unsupportive interactions may stabilize over time. Therefore, interventions that target only maternal behavior may be less effective than those that focus on both individuals. The changes in child regulatory processes described in this study need to be added to widely recognized parent effects in order to have a complete understanding of maternal depression.

Table 1

*Descriptive Statistics: Percentages of Pure, Half-Obscured, and Ambiguous Child*

*Facial Emotions*

Emotions	% of Pure Emotions	% of Half-Obscured Emotions <sup>a</sup>	% of Ambiguous Emotions <sup>a</sup>
Interest	76.27%	88.04%	---
Joy	19.84%	9.18%	83.8%
Surprise <sup>a</sup>	1.22%	.96%	8.3%
Sadness	1.22%	1.07%	4.2%
Anger	1.44%	.75%	3.6%
	N = 9,327	N = 937	N = 1,270

*Note.* *Pure emotions* are instances in which both zones of the face expressed the same emotion. *Half-obscured emotions* are instances in which one zone of the face was obscured and the other zone expressed a codeable emotion. *Ambiguous emotions* are instances in which one zone of the face was neutral or flat (i.e., coded interest) and the other zone expressed a codeable emotion other than interest.

<sup>a</sup> Excluded from data analysis.

Table 2

*Descriptive Statistics: Means, Standard Deviations, and Ranges for the Frequencies of Maternal and Child Variables*

<b>Maternal Variables</b>	<i>M</i>	<i>SD</i>	Range
Depressive Symptoms <sup>a</sup>	30.14	7.68	20-59
<i>Supportive Behaviors</i>			
High Synchrony	66.89	16.22	18-102
Asynchrony	10.98	8.93	0-49
Restrictiveness	10.56	7.94	0-41
Valid Intervals	115.85	7.65	83-136
<b>Child Variables</b>			
Frequency of Initiations	10.17	9.09	0-48
<i>Compliance Behaviors</i>			
Eager Compliance	9.16	6.40	0-29
Passive Noncompliance	6.03	4.39	0-21
Defiant Noncompliance	2.36	4.26	0-25
Simple Refusal	6.78	5.35	0-25
Total Compliance-Related Exchanges	29.35	12.21	5-64
<i>Dimensions of Child Temperament</i>			
Anger	3.89	.76	1.75-5.77
Pleasure	5.18	.68	3.42-6.56
Activity	4.23	.60	2.83-5.65
Fear	3.96	1.01	1.47-6.44

<sup>a</sup> Depression scores reflect the sum of all CES-D items. All items were scored using a 1-4 scale, rather than a 0-3 scale (see Appendix A).

Table 3

*Descriptive Statistics: Means, Standard Deviations, and Ranges for the Frequencies of Child Facial Emotions*

Child Facial Emotions	<i>M</i>	<i>SD</i>	Range
<i>Individual Emotions</i>			
Interest <sup>a</sup>	78.18	26.50	35-181
Joy	20.34	15.11	1-65
Surprise <sup>b</sup>	1.25	1.98	0-10
Anger	1.47	2.58	0-13
Sadness	1.25	2.74	0-15
Disgust <sup>b</sup>	.37	.770	0-4
Fear <sup>b</sup>	.18	.508	0-3
Pain <sup>b</sup>	.11	.458	0-3
Startle <sup>b</sup>	.05	.229	0-1
<i>Aggregated Emotions</i>			
Pure Emotions <sup>c</sup>	103.21	34.23	49-218
Negative Emotions	3.04	4.78	0-24
Total Expressed Emotions <sup>a</sup>	41.15	23.96	6-109

*Note.* The variable *total expressed emotions* represents the total number of codeable emotions minus interest (i.e., excluding instances in which both zones of the child's face were coded neutral or flat).

<sup>a</sup> The variables *interest* and *total expressed emotions* are numerical inverses.

<sup>b</sup> Excluded from data analysis.

<sup>c</sup> The *pure emotions* aggregate includes *interest*.

Table 4

*Relations Among Maternal Depressive Symptoms, Child Facial Emotions, and Perceptions of Child Temperament: Regression Coefficients*

Child Facial Emotions	Maternal Depressive Symptoms
<i>Individual Emotions</i>	
Interest <sup>a</sup>	.005 (.002) **
Joy	-.011 (.003) **
Anger	.006 (.012)
Sadness	-.067 (.016) ***
<i>Aggregated Emotions</i>	
Pure Emotions <sup>b</sup>	.002 (.001)
Negative Emotions	-.028 (.009) **
Total Expressed Emotions <sup>a</sup>	-.010 (.002) ***
<b>Dimensions of Child Temperament</b>	
Anger	-.002 (.010)
Pleasure	-.006 (.008)
Activity	.012 (.008)
Fear	.001 (.012)

*Note.* Coefficients are unstandardized regression coefficients predicting each child facial emotion and temperament from maternal depressive symptoms (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education. R<sup>2</sup> coefficients are not presented because they are not appropriate estimates of variance accounted for in poisson regressions.

<sup>a</sup> The variables *interest* and *total expressed emotions* are numerical inverses.

<sup>b</sup> The *pure emotions* aggregate includes *interest*.

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

Table 5

*Relations Among Child Facial Emotions and Maternal Supportive Behaviors:  
Regression Coefficients*

<b>Child Facial Emotions</b>	<b>Maternal Supportive Behaviors</b>		
	High Synchrony	Asynchrony	Restrictiveness
<i>Individual Emotions</i>			
Interest <sup>a</sup>	-.304 (.098)**	1.44 (.245)***	.122 (.247)
Joy	.493 (.134)***	-1.43 (.351)***	-1.47 (.352)***
Anger	-1.25 (.618)*	1.05 (1.51)	5.96 (1.44)***
Sadness	.132 (.492)	-4.12 (1.51)**	1.15 (1.20)
<i>Aggregated Emotions</i>			
Pure Emotions <sup>b</sup>	-.125 (.160)	1.54 (.413)***	-1.42 (.412)***
Negative Emotions	-.330 (.319)	-1.41 (.868)	2.69 (.732)***
Total Expressed Emotions <sup>a</sup>	.304 (.098)**	-1.44 (.245)***	-.122 (.247)

*Note.* Coefficients are unstandardized regression coefficients predicting each supportive behavior from each child facial emotion (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education. R<sup>2</sup> coefficients are not presented because they are not appropriate estimates of variance accounted for in poisson regressions.

<sup>a</sup> The variables *interest* and *total expressed emotions* are numerical inverses.

<sup>b</sup> The *pure emotions* aggregate includes *interest*.

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



Table 6

*Indirect Paths Involving Child Facial Emotions*

	B	SE	<i>p</i>	Sobel Test	<i>p</i>
<b>I. Depression – High Synchrony</b>	<b>-.006</b>	<b>.001</b>	<b>.000</b>		
<i>Mediation by Total Expressed Emotions</i>					
Depression-High Synchrony with Total Expressed Emotions	-.005	.002	.007		
Depression-Total Expressed Emotions	-.010	.002	.000		
Total Expressed Emotions-High Synchrony	.247	.100	.014	-2.21	.027*
<b>II. Depression - Asynchrony</b>	<b>.016</b>	<b>.003</b>	<b>.000</b>		
<i>Mediation by Total Expressed Emotions</i>					
Depression-Asynchrony with Total Expressed Emotions	.023	.004	.000		
Depression-Total Expressed Emotions	-.010	.002	.000		
Total Expressed Emotions-Asynchrony	-1.28	.250	.000	3.58	.000***
<b>III. Depression – High Synchrony</b>	<b>-.006</b>	<b>.001</b>	<b>.000</b>		
<i>Mediation by Joy</i>					
Depression-High Synchrony with Joy	-.005	.002	.004		
Depression-Joy	-.011	.003	.002		
Joy-High Synchrony	.448	.135	.001	-2.46	.014*
<b>IV. Depression - Restrictiveness</b>	<b>.011</b>	<b>.003</b>	<b>.002</b>		
<i>Mediation by Joy</i>					
Depression-Restrictiveness with Joy	.001	.004	.852		
Depression-Joy	-.011	.003	.002		
Joy-Restrictiveness	-1.47	.353	.000	2.75	.006**
<b>V. Depression - Asynchrony</b>	<b>.016</b>	<b>.003</b>	<b>.000</b>		
<i>Mediation by Joy</i>					
Depression-Asynchrony with Joy	.024	.004	.000		
Depression-Joy	-.011	.003	.002		
Joy-Asynchrony	-1.30	.355	.000	2.59	.010**

*Note.* Rows with Roman numerals display unstandardized regression coefficients from single predictor models. These include maternal depressive symptoms and five demographic controls predicting maternal supportive behavior. Entries below these represent, first, the same relation with child emotions in the equation, second, the relation of depression to child emotions, and third, the relation of child emotions to maternal supportive behavior with the independent variable (depression) in the equation.

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

Table 7

*Indirect Paths Involving Child Behaviors*

	B	SE	<i>p</i>	Sobel Test	<i>p</i>
<b>I. Depression - Asynchrony</b>	<b>.016</b>	<b>.003</b>	<b>.000</b>		
<i>Mediation by Initiation</i>					
Depression-Asynchrony with Initiation	.019	.004	.000		
Depression-Initiation	-.015	.005	.002		
Initiation-Asynchrony	-.633	.209	.002	2.13	.033*
<b>II. Depression - Asynchrony</b>	<b>.016</b>	<b>.003</b>	<b>.000</b>		
<i>Mediation by Passive Noncompliance</i>					
Depression-Asynchrony with Passive Noncompliance	.022	.004	.000		
Depression-Passive Noncompliance	.014	.004	.003		
Passive Noncompliance-Asynchrony	.912	.186	.000	2.85	.004**
<b>III. Depression - Restrictiveness</b>	<b>.011</b>	<b>.003</b>	<b>.002</b>		
<i>Mediation by Passive Noncompliance</i>					
Depression-Restrictiveness with Passive Noncompliance	.009	.004	.015		
Depression-Passive Noncompliance	.014	.004	.003		
Passive Noncompliance-Restrictiveness	-.750	.213	.000	-2.48	.013*

*Note.* Rows with Roman numerals display unstandardized regression coefficients from single predictor models. These include maternal depressive symptoms and five demographic controls predicting maternal supportive behavior. Entries below these represent, first, the same relation with child behavior in the equation, second, the relation of depression to child behavior, and third, the relation of child behavior to maternal supportive behavior with the independent variable (depression) in the equation.

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

Table 8

*Maternal Supportive Behavior Influencing Child Emotional Expressiveness*

	B	SE	<i>p</i>	Sobel Test	<i>p</i>
<b>I. Depression – Total Expressed Emotions</b>	<b>-.010</b>	<b>.002</b>	<b>.000</b>		
<i>Mediation by High Synchrony</i>					
Depression-Total Expressed Emotions with High Synchrony	-.008	.002	.002		
Depression-High Synchrony	-.006	.001	.000		
High Synchrony-Total Expressed Emotions	.588	.152	.000	-3.25	.001***
<b>II. Depression – Total Expressed Emotions</b>	<b>-.010</b>	<b>.002</b>	<b>.000</b>		
<i>Mediation by Asynchrony</i>					
Depression-Total Expressed Emotions with Asynchrony	-.005	.002	.040		
Depression-Asynchrony	.016	.003	.000		
Asynchrony-Total Expressed Emotions	-1.79	.312	.000	-3.91	.000***
<b>III. Depression – Joy</b>	<b>-.011</b>	<b>.003</b>	<b>.002</b>		
<i>Mediation by High Synchrony</i>					
Depression-Joy with High Synchrony	-.006	.004	.074		
Depression-High Synchrony	-.006	.001	.000		
High Synchrony-Joy	1.30	.220	.000	-4.21	.000***
<b>IV. Depression – Joy</b>	<b>-.011</b>	<b>.003</b>	<b>.002</b>		
<i>Mediation by Restrictiveness</i>					
Depression-Joy with Restrictiveness	-.011	.003	.001		
Depression-Restrictiveness	.011	.003	.002		
Restrictiveness-Joy	-1.53	.353	.000	-2.80	.005**
<b>V. Depression – Joy</b>	<b>-.011</b>	<b>.003</b>	<b>.002</b>		
<i>Mediation by Asynchrony</i>					
Depression-Joy with Asynchrony	-.005	.004	.131		
Depression-Asynchrony	.016	.003	.000		
Asynchrony-Joy	-2.00	.456	.000	-3.39	.001***

*Note.* Rows with Roman numerals display unstandardized regression coefficients from single predictor models. These include maternal depressive symptoms and five demographic controls predicting child facial emotions. Entries below these represent, first, the same relation with maternal supportive behavior in the equation, second, the relation of depression to maternal supportive behavior, and third, the relation of maternal supportive behavior to child emotions with the independent variable (depression) in the equation.

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

Table 9

*Maternal Supportive Behavior Influencing Child Behavioral Assertiveness*

	B	SE	<i>p</i>	Sobel Test	<i>p</i>
<b>I. Depression - Initiation</b>	<b>-.015</b>	<b>.005</b>	<b>.002</b>		
<i>Mediation by Asynchrony</i>					
Depression-Initiation with Asynchrony	-.010	.005	.052		
Depression-Asynchrony	.016	.003	.000		
Asynchrony-Initiation	-2.11	.674	.002	-2.70	.007**
<b>II. Depression - Passive Noncompliance</b>	<b>.014</b>	<b>.004</b>	<b>.003</b>		
<i>Mediation by Asynchrony</i>					
Depression- Passive Noncompliance with Asynchrony	.010	.005	.028		
Depression-Asynchrony	.016	.003	.000		
Asynchrony-Passive Noncompliance	1.68	.526	.001	2.74	.006**

*Note.* Rows with Roman numerals display unstandardized regression coefficients from single predictor models. These include maternal depressive symptoms and five demographic controls predicting child behavior. Entries below these represent, first, the same relation with maternal supportive behavior in the equation, second, the relation of depression to maternal supportive behavior, and third, the relation of maternal supportive behavior to child behavior with the independent variable (depression) in the equation.

\*\*  $p < .01$ .

Table 10

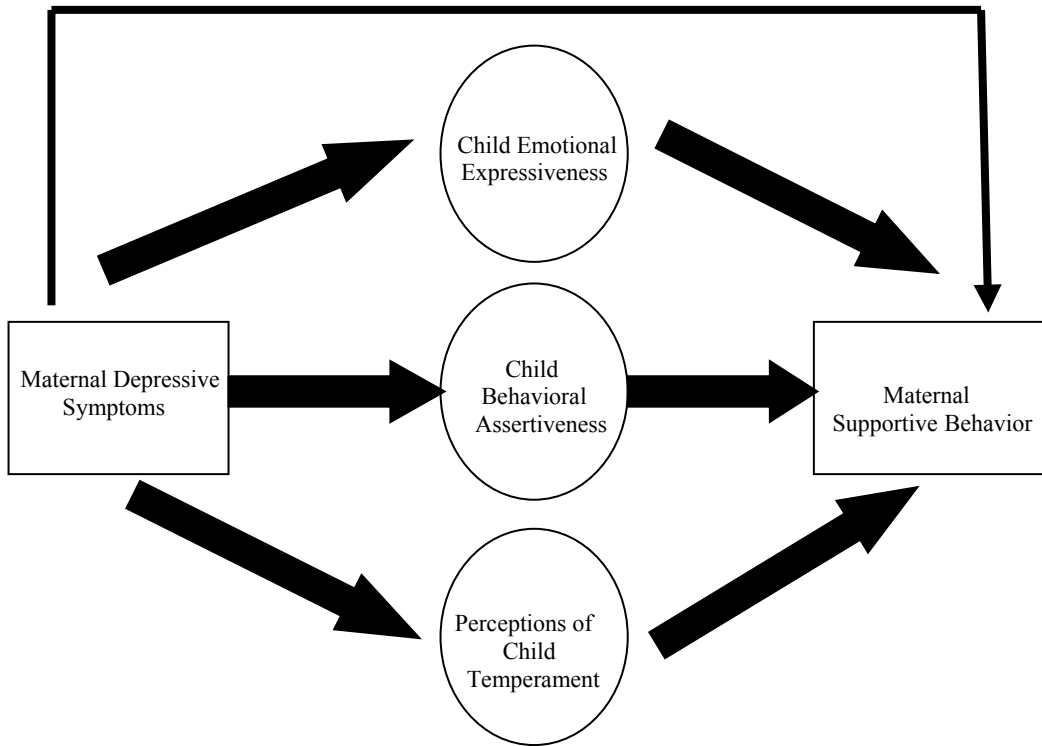
*Summary of Mediation and Indirect Paths*

	<b>Child Effects Model <sup>a</sup></b>	<b>Parent Effects Model <sup>b</sup></b>
<b>Indirect Paths</b>	Depression – Asynchrony by Total Expressed Emotions	Depression – Joy by Restrictiveness
	Depression – Asynchrony by Joy	
	Depression – Asynchrony by Initiation	
	Depression- Asynchrony by Passive Noncompliance	
<b>Partially Mediated Paths</b>	Depression – High Synchrony by Total Expressed Emotions	Depression – Total Expressed Emotions by High Synchrony
	Depression – High Synchrony by Joy	Depression – Total Expressed Emotions by Asynchrony
	Depression – Restrictiveness by Passive Noncompliance	Depression – Joy by High Synchrony
		Depression – Passive Noncompliance by Asynchrony
<b>Fully Mediated Paths</b>	Depression – Restrictiveness by Joy	Depression – Joy by Asynchrony
		Depression – Initiation by Asynchrony
<b>Paths that failed to reach significance</b>	Depression – Asynchrony by Sadness	Depression – Passive Noncompliance by Restrictiveness
	Depression – High Synchrony by Initiation	
	Depression – Restrictiveness by Initiation	
	Depression – High Synchrony by Passive Noncompliance	

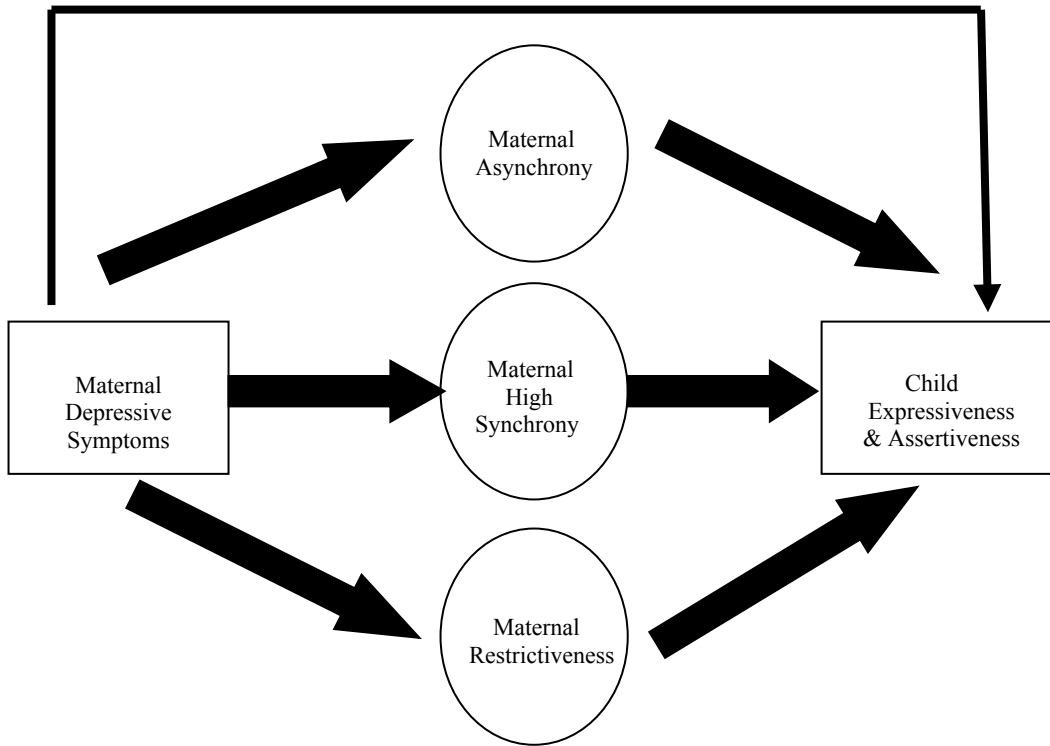
*Note.* This table displays the results of all tests of mediational and indirect paths that were performed based on results from tests of direct effects.

<sup>a</sup> The effects of maternal depressive symptoms on maternal supportive behavior mediated by child expressiveness, assertiveness, and temperaments.

<sup>b</sup> The effects of maternal depressive symptoms on child expressiveness and assertiveness mediated by maternal supportive behavior.



*Figure 1.* The effects of maternal depressive symptoms on supportive behavior mediated by child effects.



*Figure 2.* The effects of maternal depressive symptoms on child expressiveness and assertiveness mediated by maternal behavior.

## Appendix A: CES-D Scale

Instructions for Questions: Below is a list of the ways you might have felt or behaved recently. Please tell me how often you have felt this way during the past week.

1	2	3	4
RARELY OR NONE OF THE TIME (LESS THAN 1 DAY)	SOME OR A LITTLE OF THE TIME (1-2 DAYS)	OCCASIONALLY OR A MODERATE AMOUNT OF TIME (3-4 DAYS)	MOST OR ALL OF THE TIME (5-7 DAYS)

During the past week:

- \_\_\_\_\_ 1. I was bothered by things that usually don't bother me.
- \_\_\_\_\_ 2. I did not feel like eating; my appetite was poor.
- \_\_\_\_\_ 3. I felt that I could not shake off the blues even with help from my family or friends.
- \_\_\_\_\_ 4. I felt that I was just as good as other people. (R)
- \_\_\_\_\_ 5. I had trouble keeping my mind on what I was doing.
- \_\_\_\_\_ 6. I felt depressed.
- \_\_\_\_\_ 7. I felt that everything I did was an effort.
- \_\_\_\_\_ 8. I felt hopeful about the future. (R)
- \_\_\_\_\_ 9. I thought my life had been a failure.
- \_\_\_\_\_ 10. I felt fearful.
- \_\_\_\_\_ 11. My sleep was restless.
- \_\_\_\_\_ 12. I was happy. (R)
- \_\_\_\_\_ 13. I talked less than usual.
- \_\_\_\_\_ 14. I felt lonely.
- \_\_\_\_\_ 15. People were unfriendly.
- \_\_\_\_\_ 16. I enjoyed life. (R)
- \_\_\_\_\_ 17. I had crying spells.
- \_\_\_\_\_ 18. I felt sad.
- \_\_\_\_\_ 19. I felt that people dislike me.
- \_\_\_\_\_ 20. I could not get "going".



## Appendix B: Supportive Behavior Code

The Supportive Behavior Code measures the extent to which mothers are interacting with young children in ways that are connected to and supportive of the child's focus and interest. The code includes 5 main codes, positive affect (PA), three subcodes within level 3 (High Synchrony), and types of socialization within Level 5. Each five-second interval is given one of the five main codes (labeled 1 to 5 below) according to the rules outlined in this document. In addition, Positive Affect is always coded. Whenever a 5-second interval includes positive affect, it is noted within that interval. Furthermore, it is always noted whether the positive affect is facial-laughter only, verbal content only, or verbal content and facial/laughter together. Furthermore, when an interval is considered High Synchrony (Level 3), the presence of feeling verbalizations (FVs) and two types of contingent verbalizations (CVs) are noted. Finally, when Restrict/socialize is coded, what type is noted. All other specific codes noted below are used only to determine which of the five main codes an interval falls into and are not themselves distinguished as individual codes (e.g., Child Interest, Different Focus, Just Watching).

This then is the structure of the Revised Synchrony Subcode.

- 1 Asynchronous/detached
- 2 Low Synchrony
- 3 High Synchrony
  - a. CV(v): Contingent Verbalization in response to child's verbalization.
  - b. CV(n): Contingent Verbalization in response to child's nonverbal behavior.
  - c. FV: Feeling Verbalizations
- 4 Mother Observing
- 5 Restrict/socialize
  - (a) Forbidden Toy (FT): Any interaction in which the FTs are at issue.
  - (b) Clean (C): Keeping things clean in general (but sand stuff has its own code)
  - (c) Break (B): Keeping things from breaking
  - (d) Noise (N)/Rambunctiousness: Keeping noise and activity at reasonable level
  - (e) Adult Things (AT): Not touching adult things (e.g., videotapes, too many tissues)
  - (f) Safety (Sf): Ensuring that safety is maintained
  - (g) Sand (S): Keeping sand off floor, table, child, mother, etc.
  - (h) Spill water (W): Keeping pitcher, cups, and water under control

PA: One of three Positive Affect codes are used wherever positive affect occurs within any of the above five codes.

- a. F: Facial/Laughter Only
- b. V: Verbal Only
- a. V+F: Verbal plus Facial/Laughter.

## Primary Codes

I. Level 1: Asynchronous/detached. Contains maternal actions that imply little connection between the mother's behavior and the child's immediate interests, feelings, or behavior.

- (a) General (G). Failing to Respond (FR). When a child gives verbal or nonverbal signals such that a response should be forthcoming from the mother but is not. Grooming: Grooming the child is always considered distracting. In general mothers will not be coded "1" during interval in which they are looking at child.
- (b) Different Focus (DF, Full Parallel). Mother is focused on a different activity, playing a different game, or fully focused on something other than what the child is focused on. She has not retained involvement with the child. Brief, insignificant attentional asynchronies of this kind are ignored. To be Level 1 parallel focus and activity should involve almost no looking at child, touching child or child's activity, or connection (for example, no verbalizations) between mother and child. Child looking at the mother is not considered a connection.

M1: Move, Level 1. When the mother moves objects that the child is not playing with and in so doing disengages completely from interacting with the child.

- (c) Distracting (DS). Maternal behavior that relates to things that the child is not attending to (i.e., changing or trying to change the child's focus of attention). For this code to apply the child must have established a focus of attention that differs from the mothers'.

Mother Asking about a toy or activity is Level 1 if the child is fully attending to a different toy or activity when the question is asked

- (d) Recrimination (RE). Criticizing; threatening, condemning, arguing, putting the child down.
- (e) Resistance, Constraint, & Interference (RCI). Maternal behavior that resists, attempts to change, or interferes with the child's behavior.

Resisting. Child takes or tries to take a toy or object and mother resists. Mother must move toy away from interested child or pull against a child who is touching the toy and resisting.

Mother Takes a toy the child is interested in.

Physical Constraint. This is coded "1" unless it is sensitive helping or participation.

Interference. It is interference when mother take toys from children who are fully involved or interacting with those toys so that children must stop playing with them or so that children's play is disrupted, even if mothers are attempting to help when they do so.

II. Level 2: Low Synchrony. Contains behavior that suggests neither asynchronous/detached (Level 1) nor high synchrony (Level 3). Level 2 implies maternal behavior that is not highly synchronous but that is also not entirely disconnected.

(a) General. Code General Low Synchrony when an interval contains no acts that are High Synchrony or Asynchronous/detached: That is, no specific actions that must be coded High or Absence of Synchrony are present. Code General Low Synchrony for Late Speaking (LS), when mothers comment on something that the child is no longer attending to. This code is used only when the mother's timing is slightly off and she then quickly follows the child. Such brief timing lapses are not considered a different focus. If she has time to notice and change her attention, however, and still talks about a prior activity, it become Level 1 (DS or DF).

Code General Low Synchrony when, during interactions involving the same activity, the following occur:

- (i) Talking about different part of same activity. Child is physically engaged in one part of an activity, and mother is talking about/engaged in different part of same activity (Partial different focus).
  - (ii) Child looking, but not behaviorally engaged in an activity the mother is showing (see Just Watching rule).
  - (iii) Child looking at one part of activity, mother talking about a different part of that activity (Partial different focus).
  - (iv) Mother's behavior changes child's attention from child's focus to mother's focus (Partial distraction).
  - (v) Maternal actions are not responses to the child's immediate words, attention, or actions even though they are focused on same activity. Mother and child are focused on the same activity but maternal behavior is not connected to child (they're not interacting) (Partial different focus).
- (b) JW: Child just watching (mother usually showing or explaining). If the child is only watching and thus the mother is showing, explaining, questioning, or driving the interaction in other ways, code "2". If the child is talking about or is physically engaging an activity, then the mothers' words and actions about the activity are typically Child Interest.

Ignore trivial, partial, or secondary (child not attending) behaviors that do not constitute a focus nor a significant break in the child's watching. The child is still considered to be just watching.

Child Buys In. If a child who has been "just watching" begins to participate in a coordinated fashion with the mother (the child accepts the mothers "invitation"), the interaction becomes a "3", coordinated play.

Smiling. A "just-watching" child who smiles is still considered to be "just watching."

III. Level 3: High Synchrony. Contains maternal actions that demonstrate close connection between the mothers' attention and behavior and the child's immediate feelings and activity.

(a) General. Coordinated play, mutual participation - Talking about or nonverbally engaging with exactly what the child is touching, doing, attending to, etc. in a way that connects to the child's focus and interests (e.g., interacting with the child).

CNV: Contingent Nonverbal Behavior. Nonverbal maternal behavior that is contingent and matched well to the child's immediately prior verbal or nonverbal behavior (e.g., taking a toy offered by a child; picking up a toy at which the child points). Passive behavior (e.g., allowing the child to take a toy from your hand; watching a child cross the room) is not coded.

CI: Child's Interest. Commenting on the activity or play in which the child is currently interested. Commenting on what the child is touching or is focused on. Includes relating child's focus to a prior experience.

Comments or nonverbal behavior if the child is only watching during the interval are coded "2" (Child Watching). To be coded Child Interest requires that the child be engaging the activity, not simply focusing on it.

AT3: Ask about Toy Level 3. Asking child about a toy or activity if the child is watching plus talking or physically engaging the mother or the toy about which the mother is talking.

Child Buys In. If a child who has been just watching (just-watching child) begins to participate in a coordinated fashion with the mother (the child accepts the mothers invitation), the interaction becomes a "3", coordinated play.

HL: Helping & Instruction. Maternal behavior initiated to improve the child's immediate experience (e.g., stabilizing cylinder or train) unless intrusive or involves moving stuff (see Move rules).

M3: Move Level 3. Helping child by moving things. When the mother helps the child by moving objects that need to be moved for the benefit of the child or interaction. Exception: When during moving things to help the child, the mother separates from the child or takes on a different focus within the activity (M2).

US: Unfocused suggestions. Helping unfocused child by suggesting things. Suggestions to the child about what to do when the child is unfocused, not currently manipulating the toy, etc. To be considered unfocused, children should not be settled down with the mother. They need to have abandoned their prior focus and generally to be moving in search of an activity,

I: Instruction. Helping child engaging in an activity by giving them instructions and feedback. Mothers' instructing children who are clearly interested in a toy in how to engage the toy correctly or well, if this instruction is well-coordinated with the child's behavior. Labeling is not instruction (often it's Mother Showing).

Disruption Exception: Taking toys from children who are fully involved or interacting with them that children must stop playing or so that children's play is disrupted is interference, even if mothers were attempting to help (see Interference under Level 1).

(b) PA: Positive Affect, Praise, Affection, Empathy. Smiling, laughing, affectionate touch, and related positive affective nonverbal behavior. Praise, encouragement, affectionate remarks and related verbal behavior. The only exception to smiles being coded PA is when the mother is totally disengaged from the child, not even on the same activity, and not oriented toward the child.

(i). Facial/Laughter. Code PA as facial when it includes a smile and/or laughter.

(ii) Verbal. Code PA as verbal when it does not include a smile or laughter.

Typically these will be positive remarks such as praise or encouragement that are not accompanied by facial/laughter expressions of positive affect.

(iii) Verbal+Facial. Code PA as Verbal+Facial (laughter) when both facial/laughter and verbal components are present.

Not Positive Affect. Surprise reactions are not positive affect. Thus, mothers who raise their eyebrows and open their mouths are not coded PA unless their surprise reactions includes a smile.

- (c) FV: Feeling Verbalization. Questions or comments about the child's feelings. These include most "Do you like..." or "Do you want..." statement: "that hurt, didn't it?"; "that surprised you, didn't it?" "Do you like it?" "Did it scare you?" "Is it fun?" "Do you want to do something else?"
- (d) TV: Thought Verbalization. Questions or comments about the child's thoughts and perceptions. These include open ended questions like, "What do you see in the box?"

Exceptions: "Do you know what this is", "Do you think it's a dog" are really the same as "What is this" and thus are not really asking about the child inner life. They appear to be inquiring about the child's thinking only semantically.

- (e) CV: Contingent Verbalization. Maternal verbalizations that are a direct response to a child's prior verbal or nonverbal behavior and that appropriately address it (e.g., responses to fussing, crying, signaling). Repeat child. Repeating what the child has just said.

IV. Mother Observing. Watching the child but not acting or talking interactively. Mothers may change body positions, move to maintain attention, move to get out of the way, engage in self grooming, but she is not involved with the child and is watching only.

V. Restrict/socialize. Socialization verbalizations to the child designed to enforce or instruct about basic social norms and rules (e.g., verbalizations about keeping things clean, about playing with forbidden toys, Kleenex, or other objects, about not yelling, not breaking something, etc.). Nonverbal socialization constraint, such as constraining the child from touching the water pitcher or the forbidden toys. All interactions in which the forbidden toys, touching adult objects (staying away from candy jar, paper towels, etc.) and the like are at issue are coded "5" even if no verbalizations or other socialization behavior occurs. Code each socialization interval as 5 and specify which of the following types of socialization it was. (a) Forbidden Toy, (b) Keeping things clean in general (but sand stuff has its own code), (c) Keeping things from breaking, (d) Keeping noise and rambunctiousness at reasonable level, (e) Not touching adult things (e.g., videotapes, glasses, using too many tissues, etc.), (f) Safety, (g) Keeping sand off floor, table, child, mother, etc., (h) Spill water

VI. Not Codeable (NC). Any time the head/face of either mother or child is not within the screen, code NC. If the face/head is within the screen but obstructed, apply the normal code as written as best as you can. Also, any time the experimenter is in the room, the interval is Not Codeable.

### General Rules for Application of Codes

When two codes occur within an interval. Often behavior from two clearly different levels is present within a single 5-second interval. When this occurs, coders should use the priority scheme below or, if no priority rules apply, should use the Default Code, Level 2.

Watching is irrelevant. Unless Watching occupies the entire 5-second period, ignore those parts of the 5 second interval in which the mother is only watching.

Code mothers' behavior. Focus coding on the mothers' behavior and its relation to the child's behavior even if the mothers' behavior is a response to a child's behavior from a prior interval.

Acts begin when the first movement can be detected (e.g. arm first moves, lips first move back to begin a smile). They are considered to be a part of the interval in which they begin.

Code discreet behaviors only in the interval in which they begin. Don't code the same act in two intervals. Single acts that extend across two intervals are coded only in the first interval. The part of them that extends into the next interval are ignored for determining the code of that next interval. However, if a sequence that contains multiple acts crosses an interval, consider the first act to be in the first interval and subsequent acts to be in the next interval when they begin in that next interval. In general, verbal behavior is a new act when a new sentence has begun or utterances are separated by a brief time interval. Nonverbal behavior is a new act when lack of fluidness implies two components.

Facial behavior is considered new when an accentuation or non-gradual change occurs. Smiles are coded only once. Face must return to no smile or clearly accentuate to be coded again. However, if a smile takes up the entire next interval, even if it is a continuation of a previously coded smile, the interval is coded PA or high synchrony.

Changing positions. Changes of position for comfort or simply to get out of the way are not coded.

Visual attention is primary. In general, a person's focus of attention is considered to be that at which he or she is looking (unless the mothers' verbalizations are totally unconnected to her visual attention, such as, "I should have bought groceries").

Ambiguous attention is synchronous. When it is unclear whether the mother is looking at the child or the child's activity, we assume that she is. By default ambiguous direction of attention is considered synchronous.

Passive behavior. Passive (non-)behavior from mothers is considered uninformative and is generally not coded. Children's taking things from a passive mother, for example, tells us little about the mother.

Moving objects is ignored if mothers maintain their ongoing involvement with the child in the process. On the other hand, if they disengage to move objects, it's considered a different focus ("1").

Referencing is looking away from ones partner or activity briefly and then looking right back again without establishing a new focus elsewhere. It is ignored and does not affect coding.

Subcoding: PA is always coded in any interval in which it occurs. CV(v), CV(n), FV are coded only within High Synchrony ("3") intervals. Other individual behaviors (e.g., df, ds, re, rci, jw, tv) are not coded but are only used to assign the interval to an appropriate 1 to 5 category. For restrict/socialize, specify what type occurred.

#### Priorities and Defaults

Priority 1: SOC: Restrict/socialize. When the socialization code applied, it has priority over all others.

Priority 2: RE Recrimination, criticism. Intervals that include RE are always Level 1.

Priority 3: PA Positive affect, praise, attention. Intervals that include PA (praise, contingent smiling, laughing, etc.) are Level 3 unless RE (recrimination) has also occurred.

Priority 4: Feeling verbalizations. Verbalizations about the child's feelings FVs are priority 3.

Priority 5: Contingent verbal and nonverbal behavior. Contingent verbal and nonverbal behavior – CVV, CNV, and CVA – are Priority 4.

Levels 1 and 3 Take Priority Over Level 2. An interval that contains interactions that are Level 3 or Level 1 should never be coded Level 2. Level 2 is uninformative relative to the more extreme behaviors reflected in the other codes. If any part of an interval is a 1 or 3, do not use code 2.

Level 1 Takes Priority Over Level 3. Level 1 is rare and Level 3 is common, Level 1 takes priority.

Ambiguous Intervals Default to Level 2. When it is unclear which code is best, use Level 2.



## Appendix C: Child Compliance Code

- To code compliance or noncompliance, the child's behavior is observed in the five seconds following the end of the mother's initial control attempt or until the mother initiates a new control attempt, whichever comes first.
- The child is coded as complying if he or she complies with or begins to comply with the mother's control.
- If the child obeys the spirit of the control but not the letter of the control (e.g., child puts train in clean-up box after mother asked him to put a horn in the box), the behavior is still coded as compliance.
- If the child issues two commands at once, the child is coded as complying if he or she complies with the aspect of the control directed at forbidden toys or clean up. For example, if the mother says "Don't touch that. Come over here," the child is coded as complying if he or she does not touch the forbidden toy but does not come over to the mother.
- Once it is established that the child initiated compliance with the mother's request, the type of compliance is indicated by using one of the following categories:

### **Eager Compliance**

The child complies without protesting, showing frustration, or asking mother to share the job,

e.g., child turns away from forbidden toys without complaining and finds an appropriate toy on the table

e.g., child cleans up enthusiastically

### **Active Defiance**

The category of active defiance was created by combining two subcategories of children's noncompliance from the original compliance code: overt resistance and defiant noncompliance. Both subcategories include an acknowledgement by the child of the mother's control attempt and an active resistance to it.

#### ***Overt Resistance***

The child does not perform the requested behavior even though he or she gives an indication that he or she heard/understood the mother's request. Child may say "No" or shake head but not in an angry manner. Any trace of anger or aversiveness should be coded as defiance below. If child does exact opposite of what mother requested but is not angry or upset, code in this category.

e.g., child struggles out of mother's grasp and goes to forbidden toys.

e.g., child tries to hold on to a toy the mother wants to put away but the child does not fuss, complain, or struggle

e.g., mother asks child not to touch a forbidden toy, and child looks at her and touches it anyway

### ***Defiant Noncompliance***

The child does not perform the requested behavior and emits overt verbal or nonverbal refusal and/or opposition accompanied by anger or aggression in voice or body language. Child may cry, whine, kick or throw toys, have a tantrum, or do the opposite of what mother has asked.

e.g., child fusses, struggles away from mother, and goes back to forbidden toys  
e.g., mother asks child to put the train away and the child holds onto the train and loudly says “No!”

## **Additional Categories of Compliance and Noncompliance**

### ***Unenthusiastic Compliance***

The child grudgingly complies without maternal intervention, but he or she may complain, ask for help, or fuss while complying.

e.g., child cries in front of forbidden toys but does not touch them  
e.g., child whines while throwing toy in clean-up box

### ***Passive Coerced Compliance***

The child is forced to comply by the mother’s physical intervention but the child has no negative reaction.

e.g., mother picks up child and removes him or her from area by forbidden toys and child is passive  
e.g., mother forces child’s hands to pick up a toy and drop it in the box and child does not struggle

### ***Fussy Coerced Compliance***

The child is forced to comply by the mother’s physical intervention and the child complains, fusses, whines, or struggles (i.e., the child’s resistance can be verbal, behavioral, or both)

e.g., mother picks up child and removes him or her from area by forbidden toys and child kicks and screams  
e.g., mother grabs a toy the child is holding and puts it in the clean-up box and child whines

Note: If the mother holds the child while asking him or her to clean up but does not manually force the child to clean up, the child is not being coerced to comply. Because holding a child to keep him or her away from the forbidden toys does force the child to not touch them, the child in this instance is being coerced to comply.

*Passive Noncompliance*

The child does not perform the requested behavior but does not overtly refuse or defy; the child ignores or does not acknowledge mother's control attempt; child does not respond to mother's control verbally or physically. The child's behavior may be irrelevant to the task.

e.g., child continues to move toward forbidden toys without acknowledging the mother's prohibitions

e.g., child continues to play with the sand on the table after the mother has asked the child to put the train in the box

## Appendix D: Initiation Code

For 20 seconds after each coded smile, child behavior is coded whenever an engaging behavior occurs. Thus, engaging is coded when the child seeks, initiates, or is fully (enthusiastically) involved in interaction with the mother. (It is coded whenever the child looks at, plays with, talks to, or in other ways acts such that the mother is positively included.) To be coded as engagement, an interval has to include a child emitted behavior that demonstrates interest in interacting with the mother.

### A. Engaging

#### 1. Vocalization:

- a. Verbal: The child speaks (such as wow, shake, etc) to the mother (indicated by the content of the child's speech or if the child looks at the mother while speaking) in a way that seeks to elicit her attention (engagement) or to include her in child-focused activity. For example: the child asks questions or makes comments about a toy or shared activity in a positively inclusive way.

Note: a shared activity is defined as when the mother and the child share focus of attention and the mother is not working at different goals, which means that the mother is not trying to keep the child from the activity or present the child from free play with it.

- b. Verbal: When the child responds to the mother's question, it is coded as engagement as long as the child does not display any flat or negative affect.
- c. Nonverbal vocal communication:
  - i. Do not code noise or whispers
  - ii. They all have to be positive (not whining), cooperative, and not resistive
  - iii. They are NOT considered mother- directed (e.g., the child is looking at the mother while making nonverbal sounds) unless it meets one of the following criteria:
    1. The child looks at the mother before or after talking to the mother
    2. when they are in a shared activity
- d. Instrumental purpose: Child speaks to the mother for instrumental purpose is not considered engagement. Note: See B.1 for definition of instrumental purpose.

Physical Contact:

- e. The child voluntarily moves toward the mother for direct physical contact (e.g., hugging, physical reassurance, physical comfort).
- f. While the mother is busy and the child is leaning, touching, pushing, or hitting the mother in a way that suggests that he/she is attempting to get the mother's attention is coded as engagement. Note: if the child demonstrates any of the above behaviors for the instrumental purpose, it is not called engagement.

2. Nonverbal Behavior:

a. Child's excitement: The child displays nonverbal excitement (e.g., movements that suggest the child's excitement) with a joint activity that includes behavior toward the mother, rather than simply engaging the toy without behaviors toward the mother specifically

b. Attention and Gaze:

- i. The child actively looks at the mother with enthusiasm or/and excitement (vocal involvement; facial expression of shock or excitement but not fear; body movement such as wiggles).
    - 1. The child must be animated
    - 2. The child must display facial or verbal response that clearly surpass normal levels of facial or vocal responses
    - 3. The enthusiasm cannot be simply an intense interest
  - ii. Looking with an instrumental purpose is not coded as engagement
- b. Shows a toy to the mother: The child hands or shows toys or objects to mother.
  - c. Physical proximity: The child moves closer to the mother when there are no toys or activities toward which the child is moving (i.e., when there's no other reasons to move toward the mother except to be near her).
  - d. Mimicking: Child duplicates the mother's behavior in a situation when the child would not typically display the behavior (e.g., the behavior is not called for in the situation or the activity).
  - e. Responsiveness to the mother:
    - i. When the child responds to the mother's question, it is coded as engagement as long as the child does not display any flat or negative affect

- f. Accepting the mother's invitation: If the child accepts mother's invitation to do something, it is considered engaging as long as the child displays an action toward the mother, and not just toward the toys (e.g., the child speaks to the mother about the activity she has invited the child to do or explicitly includes the mother in some other way).
- g. Positive Emotion: The child displays a new distinct social smile (the child smiles as he/she looks or talks to the mother; the child smiles as a result of mother's behavior) separate from the one that occurs at the beginning of the 20 seconds interval being coded.
  - i. Guilt smiles are not coded as social smiles

## B. Not Engaging

1. Instrumental purpose: Engagement is not coded if children's actions toward the mother are clearly for the purpose of using the mother to obtain something or in some other way meet the child's personal needs. For example, needs help get train to move or make noise; needs help get shapes in holes; needs help with candies)

Note: (positive excitement and affect about letting a mother to help with a toy or an activity is not considered instrumental)

2. Looking at the mother in and of itself does not constitute engagement unless done with enthusiasm or excitement (see Rule 1).

### c. Child's resistance behavior:

- a. The child actively refuses (e.g. continue to play with the forbidden toy, starts crying for not being able to play with the toy that she is interested in) to follow mom's request/commands
- b. Resisting the mother by making comments that imply different interests than the mothers'

3. Child's anger: Expression of anger is not engaging

4. Speech is not coded as engagement unless it is *to the mother*, is not a response to her requests or questions or the mother's attempts to control the child, is cooperative rather than resistive, non-instrumental.

5. When the child tries to include the mother in a negative way

6. When the child engages in a solitary activity.

- A. (20) The child vocalizes during a shared activity while not looking at the mother
- B. (21) The child is compliant to the mother's request

## E. Not Codable

1. Socialization: When the adult tries to engage the child in a proper way (e.g. requiring the child to behave in a certain way).
2. Off camera: Any interval during which either the child's or mother's face is off camera for any part of the interval. IF the child's face is blocked by an object, as long as the face is on the camera, it is codable.
3. When the experimenter is in the room.

### Note

1. Engagement always has priority over non-engagement.
2. Do not code any segment of the tape twice.
1. Code discrete behaviors only in the interval in which they begin. Don't code the same act in two intervals. Single acts that extend across two intervals are coded only in the first interval. The part of them that extends into the next interval are ignored for determining the code of that next interval. However, if a sequence that contains multiple acts crosses an interval, consider the first act to be in the first interval and subsequent acts to be in the next interval when they begin in that next interval. In general, verbal behavior is a new act when a new sentence has begun or utterances are separated by a brief time interval. Nonverbal behavior is a new act when lack of fluidness implies two components.
2. If any part of the interval is not codable, the whole interval is not codable.
3. Do not code the child's smile that initiates the interaction with the mothers as an engagement behavior
4. Units of behavior: Acts often involve physical movements and vocalizations. When this is the case, the unit begins with the first manifestation of it, be that physical or verbal.

Appendix E: Toddler Behavior Assessment Questionnaire (TBAQ)

Child's name: \_\_\_\_\_ Child's birthdate: Month: \_\_\_ Day: \_\_\_  
Yr: \_\_\_

Today's date: Month: \_\_\_ Day: \_\_\_ Yr: \_\_\_ Child's age: \_\_\_ Years, \_\_\_ Months

Please circle who completed this TBAQ: Mother    Father

Sex of child (circle one): Male    Female

**INSTRUCTIONS: Please read carefully before starting.**

As you read each description of the child's behavior below, please indicate how often the child did this during the last month before circling one of the numbers in the column. The numbers indicate how often you observed the behavior described during the last month.

- |                             |                             |
|-----------------------------|-----------------------------|
| (1) Never                   | (5) More than half the time |
| (2) Very rarely             | (6) Almost always           |
| (3) Less than half the time | (7) Always                  |
| (4) About half the time     | (NA) Does not apply         |

The "Not Applicable" column (NA) is used when you did not see the child in the situation described during the last month. For example, if the situation mentions the child going to the doctor and there was no time during the last month when the child went to the doctor, circle (NA) column. "Does Not Apply" (NA) is different from "Never" (1). "Never" is used when you saw the child in the situation but never engaged in the behavior mentioned during the last month. Please be sure to circle a number or NA for every item.

First are some questions concerning your child's behavior while playing.

**WHEN PLAYING INSIDE THE HOUSE (FOR EXAMPLE, BECAUSE OF BAD WEATHER) HOW OFTEN DID YOUR CHILD:**

- |                           |   |   |   |   |   |   |   |    |
|---------------------------|---|---|---|---|---|---|---|----|
| 1. run through the house? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 2. climb over furniture?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

**WHEN PLAYING ON A MOVEABLE TOY, SUCH AS A TRICYCLE, HOW OFTEN DID YOUR CHILD:**

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 3. attempt to go as fast as he/she could? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---|---|---|---|---|---|---|---|----|



WHEN HE/SHE SAW OTHER CHILDREN WHILE IN THE PARK OR PLAYGROUND, HOW OFTEN DID YOUR CHILD:

4. approach and immediately join in play? 1 2 3 4 5 6 7 NA  
5. join in the laughing and giggling? 1 2 3 4 5 6 7 NA

WHEN YOU REMOVED SOMETHING YOUR CHILD SHOULD NOT HAVE BEEN PLAYING WITH, HOW OFTEN DID HE/SHE:

9. scream? 1 2 3 4 5 6 7 NA  
10. try to grab the object back? 1 2 3 4 5 6 7 NA  
11. follow your request without signs of anger? 1 2 3 4 5 6 7 NA

WHEN MAKING A DISCOVERY (SUCH AS FITTING TWO LEGO PIECES TOGETHER, LEARNING TO STACK BLOCKS, OR LEARNING TO TURN A LIGHT SWITCH ON AND OFF), HOW OFTEN DID YOUR CHILD:

12. smile? 1 2 3 4 5 6 7 NA  
13. seem pleased? 1 2 3 4 5 6 7 NA

WHEN YOUR CHILD WAS ASKED TO SHARE HER/HIS TOYS, HOW OFTEN DID SHE/HE:

14. protest in a whining tone of voice? 1 2 3 4 5 6 7 NA  
15. follow the request without signs of anger? 1 2 3 4 5 6 7 NA

WHEN IN A SHOPPING MALL OR STORE, HOW OFTEN DID YOUR CHILD:

18. seem eager to explore the store? 1 2 3 4 5 6 7 NA

WHEN ANOTHER CHILD TOOK AWAY A FAVORITE TOY THAT YOUR CHILD WAS PLAYING WITH, HOW OFTEN DID SHE/HE:

19. object? 1 2 3 4 5 6 7 NA  
20. find something else to play with? 1 2 3 4 5 6 7 NA  
21. try to hit, kick or bite the other child? 1 2 3 4 5 6 7 NA

WHEN PLAYING QUIETLY WITH ONE OF HIS/HER FAVORITE TOYS, HOW OFTEN DID YOUR CHILD:

22. smile? 1 2 3 4 5 6 7 NA  
23. make happy noises? 1 2 3 4 5 6 7 NA

WHEN YOUR CHILD WANTED TO PLAY OUTSIDE, BUT YOU SAID “NO”,  
HOW OFTEN DID SHE/HE:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 24. protest by crying loudly?           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 25. protest in a whining tone of voice? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 26. pout or frown?                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOUR CHILD JOINED IN AN ACTIVE GAME WITH OTHER CHILDREN,  
(FOR EXAMPLE, ONE THAT INVOLVED RUNNING OR JUMPING), HOW  
OFTEN DID HE/SHE:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 29. keep up with the most energetic and active children? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|--|---|---|---|---|---|---|---|----|

WHEN BEING TOSSED ABOUT PLAYFULLY OR WRESTLED WITH, HOW  
OFTEN DID YOUR CHILD:

- |                   |   |   |   |   |   |   |   |    |
|-------------------|---|---|---|---|---|---|---|----|
| 33. smile?        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 34. laugh?        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 35. ask for more? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

HOW OFTEN DURING THE PAST MONTH DID YOUR CHILD:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 38. play games which involved running around banging, or dumping out toys?                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 39. play quiet games that did not involve moving, such as looking at books or arranging toys? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

Now, please answer some questions about eating, dressing, bathing, and going to bed.

WHEN YOUR CHILD WAS GIVEN SOMETHING TO EAT OR DRINK THAT  
SHE/HE DID NOT LIKE, HOW OFTEN DID SHE/HE:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 43. cry?   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 44. accept the food or drink without sign of anger or protest? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 45. push the plate away?                                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOUR CHILD WANTED DESSERT BEFORE DINNER WAS FINISHED BUT DID NOT GET IT, HOW OFTEN DID HE/SHE:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 46. protest by crying loudly?              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 47. push the plate away and refuse to eat? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN IN THE BATHTUB, HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 48. laugh?   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 49. babble or talk happily?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 50. sit quietly?   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 51. splash or kick?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 52. play with toys with a lot of energy?<br>(If the child never has toys in the bath, mark "NA") | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN BEING DRESSED OR UNDRESSED, HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 53. squirm or try to get away?                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 54. lie or sit quietly long enough for you to get her/him ready? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOUR CHILD WAS HAVING HER/HIS HAIR BRUSHED OR FACE WASHED, HOW OFTEN DID SHE/HE:

- |                    |   |   |   |   |   |   |   |    |
|--------------------|---|---|---|---|---|---|---|----|
| 55. act playfully? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|--------------------|---|---|---|---|---|---|---|----|

WHEN BEING GENTLY ROCKED OR HUGGED, HOW OFTEN DID YOUR CHILD:

- |             |   |   |   |   |   |   |   |    |
|-------------|---|---|---|---|---|---|---|----|
| 56. smile?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 57. giggle? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN IT WAS TIME FOR BED OR A NAP AND YOUR CHILD DID NOT WANT TO GO, HOW OFTEN DID SHE/HE:

- |                                    |   |   |   |   |   |   |   |    |
|------------------------------------|---|---|---|---|---|---|---|----|
| 58. protest by crying loudly?      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 59. physically resist or struggle? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

Next are some questions about many different aspects of your child's behavior.

WHEN GIVEN A WRAPPED PACKAGE OR A NEW TOY IN A BAG, HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 61. remain neutral (for example, not smile)? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 62. squeal with joy?                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 63. laugh?                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN AT THE DOCTOR'S OFFICE, HOW OFTEN DID YOUR CHILD:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 66. cling to the parent?                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 67. seem unconcerned and comfortable?                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 68. cry or struggle when the doctor tried to touch her/him? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN THE CHILD NEEDED TO SIT STILL, AS IN CHURCH, A WAITING ROOM, OR A RESTAURANT, HOW OFTEN DID SHE/HE:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 69. try to climb out of the chair?      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 70. play quietly with one or two toys?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 71. try to climb all over other chairs? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN FIRST MEETING A STRANGER COMING TO VISIT IN THE HOME, HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 73. allow her/himself to be picked up without protest? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 74. abandon the parent to go to the stranger?          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 75. "warm up" to the stranger within 10 minutes?       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN PLACE IN A CAR SEAT OR STROLLER, HOW OFTEN DID YOUR CHILD:

- |                |   |   |   |   |   |   |   |    |
|----------------|---|---|---|---|---|---|---|----|
| 78. kick?      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 79. squirm?    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 80. sit still? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN THE CHILD KNEW THE PARENTS WERE ABOUT TO LEAVE HIM/HER AT HOME, HOW OFTEN DID YOUR CHILD:

- |                                   |   |   |   |   |   |   |   |    |
|-----------------------------------|---|---|---|---|---|---|---|----|
| 81. cry?                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 82. cling to the parent?          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 83. show no evidence of distress? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN ONE OF THE PARENTS' FRIENDS WHO DOES NOT HAVE DAILY CONTACT WITH YOUR CHILD VISITED THE HOME, HOW OFTEN DID YOUR CHILD:

- |                                      |   |   |   |   |   |   |   |    |
|--------------------------------------|---|---|---|---|---|---|---|----|
| 84. check with parent for assurance? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 85. talk much less than usual?       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 86. enthusiastically greet them?     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 87. squeal with joy?                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 88. smile?                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 89. babble or talk happily?          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHILE SHOPPING, IF YOU DID NOT AGREE TO BUY YOUR CHILD A TOY THAT HE/SHE WANTED, HOW OFTEN DID HE/SHE:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 90. protest in a whining tone of voice?                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 91. physically struggle when your tried to separate him/her from the toy? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOU WERE GOING OUT AND YOUR CHILD DID NOT WANT TO STAY WITH THE REGULAR SITTER, HOW OFTEN DID SHE/HE:

- |                             |   |   |   |   |   |   |   |    |
|-----------------------------|---|---|---|---|---|---|---|----|
| 92. pout or frown?          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 93. show no signs of anger? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOU DID NOT ALLOW YOUR CHILD TO DO SOMETHING FOR HER/HIMSELF (FOR EXAMPLE, DRESSING, OR GETTING INTO THE CAR SEAT), HOW OFTEN DID YOUR CHILD:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 96. show signs of anger because she/he wanted to do it her/himself? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 97. try to push you away?   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

IF YOU WERE NOT ABLE TO GIVE IMMEDIATE ATTENTION TO YOUR CHILD BECAUSE YOU WERE BUSY (FOR EXAMPLE, YOU WERE COOKING DINNER OR TALKING ON THE PHONE), HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 98. cry loudly?                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 99. find something else to do until you were free? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHILE A STORY WAS BEING READ TO YOUR CHILD, HOW OFTEN DID SHE/HE:

- |                    |   |   |   |   |   |   |   |    |
|--------------------|---|---|---|---|---|---|---|----|
| 100. sit quietly?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 101. get restless? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN FIRST VISITING A BABYSITTING CO-OP, DAYCARE CENTER, OR CHURCH NURSERY, HOW OFTEN DID YOUR CHILD:

- |  |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|----|
| 102. cry when not being held by the parent<br>and resist being put down? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 103. feel at ease within 10 minutes?                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 104. immediately begin to explore?                                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOUR CHILD WAS BEING APPROACHED BY AN UNFAMILIAR ADULT WHILE SHOPPING OR OUT WALKING, HOW OFTEN DID YOUR CHILD:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 105. babble or talk?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 106. show distress or cry?  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 107. avoid possible danger by looking to<br>parent for assurance? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

WHEN YOU TURNED OFF THE TELEVISION SET (BECAUSE IT WAS BEDTIME, DINNERTIME OR TIME TO LEAVE), HOW OFTEN DID YOUR CHILD:

- |                       |   |   |   |   |   |   |   |    |
|-----------------------|---|---|---|---|---|---|---|----|
| 108. throw a tantrum? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|-----------------------|---|---|---|---|---|---|---|----|

WHEN IT WAS TIME TO LEAVE A FRIEND'S HOUSE AND YOUR CHILD DID NOT WANT TO GO, HOW OFTEN DID SHE/HE:

- |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|----|
| 109. follow you without signs of anger? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---|---|---|---|---|---|---|---|----|

Appendix F: Relations Among Maternal Supportive Behaviors:

Regression Coefficients

	High Synchrony	Asynchrony	Restrictiveness
High Synchrony	---		
Asynchrony	-1.83** (.230)	---	
Restrictiveness	-2.17** (.241)	-1.48** (.405)	---

*Note.* Coefficients are unstandardized regression coefficients (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education. For each regression, the independent variable is the behavior listed at the top of the column and the dependent variable is the behavior listed at the end of the row.

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

Appendix G: Relations Among Individual Child Facial Emotions:

Regression Coefficients

	Interest	Joy	Surprise <sup>a</sup>	Anger	Sadness
Interest	---				
Joy	-3.32 <sup>***</sup> (.188)	---			
Surprise <sup>a</sup>	-1.89* (.739)	-.146 (.991)	---		
Anger	-.035 (.660)	-7.02 <sup>***</sup> (1.17)	11.46* (5.77)	---	
Sadness	-2.09 <sup>**</sup> (.728)	-.846 (1.07)	-40.99 <sup>***</sup> (10.83)	22.10 <sup>***</sup> (3.15)	---

*Note.* Coefficients are unstandardized regression coefficients (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education. For each regression, the independent variable is the emotion listed at the top of the column and the dependent variable is the emotion listed at the end of the row.

<sup>a</sup> Excluded from data analysis.

<sup>\*\*\*</sup>  $p < .001$ . <sup>\*\*</sup>  $p < .01$ . <sup>\*</sup>  $p < .05$ .



Appendix H: Relations Among Child Compliance Behaviors:

Regression Coefficients

	Eager Compliance	Passive Noncompliance	Defiant Noncompliance	Simple Refusal
Eager Compliance	---			
Passive Noncompliance	-.779*** (.227)	---		
Defiant Noncompliance	-4.39*** (.427)	-2.65*** (.568)	---	
Simple Refusal	-1.02*** (.220)	-1.21*** (.297)	-.314 (.343)	---

*Note.* Coefficients are unstandardized regression coefficients (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education. For each regression, the independent variable is the behavior listed at the top of the column and the dependent variable is the behavior listed at the end of the row.

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

Appendix I: Relations Among Dimensions of Child Temperament: Correlation

Coefficients

	Anger	Pleasure	Activity	Fear
Anger	---			
Pleasure	.075	---		
Activity	.357**	.281**	---	
Fear	.252**	-.295**	.046	---

\*\* p < .01.

Appendix J: Relations Among Maternal Depressive Symptoms and Child Behaviors:

Regression Coefficients

Child Behaviors	Maternal Depressive Symptoms
<i>Compliance Behaviors</i>	
Eager Compliance	.003 (.004)
Passive Noncompliance	.014 (.004)**
Defiant Noncompliance	-.068 (.010)***
Simple Refusal	.002 (.004)
<i>Behavioral Initiation</i>	
Frequency of Initiations	-.015 (.005)**

*Note.* Coefficients are unstandardized regression coefficients for depressive symptoms predicting child behaviors (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education.

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

Appendix K: Relations Among Child Behaviors and Maternal Supportive Behaviors:

Regression Coefficients

<b>Child Behaviors</b>	<b><u>Maternal Supportive Behaviors</u></b>		
	High Synchrony	Asynchrony	Restrictiveness
<i>Compliance Behaviors</i>			
Eager Compliance	.194 (.067)**	-.162 (.166)	-.538 (.170)**
Passive Noncompliance	-.167 (.080)*	.966 (.185)***	-.701 (.212)***
Defiant Noncompliance	.141 (.105)	-.036 (.297)	-.255 (.288)
Simple Refusal	.026 (.084)	-.574 (.209)***	-.110 (.211)
<i>Behavioral Initiation</i>			
Frequency of Initiations	.186 (.077)*	-.728 (.211)***	-.440 (.204)*

*Note.* Coefficients are unstandardized regression coefficients for child behaviors predicting maternal supportive behaviors (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education.

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

Appendix L: Relations Among Child Temperaments and Maternal Supportive

Behaviors: Regression Coefficients

**Maternal Supportive Behaviors**

<b>Child</b>	High Synchrony	Asynchrony	Restrictiveness
<b>Temperaments</b>			
Anger	.012 (.015)	.016 (.037)	.016 (.037)
Pleasure	.009 (.018)	.208*** (.047)	.009 (.045)
Activity	-.076*** (.020)	.078 (.048)	.186*** (.048)
Fear	.027* (.012)	-.030 (.030)	-.113*** (.029)

*Note.* Coefficients are unstandardized regression coefficients for child temperaments predicting maternal supportive behaviors (with standard errors in parentheses). Demographic covariates entered as controls: child age, child sex, SES, income, and maternal education.

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

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This dissertation was typed by the author.