The Effects of Maternal Evaluative Feedback on the Mastery Motivation of Infants

Presented to the faculty of Lycoming College
in partial fulfillment of the requirements
for departmental Honors in Psychology

by
Rebecca A. Maurer
Lycoming College
February 17, 2003

Dr. Sue A. Kelley

Dr. Susan Beery

Dr. Edward Gabriel

Dr. Richard Morris

Running head: MATERNAL EVALUATIVE FEEDBACK AND MASTERY MOTIVATION

The Effects of Maternal Evaluative Feedback on Mastery Motivation in Toddlers

Rebecca A. Maurer

Lycoming College

Abstract

The current study examined relations between maternal behavior and toddler mastery motivation. Maternal affect, dyadic harmony, and maternal evaluative feedback were assessed during a 5-minute mother/toddler interaction when toddlers were 18 months old ($N = 134$). Mastery was also assessed at 18 months as toddlers engaged with a variety of tasks. Although it was found that mothers who expressed more negative criticism of person had children with lowered mastery motivation, there were no other significant results between feedback and mastery. There were several correlations found between types of maternal behaviors however. The findings support the idea that mastery motivation is a complex concept that may be affected by more than the mother's feedback to the toddler.

The Effects of Maternal Evaluative Feedback on Mastery Motivation in Toddlers

Mastery motivation is a concept that has received increasing attention and importance with respect to the development of children over the past few decades. To strive for mastery control is a fundamental element of human nature. It is believed that the need for mastery stems from similar needs for competence, exploration, activity, and manipulation within humans (Heckhausen, 1993). The construct is defined as a striving for competence or a motivation to master the environment (Harter, 1975; Jennings, Yarrow, & Martin, 1984; Rose & Thornburg, 1984). It is believed to be a psychological force that leads children to attempt to master tasks for their intrinsic value, rather than for extrinsic rewards (Harter, 1981; Morgan, MacTurk, & Hrncir, 1995). Mastery motivation is thought of as mainly an intrinsic motivation because it seems to be a universal drive that exists naturally and is rewarding without any other external reinforcement. It is a concept that is mostly studied in toddlers, primarily because it is believed to be a precursor to motivation systems in older children, such as achievement motivation, which is a need to strive for success whenever a behavior can be evaluated against a standard (Knauf, 1998; Sigelman, 1999).

Historical Perspectives on Mastery Motivation

The concept of mastery motivation is not a new idea in the field of psychology. In the past, it has been referred to as effectance motivation, intrinsic motivation, competence, and executive skill (Harter, 1975; Grolnick, Frodi, & Bridges, 1984; White, 1959; Yarrow et al., 1984). The idea of a motive innate in people to explore and master the environment was introduced as early as 1908 by McDougall and Tolman (Frodi, Bridges, & Grolnick, 1985). The idea was later examined more closely by White, who was the first to outline the idea for the basic motive of mastery, or what he referred to as effectance. After White's ideas, Piaget introduced

his theory on the development of humans. Although Piaget did not directly address the development of motivation, he intertwined the idea with intellectual development and adaptations (Hron-Stewart, 1990). Piaget believed toddlers would become motivated when there was a difference between what they already knew and what they were being introduced to (Hron-Stewart). Then in 1965, Hunt introduced his ideas on mastery motivation, which were a combination of both White's and Piaget's ideas (Hron-Stewart; Jennings, 1993). Despite the broad and diverse background of early ideas on mastery motivation, the research was mostly theoretical in nature and consequently, little validation and interest from the psychological community was given to the theorists' claims.

Interest was renewed in the concept when Harter (1975) took the early ideas of mastery motivation and developed them as a topic that could be measured in experimental and observational designs. Although Harter believed that mastery motivation was an important concept for older children, she believed younger children would be less influenced by it and more affected by adult reinforcement. In a study comparing four and ten-year-old children working on mastery tasks, Harter found, contrary to her expectations, that mastery motivation was important to the younger children, although it was expressed differently. The older children stopped their attempts at the toy after mastering the problem, whereas the younger children continued playing even after they had been successful at mastering it the first time. She determined that toddlers' mastery motivation is based on producing interesting sensory events, which they can control through their own operations (Harter; Rose & Thornburg, 1984). Based on the results from this study, Harter developed what she believed to be three components to mastery in toddlers: challenge seeking, curiosity, and independent mastery attempts (Hron-Stewart, 1990). Harter was also the first researcher to add that socialization was necessary for

the development of mastery motivation. By socialization, Harter meant that toddlers needed to receive reinforcement for their attempts at problems in order to develop mastery (Draper, 1981; Hron-Stewart). The importance of socialization on children's mastery motivation will be discussed in further detail later. Overall, Harter's work has been very influential on the study of mastery motivation.

Despite the advances made in the literature pertaining to mastery motivation, most of the early research focused on children who were in school. Yarrow, Rubenstein, Pedersen, and Jankowski (1972) developed a more appropriate conceptualization of mastery motivation that allowed studies to be conducted on younger children and infants. Yarrow et al. still defined mastery motivation for toddlers as striving for competence, but also added that it is demonstrated by the toddler attending to and gaining information from the environment, as well as being persistent in goal-oriented activities (Hron-Stewart, 1990). Based on this definition, three components to mastery motivation in toddlers were developed: practicing emerging sensorimotor skills, producing effects with objects, and persistence in problem solving (Hron-Stewart). Yarrow et al. believed that mastery motivation could be related to very specific behaviors, such as attempting to gain responses from an object or giving more attention to a new object. With a better system for defining and observing mastery behavior in infants, numerous studies have shown that infants can demonstrate mastery behavior as young as six months old, and many believe that it is possible at even younger ages (Barrett & Morgan, 1995; Morgan et al., 1995).

Concepts Related to Mastery Motivation

Mastery motivation is important to understand because the motivational processes in infancy and young childhood have effects on the development of adaptive behavior in later years (Dweck, 1998). Striving for mastery is believed to help facilitate cognitive development and

competence in toddlers, which in turn may cause children to address the environment with renewed motivation (Hauser-Cram, 1996; Hron-Stewart, 1990; Jennings et al., 1984; Morgan et al., 1995). What results is a cycle with competence and motivation interacting with each other to further the development of the toddler (Messer, Rachford, McCarthy, & Yarrow, 1987). The two concepts are so closely intertwined in early childhood, that it is difficult to separate them when studying infant behavior. Yarrow et al. (1983) differentiated between the two by saying that mastery motivation is a striving for competence, whereas competence is how effective the child is at a behavior.

Though cognition and mastery motivation appear to be closely related in infancy, Jennings et al. (1984) found that the two concepts become more differentiated as the child grows older. Mastery motivation is believed to be a better predictor of later cognitive competence in toddlers than normal infant development tests (Hauser-Cram, 1996; Messer et al., 1986). Past research has shown that scores of mastery behavior at six months were highly correlated with scores on the Bayley Scales of Infant Development at 12 months (Hron-Stewart, 1990; Messer et al.). Further, Morgan et al. (1995) found that early mastery motivation scores predicted scores on the Stanford Binet IQ test at 3.5 years. Based on the past research linking toddlers' mastery motivation and scores on the Bayley Scales of Infant Development, it is predicted that in the current study, toddlers who have higher scores on the Bayley Scales, and therefore are considered more competent, will also show more mastery behaviors. There has been some research disproving this claim however. Messer et al. did not find a correlation between toddlers' mastery motivation and later competence scores, so the exact nature and extent of the relationship between cognition, competence, and mastery motivation remains to be determined and will be examined in the current study.

Another concept that is related to mastery motivation in the toddler is positive affect. Toddlers with more mastery motivation are believed to demonstrate more positive feelings because independently examining a task, and possibly being competent at it, tends to produce more pleasure (Hauser-Cram, 1996). However, various studies by Yarrow et al. (1993) have shown that toddlers do not demonstrate a large amount of positive affect in their interactions. This may be because toddlers do not show more positive affect after completing a task or because it is hard to judge the exact nature of a toddler's reaction. Consequently, it is difficult to discern exactly how the concepts of positive affect and mastery motivation are related, and if they carry any significance to the development of the child.

Mastery motivation is also believed to be related to the degree of autonomy or independence that the toddler possesses (Frodi et al., 1985). Toddlers who have high mastery motivation will feel competent in performing tasks, and therefore they will be more likely to seek out new objects on their own and attempt problems without an adult directly helping. Exploring the environment on their own increases the toddlers' feelings of independence and control over their actions, as well as their motivation to explore other objects (Boggiano & Ruble, 1986). Mastery motivation in toddlers is also seen as a possible forerunner to achievement strivings of older kids (Hron-Stewart, 1990). It is important for toddlers to develop mastery motivation because research has shown that children who possess mastery tend to be high academic achievers and perform better in school (Sigelman, 1999).

Mastery motivation is also a major factor in the development of self-esteem and good self-concept in toddlers because toddlers who explore their environment and feel competent about performing tasks tend to feel better about their abilities (Jennings, 1993). Overall, mastery

motivation is an extremely important part of a child's experience in infancy and toddlerhood, and without its healthy development, many other aspects of a child's life could suffer.

Development of Mastery Motivation

Mastery motivation goes through various levels of change as the infant grows (Barrett & Morgan, 1995). The mechanisms behind these changes include the toddler's developing cognitive skills and motor ability (Jennings, 1993). From birth to about nine months old, infants display primitive mastery attempts to manipulate themselves or other objects, but the attempts at this age are normally not intentional (Jennings). From 8 months to around 17 to 22 months, the toddler begins to select behaviors instead of randomly trying different actions to accomplish tasks (Barrett & Morgan; Jennings). This is an important change that dramatically affects toddlers' levels of mastery motivation because they are now able to choose how they want to accomplish a task. Having the ability to choose tasks and encounter the environment on their own terms allows toddlers to develop some degree of autonomy and mastery motivation (Boggiano & Ruble, 1986). Without the motor capabilities and new cognitive abilities that develop in this time period, toddlers would explore and produce fewer effects on toys, therefore inhibiting motivational forces to develop.

Throughout the latter half of the first year of life, some research has shown that the degree of mastery motivation in toddlers is unstable and likely to change due to the many physical and cognitive changes that toddlers undergo (Barrett & Morgan, 1995). In particular, toddlers may begin to notice standards for behavior that their parents or caregivers are setting for them, or they may begin to internalize their own standards for behaviors around this time (Barrett & Morgan). Toddlers who are just beginning to compare their actions and products to other standards in the environment can show a dramatic change in their beliefs of self-competence.

Depending on how well they have met standards, the toddlers may have a decreased or increased willingness to try new activities, and this can affect their mastery motivation (Morgan et al., 1995). Other researchers have concluded that mastery motivation is fairly stable throughout a child's maturation (Frodi et al., 1985; Smiley & Dweck, 1994). In particular, Frodi et al. found that mastery motivation scores at 12 months were correlated with scores at 20 months. Knauf (1998) also found that toddlers' scores on task persistence did not significantly vary between the ages of 16, 19, and 22 months. Although most toddlers display mastery motivation throughout their first and second years of life, it is still debatable whether the amount of mastery with which they approach tasks is stable throughout development at the beginning of the second year, or if it varies based on the cognitive changes occurring within the toddler.

Influences on Mastery Motivation

There are many different factors that influence the development of mastery motivation in infants and young children. For instance, the toddlers' individual characteristics, such as temperament and current developmental level, will impact the amount of motivation they have to explore objects and the environment (Hron-Stewart, 1990). There are also individual differences in how much pleasure toddlers derive from solving puzzles (Lutkenhaus, 1984). The more pleasure they derive from the interactions, the more motivated the toddlers will be to repeat similar actions. Older children's' mastery motivation will also be affected by whether they have a learning goal, which is when children seek to develop skills and master tasks for their own sake, or a performance goal, which is when they demonstrate competence at a task for favorable judgments from others (Smiley & Dweck, 1994). Those with performance goals are more likely to be negatively affected by failure and this may lead them to avoid new tasks and develop a sense of learned helplessness (Hokoda & Fincham, 1995). Children who develop helpless

patterns will give up when confronted with failure, attribute failures to their lack of ability, and hold low expectations for future success (Hokoda & Fincham). The overall pattern results in decreased mastery motivation for children. Those who have learning goals tend to be more persistent at tasks despite their difficulty, and therefore more mastery is developed in the child (Smiley & Dweck). The goal orientation of the toddler, combined with the developmental level and temperament, help to determine the degree of mastery present.

Mastery motivation in toddlers can also depend on environmental factors like the quality of home stimulation, amount of exploratory toys that are provided for the toddler, and the attachment relationship between the mother and toddler (Hron-Stewart, 1990). In a study comparing preschoolers from maltreating and nonmaltreating families, Vondra, Barnett, and Cicchetti (1989) found that children who came from maltreating families had lower motivation, as well as a host of other emotional and intellectual difficulties. The children from maltreating families had a less stimulating environment at home, more cultural deprivation, and poor mother interactions and attachment styles. Toddlers who have a secure attachment with their caregiver will be more likely to develop a mastery orientation because they will feel more secure in exploring their environment (Sigelman, 1999). A secure attachment is likely to be formed through parenting that is sensitive and responsive, and these were both characteristics that were notably lacking from the maltreating families (Sigelman, 1999; Vondra et al.).

Hron-Stewart (1990) also found that variables such as maternal education level and the type of job the mother holds could influence how a mother interacts with her toddler, which in turn could affect the toddler's motivational level. Mothers who are more educated may be more aware of the benefits of positive and stimulating parenting, and therefore be more likely to provide a better environment in which their toddler may grow. Also, mothers who have more

stressful jobs, or jobs that require long hours, may be less likely to spend the quality time necessary with their children to develop a secure attachment with them (Hron-Stewart). Overall, research shows that a barren environment and poor interaction with the mother leads to less mastery motivation, indicating that outside, stimulating forces, such as parents or exploratory toys, facilitate higher levels of mastery motivation in toddlers.

Socialization of Mastery Motivation

One of the most important factors in the development of mastery motivation is believed to be the social interactions infants have with their primary caregivers (Hauser-Cram, 1996; Heckhausen, 1993). Caregivers can influence children to adopt certain attitudes about their abilities, based on the interactions that the parents have during and after toddlers' actions and attempts at tasks (Andrews, 1984). In most households, the primary caregiver is the mother, and therefore the current study will examine mothers' interactions with their toddlers. Because toddlers do not yet have their own ideas about ability, and because they do not have the capacity to see other behavioral standards and compare them with their own actions, toddlers at this age tend to rely on their parents' responses to their behaviors to determine how successful they are on a task. Their amount of success, and the parents' response to it, as well as the general interactional style and affect of the interaction, will influence the toddler's future attempts to master tasks (Andrews). It appears that the methods of interacting with a toddler can have important influences on the developing child.

The type of feedback that a parent gives his or her toddler following an attempt at a task is an important component of the interaction with the toddler. The feedback toddlers receive from their parents will help them construct their motivation for new tasks in the future, and therefore the feedback that the parents provide is important in effecting the development of

mastery motivation (Hron-Stewart). Because evaluative feedback from caregivers is such an important component in the development of mastery, it is necessary to determine the types and amount of feedback that parents can use that will help, rather than impede, the development of mastery motivation in their toddlers.

Positive evaluative feedback, which includes praise and encouragement, is believed to be the best type of reinforcement toddlers can receive following their actions because it is believed to increase intrinsic motivation and have long term effects on the child's mastery (Kelley, Brownell, & Campbell, 2000). Heckhausen (1993) found that children's exploratory behavior and motivation increased after mothers were told to be more responsive and positive to their infants during a three-month observation study. Toddlers who receive enough positive evaluative feedback from parents in the early stages of development are believed to start developing their own healthy judgments of their actions as early as 17 months (Andrews, 1984). Because these toddlers receive feedback from their parents indicating that their actions and attempts at tasks are good and successful, the toddlers are expected to learn how to evaluate their own actions based on the positive feedback the parents supplied. If toddlers feel praised about their attempts to master objects and explore their environment, then they are more likely to develop mastery motivation (Andrews; Knauf, 1998).

As toddlers grow older and develop more mature internalization processes, less parental reinforcement and feedback is needed because children have developed their own system of standards and expectancies (Rose & Thornburg, 1984). Heckhausen (1993) found that mothers first expressed positive reactions to their infants after success, but then gradually withdrew their reactions as their toddlers became more competent and able to react themselves. The system of interaction between toddlers and parents rests on the idea that parents need to provide positive

evaluative feedback to the toddlers, especially in the first and second year of life when toddlers are most susceptible to their parent's standards and demands (Andrews, 1984).

If parents do not give positive reinforcement or feedback to their toddlers following attempts to solve problems, the toddler's developing mastery motivation can be negatively affected. In Hron-Stewart's (1990) study with toddlers' ages 22 to 33.5 months, it was found that mastery motivation was weakened by disapproval or a lack of reinforcement from the parent for the toddler's mastery attempts. Not only might a lack of positive feedback affect a toddler's level of mastery motivation, but an increase in negative feedback or criticism from the parent could more strongly influence and possibly decrease mastery. Dweck (1998) found that children who were asked to rate a project they had made gave lower ratings for their work after receiving criticism from adults regarding the work compared to those who did not receive criticism. So both a lack of positive feedback, and an increase in negative feedback, either occurring as a separate event or together, can influence the development of a toddler's mastery motivation.

Negative or critical interactions are believed to affect not only toddlers' levels of motivation, but also their perception of their competence and locus of control (Hron-Stewart). Many researchers believe that a lack of positive reinforcement from parents results in toddlers not internalizing a healthy self-reward system, therefore causing toddlers to internalize the idea that they are not good at completing tasks. The lack of positive feedback for mastery attempts will also leave toddlers more dependent on adult reactions, and more likely to develop a learned helplessness orientation when older (Andrews, 1984; Heckhausen, 1993). Toddlers who are more dependent on adult reactions have less autonomy and independence, and therefore will probably explore and interact with their environment less. Toddlers with less autonomy are assumed to therefore have decreased amounts of mastery motivation based on their decreased

interactions with environments (Frodi et al., 1985; Lutkenhaus, 1984). Overall, it seems that a lack of positive feedback, and an increase in parent's negative responsiveness, hinders the toddler's needs to explore and master his environment. Based on past research, it was predicted in the current study that mothers who expressed more negative feedback and criticism would therefore have children with decreased levels of mastery motivation.

In general, a parent who is critical or negatively evaluative can hurt their toddler's developing sense of self and motivation to explore new things (Hron-Stewart, 1990). There are different types of evaluative feedback that mothers can give to toddlers after their attempts at a task, and it is possible that certain types of criticism or evaluation can be particularly harmful. Heyman, Dweck, and Cain (1992) utilized four different types of feedback conditions with kindergarten students to determine if children's responses varied based on the type of feedback given. The four categories they used were feedback that conveyed a judgment of the child (feedback of person), feedback that was directed only at the child's behavior (feedback of product/action), feedback that was directed at the child's behavior but included an explanation for why the action was wrong (corrective feedback), and feedback that spent time on solving strategies (also very similar to corrective feedback). The study found that feedback that focused on strategies and explanations for why the behavior was wrong, which could be considered a type of corrective or constructive feedback, was most likely to produce mastery. Feedback directed toward the person (feedback of person) was most likely to produce a helpless orientation, which is characterized by a child not attempting a task due to past failures (Heyman et al.). This is contrary to the results of Kelley et al. (2000) who found that toddlers who were given evaluative feedback directed toward their self (feedback of person) showed less shame (indicating that they were less personally upset) than those who received feedback directed

toward their product or action (feedback of product/action). The differing findings may have resulted from the fact that negative evaluative feedback from mothers occurs fairly infrequently during observations as in the Kelley et al. study, and Heyman et al.'s study actually *induced* a negative feedback situation. It is possible that the production of a helpless orientation from evaluation toward self was significant in the Heyman et al. study because more evaluative feedback of self was present compared to Kelley et al. Also, Heyman et al. assessed kindergarten children and Kelley et al. examined 24 and 36 month old toddlers. Because the two groups have such a wide age difference, it is possible that they might have interpreted the feedback in different ways or have been affected by negative evaluations differently based on their age.

This research reveals that more negative feedback possibly directed at both the toddler and his actions or just one of these components, negatively affects a toddler's beliefs about his competence and is therefore more likely to produce a helpless, rather than mastery orientation. Unfortunately, research on mother-child dyads has found that few mothers express many negative evaluations towards their children during observations and therefore viewing the exact relationship between different spectrums of negative evaluative feedback (such as feedback directed towards the person, toward a person's actions, or even nonverbal negative feedback) and mastery motivation has been difficult and as yet unresolved (Heckhausen, 1993). Due to the small numbers of negative evaluations, studying their occurrence and effects becomes more difficult, but not impossible, and therefore further research using more precise variables of all of the components of negative evaluative feedback is necessary. Similar to Heyman et al. (1992) and Kelley et al. (2000), the current study attempts to examine the effects of using different types of evaluative feedback on the child's development of mastery motivation. It is believed that

mothers who express more corrective feedback will have toddlers with increased levels of mastery behavior, whereas mothers who express more feedback directed toward person and product/action will have toddlers with decreased amounts of mastery.

Although toddlers need parental interaction and evaluative feedback to direct their actions, caregivers can provide an excess of responses, indicating their parental style is perhaps too controlling. A large amount of feedback, even if it is positive feedback, could still negatively affect the child and his mastery motivation (Grolnick et al., 1984). Mothers need to provide help and assistance for their child to complete some tasks, but if they provide too much help, their child's sense of self control over his or her actions and autonomy may be hindered (Kelley et al., 2000).

A mother who is overcontrolling and who has poor communication and cooperation with her toddler may be regarded as having less dyadic harmony with him or her (Grolnick et al.). Dyadic harmony describes the relationship or fit between the mother and toddler. This concept includes the extent to which the pair enjoys each other's company, the sensitivity of the mother, and the smoothness and communication between them (Biringen, 1990). A mother who has less harmony with her toddler and who is more controlling can lead to the development of a toddler with low autonomy (Vondra et al., 1989). A toddler with low autonomy will probably explore the environment less, and therefore have a decrease in mastery motivation and an increase in a helpless orientation (Boggiano & Ruble, 1986). Hauser-Cram (1996) linked positive parental relations to increased persistence on a task by toddlers, but also found that a parent's interference with a toddler's attempts to engage in activity decreased the toddler's mastery motivation. Too much feedback and control from the parent, even if it is positive in nature, can lead to frustration for the toddler and possibly decreased mastery motivation (Boggiano & Ruble). The current

study predicts that mothers who show an excess of control and misunderstanding of their toddlers, as demonstrated by lower scores of dyadic harmony, will have toddlers with decreased levels of mastery motivation.

The emotional affect of the interaction between mother and toddler may also have an impact on the motivation of the child and the harmony between the mother/child pair. The emotional affect of the interaction refers to the level and amount of positive or negative emotions and affect that the mother expresses, either directly toward the child, or in general throughout the interaction. Busch-Rossnagel, Knauf-Jensen, & Des Rosiers (1995) found that toddlers between the ages of 9 and 22 months were more persistent and derived more pleasure from a task when mothers had more positive affect and demonstrated more emotional communication throughout the interaction. Mothers who demonstrated more negative affect during these exchanges had children with lower persistence, and consequently possibly lowered mastery motivation. Vondra et al. (1989) found that parents who had greater enthusiasm, alertness, and positive attitudes during the interaction had children with more motivation. Based on this research, it was predicted in the current study that the emotional affect of the mother/toddler interaction would affect the development of mastery motivation in the toddler. Specifically it was believed that mothers with more positive affect would have children with higher levels of mastery motivation, whereas mothers with more negative affect would have children with lower levels of mastery motivation.

Overall, past research has indicated that for a toddler to develop appropriate mastery motivation, parents need to provide certain interactions and stimulations for their toddler. Good adult interaction will take into account the toddler's weaknesses and current developmental level, in order to help challenge him to advance within his developmental potential (Heckhausen,

1993). It is believed that a toddler needs high interaction with the environment to develop good mastery behavior (Andrews, 1984). To have success at mastery attempts, toddlers need to receive approval and reinforcement for attempts from their parents or caregivers, and have autonomy supporting rather than controlling mothers (Hron-Stewart, 1990). A toddler who (a) fails at mastery attempts, (b) is reinforced for depending on adults, and (c) is restricted by his or her parents will develop lower levels of mastery motivation (Hron-Stewart). Without these needed interactions, toddlers can develop less autonomy and less competence in themselves and their actions.

It is important to determine the parental behaviors and exactly what type of help and feedback parents should give to their struggling toddlers to allow them to develop healthy mastery motivation. It was hypothesized in the current study that mother's interaction styles at 18 months would be related to their toddler's levels of mastery motivation at 18 months. This age period was examined in the current study because it is at this time that toddlers are believed to be developing their own self-evaluations and are therefore more affected by parental evaluations of them (Brownell & Kopp, 1991; Kelley et al., 2000). In particular, it is believed that mothers who interact with their toddlers with more criticism and negative evaluative feedback overall will have toddlers with lowered motivational scores. Mothers who show less negative feedback in general are believed to increase their toddlers' mastery motivation by allowing them independence to develop their own skills and explore with autonomy (Kelley et al.). Mothers who demonstrate more negative evaluations of their toddler are also believed to show more negative affect and less positive affect throughout their interaction together. It is also believed that those mothers who demonstrate more criticism will have less dyadic harmony with their toddler than mothers who demonstrate less negative evaluation.

The differences in the ways mothers express criticism or disapproval can also affect a toddler's motivation (Heyman et al., 1992). Within the group of mothers who demonstrate critical or evaluative feedback to their toddlers, it is believed that those who interact with their toddler in a more corrective and instructional manner, as opposed to those who demonstrate more criticism aimed directly at the toddler or his actions, will have toddlers with higher levels of mastery motivation. It is also believed that the timing of a mother's interaction and feedback of the toddler will influence the effect the criticism has on the toddler's mastery motivation. Mothers who negatively evaluate or give corrective information to their toddlers prior to the toddlers having a chance to fully explore and attempt a toy are presumed to have toddlers with lower levels of mastery motivation (Grolnick et al., 1984). Even if a toddler is failing with a toy, those mothers who intervene in their toddler's actions too quickly are believed to affect a toddler's concept of himself by indicating that he is failing, and this is believed to help decrease his motivation for the future (Heckhausen, 1993). Mothers who express corrective feedback to their toddler when it is necessary, meaning after the toddler has been failing at the toy and needs assistance, are believed to have toddlers with higher levels of mastery motivation than mothers who express negative evaluations, either verbal or nonverbal, to the toddler after failing.

Method

Participants

The participants were 134 toddlers and their mothers. They were recruited as part of a larger study completed on children's early development at The University of Pittsburgh. The mothers were screened for depression when their toddlers were 18 months old, using the Structured Clinical Interview for DSM IV (First, Spitzer, Gibbon, & Williams, 1995). Out of the 134 participants, 71 mothers qualified for having experienced clinical depression within their

child's lifetime and 63 mothers did not. Both mothers with and without depression were included in the study to diversify the sample and increase the variety of behaviors exhibited. Although examining the effects of depression in mother/child interactions is an interesting and important field of study, it is not the focus of the current project, and therefore will not be examined in primary analyses. The mothers who were classified as depressed were recruited from clinicians, and through poster advertisements at a large university's psychiatric service area. A few of the mothers were originally included as controls but because they met the criteria for depression, they were included in the study as depressed. Nondepressed mothers were recruited from a local obstetrics hospital, except for one nondepressed mother who saw the poster advertisement at the university and responded.

The ethnic make-up of the participants was 89.5% Caucasian, 4.8% African American, and 5.6% biracial, as indicated by mother's reports taken when toddlers were 18 months old. The families, assessed by the Hollingshead (1975) index of social status, demonstrated a full range of SES (on a range of 1 through 5); however, the participants were predominantly middleclass ($M = 2.02$, $sd = 1.07$)[1]. Mothers were aged 20-46 years ($M = 34$) and 85% of the families were intact. The number of children in the family ranged from one to five ($M = 1.84$). Of these, 44% were first born and 36% were second born.

Materials

Individuals who had been uninvolved in administering the tasks and who did not know the children or their mothers coded maternal and toddler behavior. Coding systems for maternal and toddler behavior were based on previous research (Alessandri & Lewis, 1996; Eyber, Bessmer, Newcomb, & Edwards, 1994; Heyman et al., 1992; Kelley et al., 2000; Moustakas, Sigel, & Schalock, 1956; Valone, Norton, Goldstein, & Doane, 1983) as well as regular patterns

in the current data (see Appendix). Reliability was established prior to coding and was computed on 20% of the sample during coding. The measures for positive affect, negative affect, and dyadic harmony were all continuously time sampled in 30 sec intervals, beginning when the experimenter left the mother and child alone to play with the toy. Coding was stopped either when the experimenter returned to the mother, or verbally informed the mother that they were finished. Because the duration of the mother and child interactions varied across participants, the frequency of positive/negative affect, dyadic harmony, and maternal evaluations were adjusted by dividing each interaction by the mean seconds on task of the interactions.

Positive Affect. Positive affect was coded as "occurring" or "not occurring" during each 30-second interval of the interaction. Any interaction from the mother that was characterized by smiling, laughing, or having a positive or upbeat tone of voice was coded as positive affect. Percent agreement for positive affect was .90, and Kappa was .77.

Negative Affect. Negative affect was also coded as "occurring" or "not occurring" during each 30-second interval of the interaction. Any interaction from the mother that was characterized with frustration or irritation, as demonstrated by short statements, raised voice, frowning, or tongue clicking, was coded as negative affect. Percent agreement for negative affect was .98, and Kappa was .82.

Dyadic Harmony. Dyadic harmony, or the fit or extent to which the mother and toddler appear to be enjoying each other's company, was coded on a 1 (*no dyadic harmony*) to 5 (*high dyadic harmony*) scale (see Appendix for examples). A score of 1 was characterized as an unbalanced relationship or some conflict between mother and toddler, with no notable positive interaction or cooperation. A score of 2 indicated some mismatched agendas or notable communication problems with one or two positive interactions during the interval. A score of 3

was characterized by an interaction with little friction but no real engagement between the mother and toddler, and/or the mother giving directives and the toddler following these orders for a majority of the time. A score of 4 included both partners being warmly engaged in the interaction with only one or two small instances of miscommunication. A score of 5 was characterized by high engagement and enjoyment between the pair with no communication difficulties and no instances of the mother being overcontrolling. Percent agreement for dyadic harmony was .68 and percent agreement within one point was .98. The correlation between raters was .68.

Maternal Evaluation and Criticism. Seven categories of maternal feedback were coded on a frequency basis throughout the entirety of the mother and toddler interaction: verbal corrective feedback, nonverbal corrective feedback, positive criticism of product action (evaluative feedback), negative criticism of product action, nonverbal criticism, criticism of person, and criticism of person and product action (see Appendix for examples). Verbal corrective feedback consisted of a mother correcting the toddler's actions and giving suggestions for future actions (e.g., try the triangle), whereas nonverbal corrective feedback consisted of a mother correcting her toddler's actions using nonverbal means, such as helping push the lever or helping put the piece in the hole. For either verbal or nonverbal corrective feedback to be coded, the action had to occur after a failure attempt by the toddler. Failure at the toy was defined as trying to complete the task but doing something wrong, such as putting the piece in the wrong hole, or struggling with the toy for two or more seconds, even if using the toy in the correct manner.

Positive criticism of product action, referred to as evaluative feedback in the future, involved the mother indicating to her toddler that his or her action was wrong in a positive or

neutral voice, without any indication of future action for the toddler (e.g., No, you are putting it in wrong). Negative criticism of product action was considered the same as positive criticism except that the statements were both negative in content and tone (e.g., That's an ugly drawing).

Nonverbal criticism included any forceful body movements or facial expressions that were meant to force the toddler to follow the parent's agenda. Criticism of person was a negative evaluation of the child directed toward the toddler's nature or character (e.g., You are bad at this toy, obviously you are going to do this wrong), whèreas criticism of person and product action was a negative evaluation directed at both the toddler and his actions (e.g., You shouldn't talk like that, you're acting like a baby). The Kappa for maternal evaluation and criticism was .65.

In addition to examining what types of evaluation mothers used towards their toddler throughout the interaction, the amount of time that they allowed the toddler to explore or attempt the task before intervening was recorded. Whenever a category of maternal evaluation and criticism was recorded, it was also determined whether the toddler had been failing at his current task. Again, failure was defined as trying to complete the task but doing something wrong or struggling with the toy for two or more seconds, even if using the toy in the correct manner. If the toddler was failing at the task, it was determined whether he or she had been failing for less than two seconds on the current task, or more than two seconds. The Kappa for determining the situation in which the maternal evaluation occurred (whether the toddler had no failure, had been failing less than two seconds, or failing more than two seconds) was .77.

Mastery Motivation. The outcome data for mastery motivation was coded at The University of Pittsburgh using a mastery scale developed by Dr. Kay Jennings. A global mastery scale was developed for each toddler based on the toddler's behavior while engaged with three

different types of tasks. These tasks were designed to measure different aspects of mastery. One of the tasks in which toddlers engaged was a curiosity task. This task involved the exploration of a curiosity box containing various knobs, bells, and lights. The toddlers also engaged in effectance tasks, which are cause-and-effect tasks where the toddler does something to the task (i.e., a "cause") and various "effects", such as lights or noises are produced. The last aspect of the global mastery score involved goal-directed tasks. The goal-directed tasks each had some type of end goal, such as putting pegs in a pegboard. Several different tasks were completed under each category and the scores were standardized and added together. Toddlers' levels of engagement, affect, pride, and number of bids to parent or experimenter were recorded during each task. The engagement of the toddler, ranging from no engagement to active and exploring, was determined by how interested the toddler was in the task. The affect of the toddler was either rated as positive, neutral, negative, or mixed. The level of pride of the toddler was determined in part by the positive affect the toddler showed, and also by other characteristics such as eye contact and positive self-evaluations. The number of bids, or number of times the toddler looked to the parent or experimenter or asked for help on the task, was reversed scored and added to the rest of the mastery data after standardization.

Maternal Depression. Depression in mothers was measured in three different ways from the larger child study being conducted at The University of Pittsburgh. The first depression measure was a classification of "depressed" or "not depressed" based on the presence or absence of an episode of major depression during the toddler's lifetime. Mothers were categorized as depressed or not depressed based on their responses on the SCID (First et al., 1995), a widely used semi-structured and diagnostic interview with well-established validity and reliability, when

toddlers were 18 months of age. Kappa was 1.0 for diagnosis of depression based on three depression measures obtained from the SCID.

The second depression measure was a gauge of the recency of depressive symptoms developed by Dr. Kay Jennings at The University of Pittsburgh. To determine the timing of maternal depressive symptoms, the mother was asked questions during the SCID interview about whether she experienced depressive symptoms in the month prior to the interview, in the six months prior to that (when the toddler was between 12 and 18 months of age), and in the first year of the toddler's life. If the mother reported experiencing at least two symptoms of depression, then she was considered at least partially depressed. Recency of depression was coded on a four-point scale (4 = at least partially depressed in past month, 3 = at least partially depressed within 6 months, but not the past month, 2 = depressed only when toddler was an infant, 1 = never depressed).

A third depression measure was obtained from the Beck Depression Inventory (BDI), a widely used questionnaire that measures current self-reported depression symptoms (Beck, 1972). At each playroom visit, maternal depressive symptoms were assessed using the BDI, and a higher score on the inventory indicates more depressive symptoms.

Design and Procedure

As part of a larger longitudinal study, toddlers were assessed at 18, 25, and 32 months of age. At each age, mother and toddler were seen at the family's home and also in a lab playroom. Mothers were paid for their participation after each set of visits, receiving $25.00 after the 18- and 25-month visits and $50.00 after the 32-month visit. Only the data collected from the 18-month home and lab visit are used in this study.

For the home visit at each age, the experimenter entered the home and conducted a structured interview with the mother. A task was then introduced to the mother/child dyad. The task used at 18 months was a shape sorter, which consisted of holes in the forms of a square, triangle, and circle in the top of the toy and then shoots leading to a release lever for all three at the bottom of the toy. Each shape was a different color. Three shape pieces that corresponded to the holes in the top of the toy were used with the toy. Although the pieces fit into the holes in either direction that they were inserted, a whistling sound was produced as the piece moved down the shoot if the piece was inserted in the "correct" way. The task was fairly difficult for 18-month-old toddlers, and it was intended to be slightly above toddlers' current level of ability. Because of its difficulty, mothers were asked to show their toddlers how to use the toy first, and to assist them if they got stuck on any one shape. No further instructions were given to the mother. Interactions between mother and toddler with the shape sorter were videotaped by a video camera placed in the home for approximately five minutes. The experimenter was present during the interactions.

Mastery motivation of the toddlers was assessed during the visit to the lab playroom at each age (only data from the 18 month visit will be discussed). Toddlers participated in a variety of activities and tasks while at the lab playroom, but to judge mastery motivation, toddlers were seated at a small table and a female experimenter introduced several achievement-like tasks to the children. They were allowed to play with the tasks however they chose. The tasks presented included the effectance, goal-directed, and curiosity tasks that were used to gauge mastery motivation. The mother was present but was filling out questionnaires and other paperwork, and therefore there was limited interaction between mother and toddler. The toddler's actions with the toy were videotaped through a one-way mirror.

At 18 months, the toddlers were also given a mental index measure known as the Bayley Scales of Infant Development (Bayley, 1993). The Bayley scales are an individually administered test that assesses current developmental functioning of infants and children. The measure has three main components: mental development, motor skills, and behavior ratings. All three are measured using a variety of tasks (Bayley, 1993). The only aspect that will be explored in the current study is the mental development index.

Results

Descriptive Statistics

The analysis of mother and toddler interactions for negative and positive affect, dyadic harmony, and mother's interactional style yielded a large amount of descriptive information (see Table 1). The mean amount of time on task for mother and toddler interactions was 285.37 seconds, or 4.76 minutes. Overall, there was a great deal of positive affect displayed in the interactions but rarely any negative affect displayed (less than 10% of the sample displayed negative affect). The average for dyadic harmony was 3.4, which falls in the middle of the range of scores. There was a fair amount of verbal corrective feedback, nonverbal corrective feedback, evaluative feedback, and nonverbal criticism, with a vast majority of them occurring less than two seconds after the toddler was attempting the task. In contrast to that, there were very few, if any, instances of negative criticism of product action, negative criticism of person, and negative criticism of person and product action. There were actually no occurrences of criticism of person and product action in any of the mother and toddler interactions examined, thus, the criticism of person and product action category will not be explored in any analyses.

Preliminary Analyses

Maternal Depression. Overall, maternal depression was not found to be significantly related to maternal or toddler behavior. Independent samples *t*-tests were used to determine if toddler mastery differed as a function of maternal depression. Only one out of 28 analyses was statistically significant (all *p*s > .06). The only significant difference found was that depressed mothers ($M = 6.79$) were significantly more likely to use evaluative feedback during the interaction than were nondepressed mothers ($M = -5.25$), $t(132) = -2.18$, $p < .05$. Because this was the only significant finding between depressed and nondepressed mothers, this variable was not controlled in primary analyses. Analyses on the recency of depression revealed that the toddlers of mothers who showed more recent depressive symptoms had decreased mastery motivation scores at 18 months, $r(134) = -.23$, $p < .01$. Mothers who had experienced more recent depressive symptoms also showed more instances of evaluative feedback during their interactions, $r(134) = .18$, $p < .05$. Because the measure of recency of depression was related to both independent and dependent variables, maternal recency was controlled in all other analyses. Finally, mothers who reported more depressive symptoms on the BDI also had more instances of evaluative feedback less than two seconds after the child was playing with the toy, $r(126) = .19$, $p < .05$, and more instances of negative criticism of product action less than two seconds after playing, $r(126) = .23$, $p < .05$. There were no other significant relationships between maternal or toddler behavior and maternal self-reports of depression symptoms (the BDI; all *p*s > .07), and therefore this variable was not controlled in analyses.

Child Gender. Independent samples *t*-tests were performed to determine if maternal behavior and toddler mastery differed as a function of child gender. Out of 28 analyses, only one was statistically significant. Mothers were more likely to use negative criticism of person with

boys ($M = .01$) than with girls ($M = .00$), $t(132) = 2.26, p < .05$. This finding was only significant for negative criticism of person that occurred after the toddler had been failing on the task for more than two seconds. Because of the minimal effects that gender had on the variables (all other $ps > .13$), gender will not be controlled in further analyses.

Socioeconomic status. Pearson product-moment correlations were performed to examine relations between socioeconomic status (SES), maternal behavior, and toddler mastery motivation. There were no significant relations found for SES and mastery behavior or any maternal behaviors (all $ps > .05$); therefore, socioeconomic status will not be controlled in further analyses.

Child Mental Index. Pearson product-moment correlations were used to examine relations between toddlers' mental index, as measured by the Bayley Scales of Infant Development, toddler mastery behavior, and maternal behaviors. Toddlers who received higher scores on the Bayley scores (indicating greater competence), demonstrated more mastery motivation, $r(134) = .20, p < .05$, and mothers who had toddlers with higher mental index scores had increased dyadic harmony scores, $r(134) = .27, p < .005$, and expressed less nonverbal corrective feedback, $r(134) = -.22, p < .05$, as well as less negative criticism of product action, $r(134) = -.17, p < .05$. Because mental index scores were related to both maternal behavior and toddler mastery, this variable will be controlled in all other analyses.

Intercorrelations of Maternal Behavior

Preliminary Pearson correlations were conducted to examine relationships between the maternal behaviors. Analyses revealed several significant associations between the types of maternal feedback used by mothers (see Table 2). For instance, mothers who used more verbal corrective feedback also used more nonverbal corrective feedback and evaluative feedback.

Mothers who displayed more evaluative feedback displayed more nonverbal corrective feedback and more negative criticism of product action. Interestingly, mothers who had more instances of evaluative feedback also had more intervals of both negative affect and positive affect. Mothers who displayed more negative criticism of product action also had more intervals containing displays of negative affect. And finally, mothers who expressed more nonverbal criticism had decreased dyadic harmony scores.

Pearson correlations were also conducted on the maternal behaviors and the timing in which they occurred. Mothers who expressed more nonverbal corrective feedback less than two seconds after the toddler attempted the toy had more verbal corrective feedback less than two seconds, $r(126) = .83, p < .001$, and more evaluative feedback less than two seconds, $r(126) = .42, p < .001$. Similar to this, mothers who showed an increased amount of nonverbal corrective feedback more than two seconds after failing with the toy also showed an increased amount of verbal corrective feedback more than two seconds after failure, $r(126) = .63, p < .001$, and more evaluative feedback more than two seconds after failure, $r(126) = .29, p < .005$. Also, mothers who demonstrated more nonverbal corrective feedback less than two seconds after their toddler had been playing with the toy had lower mean scores for dyadic harmony during the interval, $r(126) = -.21, p < .05$.

Primary Analysis

It was believed that toddlers would have decreased levels of mastery motivation at 18 months if mothers displayed more critical and evaluative feedback. Partial correlations (controlling for recency of depression and mental index scores) showed almost no significant relationship between mastery behavior and any maternal variables (all $ps > .13$) . The only relationship found was that mothers who expressed more negative criticism of person had

toddlers with lowered mastery motivation scores, $r(134) = -.18$, $p < .05$. Because there were almost no significant correlations between mastery and any of the maternal behaviors, including the time separation of mother's feedback (i.e., less than two seconds, greater than two seconds, or no failure, all $ps > .18$), only summary scores of maternal feedback will be reported (see Table 2).

Discussion

It was expected that mastery motivation would be positively correlated with corrective feedback, higher dyadic harmony, and positive affect; and therefore, mastery was also expected to be negatively correlated with evaluative and critical feedback, decreased dyadic harmony, and negative affect. The results indicated that there was not a significant relationship between the mastery motivation of toddlers and the types of feedback and other behaviors that the mothers exhibited during the interactions. The reasons for the lack of support of this concept will be discussed in further detail later. However, despite the lack of support for the idea that mothers' evaluations and timing of those evaluations will affect toddlers' mastery motivation, there were other correlations found between maternal and toddler behaviors, and the emotional affect of the interactions as a whole. Although these correlations do not address the main focus of the current study, they do provide insights into maternal behavior and the mother/child relationship, and therefore can serve a useful purpose in shedding more light on parent and toddler relations as a whole.

In examining maternal behaviors that were associated with one another during the interaction with the toddler, it was found that mothers who gave more nonverbal corrective feedback and more evaluative feedback also gave more corrective feedback to their toddlers. It is understandable that these three types of feedback from the mother would be related to one

another because a mother who is more expressive to her toddler, and attempts to help him with the task, would typically provide information not only to let him know he was doing the task wrong, but to offer advice on how to complete the task and also help him physically if necessary. A mother who would give her toddler verbal help as to how to complete the task would logically be more likely to reach out and physically guide the toddler or offer evaluations if the toddler was completing the task incorrectly.

Mothers who gave more evaluative feedback were also more likely to have increased instances of negative criticism of product action. Again, it is understandable why these two behaviors may be connected to one another. Evaluative feedback, by definition in this study, is informing the toddler that his or her actions are wrong or incorrect, but in a positive tone of voice. Because the mother is evaluating the toddlers' actions, this type of feedback can be considered slightly more negative than corrective feedback, which is simply offering other suggestions to the toddler. Therefore, mothers who are more evaluative of their toddlers' actions could also be more negative and critical of their actions, which was actually the case in the current study. When using either one of these feedbacks, the mother is suggesting to the toddler that he is not meeting a standard of action, in other words, that he is failing in some way at the task. It may be that mothers who use this type of feedback are more concerned about whether their toddlers are successful with the task, or in other words, are more concerned with their performance on the task. It is possible that mothers who are more concerned with their toddlers' performance may be more critical or evaluative of their actions, especially when failing on the task, and therefore these mothers will use both evaluative feedback and negative criticism of product more often.

The emotional affect of the relationship was also examined in light of the type of interactions that the mother had with her toddler. As predicted, mothers who displayed more negative criticism of product action and more nonverbal criticism also had more negative affect during the interaction. A mother who is critical of her toddler's actions tends to address him in either a critical or negative manner, thereby also expressing negative feelings towards the toddler during the interaction. Simply because of the nature of the two concepts, a mother who is critical is viewed as being more negative in her interactions. Also, nonverbal criticism was operationalized in the current study as a mother being forceful and pushy with her toddler, in an attempt to exert her own control over the situation. A mother who is more pushy and forceful during the interaction is likely to be viewed in a more negative light. It is interesting to note however that the category of criticism of person, which is another distinctly negative and critical category, was not associated with increased negative affect during the interaction. This may be because there were few instances of negative criticism of person during the intervals, therefore decreasing the chances of a significant relationship being discovered. It is also possible that critical statements directed toward the toddler could have been made, but if they were stated in a positive tone of voice (i.e., "You are silly and don't know what you're doing", stated in a teasing and uplifted voice), then the mother's statements would not have been considered as expressions of negative affect.

Another interesting result dealing with the emotional affect of the interaction was that mothers who exhibited more evaluative feedback had higher levels of both positive and negative affect during their interactions. This indicates that mothers who provide more evaluation and feedback to their toddler in general are more likely to be involved emotionally in the interaction, and therefore express higher levels of both positive and negative affect. Mothers who give more

evaluation may express more emotion or affect in general, compared to mothers who are less involved with their toddler during the interaction. However, increased levels of all of the other categories of feedback were not associated with increases in both negative and positive affect, and this may be because the other categories are more directly related to either displaying positive or negative affect, whereas evaluative feedback can contain elements of both correction and criticism. This allows the mother to be viewed as either more negative, more positive, or at times both throughout the interaction.

Toddlers' levels of mastery motivation were also correlated with their scores on the Bayley Scales of Infant Development. This result is similar to other studies, which have found that within the first year or two of birth, there is a strong relationship between cognition, competence, and mastery motivation (Hron-Stewart, 1990). Further, the mental component of the Bayley has been shown in previous studies to be correlated with mastery behavior at both six and 12 months of age (Messer et al., 1986). Toddlers with higher levels of competence may be more effective in their interactions with tasks, and therefore they may display more persistence and joy (e.g., positive affect and pride), which are all considered components of mastery motivation, during task engagement.

Toddler's scores on the mental index were also related to the dyadic harmony of the interaction as well as to decreased amounts of nonverbal corrective feedback and negative criticism of product from the mother. Toddlers who scored higher on the mental index are assumed to be more competent, and therefore expected to perform better at the shape-sorting task. Toddlers who can complete the task easier will not need as much help from their mother; therefore, moms may give less feedback simply because their toddlers need less help in completing the task. This theory would account for the decreased amounts of corrective

feedback and negative criticism of product, and also for the increased dyadic harmony due to the fact that if the toddler is doing better at the task, the mother will probably interfere less and use less control to help him or her.

In the current study, there were also some relationships among the timing of the mother's evaluative feedback. Mothers who gave nonverbal corrective feedback after two seconds of the toddler's failure were more likely to give verbal corrective feedback and evaluative feedback two seconds after failure as well. Because the mothers waited for over two seconds to give any feedback, this indicates that they may be more patient with their toddlers and willing to give them a chance to attempt the task on their own. If a mother waits to help her toddler with the toy for one variable, such as corrective feedback, then it is more likely that she will wait to give him feedback for other variables such as evaluative feedback. Mothers who are allowing their toddler a chance to attempt the task without interrupting would therefore probably abstain from giving any type of feedback for the time period when their toddler is exploring, and this was the case in the current study. Another reason why these types of behaviors were correlated with one another, whether it be for two or more seconds after failure or under two seconds, could be because they are general actions that a mother would use when her toddler is having trouble with the toy. If a toddler is failing, it is a common human reaction to say, "No, try this," and to point. That was the situation observed numerous times in the current study, and therefore it is not surprising that feedback of this nature and with the same amount of timing was correlated with one another.

It was also found that mothers who gave more nonverbal corrective feedback less than two seconds after failure had lower dyadic harmony scores. Mothers who quickly interfere with their toddlers' attempts at the task and do not allow them to try to succeed on their own are

generally viewed as more controlling and as having poorer communication with their toddlers. And moms who use nonverbal feedback under two seconds would generally interrupt their toddlers before they really had a chance to try the toy, therefore that can explain why these mothers were judged as having lower dyadic harmony with their toddlers. Some mothers may be less controlling and physically interruptive with their toddlers' attempts at the task, and therefore give their child time to explore and attempt the task on their own before intervening. Other mothers may be less likely to sit back, inhibit their feedback, and allow their toddler to fully explore the toy and possibly fail at the task for a few seconds. The mothers who were unable to inhibit their expressions and physical interactions for even a few seconds were viewed as having lower dyadic harmony. Some variables that could possibly be related to the ability to inhibit feedback of the toddlers' attempts at the task include the mother's personality, maternal beliefs about the toddler and toddler competence, and the mother's concern for standards for performance and succeeding at the toy, to name a few.

Although relations with maternal depression were not the primary focus of the current study, it is interesting to note that mothers who reported increased depressive symptoms during the lab visits on the BDI also displayed increased amounts of evaluative feedback less than two seconds after the child was failing at the task, as well as negative criticism of product action less than two seconds after the child was failing. This indicates that the depressed mothers were less likely to be patient with their toddlers and did not or were not able to inhibit their feedback about the toddlers' attempts at the task. It is possible that mothers with more depressive symptoms are more concerned about performance on a task, and therefore the mothers did not allow their toddlers a chance to fully explore the toy on their own. It is also possible that the very nature of depressive symptoms causes the mothers to have less patience and sensitivity towards their

toddler, which is indicated by the fact that the mothers were more likely to express evaluation towards their toddler less than two seconds after the toddler had begun failing. It is also interesting that feedback less than two seconds after failure was related to the BDI but not to the other depression variables. This indicates that depression is a complex disorder and warrants further study with respect to the types of maternal behavior and evaluative feedback given by depressed/nondepressed mothers as well as the context in which the feedback is conveyed.

Despite the significant relationships found within many of the maternal behaviors, there were not many significant findings between mastery motivation and maternal feedback and other behaviors, contrary to past research (e.g., Andrews, 1984; Dweck, 1998; Hron-Stewart, 1990). There are many explanations for the lack of correlation between these variables. One of the major explanations is that across interactions, there were limited amounts of criticism and negative feedback displayed by mothers toward their toddlers. This is especially evident in the fact that there was not one instance out of 134 participants of any criticism directed toward person and product action. There were also very few instances of criticism toward product action and criticism toward person alone. Similar studies addressing questions of mothers' criticism and negativity during interactions have been faced with this same problem. Barrett and Morgan (1995) found that most mothers of toddlers will provide some information about the correct solutions but will almost never criticize their toddlers for not meeting their standards. Kelley et al. (2000) also found that mothers did not exhibit negative evaluations often, and the infrequency of the behavior limited the chances of finding significant relationships with other variables. The lack of instances of criticism and negativity during the interactions makes it difficult to compare data and truly arrive at a clear picture of the effects of negative feedback in general. If criticism and negative evaluations rarely happen during the interactions, then it is

next to impossible to link them to any other factors of the toddler, such as his or her mastery motivation.

Because so little critical feedback occurred during the interactions, it is necessary to address why this was the case in the current study. One explanation is because mothers knew they were being watched by the experimenter and videotaped for later study. Even though mothers were interacting in their homes, the video camera was clearly visible throughout the interaction. The fact that the mothers were aware that they were being watched may have caused them to adjust their interactional styles with their toddlers. Mothers would typically be less likely to act negatively or critical in front of a camera than they would in a normal home situation where no one was there to analyze their interactions (Gonzales, Hiraga, & Cauce, 1998). So it is possible that mothers are critical at times in real life, but they sensor their interactions when in front of others, thereby exhibiting less "observed" criticism. To correct this, a more naturalistic observation of mothers and toddlers should be conducted to determine true levels of criticism. Creating a naturalistic experiment with almost no interaction from the experimenter is very difficult though. Another option may be to use a task designed to specifically induce negative evaluations of the toddler by the mother or, as Heyman et al. (1992) did, have the adults criticize the children directly and observe the results.

Another explanation for the lack of criticism occurring in the study is because it is possible that mothers do not interact with their toddlers in very critical or negative manners for the most part. This is unlikely though because general observations in society show that some mothers are at times critical or negative. Although negative interactions occur at times, perhaps they occur relatively infrequently enough that they are hard to capture in an observational study, especially when the mother/toddler interaction is limited to 5 minutes.

Another possibility for the lack of negative evaluations is that mothers did not need to provide many evaluations if their toddlers were doing well on the toy and were fairly competent. The shape-sorting toy was chosen specifically because it would be fairly difficult for the toddlers at 18 months, and in viewing the interactions, there were many toddlers who did struggle with the task. However, the competence of the toddlers with the shape-sorting task was not assessed in the current study, but it may be one aspect to investigate in future research. No matter what the reasons, there were small amounts of negative evaluations observed in the mother and toddler interactions, and that made it difficult to fully judge the relationship that this variable had with toddlers' mastery.

There could also be other explanations for why toddlers' mastery motivation was not associated with mothers' evaluative feedback. Mastery motivation is a very complex concept that changes over children's development (Andrews, 1984). There are many factors that come into account in shaping and determining a toddler's level of mastery. These factors include the toddler's own level of development and cognition, motor ability, and temperament (Yarrow et al., 1984). Other factors include the amount of toys in the home for the toddler to play with, maternal education and job, maternal responsiveness and involvement, and the attachment between mother and toddler (Hron-Stewart, 1990). These are some of the variables that can influence the development of mastery motivation in the toddler, and the mother's interactional style and amount and type of feedback she gives to the toddler while completing tasks is just one small aspect of the many variables that can affect or influence mastery. Although past studies have found a link between mastery motivation and mothers' feedback following attempts at tasks, it is possible that it is more important to look at the full interaction of all maternal variables, rather than mothers' feedback specifically (Heckhausen, 1993). It is possible that

measuring the interactions of these various toddler and maternal variables would better predict mastery in the child rather than simply focusing on one aspect of the complicated development of mastery motivation. Hauser-Cram (1996) believed that the absolute level of maternal stimulation and feedback in the interaction is not the most important aspect, but rather that there is a complex correspondence between certain aspects of maternal behavior and background and specific child outcomes.

Another possibility for why the expected relationship between mastery motivation and maternal feedback was not uncovered might be because negative evaluations of the child might not have the largest effect upon the child's development of internal standards and behavior goals. Other feedback, that may be positive in nature, may have a more direct impact on the developing child. Kelley et al. (2000) actually found that negative evaluations influence 36 month old children's self-evaluations and their resulting emotions, but do not seem to influence early mastery motivation, which was assessed based largely on the persistence of toddlers. In contrast to this, they found that positive evaluations from the mother influence mastery. Further, Barrett and Morgan (1995) found that infants' ages 9 to 22 months tend to be less concerned with others' awareness of their accomplishments or failures and more concerned with simply completing the task, and Rose and Thornburg (1984) found that praise is more effective than criticism in keeping younger participants on task. However, this effect is reversed as the children grow older. Taken together, this research suggests that infants would be less affected by the evaluations and feedback that they receive from their parents when young, and therefore aspects such as mastery motivation would not be as determined by the feedback they receive.

It is also possible that the feedback the toddlers receive at this early age is important, but its influence on mastery and other concepts is not as easily detectable at this time. Perhaps the

effects of early feedback are not manifested until children have developed a clear self-concept, and therefore measuring the mastery motivation of toddlers when young will not show the direct effects of early feedback. It is possible that measuring the mastery motivation a few years later, once the child has standards for behavior and a developed sense of self, will reveal mastery that is related not only to maternal feedback during that time period, but also to maternal behaviors expressed when the child was younger. Longitudinal research involving measurements of children's mastery at later ages with comparisons to mothers' behaviors when the children were toddlers may prove helpful in understanding the relations between mastery and mothers' feedback.

It is also possible that there could be a relationship observed between toddlers' mastery behavior and maternal behaviors if a study would assess both concepts during the same mother/toddler interaction. In the current study, maternal feedback and other behaviors were assessed during an interaction with the toddler in the home. Mothers were providing feedback to their toddlers at that time, however, toddlers' reactions to this feedback and their continued persistence, affect, pride, and engagement with the task were not assessed from that interaction. Instead, the toddlers' mastery was judged on separate tasks with little to no interaction with the mother in a laboratory setting at a later date. If mastery is not directly, or observably, affected by maternal feedback when the child is young, as mentioned above, then it may be best to attempt to observe the child's immediate reactions in terms of persistence, curiosity, and engagement with a task while receiving direct feedback from the mother. This may not provide a true account of the toddler's mastery behavior, which will be expressed in later years, but it may help determine the effects that mothers' feedback and other behaviors have on the toddler immediately.

Another possibility for why mother's feedback did not appear to influence the toddler's development of mastery motivation may be because there are other, more important developmental processes occurring during this time in the toddler's life on which feedback has a larger effect. During the time period of 12 to 24 months, toddlers are beginning to internalize their own standards for behavior, based on the standards that their parents, and in particular, their mother, convey to them (Barrett & Morgan, 1995). It is possible that the feedback that toddlers receive during this important developmental time period is incorporated into the toddlers' developing standards for themselves and their self-concept. In particular, evaluative feedback may contribute most to the standards of behavior of the developing toddler because evaluative feedback, by its very nature, provides a guideline by which the toddler can evaluate his or her actions. The maternal feedback may help develop the child's internal standards of behavior, and the internalization of acceptable behaviors may in turn affect the development of mastery motivation in the growing child. That means that maternal feedback and behavior may directly affect the internalization of standards process, but only indirectly affect the mastery motivation of the toddler. This could account for the lack of relationships found between feedback and mastery in 18 month olds. It is also possible that critical feedback, because of a more negative manner as opposed to evaluative feedback, would more directly influence the mastery of the toddler rather than just the standards of the toddler. But because few instances of critical feedback occurred during the interactions, it is difficult to test this relationship statistically.

There were also no significant correlations found between positive and negative affect of the interaction and toddlers' levels of mastery motivation. There are numerous explanations for why this may be the case. A mother showing positive affect to her son or daughter may be helping to sustain his or her mastery attempts, but it is possible that the affect itself does not

increase any mastery in the toddlers over time. The positive affect can help the child stay more task focused and perhaps persistent during one interaction, but whether that will carry over to other times is questionable (Busch-Rossnagle et al., 1995). It is also possible that negative affect may lessen or hinder mastery motivation in the toddler, but again because there were few interactions with a great deal of negative affect, it was difficult to determine its exact effect in the current study. Further, positive and negative affect was coded in the current study based on whether or not an instance of the affect had occurred during the 30-second interval. This means that even if the mother only smiled or laughed at one point throughout the whole 30 seconds, the interval was noted as containing positive affect. On the other hand, a mother could have displayed numerous instances of negative affect and she would have only received one mark for having displayed negative affect at all. In the future, it may be more helpful to code positive and negative affect in a way, such as frequency coding, that provides a better picture of the true amount of emotional affect that is displayed. With a more sensitive coding system for the emotional variables, it is possible that more correlations might have been gained between emotion and mastery motivation.

There were also no significant correlations found between mastery behaviors of the toddler and the dyadic harmony of the relationship. The harmony of the relationship is determined by the mother's sensitivity to the needs of the toddler and her communication styles with him. Although a harmonious relationship is beneficial to have between mother and toddler, it is possible that a mother who is overcontrolling and less in tune with her child will not negatively affect the mastery motivation of her toddler. Mothers who are more controlling and show greater communication difficulties with their toddlers may not necessarily cause them to have a decreased sense of autonomy and therefore a decreased amount of mastery motivation. It

is possible that some toddlers who find themselves in a situation where mom is extremely controlling and/or insensitive may rebel from the mother's control, therefore gaining in independence and possibly increasing their own mastery motivation as they attempt to discover things on their own (Heckhausen, 1993). It is also possible that the child is focused less on outside people's interactions, and therefore is not as affected by the mother's harmony and relationship style (Barrett et al., 1995). If the toddler disregards what the mother does or says during the interaction, then it is understandable why dyadic harmony may not play the largest role in the development of mastery motivation.

It is also possible that the lack of significance between the primary variables may have been caused by errors in the design of the study. Although the system for coding maternal evaluative feedback and criticism, positive and negative affect, and dyadic harmony was based on past research and changes in the data, the coding system developed was used for the first time in this study and may have not been the most accurate or sensitive measure of maternal evaluation. In an attempt to capture every aspect of true maternal feedback and criticism, the coding system became very complex and in-depth. This resulted in difficulties with reliability and could have quite possibly resulted in a less accurate view of the maternal interaction than hoped for. However, the manual did cover the basic parts of maternal evaluative feedback and criticism, and reliability was reached and maintained throughout the study. Future studies in this area using a similar coding system may benefit from minor changes to the measure though.

Although the current study did not produce the expected link between increased maternal criticism and evaluations and toddler's decreased mastery motivation, it did provide numerous results and findings that can add to the body of knowledge already existing about toddler's development and mother's effects over that important time period. Future studies would benefit

from examining the amounts and types of positive feedback given to toddlers, as well as negative feedback. Adjusting the coding manual slightly and coding emotional affect of the relationship in a slightly different manner may allow for more precise and accurate data that produces correlations about the mother/child interactions. The current study allowed us to take a closer look at the feedback and its effects that a mother gives to her toddler, and the effect that this had on the toddler's development, which truly sets the stage for the rest of the toddler's childhood and life.

References

Alessandri, S. M., & Lewis, M. (1996). Differences in pride and shame in maltreated and nonmaltreated preschoolers. *Child Development, 67*, 1857-1869.

Andrews, D. E. (1984). *Origins of helpless and mastery orientations towards achievement situations among children: Differences in the behavioral profiles of mothers of helpless versus mothers of mastery children.* Unpublished doctoral dissertation, State University of New York, Stony Brook.

Barrett, K. C., & Morgan, G. A. (1995). Continuities and discontinuities in mastery motivation during infancy and toddlerhood: A conceptualization and review. In R. H. MacTurk & G. A. Morgan (Eds.), *Mastery Motivation: Origins, conceptualizations, and applications* (pp. 57-93). Norwood, NJ: Ablex Publishing Corp.

Bayley, N. (1993). *Bayley scales of infant development* (2nd ed.). San Antonio, TX: The Psychological Corporation.

Beck, A. T. (1972). Measuring depression: The depression inventory. In T. A. Williams, M. M. Katz, & J. A. Shields (Eds.), *Recent advances in the psychobiology of the depressive illnesses* (pp. 299-302). Washington, DC: U.S. Government Printing Office.

Biringen, Z. (1990). Direct observation of maternal sensitivity and dyadic interactions in the home relations to maternal thinking. *Developmental Psychology, 26*(2), 278-284.

Boggiano, A. K., & Ruble, D. N. (1986). Children's responses to evaluative feedback. In R. Schwarzer (Ed.), *Self-related cognitions in anxiety and motivation* (pp. 195-227). Hillsdale, NJ: Erlbaum.

Brownell, C. A., & Kopp, C. B. (1991). Common threads, diverse solutions: Concluding commentary. *Developmental Review, 11*, 288-303.

Busch-Rossnagel, N. A., Knauf-Jensen, D. E., & Des Rosiers, F. S. (1995). Mothers and others: The role of the socializing environment in the development of mastery motivation. In R. H. MacTurk & G. A. Morgan (Eds.), *Mastery Motivation: Origins, conceptualizations, and applications* (pp. 117-145). Norwood, NJ: Ablex Publishing, Corp.

Draper, T. W. (1981). Maternal acceptance and mastery motivation in older children: Is task persistence related to socialization. *Journal of Early Adolescence, 1*(3), 311-314.

Dweck, C. S. (1998). The development of early self-conceptions: Their relevance for motivational processes. In J. Heckhausen & C. S. Dweck (Eds.), *Motivation and self-regulation across the life-span* (pp. 257-281). New York: Cambridge University Press.

Eyber, S., Bessmer, J., Newcomb, K., & Edwards, D. (1994). Dyadic parent-child interaction coding system-II: A manual.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1995). *Structured clinical interview for DSM-IV Axis I disorders – non-patient edition (SCID-I/NP Version 2.0).* New York: Biometrics Research Department.

Frodi, A., Bridges, L., & Grolnick, W. (1985). Correlates of mastery-related behavior: A short- term longitudinal study of infants in their second year. *Child Development, 56,* 1291-1298.

Gonzales, N. A., Hiraga, Y., & Cauce, A. M. (1998). Observing mother-daughter interaction in African-American and Asian-American families. In H. I. McCubbinet (Ed.), *Resiliency in African-American families.* (pp. 259-286). London: Sage Publications.

Grolnick, W., Frodi, A., & Bridges, L. (1984). Maternal control style and the mastery motivation of one-year-olds. *Infant Mental Health Journal, 5*(2), 72-82.

Harter, S. (1975). Developmental differences in the manifestation of mastery motivation on problem-solving tasks. *Child Development, 46*, 370-378.

Hauser-Cram, P. (1996). Mastery motivation in toddlers with developmental disabilities. *Child Development, 67*, 236-248.

Heckhausen, J. (1988). Becoming aware of one's competence in the second year: Developmental progression within the mother-child dyad. *International Journal of Behavioral Development, 11*(3), 305-326.

Heckhausen, J. (1993). The development of mastery and its perception within caretaker-child dyads. In D. J. Messer (Ed.), *Mastery motivation in early childhood: Development, measurement and social processes* (pp. 55-79). New York: Routledge.

Heyman, G. D., Dweck, C. S., & Cain, K. M. (1992). Young children's vulnerability to self-blame and helplessness: Relationship to beliefs about goodness. *Child Development, 63*, 401-415.

Hokoda, A., & Fincham, F. D. (1995). Origins of children's helpless and mastery achievement patterns in the family. *Journal of Educational Psychology, 87*(3), 375-385.

Hron-Stewart, K. M. (1990). Relation between mother-child interaction and the emergence of gender differences in mastery motivation. (Doctoral dissertation, University of Illinois at Chicago, 1989). *Dissertation Abstracts International, 51*(2-B), 1014.

Jennings, K. D., Yarrow, L. J., & Martin, P. P. (1984). Mastery motivation and cognitive development: A longitudinal study from infancy to 3 ½ years of age. *International Journal of Behavioral Development, 7*, 441-461.

Jennings, K. D. (1993). Mastery motivation and the formation of self-concept from infancy through early childhood. In D. J. Messer (Ed.), *Mastery motivation in early childhood: Development, measurement and social process* (pp. 36-54). New York: Routledge.

Kelley, S. A., Brownell, C. A., & Campbell, S. B. (2000). Mastery motivation and self-evaluative affect in toddlers: Longitudinal relations with maternal behavior. *Child Development, 71*(4), 1061-1071.

Knauf, D. E. (1998). The role of the socializing environment in the development of mastery motivation: Examining the transition period from 17 to 22 months. (Doctoral dissertation, Fordham University, 1998). *Dissertation Abstracts International, 59*(3-B), 1392.

Lutkenhaus, P. (1984). Pleasure derived from mastery in three-year olds: Its function for persistence and the influence of maternal behavior. *International Journal of Behavioral Development, 7*, 343-358.

Morgan, G. A., MacTurk, R. H., & Hrncir, E. J. (1995). Mastery motivation: Overview, definitions, and conceptual issues. In R. H. MacTurk & G. A. Morgan (Eds.), *Mastery Motivation: Origins, conceptualization, and applications* (pp. 1-18). Norwood, NJ: Ablex Publishing Corp.

Moustakas, C. E., Sigel, I. E., & Schalock, H. D. (1956). An objective method of the measurement and analysis of child-adult interaction. *Child Development, 27*(2), 109-134.

Messer, D. J., McCarthy, M. E., McQuiston, S., MacTurk, R. H., Yarrow, L. J., & Vietze, P. M. (1986). Relation between mastery behavior in infancy and competence in early childhood. *Developmental Psychology, 22*(3), 366-372.

Messer, D. J., Rachford, D., McCarthy, M. E., & Yarrow, L. J. (1987). Assessment of mastery behavior at 30 months: Analysis of task-directed activities. *Developmental Psychology, 23*(6), 771-781.

Rose, S. C., & Thornburg, K. R. (1984). Mastery motivation and need for approval in young children: Effects of age, sex and reinforcement condition. *Education Research Quarterly, 9*(1), 34-42.

Sigelman, C. K. (1999). Achievement motivation. *Life-Span Human Development* (pp. 431-460). New York: Brooks/Cole Publishing Co.

Smiley, P. A., & Dweck, C. S. (1994). Individual differences in achievement goals among young children. *Child Development, 65*, 1723-1743.

Valone, K., Norton, J. P., Goldstein, M. J., & Doane, J. A. (1983). Parental expressed emotion and affective style in an adolescent sample at risk for schizophrenia spectrum disorders. *Journal of Abnormal Psychology, 92*(4), 399-407.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297-333.

Yarrow, L. J., MacTurk, R. H., Vietze, P. M., McCarthy, M. E., Klein, R. P., & McQuiston, S. (1984). Developmental course of parental stimulation and its relationship to mastery motivation during infancy. *Developmental Psychology, 20*(3), 492-503.

Yarrow, L. J., McQuiston, S., MacTurk, R. H., McCarthy, M. E., Klein, R. P. & Vietze, P. M. (1983). Assessment of mastery motivation during the first year of life: Contemporaneous and cross-age relationships. *Developmental Psychology, 19*(2), 159-171.

Yarrow, L. J., Rubenstein, J. L., Pedersen, F. A., & Jankowski, J. J. (1972). Dimensions of early stimulations and their differential effects on infant development. *Merrill-Palmer Quarterly, 18*(3), 205-219.

Vondra, J. I., Barnett, D., & Cicchetti, D. (1989). Self-concept, motivation, and competence among preschoolers from maltreating and comparison families. *Child Abuse and Neglect, 14*(4), 525-540.

Footnote

[1] The Hollingshead (1975) index of social status involves the income, education, and job title of the parents. A higher Hollingshead score indicates a higher SES.

Table 1
Descriptive Statistics

Measure		Min	Max	Mean	Std. Deviat
Proportion of intervals in which positive affect was displayed		0.00	1.00	0.77	0.23
Proportion of intervals in which negative affect was displayed		0.00	0.50	0.02	0.06
Mean score for dyadic harmony		2.17	4.50	3.42	0.46
Mastery Motivation at 18 mo.		-7.70	6.80	0.00	2.61
Verbal corrective feedback summary score		0.00	30.52	9.17	5.03
	Less 2 sec	0.00	28.99	6.39	4.42
	Greater 2 sec	0.00	13.34	2.52	2.16
Nonverbal corrective feedback summary score		0.00	22.16	7.91	4.65
	Less 2 sec	0.00	19.50	5.41	3.94
	Greater 2 sec	0.00	8.96	2.48	1.89
Evaluative feedback summary score		0.00	19.74	6.07	4.14
	Less 2 sec	0.00	18.09	4.62	3.66
	Greater 2 sec	0.00	5.61	0.85	1.19
	No failure	0.00	2.90	0.15	0.45
Negative Criticism of Product Action summary score		0.00	6.34	0.15	0.74
	Less 2 sec	0.00	5.07	0.07	0.48
	Greater 2 sec	0.00	1.73	0.04	0.23
	No failure	0.00	2.47	0.04	0.27
Nonverbal Criticism summary score		0.00	15.51	4.18	3.38
	Less 2 sec	0.00	9.26	1.52	1.66
	Greater 2 sec	0.00	4.28	0.82	1.02
	No failure	0.00	9.31	1.53	1.78
Negative Criticism of Person summary score		0.00	1.27	0.03	0.17
	Less 2 sec	0.00	0.00	0.00	0.00
	Greater 2 sec	0.00	0.93	0.01	0.08
	No failure	0.00	1.27	0.02	0.15

Negative Criticism of Person and Product Action summary score		0.00	0.00	0.00	0.00
	Less 2 sec	0.00	0.00	0.00	0.00
	Greater 2 sec	0.00	0.00	0.00	0.00
	No failure	0.00	0.00	0.00	0.00

Table 2
Intercorrelations of Maternal Behavior

Subscale	1	2	3	4	5	6	7	8
1. Prop. of intervals of pos. affect	-							
2. Prop. of intervals of neg. affect	-0.15	-						
3. Dyadic harmony	0.16	-0.12	-					
4. Verbal corr. feedback	0.05	-0.04	-0.10	-				
5. Nonverbal corr. feedback	-0.06	0.04	-0.16	0.76**	-			
6. Evaluative feedback	0.20*	0.24**	-0.03	0.37**	0.27**	-		
7. Neg. criticism of product action	-0.11	0.77**	-0.14	-0.01	0.10	0.23**	-	
8. Nonverbal criticism	-0.10	0.14	-0.38**	0.14	0.17	-0.01	0.15	-
9. Neg. criticism of person	0.11	0.14	-0.08	-0.12	-0.11	0.02	-0.03	0.04

*$p < .05$.

**$p < .01$.

Table 3
Mastery Motivation and Maternal Behavior Correlations (n = 132)

	Mastery Scores	
Maternal Behavior	Pearson Correlation	Sig. (2-tailed)
Prop. Intervals pos. affect displayed	-0.04	0.64
Prop. Intervals neg. affect displayed	-0.13	0.14
Mean score for dyadic harmony	0.13	0.13
Corrective feedback	-0.10	0.27
Nonverbal corrective feedback	0.02	0.84
Evaluative feedback	-0.02	0.87
Negative criticism of product action	-0.09	0.30
Nonverbal criticism	-0.08	0.37
Negative criticism of person	-0.18	0.04

Appendix

Maternal Evaluation and Criticism Coding Manual
Definition of Criticism: A verbal or nonverbal expression of disapproval, normally involving a negative evaluation, of the child or the child's attributes, activities, products, or choices.

Mother-child interactions should be watched in 15 sec intervals and each interval given a global scale rating. Begin coding for the global scales the first second that ends in either a 0 or 5 after the home visitor presents the toy to mom and child, and mom and child can be observed interacting (experimenter can still be present but must be out of the mother/child's way). Code up to 5 minutes of interaction for the global scales.

Global Affective Scale for Mother

The scale will show whether any positive or negative affect occurred during each 15 sec interval. While watching each 15 sec interval, make a check if any positive affect and negative affect occurs (so even if there is only one instance of positive affect by the mother, still check off that positive affect occurred during that interval). Both positive and negative affect can occur within the same interval, so mark down both if they both occurred. If there are no instances of positive or negative affect within the 15 sec interval, then write N, which stands for a neutral affective tone, in the boxes. Positive affect is characterized by the mother smiling or having a positive or upbeat tone of voice. Negative affect is characterized by a mother being short in her statements, or showing frustration or irritation by possibly raising her voice, frowning, or tongue clicking, etc.

Global Dyadic Harmony scale: Mark which one of these situations occurs for the **majority of the time** during each 15 sec interval.

1- The mother and child are working together intently on the task and are working together well (no resisting on either side or conflicts over what to do with toys). Mother may suggestions about what to do (ex, Should we try that one?).

2- Mother or child seems to impose their ideas/wishes on the recipient and they accept, producing more harmony. Mother may tell the child what to do (ex, "Do this one", "Use that one", "Put the red one in", "Try the next one").

3- Mother or child imposes their idea and child doesn't follow the suggestion or order, but rather goes about with their own actions. This does not lead to more conflict between the two or a disruption of the playing.

4- Mother or child imposes their ideas/wishes on the other and the recipient rejects or resists the action, either physically or emotionally. This rejection can be demonstrated by verbal or physical resistance, a negative affect, crying, frowning, disgust, etc. This interaction thus produces more conflict. Neither participant is able to get along with the other or their directions.

Now, watch mother and child interactions specifically to code the frequency of critical or negative evaluative behaviors. If two of these behaviors occur at the same time, code them both (including verbal and nonverbal corrective feedback). Start coding when you can clearly see the mother and child interacting with one another and the toy.

In coding criticism, statements are considered separate statements and should therefore be coded separately if they are made in reference to different actions by the child, if they are statements

made by the mother that are separated by two seconds or more, or if the mother's statement is an escalation of the previous statement made (for example, mother says, "No, you forgot one", which would be coded as #2. But then she repeats, "You forgot one" in an escalated and negative tone. Even though it was a statement about the same action and despite the fact that the statements were not separated by 2 seconds, the second statement of "You forgot one" will be coded separately as #4 because of the escalation in negativity involved. If the mother simply repeated the statement "You forgot one", without the escalation in tone and manner, then all the statements would be coded together as #2).

If a mother criticizes, evaluates, etc. at the exact same time as the child's behavior, it must still be coded. (ex, after child has been trying to insert toy into piece for over 2 sec, mother says turn it that way just as the child turns it and gets it in the hole. This is still coded because it happened at the same time as the child was performing the behavior).

Criticism Coding Scale

1- **No Criticism Present**: Mother does not make statements to child that have a negative evaluative tone or indicate dislike, disapproval, or lack of support of the child's actions. She does not use the word "No" in telling the child about their actions or in conversation with them. (One exception is for a child's request. In this case a parent could respond with "No" and this is not considered criticism but rather acknowledgement of the child's question).

Mother can make other negative evaluations about objects in the environment, as long as it isn't about the child directly.

2- **Verbal Corrective Feedback**: Mother corrects the child's actions, and provides help or advice on how to complete the task following the correction. Tends to be positive in tone. There is an emphasis made by the mother to explain what the child is doing wrong and help them to do it better. It is a suggestion for future action to the child or an indication of why it was wrong. Examples are "No, that's not where it goes, No, try the blue one."

Mother could also just give corrective or directive feedback, **as long as it occurs after failure**. Examples would be "That's the circle, try the triangle (if child was putting piece in wrong place) or "Push harder" (if child was trying to push the lever and was having difficulty.

3- **Nonverbal Corrective Feedback**: Mother corrects child's actions using nonverbal means. This includes any actions by mother that facilitate the child's actions, such as helping the child twist the piece of toy or pointing or tapping to the correct hole on the toy when the child is at the wrong hole.

Actions are done in a manner of guidance to help the child be successful on the toy, not in a manner of impatience or negativity. Does not include actually taking the toy from them or moving the child's whole arm to the correct area.

4 **Positive Criticism of Product Action**: Mother expresses criticism, either in statements or questions, toward child that is directed toward specific incidents, objects, or products of a child's actions.

The statements negate the child's actions like in constructive feedback, but they do not include any constructive statement afterwards to help the child accomplish the task.

The statements tend to be negative in content but stated with a **positive tone** of voice.

Examples are if a mother just says "No" to indicate the child is wrong, "That's an ugly drawing", "You were putting them in wrong", "You have to put them in or they won't come out".

5 **Negative Criticism of Product Action**: Mother expresses criticism, either in statements or questions, toward child that is directed toward specific incidents, objects, or products of a child's actions.

The statements negate the child's actions like in constructive feedback, but they do not normally include any constructive statement afterwards to help the child accomplish the task. Mother's statement could contain constructive advice and information about future actions and still be considered negative criticism of product action if stated in a clearly negative tone.

The statements tend to be negative in content and also **stated in a negative tone of voice**. Negative tone of voice may include frustration, a sharp tone, sarcasm, etc. Examples are the same as #3.

6 **Nonverbal Criticism**: Includes any body movements, facial expression, or body tension that are of a negative or critical tone toward the child or his actions. The nonverbal actions tend to be forceful, not gentle guidance.

Nonverbal actions may include such things as ignoring the child, mother sighs, and touches child aggressively, etc. Can also include negative intrusiveness such as taking pieces of toys out of child's hands, trying to move child's whole arm, or moving entire toy while child is clearly trying to engage toy (this can not be subtle movement by the

child but must be clear that child was going to play with specific part of toy). Does not include mother shaking her head no. If the child removes his or her hand when mother is trying to help, it is still considered nonverbal criticism.

Mother indicates dissatisfaction with child and may seem to become impatient with them.

7 **Criticism of Person**: Adult makes negative evaluation of child by employing shame or ridicule.

It is personal criticism that is unnecessary or overly harsh and gives references to the child's character or nature. It is also not specific to an action, but meant to generalize to the child's play overall or their personality.

Examples are "You are bad at this toy, obviously you are going to do this wrong".

Does not include criticism that is made "in play", while playing with toys in play talk (ex, You're silly but said in a character's voice).

8 **Criticism of Person and Product Action**: Mother makes negative evaluation of child and child's productions by using shame or ridicule. It includes both a negative evaluation of child and his product action together.

Examples are "You shouldn't talk like that, you are acting like a baby". It is basically 2 criticisms together in one statement.

When criticism occurred: Mark off the child's actions preceding the event. Child could be having no failure, playing for less then 2 seconds before mother made critical remark/gesture,

failing for 2 seconds or more before mother made critical remark/gesture. Mark down whatever situation was occurring prior to the mother evaluating the child.

Failing is defined as the child clearly trying to complete the task, but the child is completing something wrong on the task, such as attempting to put the piece in the wrong hole or trying to remove the piece from the wrong area. If the child is trying to complete the task correctly but is struggling and unable to complete it, such as matching the toy with the right hole but unable to line it up correctly, the action is considered failure if the child was struggling for 2 or more seconds. Failing does not include exploring the toy, or playing with the toy in a different manner then was intended, such as stacking the blocks or banging them. If a child gets a piece in the hole, but it is upside down and will not make the noise, this is not considered failure because they still completed the task. The time spent on the specific task by the child can be counted from the beginning of the child's actions with that particular task (i.e., start counting the seconds they are attempting to place the toy in the hole when they first begin putting the toy there. Even if the mother interrupts or gives corrections about the task, continue with the same counts as long as the child is attempting the same action. Also, even if a child is switching between different holes on the toy or between the bottom or top of the whole, as long as they are attempting the same general thing..in this case to get the toy in the hole, then the child's movements are considered as the same action). If a child is failing at the toy, pauses for 2 sec or more and then resumes the same action again, it is considered a separate action and the time spent on the actions should be separate counts.