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Mothers' Emotions As Predictors of Toddlers' Autonomous Behaviors

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Mothers' Emotions As Predictors of Toddlers' Autonomous Behaviors

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Dedication

In loving memory of my Dad and his optimism, and for Joel whose unconditional love has helped me have all that is good in my life--especially Caleb

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Mothers' Emotions As Predictors of Toddlers' Autonomous Behaviors

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Autonomy is a critical component of early childhood with important implications for children's competence and well-being (e.g., Erikson, 1963; Mahler, Pine & Bergman, 1975; Sroufe & Rutter, 1984). Although parental autonomy support is associated with the development of early autonomy (e.g., Endsley, Hutcherson, Garner & Martin, 1979; Frodi, Bridges & Grolnick, 1985; Landry, Smith, Swank & Miller-Loncar, 2000), the mechanisms underlying these associations are largely unexplored. Mothers' emotions and the affective climate of parent-child interactions may be critical factors by which parenting influences early autonomy. This study (a) examined the degree to which discrete, naturally occurring maternal emotions regulate four indicators of autonomy during toddlerhood: co-regulated goal-directed behavior, low aimlessness, self-assertion, and positive initiative, (b) explored mechanisms through which maternal emotion exerts an influence on children's autonomous behaviors, and (c) isolated the contribution of mothers' emotions to children's autonomous behaviors over that of mothers' autonomy-supportive behavior. Several important findings emerged. First, maternal emotions, both felt and expressed, were related to children's autonomous behaviors--mostly in ways predicted by emotion and relationship theories. In general, mothers' frequent joy and infrequent anger, sadness, and fear predicted high autonomy. Second, the affective climate of mothers' interactions with their toddlers predicted children's autonomous behaviors over and above

mothers' autonomy-supportive behavior, suggesting that parental emotion is a unique aspect of autonomy support. Finally, different forms of early autonomy were predicted by different emotions in mothers, emphasizing the complexity of autonomy and the need to better define and measure this construct.

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Introduction

Autonomy is a critical component of early childhood that has important implications for future competence and well-being (e.g., Erikson, 1963; Mahler et al., 1975; Sroufe & Rutter, 1984). Although parental autonomy support (i.e., collaborating, compromising, negotiating, maintaining children's interests) is associated with the development of early autonomy (e.g., Endsley et al., 1979; Frodi et al., 1985; Landry et al., 2000), the mechanisms underlying these associations are largely unexplored. Mothers' emotions and the affective climate of parent-child interactions may be critical factors by which parenting influences early autonomy. Although this has rarely been studied, there are conceptual and empirical reasons to believe that mothers' emotions regulate children's autonomous behaviors.

Existing research assesses children's autonomous behaviors mostly in relation to aggregated or global measures of mothers' expressed positive or negative affect (e.g., Denham, Renwick & Holt, 1991; Meng, Henderson, Campos & Emde, 1983; Valiente, Eisenberg, Fabes, Shepard, Cumberland & Lasoya, 2004). A few studies examine relations among children's autonomous behaviors and mothers' discrete emotions; however, they analyze contrived, rather than naturally occurring, expressions of maternal emotion (e.g., Jenkins, Franco, Dolins & Sewell, 1995; Klinnert, 1984; Termine & Izard, 1988). To date, no study has analyzed associations between discrete emotions experienced by mothers and children's autonomous behaviors or identified variables through which maternal affect and early autonomy are related. Furthermore, no research has isolated the contribution of mothers' discrete emotions to early autonomy over that of mothers' autonomy-supportive behavior.

The purposes of this study, therefore, were to (a) examine the degree to which discrete, naturally occurring felt and expressed maternal emotions regulate four indicators of autonomy during toddlerhood: co-regulated goal-directed behavior, low aimlessness, self-assertion, and positive initiative, (b) explore mechanisms through which maternal emotion exerts an influence on children's autonomous behaviors, and (c) isolate the contribution of mothers' emotions to children's autonomous behaviors over that of mothers' autonomy-supportive behavior. Five primary questions guided this research: (a) Are mothers' felt and expressed emotions associated with indicators of early autonomy? (b) Do mothers' internal affective states regulate toddlers' autonomy because they influence parenting behavior? (c) Does the affective climate of mothers' interactions with their toddlers predict children's autonomous behaviors because it influences children's emotions? (d) Are associations between mothers' internal affective states and toddlers' autonomous behaviors dependent on mothers expressing these emotions? (e) Does the affective climate of mothers' interactions with their toddlers predict children's autonomous behaviors over and above mothers' autonomy-supportive behavior?

WHAT IS AUTONOMY?

Within the developmental literature, there is disagreement about what autonomy means. Across theoretical frameworks, no universal conception of autonomy's essential elements has emerged (Ryan, Deci, Grolnick & La Guardia, 2006). Autonomy has been conceptualized as an innate, biological drive necessary for survival (White, 1959), a sense of self as separate from others and capable of independent functioning (Erikson, 1963; Mahler et al., 1975; Spitz, 1957), and the experience of freedom that comes from initiating and authentically endorsing one's actions (Deci & Ryan, 1985). Accordingly, myriad terms are used to typify early autonomy. Most commonly, it is measured as independence, exploration, mastery motivation, self-assertion, initiative, agency, self-

reliance, goal-directed behavior, internalization, or self-regulation (e.g., Dix, Stewart, Gershoff & Day, 2007; Endsley et al., 1979; Landry et al., 2000; Mahler et al., 1975; Stayton, Hogan & Ainsworth, 1971). Despite variability in labels and behaviors, however, several key elements recur in definitions of early autonomy. Its central components appear to be (a) self as a locus of control, (b) perceptions of self-efficacy or competence, (c) ability to be self-regulating on developmentally appropriate tasks, (d) intrinsic motivation to explore and manipulate, and (e) persistence and frustration tolerance.

First, autonomy describes motivation and behavior that reflects the interests or motives of the individual, that is, *the self is the locus of causality* (e.g., deCharms, 1968; Heider, 1958). Autonomous individuals act, not due primarily to external pressures, but to self-generated ideas, motives, and goals in which they believe (Ryan, Kuhl & Deci, 1997). The diverse terms used to characterize early autonomy reflect this core principal of *the self as a locus of causality*. Despite an emphasis on the self, healthy autonomy occurs within the context of relationships with others (Lamb, Thompson, Gardner & Charnov, 1985; Ryan et al., 1997).

Second, autonomous individuals perceive themselves to be efficacious: separate from others and capable of independent choices, actions and effects. Even if another person suggests behavior, it can be autonomous if children embrace it as congruent with their own preferences and agendas (Bandura, 2006; Deci & Ryan, 1985). For example, young children may accept suggestions or help from others when it facilitates the achievement of their goals.

Third, autonomous individuals have the ability to be self-regulating on developmentally appropriate tasks. They resist help when it is unnecessary because they believe themselves to be capable (e.g., Shell & Eisenberg, 1996). Fourth, autonomous

individuals are intrinsically motivated to explore, manipulate objects, and master tasks (White, 1959). They are biologically primed to function adaptively across environments. Finally, they have the persistence and frustration tolerance necessary to pursue their goals (Ryan et al., 1997). Autonomous individuals are able to self-regulate around obstacles to realize ideas and achieve outcomes.

In the present study, early autonomy was measured as children's goal-directed behavior, low aimlessness, self-assertion, and positive initiative. These behaviors embody the core principals of early autonomy. All four reflect the interests and motives of the child or emphasize the self as a locus of control. Goal-directed behavior and low aimlessness specifically capture children's intrinsic motivation to purposefully explore. Self-assertion and positive initiative reflect children's perceptions of themselves as capable and able to be self-regulating on developmentally appropriate tasks. Finally, they all indicate that children have the persistence necessary to pursue their goals. Thus, these behaviors were considered indicators of the larger construct of early autonomy. As such, it was expected that they would be predicted similarly by other variables in the study.

Despite their similarities, however, these four measures capture distinct nuances of early autonomy as well. Goal-directed behavior was measured dyadically and involved cooperation between children and mothers working together toward children's goals. Low aimlessness gauged children's abilities to focus and engage independently in purposeful activity, while self-assertion assessed children's resistance to comply with mothers' requests. Finally, positive initiative measured children's attempts to initiate interactions with their mothers solely to connect with them. Given these differences, a secondary goal of this study was to explore whether unique relations with maternal emotions might distinguish these forms of early autonomy from one another.

THEORETICAL SUPPORT FOR THE PRESENT STUDY

How and why might the affective climate of parent-child interactions influence children's autonomy? Two groups of theories informed hypotheses for the present study: emotion theories and relationship theories.

Emotion Theories

Children come into the world biologically prepared to understand and engage in emotional communication with others (Gopnik, Meltzoff & Kuhl, 1999). Infants so expect parents to engage with them emotionally that they become distressed when mothers present a neutral face during mother-child interactions (e.g., Striano, 2004). Similarly, infants work to reestablish emotional synchrony with parents who affectively distance themselves during parent-child interactions (Tronick, 1989).

Emotion theories suggest that discrete emotions have unique motivational characteristics. Once activated, they organize particular cognitive processes and behaviors (Izard, 1971, 1977, 1991). The effects of emotion can vary depending on whether one is experiencing an emotion or receiving an emotion being expressed by another. For example, anger activates the person experiencing it to regain control over events; it also inhibits behavior in others by intimidating the receiver (Frijda, 1986). Sadness typically activates withdrawal (Frijda, 1986). It can also inspire sympathy, however, motivating the receiver to reach out to the person experiencing the sadness and bringing people closer together (Izard & Ackerman, 2000). The effects of some emotions are more general. For example, fear functions to protect; it activates avoidance or withdrawal in both the person experiencing it and the person receiving it (Frijda, 1986). Similarly, joy universally enhances bonds with others and elicits attention and participation (Frijda, 1986).

Emotion theories imply three pathways through which maternal emotion may influence children's autonomous behaviors. First, the emotions mothers express are information that may directly encourage or inhibit children's tendencies to act autonomously. Parents' affective responses provide children with critical information about the world and their behavior (Bandura, 1977; Campos & Stenberg, 1981). From early infancy, children recognize and differentiate facial expressions of emotion (e.g., LaBarbera, Izard, Vietze & Parisi 1976; Young-Brown, Rosenfeld, Rosenfeld & Horowitz, 1977). Young children believe themselves to be the cause of mothers' expressed emotions (Covell & Abramovitch, 1987), and they use mothers' facial expressions to guide their behavior (e.g., Caron, Caron & McLean, 1988; Haviland & Lelwica, 1987; Sorce, Emde, Campos & Klinnert, 1985). Especially in ambiguous situations, children regulate their behavior by reading affective messages from their mothers (Gunnar & Stone, 1984; Sorce et al., 1985). For example, one-year-olds whose mothers smile in response to a novel toy crawl toward it to investigate; infants whose mothers express fear in response to a novel toy work to avoid it (Hornik, Risenhoover & Gunnar, 1987). Similarly, infants faced with a visual cliff either proceed over the cliff or stop crawling at its edge based on facial cues from their mothers (Sorce et al., 1985).

It has been suggested that mothers' negative emotions in particular may inhibit early autonomy (e.g., Erikson, 1963; Mahler et al., 1975; Stern 1985). Research supports this proposition. For example, maternal anger is negatively associated with the degree to which young children initiate play activities (Cummings, Pellegrini, Notarius & Cummings, 1989; Denham, 1989), and maternal sadness is negatively associated with the degree to which children explore, play constructively, and persist at tasks (Kelley & Jennings, 2003; Jenkins et al., 1995). Maternal fear motivates children to stay close to their mothers, inhibiting exploration (Klinnert, 1984). Similarly, young children take

longer to initially touch an object and play less with that object when negative affect has been expressed about that object than when neutral or positive affect has been expressed about it (Hertenstein & Campos, 2004; Repacholi & Meltzoff, 2007). Children whose mothers express frequent negative emotions are less effective at solving problems (Meng et al., 1983; Valiente et al., 2004), spend less time in exploratory play (Sorce & Emde, 1981; Termine & Izard, 1988) and are less assertive (Denham et al., 1991) than children whose mothers express positive emotions. Negative maternal emotion also seems to affect children's self-regulation; children whose mothers express frequent negative emotion demonstrate low persistence, poor focus of attention during tasks, and low inhibitory control (Eisenberg et al., 2001; Eisenberg et al., 2003). Similarly, toddlers whose mothers express frequent negative emotions are less able to self-soothe than toddlers whose mothers express frequent positive emotions (Garner, 1995). Most importantly, when infants use negative cues from their mothers to appraise novel events, people and toys, the negative effects last beyond the immediate event (e.g., Feinman & Lewis, 1983; Hornik et al., 1987). Up to an hour after an experimenter has ceased expressing negative affect about a toy, infants continue to avoid the toy (Hertenstein & Campos, 2004). Thus, negative maternal emotion immediately thwarts children's autonomous behaviors; it may also have lasting effects that create pervasive patterns of non-autonomous behavior in children over time. In the present study, it was hypothesized that mothers' felt and expressed joy would predict high autonomy in toddlers, while mothers' felt and expressed sadness, anger, and worry would predict low autonomy in toddlers.

Second, the emotions mothers experience may influence the extent to which they display behavior that supports children's autonomy. Autonomy-supportive parenting behavior is generally defined as "the readiness of a person to assume another's

perspective and to facilitate self-initiated expression and action" (Ryan & Solky, 1996, p. 252). Positive affect is thought to facilitate parents' abilities to engage in autonomy-supportive behavior (e.g., Crockenberg & Litman, 1990; Dix, Gershoff, Meunier & Miller, 2004; Grolnick, Frodi & Bridges, 1984; Frodi et al., 1985). It is believed to set an emotional tone that promotes safety and affiliation, which are conducive to exploration and self-assertion (Carr, Dabbs & Carr, 1975). Furthermore, it has been suggested that experiencing low levels of negative emotion during interactions with children allows parents to engage in behaviors critical to autonomy support such as negotiating and reasoning with children (Denham et al., 2000). Indeed, mothers who experience negative emotion are less likely to be supportive during interactions with their children than mothers who experience positive emotions (e.g., Crockenberg, 1985; Crockenberg & Litman, 1990; Dix, 1991; Dix et al., 2004; Grolnick et al., 1984; Frodi et al., 1985). In the present study, it was hypothesized that mothers' felt emotions would predict children's autonomous behaviors because they influence mothers' autonomy-supportive behavior.

Third, emotion theories suggest that mothers' expressed emotions may induce in children emotions that either promote or inhibit children's autonomous behaviors (Frijda, 1989; Izard, 1971, 1977, 1991). Emde (1983) suggests that children's experiences with their mothers bias children with tendencies to experience certain emotional states. Overall, mothers' positive and negative emotions are highly correlated with children's positive and negative emotions (Denham, 1989; Isley, O'Neil, Clapfelter & Parke, 1999). For example, infants respond to mothers' facial expressions of sadness or joy with their own facial expressions of sadness or joy (Termine & Izard, 1988). Negative affect is especially contagious; children exposed to an experimenter's negative affect via a television show increase their negative affect from a neutral baseline trial, while infants exposed to an experimenter's positive affect decrease their negative affect (Mumme &

Fernald, 2003). There is evidence that such affective synchrony between mothers and infants predicts self-control during toddlerhood (Feldman, Greenbaum, and Yirmiya, 1999; Kochanska, 1993).

Responsive parents promote early autonomy by encouraging emotional expressiveness in their children. They create an environment where children feel safe expressing a wide range of emotions, including anger, and communicating their needs without fear of rejection (Ainsworth et al., 1978; Erikson, 1963; Sroufe, 1995). This freedom allows young children to experience control and practice self-regulating their emotions and actions.

Experiencing joy is considered essential to the development of early autonomy (Deci, 1992). Indeed, toddlers who experience sadness engage in low levels of exploratory play, and the quality of their play is compromised (Termine & Izard, 1988). This is consistent with emotion theories, which propose that joy activates participation and motivation to explore, while sadness activates withdrawal (Frijda, 1986).

Feelings of anger, however, may also accompany early autonomy. By age two, children begin to assert themselves because they understand that they are separate individuals capable of controlling events (Erikson, 1963; Mahler et al., 1975; Spitz, 1957). Toddlers characteristically resist, even defy, parents as a means of advancing their own agendas, and they express anger as they negotiate control with parents (Kagan, 1981; Kopp, 1982). This is consistent with emotion theories that suggest that anger activates the person experiencing it to gain control over events (Frijda, 1986).

There is evidence that relations between maternal emotion and children's behavior are sometimes mediated by children's affect (Isley et al., 1999). Isley and colleagues (1999) demonstrate that associations between mothers' positive affect and young children's peer competence depend upon children's expressions of positive affect.

Although their study is not directly related to early autonomy, it lends credence to the supposition that mothers' emotions may induce in children emotions that either promote or inhibit children's autonomy-related behaviors. In the present study, it was hypothesized that mothers' expressed emotions would predict children's autonomous behaviors because they influence children's emotions.

Thus, emotion theories suggest that felt and expressed maternal joy will be associated with high autonomy in toddlers, while felt and expressed maternal anger, sadness and worry will be associated with low autonomy in toddlers. In addition, emotion theories suggest two mechanisms through which maternal emotion may exert an influence on children's autonomous behaviors. First, mothers' *felt* emotions may regulate children's behaviors because they influence mothers' autonomy-supportive behavior. Second, mothers' *expressed* emotions may regulate children's behaviors because they influence children's emotions.

Relationship Theories

Relationship theories, such as attachment theory (Bowlby, 1969) and psychosocial theory (Erikson, 1950), also imply pathways through which maternal emotion may influence children's autonomous behaviors. First, relationship theorists assert that mothers who communicate warmth and acceptance (emotional availability) during interactions with their children create a safe and validating context for autonomy to naturally unfold (e.g., Ainsworth, Bell & Stayton, 1974; Bowlby, 1969; Erikson, 1950; Mahler et al., 1975; Stern, 1985; Tronick, 1989). Maternal emotional availability influences the extent to which children feel safe venturing away from their mothers. Emotionally available mothers encourage children to explore, pursue their own interests and control the direction of their behavior (Bell & Ainsworth, 1972; Bretherton, 1987; Mahler et al., 1975). Sorce & Emde (1981) suggest that toddlers rely on facially

expressed, positive maternal affect to indicate their mothers' emotional availability. Indeed, in an unfamiliar play situation, toddlers position themselves so that they can see their mothers' faces; it appears they need to confirm their mothers' emotional availability before feeling safe to explore (Carr et al., 1975).

Second, mothers' emotional displays may function to regulate attachment behavior (Gilbride, 1988; Gunnar & Stone, 1984), which is related to early autonomy. In particular, joy is believed to promote secure attachment (Buechler & Izard, 1983; Izard, Haynes, Chisholm & Baak, 1991). Secure attachment is associated with toddlers' independent problem solving, persistence, emotional expressiveness, and other autonomy-related competencies (e.g., Frankel & Bates, 1990; Frodi et al., 1985; Maslin-Cole, Bretherton & Morgan, 1993; Matas, Arend & Sroufe, 1978; Sroufe, Fox & Pancake, 1983).

Third, relationship theories suggest that the positive affect demonstrated by responsive caregivers encourages synchrony and cooperation between parents and their children (e.g., Kochanska, 1997). In turn, this dyadic attunement promotes self-regulatory capacities in young children by providing a context in which young children can function on their own without sacrificing emotional connectedness to caregivers (Harrist & Waugh, 2002; Kochanska, 1997). Harrist and Waugh (2002) propose that synchrony with caregivers also promotes a sense of effectance in children by increasing the likelihood that children's self-initiated actions are realized, thereby empowering children to be increasingly self-regulating.

Although research has not examined the mediating roles that emotional availability, attachment status and dyadic synchrony might play in associations between mothers' emotions and early autonomy, relationship theories suggest that these may be mechanisms through which maternal emotions influence children's autonomy. Thus, like

emotion theories, relationship theories suggest that felt and expressed maternal joy will be associated with high autonomy in toddlers, while felt and expressed maternal anger, sadness and worry will be associated with low autonomy in toddlers.

MOTHERS' EXPRESSED EMOTIONS AS MEDIATING VARIABLES

Emotion theories imply that the mechanisms responsible for relations between maternal emotion and children's autonomy are different for mothers' felt and expressed emotions. In this study, mothers' expressed emotions are expected to regulate children's autonomy because they influence children's emotions, while mothers' felt emotions are expected to regulate children's autonomy because they influence mothers' autonomy-supportive behaviors. Emotion regulation theories support another possibility: Mothers' expressed emotions may mediate associations between mothers' felt emotions and children's autonomy.

Emotion regulation refers to controlling behavioral manifestations of emotion such as facial expressions and tone of voice (Eisenberg, Fabes, Guthrie & Reiser, 2000). Emotion regulation is considered essential to effective parenting; parents who are unable to modulate their emotions cannot maintain supportive engagement with their children (Belsky, 1984; Dix, 1991). Researchers suggest that parents' abilities to regulate their emotions during interactions with their children may be directly related to children's self-efficacy and self-regulatory skills (Lamb, 1981; Gianino & Tronick, 1988; Tronick, 1989). Caregivers who can regulate their emotions help children transform negative affect into positive affect during dyadic mismatches. When interactions between parents and children become asynchronous, children experience distress (Tronick, Ricks & Cohen, 1982). Emotion regulation allows parents to respond sensitively to children during mismatches and restore synchrony. As synchrony is restored, children learn to control their distress. This reparation process helps children see themselves as effective

and caregivers as reliable (Gianino & Tronick, 1988; Tronick, 1989). Conversely, caregivers who are unable to regulate their emotions respond less sensitively and impede children's attempts to restore positive emotional connections with parents during distressing interactions. In turn, feelings of helplessness arise in children, jeopardizing the development of positive self-schemata and self-regulation (Lamb, 1981).

There is evidence that mothers' felt and expressed emotions often do not match, suggesting that mothers attempt to regulate expressed emotions during interactions with their children (Martin, Clements & Crnic, 2002). Only one study has simultaneously examined associations among mothers' felt and expressed emotion and children's autonomous behavior. Kelley & Jennings (2003) report that associations between mothers' felt sadness and depression and children's helplessness depend upon whether mothers express negative emotion during interactions with their children. Children of mothers who report feeling sad and depressed only demonstrate helplessness if their mothers express negative emotions during interactions with them (Kelley & Jennings, 2003). This study suggests that mothers' expressed emotions mediate associations between mothers' felt emotions and children's autonomous behaviors. In the present study, it was hypothesized that mothers' felt emotions would be associated with autonomy in toddlers only if mothers expressed these emotions.

THE AFFECTIVE CLIMATE VERSUS MOTHERS' AUTONOMY-SUPPORTIVE BEHAVIOR

Although a positive affective climate is believed to be autonomy-supportive (e.g., Crockenberg & Litman, 1990; Frodi et al., 1985, Grolnick et al., 1984), no research has isolated the contribution of mothers' emotions over mothers' autonomy-supportive behaviors to the development of early autonomy. This was a goal of the present study. The most salient feature of the affective climate is the emotions parents express during interactions with their children (Halberstadt, 1986). Thus, in the present study, mothers'

expressed emotions were used as a measure of the affective climate of parent-child interactions.

The affective climate of parent-child interactions is considered an essential element of parenting, with significant influence on children's development (e.g., Darling & Steinberg, 1993; Dix, 1991; Maccoby & Martin, 1983). Indeed, a positive affective climate is correlated with positive developmental outcomes during early childhood, including socio-emotional competencies, language achievement, attachment security, and positive behavioral adjustment (e.g., Denham, Mitchell-Copeland, Strandberg, Auerbach & Blair, 1997; Denham et al., 1991; Kochanska, Askan & Koenig, 1995; Nicely, Tami-LeMonda & Bornstein, 1999). Conversely, a negative affective climate is associated with problematic outcomes for children, including behavioral difficulties and less optimal adjustment (e.g., Denham et al., 2000). These studies, however, do not specifically examine autonomy or account for the role of emotion independent of parenting behavior.

There is evidence that the affective quality of an interaction, especially when negative in tone, can be more salient than the behavioral aspects of an interaction. For example, children are hesitant to approach an adult whose tone of voice is negative, even if the adult uses friendly gestures (Volkmar & Siegel, 1979). Similarly, children rate interactions with adults as negative when they perceive the affective content of the interactions to be negative, even if adults display positive behavior (Bugental, Kaswan & Love, 1970). One study suggests that the affective quality of an interaction may be related to children's autonomous behaviors more than parents' autonomy-supportive behaviors. Kelley and colleagues (2000) report that children demonstrate more persistence when mothers provide feedback about their actions that is positive in tone, even if it is negative in content (Kelley et al., 2000). In the present study, it was hypothesized that the affective climate of mothers' interactions with their toddlers would

predict children's autonomous behaviors over and above mothers' autonomy-supportive behavior.

HYPOTHESES

This study was designed to (a) examine the degree to which felt and expressed maternal emotions regulate four indicators of autonomy during toddlerhood: co-regulated goal-directed behavior, low aimlessness, self-assertion, and positive initiation, (b) describe mechanisms through which maternal emotion exerts an influence on children's autonomous behaviors, and (c) isolate the contribution of mothers' emotions to early autonomy over that of mothers' autonomy-supportive behavior. Five primary hypotheses were tested. In addition, this study explored whether unique relations with maternal emotions might distinguish different forms of early autonomy from one another.

- **Hypothesis 1**: Felt and expressed maternal joy predicts high autonomy in toddlers, while felt and expressed maternal anger, sadness and worry predict low autonomy in toddlers.
- **Hypothesis 2**: Mothers' expressed emotions predict children's autonomous behaviors because they influence children's emotions.
- **Hypothesis 3**: Mothers' felt emotions predict children's autonomous behaviors because they influence autonomy-supportive parenting behavior.
- **Hypothesis 4**: Mothers' felt emotions predict autonomy in toddlers only if mothers express these emotions.
- **Hypothesis 5**: The affective climate of mothers' interactions with their toddlers predicts children's autonomous behaviors over and above mothers' autonomy-supportive behavior.

Methods

PARTICIPANTS

122 mothers and their 14 to 27 month old children participated in this study. They were recruited from birth announcements in the daily newspaper (60%) and advertisements in a free weekly paper (40%). On average, mothers were 31 years old. Forty-one percent had completed only high school, 14% had some college, 38% completed college, and 6% had graduate or professional degrees. Two-thirds of the participants worked outside of the home. Average annual family income was in the $30,000- $39,000 range. Ninety percent of mothers were Caucasian American, and ten percent were African American. There were roughly equal numbers of male (*n* = 61) and female (n = 57) children. Mothers were paid $35 for their participation.

PROCEDURE

Mothers interacted with their children in a university laboratory for 20 minutes. The interaction was divided into three parts: (a) a 5-minute waiting period, (b) a 10-minute play period, and (c) a 5-minute clean up time. During the 5-minute waiting period, mothers were asked to complete a questionnaire while an experimenter collected age appropriate toys. During this time, mothers had to divide their attention between questionnaires and children who had nothing to do. Mothers were then asked to play with their children for 10-minutes. Four "forbidden toys" were set up in the playroom, and mothers were asked to keep children from playing with these toys. For the last five minutes of the session, mothers were asked to have their children help them clean up the playroom. During all three periods, the playroom contained a variety of objects that could be problematic with young children, including eyeglasses, paper towels, a television, boxes of tissue, a sealed jar of candy, a pitcher of water, a stack of drinking cups, a

videocassette recorder, and stacks of videotapes and papers. Three cameras recorded interactions from behind a one-way observation mirror. One camera provided a view of the entire mother-child interaction. Two other cameras provided close-up views of the mother's and child's faces so that their facial expressions could be coded in detail.

MEASURES

Mothers' Felt Emotions

Mothers completed a tape reviewing procedure adapted from Gottman and Levinson (1985). After the 20-minute interaction, mothers watched a tape of that interaction. They used an emotion dial, comprised of an 11-point scale ranging from –5 (extremely negative emotion) to 0 (no emotion) to +5 (extremely positive emotion), to indicate when emotions occurred. Each time mothers moved the emotion dial, interviewers paused the tape and asked them to describe how they were feeling at that moment and why. Mothers were asked to choose from six sets of basic emotion words the set that best described their feelings in a given moment: (a) angry or irritated, (b) worried, concerned or fearful, (c) sad or disappointed, (d) guilty, (e) joyful, pleased, happy, or relieved, and (f) interested or positively focused. These six sets of words were chosen because they correspond to basic emotions that tend to occur in early parent-child interactions. Mothers' reports about why an emotion occurred were then coded as either parent- or child-oriented. Emotions were considered parent-oriented when mothers said that they experienced emotions out of concern for things of interest principally to mothers rather than to children. Emotions were coded parent-oriented, for example, when a mother said that she felt pleased because her child was playing without spilling. Emotions were considered child-oriented when mothers said that they experienced emotions out of concern for the child's welfare or things of interest principally to their children. Responses were coded child-oriented, for example, when a mother said that she felt

pleased that her child was excited about an activity. Guilt was not included in analyses because it occurred infrequently, and interest was not included in analyses because it was not central to the study's hypotheses. This procedure has been used successfully to demonstrate predictable associations among mothers' concerns, emotions and parenting behaviors (Dix et al., 2004).

Mothers' and Children's Expressed Emotions

Across the 20-minute interaction, mothers' and children's expressed emotions were videotaped using two separate cameras with lenses that provided close-up, full-face records. A third camera recorded the whole interaction. Facial expressions were coded using the AFFEX facial coding system (Izard, Dougherty & Hembree, 1983). Coders independently assessed the facial musculature of two zones of mothers' and children's faces (upper and lower). Facial emotion codes are created in the AFFEX system by combining the data from these two zones. Pure emotions were coded when mothers and children communicated the same emotion in both zones. Twenty-four percent of the emotions expressed by mothers were pure. Joy was considered a positive emotion. Anger, sadness and worry were considered negative emotions. Children's worry, however, occurred too infrequently to be analyzed. Several other pure emotions for both mothers and children were coded (e.g., interest, surprise and guilt) but not included in analyses either because they occurred infrequently or they were not central to the hypotheses of the current study. Analyses also did not include instances when the mother or child's face was 50% or more obscured. To establish inter-rater reliability, two coders assessed 22% of the videotapes. Average real-time agreement between coders was very good for both mother and child coding (82% and 84% respectively). The AFFEX system is well validated and widely used (e.g., Chisholm & Strayer, 1995; Izard et al., 1983; Termine & Izard, 1988).

Mothers' Autonomy-supportive Behavior

Autonomy-supportive behavior was defined as maternal action that supported children's immediate wants, interests, and intentions (Dix et al., 2004). Every 5 seconds, mothers' received one of five behavioral codes. Three codes (high synchrony, asynchrony, and restrictiveness) represented behaviors related to support. High synchrony was coded when mothers' behaviors contingently supported children's wants and intentions. Asynchrony indicated maternal behavior that was either unrelated to children's intentions or resisted what children wanted. Restrictiveness was coded when mothers attempted to get children to conform to maternal standards of behavior. These three behaviors were the basis of all predictions based on this code. Two other codes (low synchrony and watching) were coded to enable the code to be mutually exclusive and exhaustive, but these codes did not yield clear information about mothers' support for children's intentions. Watching involved no action toward the child, and low synchrony was coded when there was joint activity between mothers and their children, but children's intentions within that activity were not clearly supported. Three coders were trained to use the supportive behavior code. On 20% of the videotapes, their agreement was good (κ = .71). Demonstrated relations with low depression, positive maternal emotions, and child-sensitive emotional reactions to children support the validity of this measure (Dix et al., 2004). In the present study, a single variable comprised of high synchrony minus asynchrony was used in all analyses to represent mothers' autonomy-supportive behavior. High synchrony and asynchrony were significantly and negatively related (B = -1.86; SE = .241; p = .001). This single variable was created to reduce the number of analyses needed to test hypotheses.

Children's Self-assertion

Observers coded children's responses in the five seconds following each maternal request to clean up or avoid the forbidden toys. Four primary responses were coded: eager compliance, passive non-compliance, simple refusal, and defiant non-compliance. Eager compliance was coded when children complied without protesting, showing frustration, or asking mothers to share the task. Passive non-compliance was coded when children failed to perform the requested behavior without comment, resistance, or an other-directed behavior of any kind. Simple refusal indicated that children did not do what their mothers asked, although they clearly indicated that they had heard and understood their mothers' requests. Defiant non-compliance was coded when children did not perform the requested behavior and emitted overt verbal or nonverbal refusal or opposition accompanied by anger or aggression. Two other types of compliance (passive coerced and fussy coerced) were coded, but were not used, because they were defined by parental control techniques rather than children's response tendencies. Percentages of each type of compliance-related behavior were figured based on the total number of requests made by mothers to their children over the entire interaction. Inter-rater agreement for this code was good ($\kappa = .65$). In the present study, subtracting defiant non-compliance from passive non-compliance created a single variable that was used to represent children's self-assertion. Passive non-compliance and defiant non-compliance were significantly and negatively related ($B = -2.65$; SE = .571; $p = .001$). This single variable was created to reduce the number of analyses needed to test hypotheses. Signs on coefficients were reversed so that reported results reflected high rather than low autonomy.

Children's Goal-directed Behavior

An event code was developed that measured the length of time children engaged in self-initiated, goal-directed behavior during the 5-minute waiting period. Children were considered goal-directed when they were both visually focused on an activity and participating in that activity. Five principal behaviors were coded. *Goal-directed independent* behavior was coded when the child's behavior was goal-directed, and there was no interaction with the mother. *Goal-directed joint* behavior was coded when the child's behavior was goal-directed and both the child and mother were engaged in the behavior. *Aimlessness* was coded when children walked around the room without purpose or looked at objects without acting on them. *Mother-child conversation* was coded when the child's only goal was to speak to the mother. *Goal-directed watching* was coded when the child and mother were cooperating toward a goal, but the child's role in the interaction was simply watching the mother. Analyses did not include instances when children were off camera, their gaze could not be determined, or the experimenter was in the room. They also did not include instances where the child was eating, distressed, seeking comfort, or being redirected by the mother to behave in socially desirable ways. To assess inter-rater reliability, 25% of the videotapes were doubly coded. Average agreement was calculated by computing the total number of seconds across the interaction in which the two coders recorded the same child behaviors and dividing that number by the total number of seconds in the interaction as a whole. Average agreement between the two coders was very good (85%). In the present study, subtracting goal-directed joint behavior from goal-directed independent behavior created a single variable that was used to represent children's co-regulated goal-directed behavior. Goal-directed independent and goal-directed joint were significantly and negatively related (B = -2.14; SE = .063; p = .001). This single variable was created to reduce the number of analyses

needed to test hypotheses. It measured the positive, cooperative nature of the dyad in working toward children's goals. Signs on coefficients were reversed so that reported results reflected high rather than low autonomy.

Children's Positive Initiative

Children's attempts to initiate interactions with their mothers were coded. Only instances when the child initiated interaction with the mother when her participation was not necessary were coded (i.e., holding toys out to mother, commenting on toys, sharing activities). Responding to mothers' verbalizations and requesting mothers' help were not considered initiations. Initiation was assessed across the entire 20-minute interaction, but only following mothers' responses to children's smiles. This was done to assure that children were positively attending to their mothers and not engaged in purely independent activity. To assess inter-rater reliability, two people coded 25% of the tapes. Agreement between coders was good ($\kappa = .80$). Relations with low depression and child-sensitive behavioral reactions to children support the validity of this measure (Dix, Cheng & Day, 2009).

Results

Basic Statistics

Basic statistics for all variables are displayed in Table 1. On average, mothers and children engaged frequently in co-regulated goal-directed behavior. Children spent much less time being aimless. Self-assertion occurred more often than positive initiative. Joy was the most frequently reported felt emotion for mothers and the most frequently observed expressed emotion for both mothers and children. Mothers reported experiencing anger, sadness and worry infrequently. Mothers and children also expressed

these emotions infrequently. On average, mothers demonstrated high levels of autonomy-supportive behavior.

OVERVIEW OF ANALYSES

All variables in this study were frequencies or count data. As such, they were predictably skewed. Poisson regression analysis was used to analyze the data because it is the analysis of choice for counts (Cameron & Trivedi, 1990). For each dependent variable, the total number of opportunities to obtain a given count was entered into the regression equation as a control variable. For example, when high synchrony was the dependent variable, the total number of valid intervals of coded maternal behavior was entered into the regression equation as a control. For independent variables, percentages were used to control for the total number of opportunities to obtain a given score. For example, when maternal joy was the independent variable, it was entered into the regression equation as a percentage of the total number of maternal emotions reported.

The four dependent variables were modestly predictive of one another and mostly in expected ways (See Table 2). Relations among them were explored using principal components analysis with un-rotated factors to determine whether they should be aggregated into one or more factors. No Eigenvalues were over one, and the uniqueness of each variable was greater than .70; thus, meaningful factors did not emerge. Bivariate regression analyses also revealed that the dependent variables were predicted uniquely by other variables in the study. Thus, the four dependent variables were analyzed separately.

Four types of independent variables were included in analyses: (a) mothers' felt emotions (b) mothers' expressed emotions, (c) mothers' supportive behavior and (e) children's expressed emotions. Relations within these sets of variables were also explored using principal components analysis with un-rotated factors to determine if emotions should be aggregated. Again, no meaningful factors emerged, and bivariate regression

analyses revealed that singular maternal emotions predicted the four autonomy measures differently. Thus, emotion variables were also left un-aggregated.

To compensate for the large number of analyses conducted relative to the study's sample size, patterns of significance rather than significant individual coefficients were examined to ensure that the data were not over interpreted. In other words, for a given set of analyses, the ratio of significant findings to the total number of possible findings was examined. The resulting percentage was then compared to what would be expected for that number of analyses by chance. Findings for any set of analyses were considered meaningful only when the number of significant findings for that set clearly exceeded what would be expected by chance, and the pattern of data made conceptual sense.

PRELIMINARY ANALYSES

Bivariate Poisson regression analyses were used to investigate associations between each variable and five demographic variables: (a) child's age, (b) child's sex, (c) mothers' education level, (d) family's income, and (e) family's socioeconomic status. All results reflect the inclusion of these control variables in analyses. Relations among control variables and all other variables are presented in Table 3.

Several sets of multivariate Poisson regression analyses were run to obtain coefficients needed to test mediational hypotheses. First, relations among mothers' felt and expressed emotions were investigated (See Table 4). Consistent with other research (Martin et al., 2002), mothers' felt emotions did not predict their corresponding expressed emotions. They did, however, predict non-corresponding expressed emotions in mothers. For example, mothers' felt anger did not predict mothers' expressed anger. Instead, it predicted mothers' expressed joy and worry. With the exception of worry, when mothers experienced negative emotions frequently, they expressed negative emotions frequently and joy infrequently.

Second, relations among mothers' expressed emotions and children's expressed emotions were examined (See Table 5). With the exception of sadness, mothers' expressed emotions were related to corresponding expressed emotions in their children. Mothers who expressed joy frequently had children who expressed joy frequently and negative emotions infrequently. Similarly, mothers who expressed negative emotions frequently had children who expressed negative emotions frequently. These findings are consistent with other research demonstrating that mothers' positive and negative emotions are correlated with children's positive and negative emotions (Denham, 1989; Isley et al., 1999).

Third, relations among children's expressed emotions and children's autonomous behaviors were examined (See Table 6). Children's emotions were significant predictors of children's autonomous behaviors. In general, children who expressed negative emotions frequently demonstrated high autonomy. These findings are inconsistent with prior research reporting that children who express negative emotions demonstrate low autonomy (e.g., Termine & Izard, 1988). They are consistent, however, with relationship theories and recent research suggesting that toddlers who are high in self-assertion express negative emotion as an age-appropriate form of autonomy (e.g., Dix et al., 2007; Spitz, 1957).

Fourth, mothers' felt emotions were examined as predictors of mothers' supportive behavior (See Table 7). Surprisingly, mothers' supportive behavior was not predicted by mothers' felt emotions. This finding is inconsistent with other research demonstrating that mothers' felt emotions are highly predictive of mothers' supportive behaviors (e.g., Dix et al., 2004). This is likely the result of two discrete behaviors being combined in the present study to create the supportive behavior variable. In other work, discrete aspects of supportive behavior were analyzed separately (e.g., Dix et al., 2004).

Finally, mothers' autonomy-supportive behavior was examined as a predictor of children's autonomous behaviors (See Table 8). The autonomy-supportive behavior that mothers demonstrated during interactions with their children predicted children's autonomous behaviors. Mothers who provided children with high autonomy support had children who were high in co-regulated goal-directed behavior and low in aimlessness. Their children were also high in both self-assertion and positive initiative. These findings are consistent with other research demonstrating relations between autonomy-supportive behavior and early autonomy (e.g., Grolnick et al., 1984; Frodi et al., 1985; Landry et al., 2000).

TESTING HYPOTHESIS ONE

Two sets of multivariate Poisson regression analyses were conducted to test the first hypothesis, that felt and expressed maternal joy would be associated with high autonomy in toddlers, while felt and expressed maternal anger, sadness and worry would be associated with low autonomy in toddlers. Felt and expressed emotions were analyzed separately. First, mothers' *expressed* emotions were entered into separate regression equations predicting each of the dependent variables. For example, mothers' *expressed* joy was entered into a regression equation as a predictor of co-regulated goal-directed behavior. Second, mothers' *felt* emotions were entered into separate regression equations predicting each of the dependent variables. For example, mothers' *felt* sadness was entered into a regression equation as a predictor of children's self-assertion.

Expressed Emotions

As expected, the emotions mothers expressed during interactions with their children predicted children's autonomous behaviors (See Table 9). Most findings were as predicted and were consistent with ideas in the current literature. As predicted by emotion and relationships theories, mothers' expressed joy predicted children's high co-regulated

goal-directed behavior, a measure of the positive, cooperative nature of the dyad at this very young age. Also consistent with emotion theories, mothers' expressed worry predicted children's high aimlessness, and mothers' expressed anger predicted children's high aimlessness and low self-assertion. Thus, as expected, the expression of these negative emotions predicted low autonomy.

Two findings did not support the hypotheses. First, expressed sadness did not inhibit children's autonomous behaviors. Mothers' expressed sadness predicted children's low, not high, aimlessness. Second, mothers' expressed joy predicted children's low, not high, self-assertion.

Felt Emotions

The emotions mothers felt during interactions with their children also predicted children's autonomous behaviors (See Table 10). Again, most results were in the predicted direction. As expected, mothers who reported experiencing joy frequently had children who were low in aimlessness. Similarly, mothers who reported experiencing anger frequently had children who were low in co-regulated goal-directed behavior, high in aimlessness, and low in positive initiative. Mothers who reported experiencing frequent sadness also had children who were low in positive initiative.

Three findings did not support the hypotheses. Contrary to emotion theories, anger did not inhibit children's active resistance to control. Mothers who felt anger frequently had children who were high in self-assertion. However, anger was associated with low autonomy for the other three forms of early autonomy. Also contrary to the hypotheses, mothers who felt sadness frequently had children who were low in aimlessness, and mothers who felt worry frequently had children who were high in co-regulated goal-directed behavior.

TESTING HYPOTHESES TWO THROUGH FOUR

Baron and Kenny's (1986) regression procedure was used to test the following three hypotheses: (a) Mothers' felt emotions predict children's autonomous behaviors because they influence parenting behavior, (b) Mothers' expressed emotions predict children's autonomous behaviors because they influence children's emotions, and c) Mothers' felt emotions predict autonomy in toddlers only if mothers express these emotions.

Mediational tests were conducted only when co-linearity existed among the dependent, independent, and potential mediator variables. When mediational effects were found, Sobel (1991) tests were performed to determine their significance. Multivariate Poisson regression analyses were used to test mediational hypotheses. In all cases, the independent and dependent variables were entered into the regression equation to test direct associations. Then, the hypothesized mediator variable was added to the model. Changes in the regression coefficient for the dependent variable between the first and second regression procedures were examined. A decrease in the regression coefficient was tested using Sobel (1991) tests to determine whether or not they were significant. Mediation was said to be full when, upon adding the mediating variable, the independent variable was no longer significant. Mediation was said to be partial when, upon adding the mediating variable, the independent variable was still statistically significant (see Baron & Kenny, 1986).

Despite their strong conceptual foundations, there was virtually no support for any of the mediational pathways predicted in the present study. The most likely explanation for this dearth of mediational findings is the study's small sample size relative to the number of variables required to test mediational hypotheses. Nevertheless, mediational results are reported below and deserve consideration as exploratory findings. Mostly,

they augment direct findings already reported. In several instances, they offer insight into findings that were contrary to hypotheses.

Children's Expressed Emotions

The hypothesis that children's emotions would mediate associations between mothers' expressed emotions and children's autonomous behaviors was tested. First, mothers' expressed emotions were entered independently into separate regression equations predicting each of the dependent variables. One at a time, children's emotions were then added to each equation as a mediating variable. For example, mothers' expressed joy was entered into a regression equation as a predictor of co-regulated goal-directed behavior. Then, children's joy was added to the equation as a mediating variable.

The data yielded very limited support for this hypothesis. Out of 64 possible relations, 18 met requirements for mediational testing; five of these were significant. Mothers who expressed joy frequently had children who were high in co-regulated goal-directed behavior in part because their children expressed anger (Sobel = 3.16; p = .002) and sadness (Sobel = -3.15; p = .002) infrequently. Also, mothers who expressed anger frequently had children who were high in aimlessness because their children expressed sadness frequently (Sobel = 1.98; p = .048). Mothers who expressed worry frequently had children who were high in aimlessness because their children expressed sadness frequently (Sobel = 1.90; p = .057). Unexpectedly, these same mothers had children who were high in aimlessness in part because their children expressed joy frequently (Sobel = -2.10; p = .036).

Mothers' Autonomy-supportive Behavior

The hypothesis that mothers' supportive behavior would mediate associations between mothers' felt emotions and children's autonomous behaviors was tested. One at a time, mother's felt emotions were entered into separate regression equations predicting

each of children's autonomous behaviors. For example, mothers' felt anger was entered as a predictor of children's positive initiative. Mothers' supportive behavior was then added to each equation as a mediating variable.

Again, the data yielded no significant support for this hypothesis. Out of 16 possible relations (four maternal emotions x one supportive behavior x four autonomous behaviors), only one met requirements for mediational testing. (In other words, the independent variable significantly predicted both the mediating variable and the dependent variable, and the mediating variable significantly predicted the dependent variable.) A Sobel test verified that this relation was significant. Mothers who reported experiencing frequent worry had children who were high in co-regulated goal-directed behavior in part because these mothers were highly supportive of their children (Sobel = -2.13; p = .033).

Mothers' Expressed Emotions

Finally, the hypothesis that mothers' felt emotions would be associated with autonomy in toddlers only if mothers expressed them was tested. First, mothers' felt emotions were entered independently into separate regression equations predicting each of the dependent variables. One at a time, mothers' expressed emotions were then be added to each equation as mediating variables. For example, mothers' felt anger was entered into a regression equation as a predictor of children's self-assertion. Then, mothers' expressed anger was added to the equation as a mediating variable.

There was virtually no support for this hypothesis. Out of 64 possible relations, 21 met requirements for mediational testing, but only one was significant. Mothers who reported experiencing frequent sadness had children who were low in aimlessness because those mothers expressed worry infrequently (Sobel = -2.18; p = .029).

TESTING HYPOTHESIS FIVE

Hierarchical Poisson regression analyses were used to test the hypothesis that the affective climate of mothers' interactions with their toddlers predicts children's autonomous behaviors over and above mothers' autonomy-supportive behavior. Two models were tested sequentially for each of the dependent variables. First, mothers' autonomy-supportive behavior and the five demographic variables were entered into a Poisson regression equation as predictors of one form of autonomy. Next, mothers' expressed emotions were entered as block into the model. This tested whether adding mothers' expressed emotions increased the predictive value of the model over and above mothers' autonomy-supportive behavior and demographics. Changes in Chi-square values between the two models were evaluated to determine whether adding mothers' expressed emotions to the model made it significantly better.

In general, the hypothesis was supported. For three of the four autonomous behaviors (co-regulated goal-directed behavior, low aimlessness and self-assertion), a model that included mothers' expressed emotions fit better than one that contained just demographic variables and mothers' autonomy-supportive behavior (See Table 11). In other words, mothers' expressed emotions predicted these three forms of early autonomy over and above demographic variables and mothers' autonomy-supportive behavior. In the case of positive initiative, however, the addition of mothers' expressed emotions did not significantly improve the predictability of the model. Thus, the affective climate did not significantly influence positive initiative over and above demographic variables and mothers' autonomy-supportive behavior. Mothers' autonomy-supportive behavior remained significant in all models tested even after mothers' expressed emotions were added, indicating that mothers' autonomy-supportive behavior predicts early autonomy independent of mothers' emotions.

Multicollinearity among the emotion variables made it difficult to interpret which emotions actually contributed to the improvement in fit between models one and two for each dependent variable. Also, adding all four emotions simultaneously to the model controlled for naturally occurring relations among the emotion variables, yielding results that were difficult to understand. Thus, hierarchical Poisson regression analyses were run again. This time, mothers' autonomy-supportive behavior and the five demographic variables were entered into a Poisson regression equation as predictors of one form of autonomy. Next, a single expressed emotion was entered into the model to test whether adding that expressed emotion increased the predictive value of the model over and above mothers' autonomy-supportive behavior and demographics. (Only emotions with significant bivariate relations to the dependent variable were tested in this manner.) Changes in Chi-square values between the two models were evaluated to determine whether adding a specific emotion to the model made it significantly better. Results indicated that individual emotions contributed differently to the affective climate as a predictor of each form of autonomy (See Table 12). Mothers' frequently expressed joy singularly defined the affective climate as a predictor of co-regulated goal-directed behavior. Mothers' frequently expressed sadness and infrequently expressed worry significantly predicted low aimlessness, while mothers' infrequently expressed joy and anger significantly predicted self-assertion over mothers' autonomy-supportive behavior and demographics.

Discussion

Emotion and relationship theories suggest that mothers' emotions and the affective climate of parent-child interactions may be critical factors by which parenting influences early autonomy; however, this has rarely been studied. This study examined the degree to which mothers' felt and expressed emotions regulate children's autonomy

during toddlerhood and explored mechanisms through which such regulation might occur. It also isolated the contribution of mothers' emotions to early autonomy over that of mothers' autonomy-supportive behavior. Several findings emerged that contribute to understanding autonomy-supportive parenting and the role of parental emotion in early parent-child interactions.

First, mothers' discrete emotions, expressed naturally during interactions with their toddlers, predicted children's autonomous behaviors. As suggested by emotion and relationships theories, mothers' expressed joy predicted children's high co-regulated goal-directed behavior, while mothers' expressed worry predicted children's high aimlessness, and mothers' expressed anger predicted children's high aimlessness and low self-assertion.

Second, mothers' discrete felt emotions also predicted children's autonomous behaviors. As expected, mothers who reported experiencing joy frequently had children who were low in aimlessness, while mothers who reported experiencing anger frequently had children who were low in co-regulated goal-directed behavior, high in aimlessness, and low in positive initiative. Mothers who reported experiencing frequent sadness also had children who were low in positive initiative.

Third, the affective climate of mothers' interactions with their toddlers predicted children's co-regulated goal-directed behavior, low aimlessness, and self-assertion over and above mothers' autonomy-supportive behavior. Furthermore, the individual emotions that contributed to the impact of the affective climate differed for each of these forms of autonomy. Finally, different patterns of maternal emotion distinguished various forms of early autonomy from one another. In particular, co-regulated goal-directed behavior was uniquely predicted by mothers' frequently felt worry and expressed joy, while low aimlessness was uniquely predicted by mothers' frequently felt and expressed sadness.

Mothers' frequently felt anger uniquely predicted self-assertion, and mothers' infrequently felt sadness uniquely predicted positive initiative.

MOTHERS' EXPRESSED EMOTIONS AND CHILDREN'S AUTONOMY

Most existing research assesses children's autonomous behaviors in relation to aggregated or global measures of mothers' expressed positive or negative affect (e.g., Denham et al., 1991; Meng et al., 1983; Valiente et al., 2004). Although a few studies examine relations among children's autonomous behaviors and mothers' discrete emotions, they analyze contrived, rather than naturally occurring, expressions of maternal emotion (e.g., Jenkins et al., 1995; Klinnert, 1984; Termine & Izard, 1988). The present study demonstrates that mothers' discrete emotions, expressed naturally during parent-child interactions, predict children's autonomous behaviors.

First, with toddlers, mothers' expressed joy predicted children's cooperative, jointly regulated behavior. At young ages, adult help has an adaptive advantage; so, autonomous toddlers engage caregivers in pursuing their goals (e.g., Matas et al., 1978). Indeed, relationship theories suggest that healthy early autonomy occurs within the context of relationships with others (Lamb et al., 1985; Sroufe, 1995). Particularly in ambiguous situations, like an unfamiliar laboratory setting, toddlers look to their mothers for affective cues to help them regulate their behavior (Gunnar & Stone, 1984; Sorce et al., 1985). Mothers' expressions of positive affect enable children to manage anxiety and feel safe exploring the environment (e.g., Sorce et al., 1985). In this study, mothers' expressions of joy seem to have invited toddlers to collaborate with them in pursuit of their goals.

Second, mothers' expressed worry predicted children's aimlessness. According to emotion theories, fear functions to protect (Frijda, 1986). When mothers express it, therefore, fear should activate avoidance or withdrawal in children. In the unfamiliar

laboratory setting, a mother's expressions of worry may undermine her child's sense of safety, disorganizing the child behaviorally and making it less likely that the child will explore and engage with the environment (e.g. Klinnert, 1984; Sorce et al., 1985). Indeed, in this study, children seem to have been less able to focus and engage in purposeful activity when their mothers expressed worry.

Third, mothers' expressed anger predicted children's aimlessness and low self-assertion. Emotion theories suggest that anger inhibits behavior by intimidating the receiver (Frijda, 1986). Indeed, children whose mothers expressed anger frequently were more aimless. They did not focus their attention on tasks or objects; rather, they wandered around the room or simply sat without a clear purpose. Other research documents that maternal anger reduces young children's tendencies to initiate play activities (Cummings et al., 1989; Denham, 1989). Children whose mothers expressed anger frequently also appeared reluctant to assert themselves when being controlled by mothers, possibly out of fear of retaliation. Indeed, numerous studies suggest that parental anger may be toxic to children's self-confidence and assertiveness (e.g., Bradshaw, Usui, Miyaki, Campos, & Campos, 1991; Cummings & Cicchetti, 1990).

Two findings did not support hypotheses. First, mothers' expressions of sadness predicted children's low aimlessness. In this study, sadness was expected to function as a negative emotion that would inhibit children's autonomy. However, emotion theories also suggest that sadness can inspire sympathy, motivating the receiver to reach out to the person experiencing it and bringing people closer together (Izard & Ackerman, 2000). It is possible that mothers' expressions of sadness elicited sympathy in their children, inspiring children to connect with their mothers, rather than pursue their own play agendas. Indeed, post-hoc analyses revealed that children who were low in aimlessness

spent significant time engaging in conversations with their mothers simply to experience mother-child contact ($B = 2.39$; SE = .172; $p < .001$).

Second, mothers' expressions of joy predicted children's low self-assertion. In this study, joy was expected to promote children's autonomy; thus, this finding seems counterintuitive. Mothers who express joy frequently, however, invite children to connect with them (e.g., Buechler & Izard, 1983; Izard et al., 1991). Relationship theories emphasize that a positive connection between a mother and her child may result in less defiance on the part of the child because (a) the child is invested in pleasing the mother to maintain the relationship and (b) the mother is able to use the quality of the relationship to bring the child over to her agenda (e.g., Ainsworth et al., 1978; Kochanska, 1997; Maccoby & Martin, 1983; Matas et al., 1978). So with a joyful mother, early autonomy may be expressed more through co-regulated, goal-directed behavior than through defiant self-assertion.

MOTHERS' FELT EMOTIONS AND CHILDREN'S AUTONOMY

To date, no research has analyzed associations among early autonomy and mothers' discrete felt emotions during interactions with their children. This study offers evidence that mothers' felt emotions predict children's autonomous behaviors. Consistent with both emotion and relationship theories, mothers who reported experiencing joy frequently had children who were low in aimlessness, while mothers who reported experiencing anger frequently had children who were low in co-regulated goal-directed behavior, high in aimlessness, and low in positive initiative. Similarly, mothers who reported experiencing frequent sadness also had children who were low in positive initiative.

Three findings did not support the hypotheses. Although mothers' felt anger was generally associated with low autonomy, it did not predict children's active resistance to

control. Mothers who felt anger frequently had children who were high in self-assertion. Although this study assumed that mothers' felt emotions preceded children's autonomous behaviors, it is possible that mothers of self-assertive children felt anger in response to their children's resistance. Interestingly, although mothers of self-assertive children felt anger frequently, they did not express anger frequently; rather, their facial expressions were often flat (B = .470; SE = .201; $p < .05$). Despite their feelings of anger, they were also supportive of their children. These findings are consistent with theories of emotion regulation (e.g., Eisenberg et al., 2000). They suggest that mothers may have been modulating the anger that they felt during interactions with assertive children, allowing them to effectively parent and promote early autonomy despite their anger (Belsky, 1984; Dix, 1991).

Also contrary to the hypotheses, mothers who felt sadness frequently had children who were low in aimlessness. Post-hoc analyses revealed that it was mothers' child-oriented, rather than parent-oriented, sadness that predicted children's low aimlessness (B = 2.30; SE = .490; $p < .001$). In other words, mothers reported that they experienced sadness during the interaction because they were concerned for their children's welfare or things of interest principally to their children. Again, as suggested by emotion theories, this finding is consistent with the idea that sadness functioned as sympathy in these data (Izard & Ackerman, 2000). Mothers who felt sadness for their children likely reached out to them, helping them organize their behavior.

Finally, mothers who felt worry frequently had children who were high in co-regulated goal-directed behavior. Post-hoc analyses revealed that it was parent-oriented, rather than child-oriented worry, that predicted children's co-regulated goal-directed behavior (B = .448; SE = .409; $p < .001$). In other words, mothers reported that they experienced worry during the interaction because they were concerned about things of

interest principally to them rather than their children. It is likely that laboratory conditions prompted anxiety in mothers who were trying to impress researchers. For example, co-regulated goal-directed behavior was measured during a time when mothers had to divide their attention between completing questionnaires and children who had nothing to do. Meanwhile, the playroom contained enticing objects that could be problematic for toddlers (e.g., a pitcher of water, a television, and a sealed jar of candy). Collaborating with their children may have helped mothers manage their anxiety by allowing them to experience some control over their children's behavior in a way that demonstrated sensitive, skillful parenting.

ABSENCE OF MEDIATIONAL FINDINGS

To date, no study has identified variables through which mothers' emotions and children's autonomous behaviors are related. Three hypothesized mechanisms were tested in the present study. Despite their strong conceptual foundations, there was virtually no support for them. The most likely explanation for the absence of mediational findings is the study's small sample size relative to the number of variables required to test these hypotheses. The resulting lack of power may have diminished the ability of the analyses to detect mediation. It is possible that similar analyses run with a larger sample would have yielded more promising results.

First, contrary to emotion theories, there was no evidence in this study that associations between mothers' expressed emotions and children's autonomous behaviors were mediated by children's emotions. In other words, children's expressions of emotion did not explain how mothers' expressions of emotion were related to early autonomy. Unlike felt emotions, however, expressed emotions do not necessarily reflect motivational states underlying behavior. Most often, they are a means of communicating affect in order to influence a social partner (Frijda, 1986). Thus, it is unclear that

children's expressed emotions reflected the affective motivation behind their autonomous behaviors. Instead, they may have more accurately represented children's desires to influence their mothers. This may be why children's expressed emotions did not mediate relations between mothers' expressed emotions and early autonomy as expected. Future studies may benefit from measuring felt emotions in children and examining them as potential mediators of these relations. This, however, would require an older sample of children.

Second, it was hypothesized that mothers' autonomy-supportive behavior would mediate associations between mothers' felt emotions and children's autonomous behaviors. However, mothers' felt emotions did not predict mothers' autonomy-supportive behavior. This lack of direct effects undermined the detection of any indirect effects involving these variables. Prior studies have found direct relations between mothers' felt emotions and mothers' autonomy-supportive behaviors (e.g., Dix et al., 2004). Initially, it seemed that this inconsistency was the result of two discrete behaviors being combined in the present study to create the autonomy-support variable. In other work, discrete aspects of autonomy-supportive behavior were analyzed separately (e.g., Dix et al., 2004). Post-hoc analyses were conducted, therefore, analyzing separately relations between mothers' felt emotions and their synchronous, asynchronous, and restrictive behaviors. In these analyses, relations were revealed between mothers' felt emotions and their autonomy-supportive behaviors; so, mediational analyses were conducted again using each type of maternal behavior. Unfortunately, contrary to emotion and relationship theories, the data still yielded no evidence that mothers' autonomy-supportive behaviors were the reason that mothers' felt emotions were related to early autonomy. A direction for future research may be examining the mediating

potential of other types of autonomy-supportive behavior (e.g. compromising, negotiating, scaffolding) rather than mothers' support for children's on-going activities.

Third, it was hypothesized that mothers' expressed emotions would mediate associations between mothers' felt emotions and children's autonomous behaviors. Despite associations between mothers' felt and expressed emotions, there was no evidence that mothers' emotional expressions contributed to the relationship between mothers' felt emotions and early autonomy. It is possible that mediation was not found because of measurement differences between mothers' felt and expressed emotions. Mothers' expressed emotions were context-specific and observed. They reflected mothers' emotions as they were occurring immediately in the laboratory. Mothers' felt emotions, however, were self-reported and may have been determined not only by the feelings they experienced in the moment, but also by the overall emotional quality of their relationships with their children (Martin et al., 2002). This measurement difference may have influenced the ways in which these variables were associated with one another and children's autonomous behaviors. Alternately, mothers' emotions may have been regulated differently in this setting than they would have been in the home environment. For example, mothers might have over-regulated or under-reported their emotions in the laboratory setting out of a desire to highlight their parenting competence. Again, this could have altered associations between mothers' felt and expressed emotions, making it more difficult to detect proposed mediation.

It is unlikely, however, that mothers' felt emotions remained completely covert from their children. Emotion theories posit that felt emotions activate related cognitions and behaviors (Izard, 1971, 1977, 1991). Unless these processes are consciously regulated, they frequently contribute to the expression of felt affect (Eisenberg et al., 2000). So, how else might mothers' felt emotions get conveyed to their children? Two

untested possibilities deserve consideration. It is possible that through either their body language or tones of voice, mothers subtly communicated their felt emotions to their children (Eisenberg et al., 2000).

Infants first rely on multi-modally presented information to recognize the affective expressions of others. They then progress to recognizing vocal expressions of affect and then facial expressions of affect as proxies for an entire emotional expression (Walker-Andrews, 1997). Vocal expressions of affect may, therefore, be more salient social signals to very young children than facial expressions (Fernald, 1992). Research suggests that by five months of age infants understand affect that is communicated vocally, even in unfamiliar languages (Fernald, 1993). There is also evidence that seven month olds rely more on the voice than the face to distinguish happy, sad and angry expressions of emotions (Caron, Caron & MacLean, 1988). By 12 months of age, children can discriminate among different affect-laden intonation patterns (Soken & Pick, 1999), and they avoid novel toys when mothers emit fearful vocal cues but maintain neutral facial expressions (Mumme, Fernald & Herrera, 1966). Furthermore, there is evidence that children are hesitant to approach an adult whose tone of voice is negative, even if the adult demonstrates friendly behavior (Volkmar & Siegel, 1979).

Young children may also be sensitive to body language, which may reveal important information about the intensity of affect not always evident through tone of voice, words or facial expressions (Cummings, Zahn-Waxler & Radke-Yarrow, 1981). Research on the development of children's perceptions of expressive behaviors is scarce. A handful of studies, however, suggest that even subtle nonverbal expressions of emotions (e.g., glares, stares and giving someone the "silent treatment") are understood by young children and elicit affective responses from them (e.g., Cummings, Vogel, Cummings & El-Sheikh, 1989). Physical expressions of anger, for example, distress

toddlers more than verbal expressions of anger (Cummings et al., 1981). Given how salient body language and tone of voice are to very young children, future research may benefit from exploring these variables to understand how mothers' felt emotions are communicated to children in ways that relate them to early autonomy.

THE IMPORTANCE OF THE AFFECTIVE CLIMATE

A positive affective climate is believed to be autonomy-supportive (e.g., Crockenberg & Litman, 1990; Frodi et al., 1985, Grolnick et al., 1984). Nevertheless, prior research has not isolated the contribution of mothers' emotions to children's autonomous behaviors over that of mothers' autonomy-supportive behavior. Results from this study indicate that the affective climate predicts early autonomy over and above mothers' autonomy-supportive behavior. For three of the four autonomous behaviors examined (co-regulated goal-directed behavior, low aimlessness and self-assertion), mothers' expressed emotions as a group predicted early autonomy over and above demographic variables and mothers' autonomy-supportive behavior. In general, high autonomy was predicted by frequent expressions of joy and infrequent expressions of anger, sadness and worry.

This study augments other research demonstrating that a positive affective climate is correlated with positive developmental outcomes during early childhood (e.g., Denham et al., 1997; Denham et al., 1991; Kochanska et al., 1995; Nicely et al., 1999), while a negative affective climate is associated with problematic outcomes for children (e.g., Denham et al., 2000). Findings also support research suggesting that the affective quality of an interaction may be related to children's autonomous behaviors independent of parents' autonomy-supportive behaviors (Kelley et al., 2000).

Individual maternal emotions contributed differently to the affective climate as a predictor of each form of autonomy. Mothers' frequently expressed joy singularly

defined the affective climate as a predictor of co-regulated goal-directed behavior. Mothers' frequently expressed sadness and infrequently expressed worry significantly predicted low aimlessness, while mothers' infrequently expressed joy and anger significantly predicted self-assertion over mothers' autonomy-supportive behavior and demographics. These results document that, with the exception of anger as a predictor of low aimlessness, relations that emerged during bivariate analyses remained significant even after controlling for mothers' autonomy-supportive behavior. For low aimlessness and self-assertion, both of which were predicted by more than one expressed emotion during bivariate analyses, they also offer some insight as to the relative importance of the multiple predictors. For example, low aimlessness was predicted by mothers' frequent expressions of sadness and infrequent expressions of worry in bivariate analyses; and, they made relatively the same contribution to the predictability of low aimlessness in multivariate analyses. The contribution of joy as a predictor of co-regulated goal-directed behavior was large compared to the contribution of other emotions as predictors of low aimlessness and self-assertion.

Two unexpected findings emerged during the multivariate analyses related to the affective climate. First, in the prediction of low aimlessness, when anger was added to the regression equation, it was no longer a significant predictor of autonomy. Mothers' autonomy-supportive behavior, however, remained a significant predictor of low aimlessness. Thus, relations between mothers' expressed anger and low aimlessness diminished when analyses controlled for mothers' autonomy-supportive behavior. Controlling for support, however, did not jeopardize any other direct associations between mothers' expressed emotions and children's autonomous behaviors. This suggests that future analyses examining the relation of maternal emotions to children's autonomous behaviors should control for parents' autonomy-supportive behavior.

Second, when joy was added to the regression equation predicting self-assertion, mothers' autonomy-supportive behavior was no longer a significant predictor of that form of autonomy. The same effect occurred when anger was added to the regression equation predicting self-assertion. These findings implied that these two maternal emotions might mediate relations between mothers' autonomy supportive behavior and self-assertion. Post-hoc analyses revealed that mothers' expressed anger was not predicted by autonomy-supportive behavior; thus, conditions to test for mediation were not met. However, mothers who were autonomy-supportive had children who were high in self-assertion because those mothers expressed joy frequently (Sobel = 2.13; $p = .03$). Although felt emotions precede behavior (Frijda, 1986), this exploratory finding suggests that mothers' expressed emotions may accompany autonomy-supportive behavior in such a way as to mediate relations between it and children's autonomy. Future studies should explore this possibility.

Although only one parenting behavior was measured in this study, these results may generalize quite well. The parenting behavior examined (support for children's on-going activities) typifies measures of autonomy-support found in the developmental literature (e.g., Grolnick, 2003; Grolnick et al., 1984; Frodi et al., 1985; Landry et al., 2000). It also exemplifies sensitive or responsive parenting, the parenting behavior researched most prevalently and associated with the widest range of positive developmental outcomes, including early autonomy (Maccoby & Martin, 1983). Future studies should continue to disentangle parents' affect from their behavior and recognize that the expression of emotion by parents may be a distinct form of autonomy-support worthy of its own line of research.

ANALYZING DISCRETE EMOTIONS

Existing research assesses children's autonomous behaviors mostly in relation to aggregated or global measures of mothers' expressed positive or negative affect (e.g., Denham et al., 1991; Meng et al., 1983; Valiente et al., 2004). Data from the present study, however, suggest that aggregating mothers' emotions may mask differences in how they relate to early autonomy. In this study, the three negative emotions predicted different autonomous behaviors. For example, mothers' frequently expressed sadness predicted low aimlessness, while mothers' infrequently expressed anger predicted self-assertion. Similarly, mothers who frequently felt worry frequently had children high in co-regulated goal-directed behavior, while mothers' who felt sadness infrequently had children high in positive initiative. These subtle distinctions would not have been apparent had anger, sadness and worry been aggregated into a single variable representing negative affect.

Furthermore, analyzing the three negative emotions separately revealed that the context in which these emotions are experienced and expressed by mothers greatly influences their relations with early autonomy. In particular, maternal sadness and worry do not always predict low autonomy in toddlers. These data suggest, for example, that when mothers feel sadness for their children, rather than for themselves, they may engage with children in ways that help them organize their behavior and focus on tasks. Thus, sadness, when it takes the form of sympathy, may facilitate rather than inhibit early autonomy. This interpretation is consistent with emotion theories (Frijda, 1986). Similarly, in the unfamiliar laboratory setting of this study, experiencing worry seems to have motivated mothers to collaborate with their children in goal-directed activities. Other research documents that worry can be associated with mothers' support of children's goals (Dix et al., 2004). It has been suggested that negative emotions,

especially those of moderate intensity, can have adaptive value (Cicchetti, Ackerman & Izard, 1995). Interpretations of sadness and worry, therefore, as purely negative emotions may obscure important positive relations between these maternal emotions and children's development.

Also, it has been suggested that positive emotionality is not simply the absence of negative affect (Belsky, Hsieh & Crnic, 1996). Indeed, in this study, children's low aimlessness was predicted by infrequent expressions of anger and worry, but not by mothers' expressions of joy. Understanding how parental emotions relate to children's autonomous behaviors, therefore, may require that researchers isolate discrete positive and negative qualities and identify the specific types of child behavior with which each is associated.

THE COMPLEXITY OF EARLY AUTONOMY

A plethora of individual behaviors have been measured under the guise of early autonomy, including mastery motivation, exploration, self-assertion, and initiative. For the most part, theories of autonomy support do not differentiate among these various indicators; rather, they imply that parenting that fosters one type of autonomy should foster all types of autonomy (e.g., Grolnick, 2003). Accordingly, an assumption underpinning this study was that the four measures of early autonomy would be related similarly to mothers' emotions. Overall, this was true. However, relations between mothers' emotions and children's autonomous behaviors varied significantly depending upon which dependent variable was under consideration. To illustrate this point, distinct relations between each autonomous behavior and mothers' emotions are reviewed in the following section. These results emphasize the complexity of the construct of early autonomy and the need to both define and measure it carefully.

Co-regulated Goal-directed Behavior

This variable assessed the positive, cooperative nature of the dyad at this very young age in working toward the child's goals. Children high in co-regulated goal-directed behavior engaged their mothers in conversation and activities focused on their own play agenda or interests. Accordingly, children who were high in co-regulated goal-directed behavior had mothers who expressed joy frequently and supported children as they pursued their goals. Mothers of children high in co-regulated goal-directed behavior also felt low anger and high worry, an affective combination that may have motivated mothers to collaborate with children in order to support them and regulate their experiences in the laboratory setting (Dix et al., 2004). Co-regulated goal-directed behavior was the only form of autonomy predicted by mothers' frequent expressions of joy and frequent feelings of worry.

Low Aimlessness

This variable measured the child's tendency to focus and maintain purposeful behavioral sequences. Children low in aimlessness were thus high in intentional activity. They had mothers who felt joy frequently and provided high support to their children. In addition, their mothers both felt and expressed anger infrequently and sadness frequently. Low aimlessness was the only form of autonomy predicted by mothers' infrequent expressions of worry and frequent feelings and expressions of sadness.

Self-assertion

Self-assertion was measured as children's defiant resistance to mothers' control. Children high in self-assertion actively resisted mothers' requests and frequently expressed anger in response to directives. Despite feeling anger frequently, mothers of children high in self-assertion expressed low levels of both anger and joy and were highly

supportive. Self-assertion was the only form of autonomy associated with frequent feelings of anger in mothers.

Positive Initiative

This variable measured children's attempts to engage the mother. Children's positive initiative was predicted by mothers' supportive behavior and mothers' infrequent feelings of sadness and anger. Unlike the other dependent variables, positive initiative was not predicted by mothers' expressed emotions. It was also the only form of autonomy predicted by infrequent feelings of sadness in mothers.

Thus, although there were some similarities in how the four autonomy measures were predicted by mothers' emotions and behavior in this study, there were also many distinct relations. This study calls into question, therefore, whether early autonomy is truly a unitary construct. Findings suggest that different forms of autonomy may actually be regulated differently by the same parenting variables.

Unfortunately, other studies have not measured simultaneously multiple indicators of early autonomy. Research currently links autonomy-supportive parenting to a number of single indicators of the construct. It is related to children's exploration of their environments and novel materials (Bornstein et al., 1999; Endsley et al., 1979), mastery motivation, persistence, and competence (Frodi et al., 1985; Grolnick et al., 1984), goal-directed activity (Landry et al., 2000), intrinsic motivation (Grolnick & Ryan, 1989 & 1991), self regulation (Stayton et al., 1971), and autonomous forms of self assertion (Donovan et al., 2000; Kuczynski et al., 1987; Perlman et al., 2007).

Definitions and measures of these indicators, however, fluctuate widely across studies. In addition, there are no more than three studies that relate any one of them to autonomy-supportive parenting. For example, only one study documents associations between autonomy support and children's goal-directed activity (Landry et al, 2000), and

only two studies document associations between autonomy support and children's intrinsic motivation (Grolnick & Ryan, 1989, 1991). It is difficult, therefore, to compare results from one study to those of another study and to synthesize a clear understanding of what behaviors actually capture early autonomy and how they are empirically related to one another and to autonomy-supportive parenting. Since multiple indicators of early autonomy were measured in this study, it is possible to see how they were related to one another and to emotional and behavioral facets of autonomy-supportive parenting in distinct ways.

Definitions of autonomy-supportive parenting vary widely too, further confounding understanding of relations between parenting and children's autonomous behaviors. Autonomy support is generally defined as "the readiness of a person to assume another's perspective and to facilitate self-initiated expression and action" (Ryan & Skolky, 1996, p. 252). Autonomy-supportive parenting typically involves granting children developmentally appropriate freedom to regulate themselves and supporting them as they pursue activities in which they feel invested. It is unclear though which characteristics of autonomy-supportive parenting exert the most influence on children's autonomous behaviors.

First, a large number of studies aggregate various aspects of autonomy supportive parenting into a single variable. Given that specific autonomy-supportive behaviors are sometimes unrelated or even negatively related to one another (Grolnick et al., 2002), it seems important that the unique effects of particular aspects of autonomy support on development be isolated and individually considered. This study demonstrates, for example, that mothers' felt emotions, expressed emotions, and autonomy-supportive behavior predict early autonomy, although in very different ways. Second, research that does isolate particular components of autonomy support does not compare the effects of

those components to one another. A contribution of this study is the understanding that mothers' emotions predict children's autonomous behaviors independent of mothers' autonomy-supportive behavior. This knowledge would not have been apparent had mothers' emotions and behaviors not been analyzed simultaneously. More research is needed that (a) clearly defines specific elements of autonomy-supportive parenting, (b) tests their associations with various forms of early autonomy, and (c) compares them with one another to identify their unique contributions to children's development.

Also, confusion about what constitutes early autonomy may be due to how difficult it is to measure the construct. First, the context in which children display certain behaviors greatly influences whether or not those behaviors may be considered autonomous. For example, a child who works cooperatively with a parent toward achieving a goal may be displaying co-regulated goal-directed behavior. Alternately, if the child is capable of achieving that goal independently, the child may be displaying dependence. Second, there are subtleties to children's behaviors that may alter the interpretation of that behavior. Since very young children are unable to state their intentions or feelings, measuring early autonomy sometimes requires significant interpretation, even clinical judgment, on the part of the researcher. The sly smile on a child's face during redirection by a parent, for example, may reflect self-assertion even if the child ultimately complies with rather than resists the parent's request. For these reasons, it is possible that, in the present study, autonomy was not measured as clearly as was intended.

To resolve some of these issues, future studies of early autonomy should clearly define autonomy and autonomy support. In addition, researchers should use multiple indicators of autonomy and specific facets of autonomy support to measure relations between the two constructs. Results of this study suggest that different forms of

autonomy may be uniquely related to the exact type of autonomy support being studied. These small methodological modifications could broaden understanding of both of these constructs.

LIMITATIONS TO THE CURRENT STUDY

There are important limits to what can be concluded from these data. First, given the complexities of early autonomy, it is likely that different associations would emerge among these variables in an older sample of children. For example, highly independent rather than co-regulated goal-directed behavior may reflect age-appropriate autonomy in three-year olds, whereas in 20-month-olds it may be related to negative emotions and an approach-avoidance conflict within the parent-child relationship (e.g., Matas et al., 1978). Similarly, in 20-month-olds, self-assertion in the form of defiance may be more tolerated by mothers as a normative part of individuation than it would be in an older child who has already individuated from his mother.

Second, because this was not an experimental study, the direction of effects cannot be determined. This study presumes that parents' emotions and behaviors precede children's autonomous behaviors. However, it is also possible that mothers' emotions and behaviors occurred in response to their children. For example, mothers' expressed anger might have been a response to, rather than a precursor of, children's high aimlessness during the laboratory observation period.

Third, findings from this study were obtained from a largely European American, working and middle class sample, and findings may not generalize beyond that sample. Both culture and socioeconomic status are related to the provision of autonomy support; these variables influence both the value parents place on autonomy and the behaviors parents use to promote it (e.g., Harwood, Miller & Irizarry, 1995; Keller, Yovsi, Borke,

Kartner, Jensen & Paliagoura, 2004; Wiley, Rose, Burger & Miller, 1998). Research documents similar influences on emotional expressiveness.

Fourth, this research had one statistical challenge. There were a large number of variables relative to the size of the study's sample; so, the number of analyses risked increasing the probability of Type 1 error. Two strategies were used to address this issue. Attempts were made to minimize the number of analyses by using single factors or aggregates derived from related variables whenever possible. Also, patterns of significance were examined to ensure that the data were not over-interpreted. Nevertheless, more research is needed that replicates these findings.

Fifth, mothers' reports of their felt emotions may be biased. The video reviewing method with which data were collected gave mothers' time and emotional distance from their actual interactions with their children. It is possible that their recollections of their emotional experiences were more influenced by cognition than they might have been if they had been measured contemporaneously. Also, it is likely that mothers' reports of their emotions were influenced by the presence of the experimenter such that mothers may have minimized their reports of their negative experiences.

Finally, expressions of affect depend upon context. In the laboratory setting of this study, for example, the anger that mothers' felt and expressed was likely activated differently than it would be at home during typical family interactions with their children. Constraints of the laboratory setting might have influenced both mothers and children in ways that make it unlikely that findings from this study would generalize to parent-child interactions at home. For example, mothers might have demonstrated unusual support or masked their expression of negative emotions in order to appear competent to researchers.

IMPLICATIONS

This study highlights the important role of parental emotions in parent-child interactions. The emotions mothers felt and expressed in this study were directly related to children's autonomous behaviors. Furthermore, mothers' expressed emotions predicted toddlers' autonomy over and above mothers' parenting behavior. These findings imply that researchers may benefit from including emotion variables more often in their studies of parenting and child development. They also suggest that clinicians and educators should help parents better understand the impact emotions have on interactions with their children and emphasize parental emotion regulation as an important parenting skill.

This study also contributes to understanding the construct of autonomy-supportive parenting. Although positive affect is believed to be autonomy-supportive (e.g., Crockenberg & Litman, 1990; Frodi et al., 1985, Grolnick et al., 1984), existing research mostly defines autonomy-supportive parenting in terms of specific parenting behaviors (e.g., Grolnick, 2003). A handful of studies aggregate parental warmth or positive affect into measures of autonomy support (e.g., Frodi et al., 1985). However, this obscures the individual contribution of affect to children's autonomous behaviors. Findings from this study suggest that parental emotion may be a distinct form of autonomy-support worthy of independent investigation.

Since there was virtually no support for any of the mediational pathways described in this study, more studies of maternal emotions and early autonomy are needed to determine the mechanisms through which these variables might be related. In particular, tone of voice, body language and setting should be carefully considered and possibly purposefully manipulated in future studies. In addition, alternative methods of testing mediation should be explored for use with these variables.

Conclusion

Autonomy is a critical component of early childhood that has important implications for future competence and well-being (e.g., Erikson, 1963; Mahler et al., 1975; Sroufe & Rutter, 1984). Although parental autonomy support is associated with the development of early autonomy (e.g., Endsley et al., 1979; Frodi et al., 1985; Landry et al., 2000), the mechanisms underlying these associations are largely unexplored. Mothers' emotions and the affective climate of parent-child interactions may be critical factors by which parenting influences early autonomy. This study (a) examined the degree to which discrete, naturally occurring maternal emotions regulate four indicators of autonomy during toddlerhood: co-regulated goal-directed behavior, low aimlessness, self-assertion, and positive initiative, (b) explored mechanisms through which maternal emotion exerts an influence on children's autonomous behaviors, and (c) isolated the contribution of mothers' emotions to children's autonomous behaviors over that of mothers' autonomy-supportive behavior. Several important findings emerged. First, maternal emotions, both felt and expressed, were related to children's autonomous behaviors--mostly in ways predicted by emotion and relationship theories. In general, mothers' frequent joy and infrequent anger, sadness, and fear predicted high autonomy. Second, the affective climate of mothers' interactions with their toddlers predicted children's autonomous behaviors over and above mothers' autonomy-supportive behavior, suggesting that parental emotion is a unique aspect of autonomy support. Finally, different forms of early autonomy were predicted by different emotions in mothers, emphasizing the complexity of autonomy and the need to better define and measure this construct.

Table 1: Basic Statistics for All Variables

Variable		Mean	Standard Deviation	Range
Co-regulated GDB		277.09	82.76	1-515 sec.
Low Aimlessness		50.96	42.26	0-265 sec.
Self-assertion		28.68	6.05	5-46
Positive Initiative		10.38	9.30	0-48
Mothers' Felt Emotions	Joy	10.64	7.39	1-44
	Anger	3.48	3.59	0-18
	Sadness	1.02	1.93	0-15
	Worry	5.70	3.93	0-18
Mothers' Expressed Emotions	Joy	24.23	13.94	0-75
	Anger	.51	1.04	0-6
	Sadness	.24	.81	0-7
	Worry	.34	.90	0-5
Mothers' Supportive Behavior		61.52	20.18	1-103
Children's Expressed Emotions	Joy	20.74	15.56	1-65
	Anger	1.42	2.55	0-13
	Sadness	1.23	2.70	0-15
Child Sex	1 = M and 2 = F	1.46	.50	1-2
Child Age		20.07	3.73	14-27 mos.
Mothers' Education		13.97	2.10	10-19 yrs.
Income		5.28	1.95	0-9
Socio-economic Status		44.04	11.57	17-80

Table 2: Relations Among the Four Autonomous Behaviors

Autonomous Behavior	Co-regulated GDB		Low Aimlessness		Self-assertion		Positive Initiative	
	B	SE	B	SE	B	SE	B	SE
Co-regulated GDB	----------		.062**	.019	.031	.023	.069*	.037
Low Aimlessness	.167***	.033	----------		.066	.109	-.226	.190
Self-assertion	.049***	.008	.011	.019	----------		.080	.063
Positive Initiative	.165***	.010	-.049*	.020	.040	.029	----------	

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 3: Demographic Variables Predicting All Variables

Variables	Income	SES	Child's Sex	Child's Age	Mother's Education
Co-regulated Goal-directed Behavior	-.009** (.003)	.003*** (.000)	-.050*** (.011)	.033*** (.001)	.025*** (.003)
Low Aimlessness	-.036*** (.006)	.006*** (.001)	-.016 (.025)	.025*** (.003)	.027*** (.006)
Self-assertion	.019* (.009)	-.001 (.002)	.070* (.034)	.044*** (.005)	.003 (.009)
Positive Initiative	.035* .016	.006* (.003)	-.017 (.061)	.047*** (.008)	.022 (.014)
Mothers' Felt Emotions Joy	.048*** (.014)	.002 (.002)	.074 (.054)	.011 (.007)	.013 (.013)
Anger	-.099*** (.022)	-.017*** (.004)	-.055 (.095)	-.031* (.013)	-.087*** (.023)
Sadness	-.009 (.043)	-.024** (.008)	-.128 (.176)	.039+ (.023)	-.046 (.043)
Worry	.002 (.018)	.003 (.003)	-.055 (.074)	.004 (.010)	.001 (.018)
Mothers' Expressed Emotions Joy	-.003 (.009)	-.006*** (.002)	.018 (.036)	-.032*** (.005)	-.025** (.009)
Anger	.041 (.063)	-.026* (.012)	.223 (.249)	.025 (.033)	-.042 (.061)
Sadness	-.050 (.089)	-.008 (.017)	.667+ .375	.084+ (.049)	-.092* (.095)
Worry	-.011 (.075)	.017 (.014)	.343 (.304)	.096* (.041)	-.021 (.074)
Mothers' Autonomy-supportive Behavior	.049*** (.006)	.003** (.001)	.143*** (.023)	.032*** (.003)	.030*** (.005)
Children's Expressed Emotions Joy	.021+ (.012)	.002 (.002)	.268*** (.045)	.014* (.006)	.042*** (.011)
Anger	.034 (.045)	-.001 (.008)-.	-.381* (.179)	.018 (.024)	-.050 (.042)
Sadness	.045 (.049)	.004 (.008)	.207 (.186)	.109*** (.028)	-.124** (.047)

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors (in parentheses).
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 4: Mothers' Felt Emotions Predicting Mothers' Expressed Emotions

Felt Emotions	Expressed Joy		Expressed Anger		Expressed Sadness		Expressed Worry	
	B	SE	B	SE	B	SE	B	SE
Joy	-.162	.120	.530	.816	.754	1.22	-.841	1.07
Anger	-.767***	.180	1.70	1.12	.116	1.62	3.48*	1.42
Sadness	-.661	.415	4.60*	2.27	5.93+	3.20	-12.58*	5.38
Worry	.012	.160	-4.28***	1.21	-10.62***	2.30	-3.54*	1.46

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 5: Mothers' Expressed Emotions Predicting Children's Expressed Emotions

Mothers' Emotions	Children's Joy		Children's Anger		Children's Sadness		Children's Worry	
	B	SE	B	SE	B	SE	B	SE
Joy	1.90***	.282	-5.34***	1.28	-5.09**	1.47	2.97	3.16
Anger	18.58***	2.84	18.74+	10.98	31.80**	10.50	14.69	28.53
Sadness	6.33	7.97	-17.44	35.54	4.32	43.62	-157.12	172.51
Worry	7.64*	3.16	-1.09	14.47	48.76***	11.24	49.65*	24.85

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 6: Children's Expressed Emotions Predicting Children's Autonomous Behaviors

Children's Emotions	Co-regulated GDB		Low Aimlessness		Self-assertion		Positive Initiative	
	B	SE	B	SE	B	SE	B	SE
Joy	-.047	.068	.557**	.163	-.172	.221	.327	.374
Anger	1.98***	.336	3.95***	.809	5.39***	1.07	2.47	2.05
Sadness	-.614*	.262	.805	.652	6.08***	.999	.925	1.35

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 7: Mothers' Felt Emotions Predicting Mothers' Autonomy-supportive Behavior

Mothers' Emotions	Autonomy-supportive Behavior	
	B	SE
Felt Joy	.118	.077
Felt Anger	-.022	.219
Felt Sadness	-.209+	.109
Felt Worry	.198*	.093

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = $p < .10$ * = $p < .05$ ** = $p < .01$ *** = $p < .001$

Table 8: Mothers' Autonomy-supportive Behavior Predicting Children's Autonomous Behaviors

Mothers' Behavior	Co-regulated GDB		Low Aimlessness		Self-assertion		Positive Initiative	
	B	SE	B	SE	B	SE	B	SE
Autonomy-support	.003***	.000	.004***	.000	.003**	.001	.009***	.002

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 9: Mothers' Expressed Emotions Predicting Children's Autonomous Behaviors

Mothers' Emotions	Co-regulated GDB		Low Aimlessness		Self-assertion		Positive Initiative	
	B	SE	B	SE	B	SE	B	SE
Joy	1.02***	.073	-.220	.170	-.611**	.223	-.805+	.430
Anger	1.01	.808	-3.84*	1.82	-6.35*	2.68	4.18	4.49
Sadness	-2.43+	1.36	14.00***	3.87	5.45	3.50	-5.21	5.87
Worry	-1.85+	1.06	-14.42***	2.26	4.99	3.10	1.25	5.95

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = $p < .10$ * = $p < .05$ ** = $p < .01$ *** = $p < .001$

Table 10: Mothers' Felt Emotions Predicting Children's Autonomous Behaviors

Mothers' Emotions	Co-regulated GDB		Low Aimlessness		Self-assertion		Positive Initiative	
	B	SE	B	SE	B	SE	B	SE
Joy	.031	.039	.440***	.092	-.108	.117	-.101	.233
Anger	-.992***	.051	-.565***	.120	.797***	.176	-.718*	.339
Sadness	-.193+	.103	.523*	.254	.548	.337	-1.77*	.696
Worry	.161***	.045	.022	.105	-.039	.142	.430	.268

Notes: Entries are unstandardized Poisson regression coefficients and their standard errors. Child age, child sex, maternal education, family income and SES were included as control variables. Independent variables are listed on the left and dependent variables are listed across the top.
+ = p < .10 * = p < .05 ** = p < .01 *** = p < .001

Table 11: Hierarchical Regression Analyses Predicting Children's Autonomous Behaviors from Demographic Variables, Mothers' Autonomy-supportive Behavior, and All of Mothers' Expressed Emotions (Affective Climate)

Dependent Variable	χ^2 *(df)*	$p <$	$\Delta\chi^2$ *(Δ df)*	$p <$
Co-regulated GDB				
Model 1	748.13 (6)	.000		
Model 2	921.84 (10)	.000	173.71 (4)	.001
Low Aimlessness				
Model 1	240.99 (6)	.000		
Model 2	307.86 (10)	.000	66.87 (4)	.001
Self-assertion				
Model 1	103.35 (6)	.000		
Model 2	121.65 (10)	.000	18.3 (4)	.01
Positive Initiative				
Model 1	50.12 (6)	.000		
Model 2	56.13 (10)	.000	6.01 (4)	n.s.

Notes: Model 1 contained the five demographic variables and mothers' autonomy-supportive behavior as predictors of children's autonomous behaviors. Model 2 contained the five demographic variables, mothers' autonomy-supportive behavior, and all four of mothers' expressed emotions.

Table 12: Hierarchical Regression Analyses Predicting Children's Autonomous Behaviors from Demographic Variables, Mothers' Autonomy-supportive Behavior, and Mothers' Discrete Expressed Emotions

Dependent Variable	χ^2 *(df)*	*p* <	$\Delta\chi^2$ *(Δ df)*	*p* <
Co-regulated GDB				
Model 1	748.13 (6)	.000		
Model 2: Expressed Joy Added	901.50 (7)	.000	153.37 (1)	.001
Low Aimlessness				
Model 1	240.99 (6)	.000		
Model 2: Expressed Anger Added [1]	-----	-----	-----	-----
Model 2: Expressed Sadness Added	254.25 (7)	.000	13.26 (1)	.001
Model 2: Expressed Worry Added	256.93 (7)	.000	15.94 (1)	.001
Self-assertion				
Model 1	103.35 (6)	.000		
Model 2: Expressed Joy Added [2]	99.04 (7)	.000	4.31 (1)	.05
Model 2: Expressed Anger Added [2]	98.91 (7)	.000	4.44 (1)	.05

[1] When anger was added to the model, it was no longer a significant predictor of low aimlessness.
[2] When these emotions were added to the model, support was no longer a significant predictor of self-assertion.

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Vita

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