

**EARLY MANIFESTATIONS OF AGGRESSION IN INFANTS OF  
HIGH RISK MOTHER-INFANT DYADS**

By

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## Abstract

The primary focus on the present study was to identify early risk factors for infant aggression in a sample of high risk, low-income teenager mothers and their infants. Despite the amount of research on externalizing behavior, relatively little is known about its development in early childhood. Because chronically aggressive school-age children tend to be those who first display symptoms during preschool years, an examination of the early manifestations of aggressive behavior and the development of measurements for infants is needed. The present study explored a model of infant aggression development that emphasized infant aggression developing largely through the interaction of infant's dispositional characteristics with their caregiving environment.

The study addressed the following relations: (1) Maternal psychosocial functioning with reported and observed infant aggression and negative emotionality, (2) reported measurements of infant aggression and negative emotionality with observed infant measurements of infant aggression and negative emotionality, (3) infant negative emotionality and infant aggression, (4) infant emotion regulation with infant aggression and negative emotionality, (5) the interaction between emotion regulation and negative emotionality in relation to infant aggression, and (6) attachment classification with infant aggression and negative emotionality. Finally, the question of whether these six relations would differ by gender was also addressed.

Maternal psychosocial functioning was assessed with self-reported measurements. Infant aggression, negative emotionality and emotion regulation were measured during two standardized assessments, the Strange Situation and the Bayley

Scales of Infant Development Assessment and maternal reported with the Infant-Toddler Social and Emotional Assessment.

Several interesting findings emerged. One of the main findings concerned maternal attribution and its possible role as a risk factor for later externalizing behaviors. That is, mothers, especially depressed and stressed mothers, tended to report higher levels of infant aggression and negative emotionality than was noted by more objective observers. This tendency was particularly evident in mothers with girl infants. Another important finding concerned emotion regulation. Even at this early age, clear differences in emotion regulation could be seen. Interestingly, infants with high negative emotionality and low emotion regulation were observed to be the most aggressive. Also significant relations emerged for infant negative emotionality and aggression and vice versa. Thus, for purposes of treatment and scientific study, the three constructs (emotion regulation, negative emotionality, and aggression) should be considered in combination. Investigating each alone may not prove fruitful in future examinations. Additionally, different emotion regulation behaviors were observed for girl and boy infants. Aggressive girls looked more at the environment, their toys and their mother, whereas aggressive boys looked less at the environment and their mother and explored their toys more, although looked at the toys less. Although difficult to interpret at this point, it is nonetheless interesting that gender differences exist at this young age in emotion regulatory behaviors.

In conclusion, although preliminary, findings from the present study provide intriguing directions for future research. More studies need to be conducted focusing on infant aggression, as well as longitudinal studies following the infants over time.



## CHAPTER I

## Introduction

Problems with aggression represent the most persistent and common forms of childhood maladjustment and therefore are a special concern for society. A significant proportion of disturbed children referred to treatment centers evidence aggressive and disruptive behavior problems and hostile relationships with family members and peers (Kazdin, 1987; Patterson, Reid, & Dishion, 1992). Children with externalizing problems are at elevated risk for poor academic performance, dropping out of school (DeRosier, Kupersmidt, & Patterson, 1993; Ollendick, Weist, Borden, Greene, 1992), peer rejection (Coie & Dodge, 1998), conflicts with family and educators (Wentzel & Asher, 1995), and engaging in delinquent activities (Kupersmidt & Coie, 1990).

In the present study, relations among observed and maternal reported infant aggression and negative emotionality, maternal psychosocial functioning, infant emotion regulation and attachment classifications are examined. Five literatures are particularly relevant. First, the literature on aggression in young children is reviewed and development, stability, and gender differences of aggression is discussed. Despite the growing interests in the developmental antecedents of aggressive behavior, child psychopathology research and practice have focused almost exclusively on schoolage children until recently. Second, emotional development in infants is discussed. Classic theories of aggression have long pointed to its emotional dimensions, including the association between frustration and aggression and the contribution of anger and negative emotionality to aggressive actions. Third, the transactional model of early childhood aggression is described as it relates specifically to the emergence of

aggressive behavior in young children. There is an extensive amount of empirical evidence supporting the premise that the development of early childhood aggression tendencies occurs as a function of cumulative transactions among child dispositional characteristics (e.g., negative emotionality), parenting factors (e.g., low psychosocial functioning, inappropriate developmental expectation), and quality of parent-infant relationship. Fourth, the literature on observed behavior problems versus parental reports of behavior problems are examined. Different types of informants commonly provide inconsistent reports about children's aggressive behavior. Parental reports are based on definitions that are likely to be specific to the parent and therefore are likely to be affected by systematic personal biases such as parental expectations, attributions about the child or the parent's mood. Fifth, recent research studies on infant aggression are discussed.

I chose to look at aggressive behavior in infancy for several reasons. First, the fact that chronically aggressive school age children tend to be those who first display symptoms during preschool years, calls for an effort to identify risk factors as early as possible. Second, the clinical practice has shown that the older the child is, the more the family is entrenched in dysfunctional patterns of interactions and the less effective interventions are. The possibilities for intervention would be increased if one could identify younger children who are already showing precursors to externalizing problems. From the clinical point of view, it is suggested that earlier interventions have the biggest potential to succeed. This clinical impression deserves systematic study that has not been done yet. As has been shown, the quality of infant-parent relationships is amenable to change in infant-parent therapy (Lieberman, Weston, & Pawl, 1991). If the hypotheses of the

present study are true and maternal low psychosocial functioning, poor emotion regulation and negative emotionality are risk factors for infant aggression, then interventions in infancy and toddlerhood intended to improve the quality of the relationships would improve child's behavior.

To date, very little scholarly work has been conducted to examine the early manifestations of aggression in infants.

## CHAPTER II

## Review of the Development of Aggressive Behavior in Young Children

Aggression

Across multiple epidemiological studies, it has been discovered that approximately 6% of school-age children display serious aggressive or antisocial behavior (Robins, 1991). Aggressive behavior appears to persist both over time and across generations, and predicts maladaptive outcomes such as delinquency and hostility in the adolescent and adult years (Farrington, 2000; Huesman, Eron, Lefkowitz, & Walder, 1984).

Because of the stability and lack of treatment efficacy of aggressive behavior in older children, it is not surprising that there has been a growing interest in identifying infants and toddlers at risk for externalizing behavior problems (Cicchetti, Ackerman, & Izard, 1995; Sameroff, Seifer, & Elias, 1982; Shaw, Keenan, & Vondra, 1994). According to Zeanah, Boris, and Larrieu (1997) even infants and toddlers can exhibit significant aggressive behavior problems which have been found to be relatively stable beginning as early as age 2 years (Cummings, Iannotti, & Zahn-Waxler, 1989; Fagot, 1984; Olweus, 1979), and predictive of more serious antisocial behavior during the school-age period and beyond (Robins, West, & Herjanic, 1975; Tremblay, Pihl, Vitaro, & Dobkin, 1994).

Despite the amount of research on externalizing behavior, relatively little is known about its development in early childhood (Olson, Bates, Sandy, & Lanthier, 2000; Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001; Robbins, 1991; Shaw, Owens, Giovannelli, & Winslow, 2001; Thomas & Guskin, 2001). The

majority of research on the developmental precursors of antisocial behavior has been focused almost exclusively on correlates of disruptive behavior in school-age children or adolescents until recently (Campbell, Shaw, & Gilliom, 2000). In regard to early manifestations of aggression behavior, there have also been conceptual and measurement gaps a lack of attention to developmental issues in child psychopathology like negative emotionality and poor emotion regulation (Shaw, Winslow, & Flanagan, 1999). A growing body of prospective evidence indicates that externalizing problems identified in the preschool years often persist (Campbell, 1995; Eyberg & Boggs, 1989; Keenan, Shaw, Delliquadri, Giovannelli, & Walsh, 1999; Keenan, Shaw, Walsh, Delliquadri, & Giovannelli, 1997; Speltz, Greenberg, & Deklyen, 1990; Webster-Stratton, 1996) and that children identified as showing relatively serious disruptive behavior problems in early adolescence often have a history of problems that began in the preschool years (Lahey, Loeber, Quay, Frick, & Grimm, 1992; Loeber & Hay, 1997; Moffitt, 1990).

Because developmental trajectories leading to adaptive or maladaptive outcome begin in the period from infancy to preschool, this period is considered critical to development (Campbell, 1995). Infants develop rapidly, shaped by the ongoing interdependence of biology and caregiving contexts (Zeanah et al., 1997). Therefore, an examination of the early behavioral markers or predictors of aggression as well as the familial and ecological influences that are likely to place very young children at risk for aggression and its negative consequences is needed. The onset of aggressive behavior at an earlier age may represent a distinct developmental pathway to later antisocial

behavior, and thus may have a unique prognosis and treatment (Patterson et al., 1992). Distinct from aggressive behavior that starts at a later age.

### Definitions of Aggression

Conceptions and definitions of aggression and antisocial behavior are as varied and distinct as the theoretical orientations that gave birth to them. Freudians, for example, believe that aggression, like sexuality, is an innate drive or instinct in each of us. Others theorize that it is not an inborn drive, but a response to frustration that every human being experiences from birth onward (Berkowitz, 1993; Scarpa & Raine, 1997).

A general definition of aggression is: A behavioral act that results in hurt or harm to another person. This includes extreme forms, such as those culminating in a violent act, but is not restricted to such acts. In fact, evidence suggests that violent behavior may have its roots in interpersonally aggressive (but nonviolent) behavior directed towards parents and peers in early childhood (Shaw et al., 1994). The term “aggression” covers a whole range of acts that vary according to age-typical manifestations, severity, and choice of opponents or victims. Thus, aggression is not a unitary term but consists of different manifestations, including physical aggression (e.g., hitting, temper tantrums and throwing toys in the presence of angry mood), verbal aggression (Briggs-Gowan & Carter, 1998), bullying, physical fighting, and different forms of criminal violence, such as robbery, rape and homicide (Loeber & Hay, 1997).

Whatever the source of aggressive energy in human motivation, it would be a mistake to think of it entirely in negative terms. A certain amount of aggression is necessary throughout childhood and adolescence. Channeled in the right direction, human aggression is the force that enables a person to be healthy, self-assertive and

independent, and to achieve mastery of the environment and self. In the context of child development, aggression is improperly channeled when it is directed toward destructive ends. The objects of these destructive impulses may be other persons, property, and even one self. These aggressive acts interfere with healthy child development by upsetting parent-child relationships and preventing the formation of friends with peers (Blustein, 1991). The literature describes instrumental and reactive aggression.

#### Instrumental versus Reactive Aggression

Different forms of aggression have been described in the animal literature and generally can be classified into two types: predatory aggression and defensive aggression. In human beings, the corresponding categories have been referred to as instrumental aggression and reactive aggression (Dodge & Coie, 1987). Aggression that involves a relatively nonemotional display of hostile behavior that is directed toward obtaining a goal can be described as instrumental aggression. Reactive aggression, on the other hand, is described more impulsive than instrumental aggression, and often arises as a defensive reaction in response to some perceived frustration, insult, or provocation. Reactive aggression involves aggressive behavior that takes place within the context of associated anger and high emotionality (Crick & Dodge, 1996; Dodge & Coie, 1987). Berkowitz (1993) labeled reactive aggression as “emotional aggression” and noted that it often occurs in conjunction with anger and in response to negative emotionality and is associated with the inability to regulate negative emotion. Scarpa and Raine (1997) showed, that a predisposition to experience negative emotionality and the inability to regulate or soothe negative emotionality are likely to increase the potential expression of violence. Recent data on negative emotionality demonstrate that

it may be associated with angry outbursts, aggression, and acting out behaviors (Teglasi & MacMahon, 1990) and that there may be a link to later externalizing problem behavior (Rothbart & Ahadi, 1994; Eisenberg et al., 1997).

In the present study, relations between infant negative emotionality and aggression were examined. We also were interested in examining how the interaction between infant emotion regulation and negative emotionality would influence infant aggression. To understand how infants actually express aggressive behavior it is important to first discuss the development of aggressive behavior.

#### The Development of Chronic Aggressive Behavior

Do children become more or less aggressive over time? How does the form of aggression change from infancy to toddlerhood to childhood? These questions must be considered when charting the course of aggressive behavioral development. Deviations from normative patterns – either in terms of excessive displays or age-inappropriate use – appear to place children and youth on trajectories culminating in antisocial behavior and violence (Provost, 1985).

The earliest manifestations of aggression occur in the infant's first encounters with the social world. Both, anger and irritability, which correlate with and potentially antecede aggression, have been observed in young infants. Recent data on anger reactions demonstrate that there may be relations to later externalizing-type behavior problems (acting out, aggression) and difficulty in peer reactions (Eisenberg et al., 1995). Anger, which is identified as first occurring at 6 months of age, along with joy and fear, is a more immediate reaction, and can occur even when a previously untried action fails (Sroufe, 1997). Sroufe (1997) defines anger in infants as an immediate,



negative reaction directed at an obstacle to an intended act and later to certain kinds of threat. Particular facial configurations associated with the experience of anger in adults can be identified as early as three month of age (Izard et al., 2001). The expression of anger emerges in tandem with the cognitive changes occurring in the second half of the first year of life, when infants begin to understand cause-and effect relations (Caplan, Vespo, Pederson, & Hay, 1991). By twelve months, peer-directed aggression and aggression directed at the primary caregiver emerge and manifest as hitting, pinching, biting, hair pulling, throwing toys in the presence of angry mood (Briggs-Gowan & Carter, 1998), and temper tantrums (arching back/stiffening limbs, angry verbalizations, pushing/pulling, stamping) (Eimon & Potegal, 1994). This is the period of life when interest in control over one's activities and possessions first begin to emerge. Conflict is highly normative at this age, characterizing up to half of peer exchanges between 12 and 18 months (Caplan et al., 1991).

One of the complexities of determining the clinical significance of aggressive behavior problems in young children is that many of the behaviors of interest (e.g., frequent tantrums, noncompliance, and aggression toward peers) are normative during this period. Externalizing symptoms in early childhood such as marked noncompliance, aggression toward peers, high activity level, and poor regulation of impulses are considered typical behaviors of toddlerhood and the preschool period, with few long-term implications for later adjustment (Campbell, 1990). Parents who complained about these problems to professionals were often told that their child would outgrow the problem or, for example, that he was "just a boy." As a consequence, a majority of the large community-based and longitudinal studies are based on assessments of aggressive

behavior problems when children were 3 years of age or older without attempts to identify aggressive behavior problems at earlier ages.

At the same time, however, some proportion of very aggressive, defiant, and overactive infants and toddlers will continue to have problems at school age and, for some, these problems may even continue into adulthood (Campbell et al., 2000).

Behaviors that have been found to significantly interfere with developmental and social functioning (e.g., peers consistently refusing to play with a child because of her or his destructiveness and poor regulation) should be regarded as clinical symptoms. Such knowledge is essential as a basis for well-targeted and effective preventive interventions (Mathiesen & Sanson, 2000). Therefore, an examination of the early manifestations of aggressive behavior and the development of measurements for infants is needed (Shaw et al., 1999). The next point of interest is how predictable early aggressive behavior is for later delinquent behavior.

#### Stability of Aggressive Behavior

The idea that aggressive behavior is highly stable over extended periods is now well accepted, with several reviews indicating a level of trait-like stability in aggression that perhaps is rivaled only by the stability of the intelligence quotient (Olweus, 1979). Early externalizing problems, particularly those involving aggressive and destructive behavior, have been found to be relatively stable beginning as early as age 2 years (Shaw, Owens, Vondra, Keenan & Winslow, 1996; Cummings et al., 1989; Fagot, 1984), and predictive of more serious antisocial behavior during the school-age period and beyond (Robins et al., 1975; Tremblay et al., 1994). The data indicate that children identified as “hard-to-manage” at age two have a high probability of continuing to show

difficulties throughout the elementary school years and into adolescence. It is clear that early aggression also predicts later delinquency and crime, as the reviews by Loeber and Dishon (1983) and Loeber and Stouthamer-Loeber (1987) show. In general, about half of any sample of antisocial children persist to become antisocial adolescents, and about half of all antisocial adolescents persist to become antisocial adults (Farrington, 1995). Cummings et al. (1989) found in their study, that long-term stability is apparently more evident for boys than for girls, with high levels of aggression in laboratory observations at two years of age predicting high rates in a similar situation three years later. In contrast, girls' levels of aggression in the toddler period did not predict aggression at age five. In a review of 16 longitudinal studies of aggression in males, Olweus (1979) concluded that individual differences in aggression is stable in boys of preschool age and older. Less strong, but still substantial, levels of stability have also been reported for girls (Parke & Slaby, 1983). Olweus' conclusions have since been replicated in many subsequent longitudinal studies based on different forms of aggression, including severe, emotional temper tantrums (Caspi, Elder, & Bem, 1987; Farrington, 1994; Olweus, 1979; Pulkkinen, 1992).

### Gender Differences in Aggression

Some studies report that aggressive behavior problems are higher in boys (e.g., Emery, 1988; Keenan & Shaw, 1994; Luk, Leung, Bacon-Shone, & Lieh-Mak, 1991; Maccoby & Jacklin, 1980; Prior, Smart, Sanson, & Oberklaid, 1993), whereas other studies have revealed relatively trivial gender differences in preschool children (e.g., Koot, 1993; Newth & Corbett, 1993; Olson et al., 2000; Richman, Stevenson, & Graham, 1982; Shaw, Winslow, Owens, & Hood, 1998). Evidence from two

investigations suggests that gender differences in aggression do not exist until age 4 or 5 (Achenbach & Edelbrock, 1983; Zahn-Waxler, Iannotti, Cummings, Denham, 1990).

Overall, studies have been inconsistent, although the bulk of the evidence suggests that gender differences in aggression are not marked in preschool children. What is despite the evidence in school-age children that indicates higher rates of externalizing behavior in boys (Achenbach, Howell, Quay, & Conners, 1991).

Although it seems there is little to no evidence for gender differences in possible precursors to aggression in toddlerhood, there are some differences between the sexes in emotional reactivity and self-regulation that may predate and correlate with later gender-differentiated aggressive behavior problems. Weinberg & Tronick (1997) found that infant boys are more emotionally labile than infant girls and express both positive and negative emotions at higher rates. However, infant girls can better regulate their own emotional states, whereas infant boys depend more on input from their mothers (Weinberg & Tronick, 1997). Earls and Jung (1987), and Shaw and Vondra (1995) found that maternal symptoms of depression when children were infants and toddlers operated rather selectively in boys to heighten the risk for poor outcomes at age three. Without external regulatory support, boys also may have more difficulty regulating their own negative affects.

### Summary

In the section “Aggression,” several definitions and forms of aggression were described, the development and the stability of aggressive behavior in young children was discussed, and the importance of examination early behavioral markers of aggressive behavior was highlighted. The next section will address emotional development in

infancy, specifically emotion regulation and caretaker-infant relationship, to provide better understanding of the onset of aggressive behavior in young children.

### Emotional Development

Wenar (1982) has suggested that problems in children can best be conceptualized as “normal development gone awry.” (Wenar, 1982, p. 305). Thus, it is appropriate to examine the major developmental challenges of infancy and toddlerhood to suggest junctures where development may proceed normally or perhaps where the stage is set for the onset of aggressive behavior problems.

Among the major milestones of early infancy are the development of emotion regulation and self-soothing abilities, the establishment of routines, the modulation and coordination of motor activity, and the ability to focus attention on, and derive meaning from, environmental events (Kopp, 1982; Sroufe, 1997). It is generally agreed that these early acquisitions are under strong biological-maturational control (Kagan, 1984), although the role of the caretaking environment is also considered important to the successful negotiation of these developmental challenges (Kopp, 1982; Sroufe, 1997). Consistent with a transactional model of development, Kopp (1982) suggests that the early modulation of behavior, as well as later self-regulatory abilities, derive from individual differences in infant characteristics that have biological-constitutional roots and from the quality of caretaking. Taken together, the process of development is seen as an active and dynamic one in which the infant moves toward more complex functioning as cognitive and social processes reorganize with each new phase of development. Whereas maturation plays a central role in this process, especially early

on, the role of a responsive and appropriate caretaking environment, which changes over time to meet the infant's developmental needs, cannot be overemphasized.

One of the present study's interests is to examine the association between caretaker's psychosocial functioning and infant's aggression and negative emotionality. Therefore it is important to discuss relations among the caretaker-infant relationship and emotion regulation in more detail.

### Caretaker-Infant Relationship

Most theories of the development of early childhood aggression stress the role of the caretaker-infant relationship (Greenberg, Speltz, & DeKlyen, 1993; Emde & Sameroff, 1992; Yarrow, Morgan, Jennings, Harmon, & Gaiter, 1982). In attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969; Sroufe, 1997), the quality of the early caregiver-infant relationship is recognized as the prototype for all later relationships and for forming the groundwork for cognitive and social development. Briefly, attachment theory argues that infants have a biologically based propensity to become attached to one or two primary caretakers, and that adults have a biologically based tendency to care and nurture helpless and dependent members of the species. Within this framework, inborn infant behaviors, such as crying and clinging, are presumed to promote and maintain proximity to caretakers, thereby protecting the infant from exposure or harm and also ensuring sustenance. Attachment bonds develop over the course of the first year, progressing from indiscriminant responsiveness to any adult to a highly specific and goal-directed emotional bond with the primary caregivers, usually the parents. Once a focused attachment to the caretaker develops, the infant's behavior becomes organized around the goal of maintaining proximity to him when in

unfamiliar surroundings or when tired or upset. The caretaker thus serves as the major source of comfort, protection, and support in times of stress. The attachment figure also serves as a secure base for exploration of the environment, facilitating the infant's mastery of the physical and social world. According to this view, the attachment figure plays a central role in the infant's cognitive and social development as well as the development of self-regulation skills.

### Emotion Regulation

Several studies have demonstrated that emotion regulation is an important component of social-emotional development in infancy and throughout the lifespan (Campos, Mumme, Kermoian, & Campos, 1994; Cicchetti, Ganiban, & Barnett, 1989; Degangi, DiPietro, Greenspan, & Porges, 1991; Fogel et al., 1992; Tomkins, 1963). Eisenberg and colleagues (2000) define emotion regulation as consisting of children's ability to (1) inhibit inappropriate behavior related to strong negative or positive emotionality, (2) self-soothe physiological arousal induced by strong emotionality, (3) use self-regulatory behaviors in the face of distress, such as distraction, self-comforting, help-seeking, and (4) organize themselves for coordinated action in the service of an external goal.

There is initial evidence that children's aggressive behavior is associated with lack of regulation (Eisenberg & Fabes, 1992; Hart, Hofmann, Edelstein, & Keller, 1997; Newman, Caspi, Moffitt, & Silva, 1997; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996; Weinberg & Schwartz, 1990). Classic theories of aggression have long pointed to its emotional dimensions, including the association between frustration and aggression and the contribution of anger and rage to aggressive actions (Cairns, 1979).

The control of anger and the tolerance of frustrating circumstances are major achievements in early socialization and do not come automatically. The ability to manage distress and anger when frustrated is likely to be critical for later adaptation. And, it is apparent that such skills begin to develop in infancy and become consolidated during toddlerhood so that by the time the child enters preschool, these skills may play an important role in the development of self-control (Kopp, 1982) and social competence (Rubin, Coplan, Fox, & Calkins, 1995). Central to emotion regulation theories is the notion that biological maturation and sensitive caregiving interact to provide the infant the means with which to effectively regulate emotion (Calkins & Johnson, 1998; Mangelsdorf, Shapiro, & Marzolf, 1995). The regulation of response systems is often a developmental achievement, as this coordination is not present at birth but is acquired during early life (Sroufe, 1997). Kopp (1989) proposed that initial regulation is provided by the caregiver and that the task for the infant-caregiver relationship is to transfer this control to the infant. In fact, the general course of emotional development may be described as movement from dyadic regulation to self-regulation of emotion.

In the first month of life, innate events – such as sucking, head turning, and hand-to-mouth movement – result in the infant’s modulation of negative arousal states. Conditioning strengthens the association between these initially innate events and their regulatory functions, so that they become more voluntary over time. As the infant matures, these developing cognitive abilities (such as discrimination, planning, and selective attention) offer new possibilities for regulating emotions. All of these regulatory activities are promoted and monitored by the caregiver. In second half year,



the regulation of arousal and emotion no longer depend simply on what the caregiver does, but on how the infant interprets the caregiver's accessibility and behavior, as well on the infant's more general expectations concerning the environment. In the period just after infancy, known as the toddler phase of development, the young child, at times, is able to regulate arousal and behavior successfully without caregiver intervention.

Informal observations of distressed infants of about 12 to 18 months indicate that they discover new ways to use objects as a means to relieve their distress when caregivers are unavailable (Stifter & Braungart, 1995), all of which paves the way for later self-regulation. Caregivers who are sensitive to their infants' arousal states or who are effectively attuned to them can help them to tolerate and cope with increasing amounts of tension (Sroufe, 1997). Thus, at this stage of development, caregivers support the infants' development of psychological self-regulation and their continual adaptation to the world. Patterns of interactions and expectations formed during previous stages are integrated to define a child's affective relationship with her or his caregiver. The formation of a secure attachment relationship with the primary caregiver is considered the paramount developmental issue of the latter half of the first year of life (Sroufe, 1997). At this phase, affect, cognition, and behavioral expression become organized around the physical and emotional availability of the attachment figure (Ainsworth et al., 1978; Sroufe, 1997). By the end of the first year, virtually all infants will become attached. The quality of the attachment, however, will vary greatly, depending on the responsiveness of the caregiver and degree of reciprocity possible between infant and caregiver. To the extent that the infant's signals elicit appropriate responses, and to the extent that the infant behaviors can be coordinated in exchanges with the attachment

figure to achieve ongoing emotional regulation, a secure attachment relationship is expected. Insecure attachments will manifest in dysfunctional dyadic emotion regulations. The differences in attachment security have a profound impact on the infant's later self-regulation of emotion (Sroufe, 1997).

#### Quality of Caretaker-Infant Relationship

Ainsworth and her colleagues (1978) identified individual differences in the patterning of infant-caregiver attachment relationships. Traditionally, children have been classified as securely attached (Type B), insecurely attached avoidant (Type A), or insecurely attached resistant (Type C). More recently researchers identified a fourth pattern, disorganized attachment (Type D) (Main & Solomon, 1990).

The Securely Attached Child. During the Strange Situation, the child who is securely attached plays and explores with confidence and enthusiasm in the presence of the attachment figure, periodically sharing a look, a vocalization, or a smile, or showing the caregiver a toy. Regardless of the degree of visible distress during the separation episodes, the securely attached child will show clear signs of pleasure and/or relief upon the caregiver's return. Research has shown secure attachment to grow from the child's experience with a caregiver who is consistently responsive to the child's cues and signals. That basic trust in caregivers and in self, or what is sometimes described as the child's internal working model of self and others (Bretherton & Waters, 1985), is carried forward, influencing the child's expectations and behavior in subsequent relationships with other adults and peers. The secure caretaker-infant relationship, which promotes the capacity for self-modulated arousal, has its roots in the range of affective exchanges throughout early infancy. It includes the repeated experience of

arousal escalation and de-escalation, the frequent occurrences of distress-relief cycles with which the caregiver is associated and the continued experiences of shared positive affect (Erickson, Sroufe, & Egeland, 1985; Sroufe, 1997). Consequently, regulation - as opposed to dysregulation - becomes familiar and anticipated. The internalization of this caregiving pattern, therefore, also includes the internalization of emotion regulation.

The Insecurely Attached Resistant Child. The resistant child seems so unsure of the caregiver's availability and predictability that he or she is preoccupied with maintaining contact with the caregiver even prior to the upsetting separation episodes and exhibits a poverty of exploration. Usually extremely upset by separation from the caregiver, this child nevertheless appears ambivalent during reunion, often alternating between desperate clinginess and active resistance when the caregiver offers contact. The caregiver's efforts to comfort the child are not successful, and the child continues to fuss rather than going about the natural one-year-old business of playing and learning from the world. They cannot effectively use the caregiver for emotional regulation. This pattern of attachment has been shown to be related to inconsistent, unpredictable care during the early months of the child's life (Ainsworth et al., 1978; Egeland & Farber, 1984). The child is never sure whether others will be there to respond and care for him or her or whether he/she will be effective in soliciting care (Sroufe, 1997).

The Insecurely Attached Avoidant Child. The avoidant child interacts minimally, if at all, with the caregiver prior to the separation episodes. He or she may look "precociously independent," playing alone with no apparent need to check to make sure the caregiver is present. When the caregiver leaves the room, this child shows no visible signs of distress, and when the caregiver returns to the room, avoidant children

actively avoid interaction (which is not shown to the stranger), averting their faces or perhaps moving to the other side of the room. The relation between stress and contact seeking is turned around: as the stress increases, the avoidance increases. The insecurely avoidant pattern of attachment often stems from experience with a caregiver who is chronically unresponsive to the baby's bids for care and attention. Early in life, these babies appear to working hard to engage their caregivers. But by one year of age, they have effectively given up (Erickson et al., 1985; Sroufe, 1983).

The Disorganized Child. Recent attachment research (Main & Solomon, 1990) describes a fourth pattern of attachment characterized as "disorganized." During the Strange Situation, these children often present contradicting behaviors simultaneously, such as reaching out to the caregiver with a grimace on their face or starting to approach and then "freezing." Main argues that these infants have not been able to form coherent strategies because the behavior of the caregiver has itself been incoherent or threatening. (Main & Solomon, 1990). Some researchers have found it to be associated with traumatic abuse (Cicchetti & Barnett, 1991; Crittenden, 1988; Main & Hesse, 1990). Numerous studies show evidence that early disorganized attachment strategies are related to oppositional or hostile-aggressive behaviors up to age 7 (Greenberg et al., 1993; Lyons-Ruth, Alpern, & Repacholi, 1993; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Shaw et al., 1995).

The differences in the quality and patterning of these relationships are thought to reflect different styles of behavioral and emotion regulation that have developed out of the children's history of distress remediation and emotional synchrony with their

caregivers. These regulatory strategies are believed to persist and remain influential into adulthood.

The Ainsworth Strange Situation represents a cumulative stress situation for the infant. The order of events is purposefully arranged. Schore (1994) stresses the importance of separation-reunion experiences for infant development. They provide key experiences of dramatic “psychobiological state transition,” a shifting from strong negative affect to positive affect and/or from a low-energy to a high-energy state. Designed to create progressively more stressful contexts for the infant, the Strange Situation is an ideal structured stress-provoking context for assessing infant negative emotionality, emotion regulation and aggression (Shaw et al., 1994).

Whereas attachment theorists emphasize the role of the caregiver in bringing about these differences, temperament theorists contend that individual differences observed in the quality of attachment may reflect constitutionally based components of emotionality such as soothability, emotional reactivity, fearfulness and distress proneness (Chess & Thomas, 1982; Kagan, 1982). The debates on these issues are beyond the scope of this dissertation. The interested reader is referred to Bates (1987), Kagan (1984), and Sroufe (1997). However, it appears that both the caregiver’s sensitivity and differences in the child’s temperament contribute to the quality of the attachment relationship and to its stability over time (Goldsmith & Alansky, 1987). Dual emphases on infant temperament and quality of attachment underscores the prevalence of individual differences in development. The insight into the dynamics of parent-child interactions focusing on individual differences in parenting and in children highlights multiple interacting factors that may lead one difficult infant to become an

engaging toddler, whereas another difficult infant becomes increasingly defiant, angry, and hard-to-control (see transactional processes and broad ecological influences; (Bronfenbrenner, 1986; Sameroff, 1995).

### The Transactional Model of Early Childhood Aggression

Anders, Goodlin-Jones and Zelenko (1998) transactional model of early childhood aggression focuses on the interaction among biological and environmental determinants, while allowing for qualitative changes in behavioral and social factors as a function of development. The model describes the process by which an individual develops and changes over time and how the impact of a child's biological strengths and vulnerabilities could be either buffered or enhanced by positive and negative environmental factors. Developmental pathways to children's aggressive behavior problems are widely believed to be multifactorial and transactional (Campbell et al., 2000; Rutter & Sroufe, 2000). A transactional approach allows researchers to consider the development of externalizing behavior problems as an ongoing and constantly changing reciprocal process between children and their caretaking environment (Sameroff, 1990).

There is an extensive amount of empirical evidence supporting the premise that the development of early childhood aggression tendencies occurs as a function of cumulative transactions among child dispositional characteristics (such as temperament [e.g. emotional reactivity, distress proneness], parenting factors (such as parent's attributions about their child and parent's psychosocial functioning), and quality of parent-infant relationship (Anders et al., 1998; Campbell et al., 2000; Coie & Dodge, 1998;). Parental behaviors are part of a dynamic, transactional system in which

biological, psychological, and sociological factors are all intertwined. The transactional model for the development of infant's aggression behavior is presented in Figure 1.

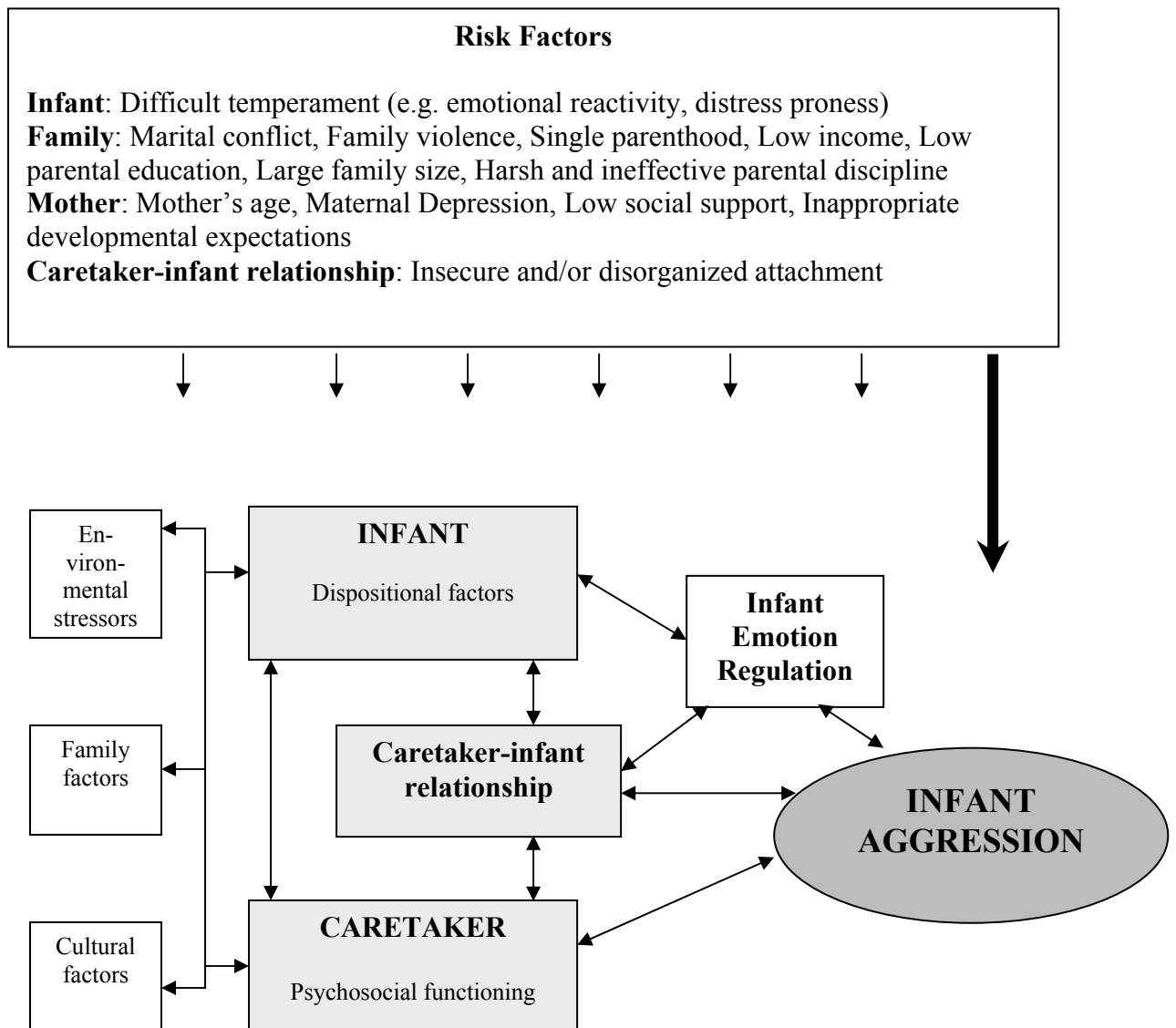


Figure 1. The Transactional Model of Early Childhood Aggression (adapted and modified from Anders et al., 1998).



### Risk Factors Associated with Childhood Aggression

Within the child psychology field, the discussion is very heated about which factors place children at highest risk for problems, and what determines whether children exposed to one or more risk factors will be resilient enough to overcome negative early experiences (Dodge, 1996; Rutter & Sroufe, 2000; Shaw et al., 1994; Zeanah et al., 1997). Recent research on how risk and protective factors affect development suggest that the transmission of risk is neither specific nor linear (Seifer, Sameroff, Anagnostopolou, & Elias, 1992). Thus the total number of risks affecting an infant may be more predictive of aggressive behavior problems in early childhood than exposure to any specific type of risk factor (Sanson, Oberklaid, Pedlow, & Prior, 1991; Shaw & Vondra, 1995; Shaw et al., 1994).

Needless to say, it is beyond the scope of this dissertation to review the literature on all the possible causes and correlates of childhood aggression. Nevertheless, it is useful to outline briefly those risk factors that are addressed in the present study: (1) Child dispositional risk factors, (2) parenting risk factors, and (3) social/family risk factors.

(1) Child Dispositional Risk Factors. Some researchers suggest a biogenetic origin to aggression. Aggressive behavior is thought to derive from genetically inspired variations in (a) temperamental and (b) physical characteristics (Cairns, 1979; Laucht, Esser, Schmidt, 2001), such as prematurity, higher body mass, and serious medical illnesses.

(a) Temperament. Difficult temperament, often manifested as highly negative affective and behavioral responses to even mildly challenging stimuli, is a construct used to describe the frequent behaviors of a minority of infants and toddlers (Kagan,

Snidman, & Arcus, 1995; Oberklaid, Sanson, Pedlow, & Prior, 1993; Rutter, 1987; Sanson & Rothbart, 1995). Early child temperamental dispositions have been linked prospectively to children's later externalizing behavior: Difficultness, indexing frequent and intense expression of negative emotionality, and resistance to control, indexing early forms of unmanageability (Bates, Pettit, Dodge, & Ridge, 1998). Difficult temperament has been associated with preschool- and early school-aged children's externalizing problems and aggression (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Bates, Pettit, Dodge, & Ridge, 1998; Henry, Caspi, Moffitt, & Silva, 1996; Rothbart & Bates, 1998; Sanson et al., 1991; Sanson, Smart, Prior, Oberklaid, 1993). Scarpa and Raine (1997) posit, that a predisposition to experience negative emotionality and the inability to regulate or soothe negative emotionality are likely to increase the potential expression of aggressive behavior. However, although possible temperamental bases for children's aggression have been identified, further work is needed to understand the ways in which early child difficultness interacts with other social and developmental factors, particularly quality of parent-child interaction, to affect children's later aggressive outcomes (Olson et al., 2000).

(2) Parenting Risk Factors. Some studies (Rutter & Sroufe, 2000) have demonstrated that aggression is a learned phenomenon that is reinforced directly and indirectly by (a) parents' age, (b) parental attributions about the child, (c) parent-infant relationship, and (d) parents' psychological problems.

(a) Parents' age. Young maternal age is a risk factor for childhood aggression (Pasino et al., 1993; Schellenbach, 1991). A large body of research indicates that compared with older mothers, adolescent mothers differ in their interactions with their

infants: teenagers are more restricted, more physically intrusive, give more commands and authoritarian statements, and score lower than adult mothers on maternal-affectual match, positivity, motivation, and overall quality of mothering (Garcia Coll, Vohr, Hoffman, & Oh, 1986; Passino et al., 1993). Passino et al. (1993) examined differences in personal adjustment among groups of pregnant adolescents and adults. Adolescent mothers reported higher levels of parenting stress and were found to perceive their children as less adaptable, less reinforcing, and more demanding than adult mothers. Adolescent mothers also viewed themselves as more socially isolated, depressed, less competent, less attached to their children, and having more health problems than adult mothers.

*(b) Parental attributions about the child.* Carter, Osofsky and Hann (1991) note that adolescent mothers often have unrealistic expectations about their infants development (e.g., encouraging very young infants to hold their own bottles and feed themselves, being insensitive to the child's growing need for autonomy, exercising excessive control over the child's locomotion and exploration) (Azar, Robinson, Hekimian, & Twentyman, 1984; Twentyman & Plotkin, 1982). Adolescent mothers often attribute malevolent intention to children (Bauer & Twentyman, 1985), are more likely to use power-assertive and negatively oriented strategies for controlling their child (Oldershaw, Walters, & Hall, 1986), and are less likely to respond consequently to the infant and to demonstrate enjoyment of, and responsiveness to, the infants' goal-directed behaviors (Crittenden & Bonvillian, 1984; Lyons-Ruth, Connell, Zoll, & Stahl, 1987). Thus, independent of current functioning, a young child whose parent holds a

negative appraisal and negative expectations of him or her may be at elevated future risk for developing aggressive behavior (Carter, Briggs-Gowan & Kogan., 1999).

In some cases, parental perception of the child and attitudes towards the child may be greatly distorted by the caregiver's own experiences and unresolved feelings of the parent may affect the child-parent relationship (Fraiberg, 1980). At the extremes, these differences in parent perception could have profound effects on infant psychological development. Zelenko and colleagues (in press) showed that pregnant adolescent mothers with lower psychosocial functioning expect problems even before the child is born. It could be that child difficultness arises because the child has been expected to be difficult and, therefore, has been treated as such (Zelenko, Huffman, Lock, Kennedy & Steiner, in press). As children are developing a sense of self in relation to the perception of others in their environment, the assessment of parental perceptions is critical to understanding children's social and emotional development (Briggs-Gowan, Carter, & Schwab-Stone, 1996). The negative appraisal of the child (i.e., the parent's internal working model of the child) may influence both parenting practices and subsequent child behavior (Zeanah, Keener, Anders, & Levine, 1986).

These results suggest that parental perceptions of infant behavior, and specifically a discrepancy between parent perception of infant intentionality and the infant's actual behavior, may have important consequences and could affect how the parents interact with the infant, which could in turn affect the infant's behavior. For example, maternal expectations that the child will be aggressive may reinforce aggressive tendencies in the child. It is necessary to be aware of these psychodynamic processes when interpreting observed behaviors with a particular caregiver (Zelenko, in

progress). For example, Bates, Maslin, & Franke (1985) have shown that maternal perception of infant difficulty in the first year of life is predictive of aggressive behavior at age three. It could be that maternal unresponsiveness at 12 months is the result of previously formed maternal perception of infant difficulty.

*(c) Parent-infant relationship.* Caregiving relationships play a vital role in the normative development of the capacity to regulate emotions and in individual differences in emotional regulation. Numerous studies have demonstrated a link between high levels of negative emotionality, low levels of regulatory behaviors and early childhood aggression (Braungart & Stifter, 1991; Calkins & Johnson, 1998; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994; Olson et al., 2000; Stifter, Spinrad, & Braungart-Riecker, 1999).

Infant attachment insecurity has been found to be related to later externalizing problems, particularly among samples of high-risk children (Erickson et al., 1985; Shaw & Vondra, 1995; Shaw et al., 1996).

*(d) Parents' psychological problems.* Numerous studies have demonstrated a link between psychological problems in parents, especially depressive symptoms, and aggressive behavior in their preschool children (Carter et al., 2001; Carter et al., 1999; Zahn-Waxler, Cummings, McKnew, & Radke-Yarrow, 1984). Findings consistently indicate that mothers who report more symptoms of depression are more likely to perceive their preschool children as hard-to-manage and are also more likely to engage in conflict and coercive interactions with their children than mothers who do not report feeling depressed. Maternal mood influences both the quality of caretaking and a women's interpretation of, and tolerance for, her preschooler's behavior (Cohn &

Tronick, 1989; Field, Healy, Goldstein, & Guthertz, 1990; Lyons-Ruth, Connell, Grunebaum, & Botein, 1990; Pelaez-Nogueras, Field, Cigales, Gonzales, & Clasky, 1994). Women, who feel fatigued and unsupported, have less tolerance for the typical behavior of young children, which leads them to label even age-appropriate behavior as problematic and to seek help for problems that other parents would ignore (Sameroff et al., 1982; Zahn-Waxler et al., 1984).

(3) Social/Family Risk Factors. Numerous studies have demonstrated a link between (a) increased stress level and (b) dissatisfaction with social support with aggressive behavior in children (Easterbrooks & Emden, 1986; Jouriles et al., 1991).

(a) Increased stress level. Stress in the parenting system during the first 3 years of life is especially critical in relation to the child's emotional/behavioral development and to the developing parent-child relationship (Abidin, 1990). A relationship between marital distress and increased risk for externalizing problems has been established in numerous studies (Block, Block, & Gjerde, 1986; Crnic & Greenberg, 1990). Cummings et al. (1985) demonstrated that 2-year-olds' display of aggression and distress were reduced to baseline levels after adults resolved their conflicts.

(b) Dissatisfaction with social support. Dissatisfaction with social support also has been found to add unique variance to the prediction of child aggression (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983; Zelenko et al., in press). In most studies, pregnant and parenting adolescents identify two main support persons: the mother of the adolescent and the father of the baby (Chen, Telleen, & Chen, 1995; Giblin, Poland, & Sachs, 1987; Thompson & Peebles-Wilkins, 1992). Zelenko et al. (in press) emphasized the powerful role of the baby's father support in parenting attitudes

and psychological well-being of a single adolescent. Young women who reported less support from the father of the baby were more distressed and unhappy and reported more behavior problems in their children (Schellenbach, 1991).

### Summary

The transactional model of early childhood aggression presents a reasonable optimistic view of childhood aggression because it suggests that interventions focusing on the child, the primary caregiver, or their interactions over time would be sufficient to reverse a trend toward the development of aggressive behavior. It also suggests that it is possible to identify those infants or young children most at risk for aggressive behavior. Finally, the transactional model makes it clear that the caretaking environment should be the major focus of preventive and therapeutic efforts.

### Maternal Reports Versus Observational Reports

Different types of informants commonly provide inconsistent reports about children's aggressive behavior (Achenbach, McConaughy, & Howell, 1987; Offord, Boyle, & Racine, 1989). Most of the initial information about the child's functioning is conveyed to an evaluator through parental report that represents the parent's perception of the child (Zelenko, in progress). Indeed, many studies have relied on parental report as the primary indicator of the young child's mental health, temperament and language ability (Glascoe & Dworkin, 1995).

The main reason why caution is required in the interpretation of any data that are filtered through an untrained observer (parent or teacher) is the concern about the inaccuracy an observer can introduce. For example, parental report may be influenced by factors such as knowledge and expectations about child development, demographic

characteristics or the parental psychological and/or psychiatric status (e.g., level of depressive symptoms or depression diagnosis) (Briggs-Gowan, Carter, Skuban, Horwitz, 2001; Wolk, Zeanah, Garcia Coll, & Carr, 1992). The parent's perception of the child reflects a variety of environmental and parental and child factors intertwined in the context of the child-parent relationship (Zelenko, in progress). Thus, parental reports are based on definitions that are likely to be specific to the parent and therefore are likely to be affected by systematic personal biases such as parental expectations, attributions about the child or the parent's mood (Eddy, Dishion, & Stoolmiller, 1998; Fergusson, Lynskey, Horwood, 1993; Patterson & Forgatch, 1995; Prescott et al., 2000; Richters, 1992).

In the temperament field, there has been considerable debate about the concordance of parent report and laboratory assessment (Bates, 1990; Wolk et al., 1992). Bates, Olson, Pettit and Bayles (1982) found in the Bloomington Longitudinal Study (BLS) of the development of children's social adjustment that there is a high degree of independence in how mothers and teachers perceive the same child in terms of the presence or absence of behavior problems. In general, mother and teacher perceptions of child psychopathology do not converge. This is consistent with other findings that different types of informants commonly provide incongruent reports about children's feelings and behaviors (Achenbach et al., 1987; Cytyn & McKnew, 1980; Offord et al., 1989).

On the other hand, some studies have shown that parental reports may be quite reliable (Carter et al., 1999; Robinson & Eyberg, 1981). Carter and her colleagues (1999) found in their study that maternal ratings on negative emotionality and problems



in inhibition and separation significantly correlated with negative emotionality in the laboratory assessment.

Overall, the literature regarding relations between objective observational measures and parental reports suggests that the two sources may measure different dimensions of the child's behavior, and, thus, offer unique information (Huffman et al., 1998; Webster & Stratton, 1998). In clinical practice, parental reports of children's behavior provide additional information to complement and clarify the observational findings. At the same time, direct observation of the child's behavior and interactions with the parents helps to reveal parental biases and achieve more objective information about infants' aggression. Parental report provides important information regarding parents' perceptions of their infants' behavior. Indeed, discordance between parents' perceptions and observed infants' behavior may in themselves be of interest in the study of the development of aggressive behavior. Thus, it is necessary to assess a child's aggressive behavior from multiple perspectives, that is, within a developmental framework and from the vantage point of several significant adults in the child's environment and from observational assessments (Reznick & Brandwein Schwartz, 2001).

#### Research Studies on Infant Aggression

To date very little is known about aggressive problem behaviors among very young children (1 – 2 years). Only a handful of studies have prospectively examined infant precursors of aggressive behavior problems in toddlers and preschoolers (Keenan & Wakschlag, 2000; Mathiesen & Sanson, 2000; Stifter et al., 1999; Olson et al., 2000).

The Bloomington Longitudinal Study (BLS), is one of the few studies which examines infant precursors for aggressive behavior to describe empirical pathways between infancy and later aggressive behavior (Bates et al., 1982). Conceptually rooted in transactional theory, the BLS provides a comprehensive database linking biological, developmental, and familial-ecological factors in the first two years of life to individual differences in children's long-term behavioral and developmental outcomes. Preliminary analyses of the BLS have emphasized linkages of two interrelated constructs to the development of children's behavioral problems at ages 3, 6 and 8 years: (a) quality of early caregiving relationship, and (b) patterns of infant/toddler difficultness (frequent and intensive expression of negative emotionality) and resistance to control (early forms of unmanageability) (Bates et al., 1998).

The Olson et al. (2000) study found that toddlers at risk for later aggressive behavior were perceived as difficult, and relationships with their caregivers were relatively low in warmth and affective enjoyment. The caregiver's perception of her toddler as emotionally unresponsive to her was predicted later aggressive behavior, suggesting that negative maternal cognitions were associated with child conduct problems that begin in toddlerhood. The study also found that lack of close, affectionate mother-child contact at age 6 months was incrementally predictive of parent and adolescent ratings of externalizing problems at age 17. The results show that patterns of caregiving risk may be identified as early as 6 months of age, well before coercive parent-toddler transactions become established. In addition, the caregiver's perception of her toddler's unresponsiveness to her was the strongest predictor of adolescent

externalizing problems, indicating the need for further research into parent's early perceptions of child behavior.

Shaw and colleagues (1994) followed a sample of high risk, low-income mothers and their infants prospectively. Mother-infant interactions were observed in several laboratory contexts at ages 12, 18, and 24 months to derive measures of infant demandingness in a frustrating situation, infant aggression, and infant noncompliance at 18 and 24 months, as well as maternal responsiveness. For boys, but not for girls, observed compliance and lower levels of maternal responsiveness at an earlier assessment (12 months) predicted global ratings of observed aggression at 24 months; earlier aggression and the interaction between aggression and maternal responsiveness predicted maternal ratings of externalizing symptoms at age 36 months. These findings highlight the utility of studying the development of behavior problems beginning in infancy. It is possible that factors in the first 6 months of life may influence 12-month maternal responsiveness. For example, Bates et al. (1985) demonstrated that maternal perception of infant difficulty in the first year of life is predictive of age 3 aggressive behaviors. Shaw et al. (1994) suggest that maternal unresponsiveness at 12 months may be the result of previously formed maternal perceptions of infant difficulty. Work by Dodge and others (1997) has further established that aggressive boys and their mothers tend to attribute hostile intentions to others in ambiguous situations. Mothers of aggressive children are more likely to attribute child misbehavior to negative personality dimensions and endorse more forceful disciplinary responses (Dix & Lochman, 1990; Dodge, Lochman, Harnish, Bates, & Pettit, 1997).

In a review of studies on the development of aggression, Hay, Castle, and Davies (2000) noted that serious aggression in childhood is sometimes predated by general oppositional states in early life, difficult temperament, and problems in attachment relationships (Fagot & Leve, 1998; Fagot, 1997; Keenan & Shaw, 1997; Maziade, Cote, Bernier, Boutin, & Thiverge, 1989; Moffitt, 1993), but they also speculated that there might be some homotype continuities from toddlerhood to childhood. For example, a composite observational measure of aggressive behavior in toddler playgroups predicted teachers' ratings of externalizing problems at 5 years of age, whereas measures of temperament and attachment status did not (Fagot & Leve, 1998). Hay et al. (2000) suggested that serious aggression in later childhood may be predicted by intense and proactive aggression in the early years. There is also evidence from community-based samples that difficult temperament and behavior problems, such as aggression and noncompliance, exhibited as early as 2 years of age are predictive of continued aggressive behavior (Keenan & Wakschlag, 2000).

Based on data from the Minnesota high risk sample (Egeland, Kalkose, Gottesman, & Erickson, 1990), Renken and colleagues (1989) studied predictors of teachers' ratings of aggression, averaged across grades one to three. Possible predictors were obtained from observations of mother-child interaction in the laboratory during toddlerhood and preschool, as well as maternal reports of stressful life events and social support. Measures of observed child negative emotionality and maternal hostility at 42 months were correlated with later teacher ratings of child aggression for both boys and girls; family context measures predicted later ratings of aggression as well. Children

whose mothers reported less social support and more stressful life events received higher aggression ratings.

### The Present Study

The primary focus on the present study was to identify early risk factors for infant aggression in a sample of high risk, low-income teenager mothers and their infants. The present study explored a model of early childhood aggression development that emphasized infant aggression developing largely through the interaction of infant's dispositional characteristics with their caregiving environment. In particular, the goal of the present study was first to examine associations between maternal psychosocial functioning, observed and reported infant aggression and negative emotionality. Second, associations between reported measurements of infant aggression and negative emotionality and observed measurements of infant aggression and negative emotionality were examined. Third, relations between infant aggression and infant negative emotionality were studied. Fourth, relations between infant emotion regulation and infant aggression and negative reactivity were examined. Fifth, the interaction between negative emotionality and emotion regulation in relation to infant aggression were studied. Sixth, relations between attachment classification and infant aggression and negative emotionality were examined. Finally, the question of whether these six relations would differ by gender was also addressed.

We chose low-income adolescent mothers because both dysfunctional relationships (Lyons-Ruth et al., 1990) and childhood aggression (Shaw et al., 1994) are more prevalent in this population and therefore, the relations among maternal

psychosocial functioning, emotion regulation, infant negative emotionality, and infant aggression if existing would be more easily detectable.

### Hypotheses

#### Relations between Maternal Psychosocial Functioning and Reported and Observed Infant Aggression and Negative Emotionality

Hypothesis 1.1: Lower maternal self-reported psychosocial functioning will be associated with higher infant aggression as reported by the mother on the Infant-Toddler Social and Emotional Assessment (ITSEA). Specifically, mothers' 1) higher levels of depression (Symptom Checklist-90-R; SCL-90-R), 2) higher level of parenting stress (Parenting Stress Index; PSI), and 3) lower levels of perceived support from baby's father (Father Support scale; FS), will be associated with mothers' higher infant reported ITSEA Aggression/Defiance scores.

Hypothesis 1.2: Lower maternal self-reported psychosocial functioning will be associated with higher infant negative emotionality as reported by the mother on the Infant-Toddler Social and Emotional Assessment (ITSEA). Specifically, mothers' 1) higher levels of depression scores (Symptom Checklist-90-R; SCL-90-R), 2) higher level of parenting stress (Parenting Stress Index; PSI), and 3) lower levels of perceived support from baby's father (Father Support scale; FS) will be associated with higher infant reported ITSEA Negative Emotional Reactivity scores.

Research shows that parental report may be influenced by factors such as knowledge and expectations about child development, demographic characteristics, and the parental psychological/psychiatric status such as level of depressive symptoms or depression diagnosis (Briggs-Gowan et al., 2001; Wolk et al., 1992). Research studies

in the past have shown that children whose mothers reported less social support and more stressful life events received higher maternal aggression ratings (Egeland et al., 1990; Renken et al., 1989).

Hypothesis 2.1: Lower self-reported maternal psychosocial functioning will be associated with higher infant SS Aggression scores (Strange Situation; SS) observed in a standardized laboratory assessment (SS). Specifically, mothers' 1) higher levels of depression (SCL-90-R), 2) higher level of parenting stress (PSI), and 3) lower levels of perceived support from baby's father (FS) will be associated with higher observed infant aggression.

Hypothesis 2.2: Lower self-reported maternal psychosocial functioning will be associated with higher infant Bayley Negative Emotional Reactivity scores (Bayley Scales of Infant Development; BSID-II) observed in a standardized laboratory assessment (BSID-II). Specifically, mothers' 1) higher levels of depression (SCL-90-R), 2) higher level of parenting stress (PSI), and 3) lower levels of perceived support from baby's father (FS) will be associated with higher observed infant negative emotionality.

Research studies have demonstrated a link between psychological problems, especially depressive symptoms, in parents and aggressive behavior in their preschool children (Carter et al., 2001; Carter et al., 1999; Zahn-Waxler et al., 1984).

### Relations between Reported Measurements of Infant Aggression and Negative Emotionality and Observed Infant Measurements of Infant Aggression and Negative Emotionality

Hypothesis 3.1: Higher maternal reported ITSEA Aggression/Defiance scores will be associated with higher observed infant SS Aggression scores.

Hypothesis 3.2: Higher maternal reported infant ITSEA Negative Emotional Reactivity scores will be associated with higher observed infant Bayley Negative Emotional Reactivity scores.

There is considerable debate about the concordance of parental report and laboratory assessment (Bates, 1990; Wolk et al., 1992). Most studies have found that different types of informants provide inconsistent reports about children's feelings and behaviors (Achenbach et al., 1987; Bates et al., 1982; Cytyn & McKnew., 1980). On the other hand, some studies have shown that parental reports may be quite reliable (Carter et al., 1999; Robinson & Eyberg, 1981). Carter and her colleagues (1999) found in their study that maternal ratings (ITSEA) on emotional negativity and problems in inhibition and separation significantly correlated with negative reactivity in an objective laboratory assessment.

#### Relations between Infant Negative Emotionality and Aggression

Hypothesis 4: Higher infant negative emotional reactivity will be associated with higher infant aggression.

Research has shown that negative emotionality is associated with angry outbursts, aggression, and acting out behaviors (Calkins & Johnson, 1998; Mangelsdorf et al., 1995; Teglasi & MacMahon, 1990)

#### Relations between Infant Negative Emotionality, Emotion Regulation and Aggression

Hypothesis 5.1: Low infant Bayley Emotion Regulation scores (BS.ERw) and low SS Emotion Regulation scores such as: (1) infant looking less at the environment, (2) infant looking less at the mother, (3) infant looking less at the stranger, (4) lower



infant self-comforting, and (5) lower infant toy exploration during the Strange Situation will be associated with high infant aggression.

Hypothesis 5.2: Low infant Bayley Emotion Regulation scores (BS.ERw) and low SS Emotion Regulation scores such as: (1) infant looking less at the environment, (2) infant looking less at the mother, (3) infant looking less at the stranger, (4) lower infant self-comforting, and (5) lower infant toy exploration during the Strange Situation will be associated with high infant negative emotionality.

These hypotheses are based on initial evidence suggesting that children's lack of regulation is associated with aggressive behavior (Eisenberg & Fabes, 1992; Hart et al., 1997).

Hypothesis 6: A possible interaction effect between negative emotionality and emotion regulation in relation to infant aggression is examined. It is predicted that infants who have high SS Negative Emotionality scores and low Bayley Emotion Regulation scores will display significantly more observed and reported aggression than infants who have high SS Negative Emotionality scores and high Bayley Emotion Regulation scores and infants who have low SS Negative Emotionality scores and either low or high Bayley Emotion Regulation scores.

Scarpa and Raine (1997) demonstrated, that a predisposition to experience negative affect and arousal and the inability to regulate or soothe negative affect and arousal are likely to increase the potential expression of aggression. Eisenberg et al. (1994) has argued that both high levels of emotional arousal and low emotional regulation play a role in the display of aggressive behavior.

Relations between Attachment Classification and Infant Aggression and Negative  
Emotionality

Hypothesis 7.1: Infants categorized as insecurely attached will be significantly more aggressive than infants categorized as securely attached.

Hypothesis 7.2: Infants categorized as insecurely attached will display significantly higher infant negative emotionality than infants categorized as securely attached.

Infant attachment insecurity-resistant and insecurity-avoidant has been found to be related to later externalizing problems, particularly among samples of high-risk children (Erickson et al., 1985; Shaw & Vondra, 1995; Shaw et al., 1996).

## CHAPTER III

## Method

Participants

Sixty adolescent mother-child dyads participated in the present study. They were recruited from community pediatric clinics and community agencies working with the adolescent mothers. Stanford University's and the County Hospital's Institutional Review Boards approved all procedures. The recruitment of subjects was conducted over an 18-month period, from April 1999 to August 2000. To make the sample uniform the following inclusion criteria were employed, (a) maternal age of 20 years or younger; (b) low socio-economic status as defined by having public medical insurance or no medical insurance and low family income; and (c) infants' age 12 to 17 months. Public nurses, social and community workers at the pediatric clinics and community agencies were provided with flyers describing the study and were asked to approach potential participants regarding participation in the study. In the case of a positive response, the referral was conveyed to the research team. A research assistant (RA) then approached eligible prospective participants by phone, described the study, and asked about participation. If a mother agreed to participate, the RA explained the procedures and obtained informed consent.

Twenty-nine of the adolescent parents were younger than 18 years of age. However, most of them qualified as Emancipated Minors according to the California Emancipation of Minors Act (i.e., at least 14 years of age, living apart from the parents, managing own financial affairs) and, as such, could provide informed consent to participate in study. If a potential participant did not qualify as Emancipated Minor,

parental or guardian's consent was obtained along with the participant's affirmative consent.

All young women who met the inclusion criteria and agreed to participate were enrolled in the study. From 70 young women approached, 10 refused to participate (three were already participating in another study and seven refused to provide a reason). Demographic characteristics of the women who refused participation in the study were similar to those in the final sample. Demographic characteristics of the sample are presented in Table 1.

Maternal age ranged from 14 to 20 years, the father's age ranged from 16 to 30 years and the age of the infants ranged from 12 to 17 months. The families were predominantly Hispanic. The majority of the families were receiving welfare (68.3%) with a monthly income per person between \$83 and \$1167. With regard to the family structure, 48 (80%) of the mothers reported being single and 12 (20%) were currently married to the infants' father.

Table 1. Sample Description

	N	M (SD) or Frequency (%)
Maternal age (years)	60	17.7 (1.5)
Maternal ethnicity		
Caucasian (non-Hispanic)	1	1.7%
African American	18	30%
Hispanic	41	68.3%
Maternal education (years)		
< 9	12	20%
10	8	13.3%
11	20	33.3%
12	20	33.3%
Mother lives*		
with Father of the baby (FOB)	30	50%
with Maternal Grandmother (MGM)	25	41.7%
with Other than FOB or MGM	3	5.1%
Alone	2	3.4%
Mother*		
Employed	23	38.3%
Enrolled in school	32	53.3%
Unknown	5	8.4%
Father's age (years)	57	21.5 (1.5)
Father's education (years)		
< 9	7	17.5%
10	0	0
11	8	20%
12	24	62.5%
Father*		
Employed	42	85.7%
Enrolled in school	3	6.1%
Unknown	11	22.4%
Household income per person per month** (\$)	44	407 (227)
Infant's age (months)	61	13.2 (1.6)
Infant's gender		
Boy	33	54.1%
Girl	28	45.9%

Notes: \* Categories are not mutually exclusive

\*\* In 16 cases, the mother did not know the household income.

## Instruments

### Maternal Report Questionnaires

Demographic Questionnaire. This 42 item self-report was developed for the Stanford Teenage Pregnancy and Parenthood Project (Zelenko et al., in press). For the purpose of this investigation, focus was on the following domains: a) participants characteristics (age, race, living situation, education and employment of the subject and the father of the baby, income) and b) perceived maternal support from father of the baby.

Perceived maternal support from baby's father was assessed from responses to three questions: 1) Can you count on the father of your baby for real help in times of trouble or difficulty, such as to watch over child, give ride to hospital or store, or help if you are sick? 2) Can you count on the father of your baby to help you to take care of the baby? 3) Do you consider the father of your baby your emotional support? Each answer was entered as "1" (Yes) or "0" (No) on the corresponding variable. These three items formed a Father Support scale (FS) (Cronbach's alpha = .71). The average of the three items was used as an independent variable in the final analyses.

Symptom CheckList-90-Revised (SCL-90-R). The SCL-90-R (Derogatis, 1986) was used to assess mothers' experience of depressive symptoms during the prior to participation week. The SCL-90-R is a widely used measurement of current psychiatric psychopathology. It consists of 90 items reflecting symptoms that are endorsed using a 4-point scale ranging from "1" (not at all) to "4" (extremely). Standardized T-scores are then derived for seven specific scales (Depression, Somatization, Obsessive-Compulsive Symptoms, Phobia, Psychotism, Paranoid, Anxiety) and 3 global scales

(Global Severity Index, Positive Symptom Total, and Positive Symptom Distress Index). The instrument has excellent psychometric properties, which have been demonstrated in adult (Derogatis, Rickels, & Rock, 1976; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988) and adolescent (Swedo et al., 1991; McGough, & Curry, 1992) populations.

In the present study only the Depression scale was used in analyses because a review of the literature indicated a meaningful link between mother's depression and infant's aggressive behavior (Briggs-Gowan et al., 2001). The 13 items on the Depression scale are about symptoms of dysphoric mood and affect, signs of withdrawal of life interest, lack of motivation, loss of vital energy, hopelessness, thoughts of suicide, and other cognitive correlates of depression. Internal consistency coefficients for the SCL-90-R range from .77 to .90, with the Depression dimension equal to .90. Test-retest reliability ranges from .78 to .90 with the Depression dimension at .82 (Derogatis & Cleary, 1977). T-Scores from the Depression scale (SCL.D) were used in the final correlation analyses.

Parenting Stress Index (PSI). The PSI (Abidin, 1990) was used to assess mothers' perceptions of their stress related to parenting. The PSI is a reliable and valid self report instrument that contains 120 items, resulting in a Total Stress score and three subscales scores: Child Domain, Parent Domain, and a Life Stress scale. The Child Domain consists of subscales that address Distractibility/Hyperactivity, Adaptability, Reinforces Parent, Demandingness, Mood, and Acceptability. The Parent Domain includes the following subscales: Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse. The instrument has shown high internal

consistency (Cronbach's alpha = .85) and good test-retest reliability ( $r = .78$ ) (Abidin, 1990). The Total Stress scores (PSI.TS) were used in the final correlation analyses.

The Infant-Toddler Social and Emotional Assessment (ITSEA). The ITSEA (Carter & Briggs-Gowan, 1993) is a 168-item adult-report questionnaire that measures social-emotional problems and competencies in 12- to 36-month-olds. The ITSEA includes three problem domains : 1) Externalizing, which includes subscales labeled Activity, Peer Aggression, Aggression/ Defiance, Negative Emotional Reactivity; 2) Internalizing, which includes Inhibition/Separation and Depression/Withdrawal; and 3) Dysregulation. In addition a Maladaptive scale, and a Competence domain (Briggs-Gowan, & Carter, 1998) are included. Items are rated on a 3-point scale: (0) Not true/rarely, (1) Somewhat true/sometimes, and (2) Very true/often. A "No Opportunity" code and an "outgrown" code are provided for some items. Preliminary psychometric properties and criterion validity for this version are sufficient (Briggs-Gowan & Carter, 1998), and ITSEA ratings were correlated with laboratory observations of attachment status, emotion regulation, and task mastery in a sample of 12-month-olds (Carter et al., 1999). Its validity has also been supported by significant correlations among ITSEA scales and other valid instruments measuring temperament and behavioral problems in children: Child Behavioral CheckList (CBCL 2/3; Achenbach, 1992) ( $r_s = .46$  to  $.72$ ,  $p_s < .01$ ), Parenting Stress Index Short Form (Abidin, 1990) ( $r_s = .20$  to  $.62$ ,  $p_s < .01$ ), Colorado Child Temperament Inventory (Rowe & Plomin, 1977), and Infant Behavioral Questionnaire (Rothbart & Derryberry, 1981). Preliminary evidence suggests that the Aggression/Defiance scale and Negative Emotional Reactivity scale employed in this study have adequate internal consistency (.78), test-retest reliability (.86) (Briggs-



Gowan & Carter, 1998) and overall good validity. In the present study, the Aggression/Defiance scale (ITSEA.AS), which consist of four subscales (Defiance, Relational Defiance, Dispositional Aggression, and Oppositional/Defiant Aggression) and the Negative Emotional Reactivity scale (ITSEA.NE) were used. Scores on these two scales (ITSEA.AS and ITSEA.NE) were used in analyses.

### Laboratory Assessments

Strange Situation Procedure (SS). *Patterns of attachment.* In the course of a detailed longitudinal study of home behavior in the first year of life, Ainsworth (1978) developed a laboratory procedure that has been widely used to measure the quality of infant-parent attachment. The SS procedure involves eight episodes which are designed to produce increasing levels of stress for the infant and involve two brief separations from, and two reunions with, mothers: (1) Caregiver and infant enter a novel, scarcely furnished room containing a variety of attractive, age-appropriate toys; (2) the infant is allowed to play with the caregiver who is seated in a chair (3 minutes); (3) a stranger enters, sits quietly for 1 minute, chats with the caregiver for 1 minute, then engages the infant in play, taking cues from the baby; (4) the caregiver leaves (3 minutes, unless the infant is unduly distressed and cannot be settled by the stranger; first separation); (5) the caregiver returns and stranger leaves unobtrusively (3 minutes, first reunion); (6) the caregiver leaves infant alone (3 minutes or less, second separation); (7) the stranger enters, attempts to comfort the infant if needed (3 minutes or less); (8) the caregiver returns, the stranger exits (3 minute, second reunion).

The SS is widely regarded for its reliability and validity, and extensively employed as an assessment of the quality of child-parent attachments (Ainsworth et al.,

1978). The procedures were videotaped through a one-way mirror and then scored by two trained coders. Interrater reliability for the patterns of attachment was 93.8%. Dyad interactions from the tapes were assigned to one of three main categories (secure, insecure-avoidant, insecure-resistant) using a scoring system developed by Ainsworth et al. (1978) and then evaluated for the disorganized pattern of attachment (Main & Hesse, 1990). Attachment categories were used as a grouping factor in the final analyses.

*Infant aggression.* To provide objective data regarding infant aggression, videotapes of the SS were analyzed. An initial coding system of aggressive behavior observed in all episodes of the SS was first developed on 15 randomly selected SS videotapes. The coders were blind to infant attachment classification. In developing a coding scheme for aggressive behavior a scale developed by Shaw et al. (1994) was considered, which determined behavioral codes for aggression based on previous investigations of disruptive behavior in the preschool period. A continuous sampling program on a laptop computer was developed to code videotapes of the SS. This computer program enabled the coders to record duration of aggressive behavior (in seconds). Each behavior corresponded to a key on the computer. Coders depressed the appropriate key when a given behavior occurred, and they depressed it again when a behavior was terminated. The computer kept track of when each behavior occurred and how long it lasted. Four measurements of aggressive behavior were coded simultaneously during the SS. The four codes included: (1) Bodily expression of anger, (2) Aggression at toys in presence of angry mood, (3), Hitting, biting and/or kicking mother in presence of angry mood, (4) Hitting, biting, and/or kicking stranger in presence of angry mood (see Table 2). Throwing toys at the mother and throwing toys at

the stranger was initially a part of the coding scheme, but because it was rarely observed, it was not included as a category.

All SS tapes were assigned random numbers and were coded in random order. Two coders trained on pilot videotapes coded all sessions. Coders made two passes through the videotapes; the first time they merely observed, and the second time they used the portable computer to record durations of the aggressive behavior. Because most SS sessions varied in length, the measures of duration were then transformed into proportions of total time of the SS. Intraclass reliability coefficient for 15% of subjects, computed separately for each aggressive behavior measure, ranged from .88 to .92. The four aggressive behavior measures (bodily expression of anger, aggression directed at toys or objects, hitting, biting, kicking mother and hitting, biting, kicking stranger) formed the SS Duration Aggression scale (SS.DA) (Cronbach's  $\alpha = .80$ ). The average of the four aggressive behavior measures formed the SS.DA score.

In addition to coding specific aggressive behaviors, the coders provided a global rating to characterize the behavior of the infant throughout the coded segments of the SS. The global rating took into consideration all of the aforementioned codes (see Table 2), but also the intensity of aggressive behavior during the SS. The Global scale was: (1) unaggressive, (2) mildly aggressive, (3) moderately aggressive, and (4) severely aggressive (the scale was adapted from Cummings et al., 1989). At the end of every SS episode, the coders provided a global rating using the Global scale. The seven global aggression measures (episode 1/2 to 8) formed the SS Global Aggression scale (SS.AS) (Cronbach's  $\alpha = .82$ ). The kappa reliability for the SS.AS was .91. The average of the seven global aggressive measures formed the SS.AS score, which was used in the

final analyses. In the final analyses, only the SS.AS scores were used given its high correlation with the SS.DA score ( $r = .96, p < .001$ ).

Table 2. Description of Aggressive Behavior during the Strange Situation

Behavior	Description
Bodily expression of anger	Infant shows one of following behaviors in the presence of angry mood: Arching back/stiffening limbs, pushing/pulling, stamping, head banging, throwing self about, hitting self, batting hands up and down.
Aggression directed at toys or objects	Infant shows one of following behaviors in the presence of angry mood: pounding on toys or objects, kicking at the door, throwing down toys or objects.
Hitting, biting, kicking mother	Infant shows one of following behaviors in the presence of angry mood: Hitting mother, biting mother, kicking mother, pushing away mother strongly.
Hitting, biting, kicking stranger	Infant shows one of following behaviors in the presence of angry mood: Hitting stranger, biting stranger, kicking stranger, pushing away stranger strongly.

*Infant emotion regulation.* The coding scheme developed for this study to code emotion regulation during the SS is based on the version developed by Braungart and Stifter (1991). A computer enabled a team of research assistants (who were unaware of other ratings) to continuously code regulatory behaviors. From this program, durations of

each behavior were obtained. We created 6 categories of regulatory behaviors: 1) looking at the environment, 2) looking at the mother, 3) looking at the stranger, 4) looking at the toys, 5) self-comforting behaviors and 6) toy exploration (see Table 3). Except for self-comforting codes, each of the categories of behavior was mutually exclusive. Computer coding was similar to coding of aggressive behavior, in that a key was depressed to indicate when the behavior started and stopped. Coders made two passes through the videotapes; the first time they merely observed, and the second time they used the portable computer to record durations of the regulative behavior. Because most SS varied in length, proportions of durations of each emotion regulation behavior for each Strange Situation were calculated. Intraclass reliability coefficients for 15% of randomly selected subjects, computed separately for each regulative behavior, ranged from .81 to .93. Table 3 describes the regulatory behavior coding system for SS. The six emotion regulation scores were used as continuous variables in the final analyses.

Table 3. Description of Emotion Regulation Coding System in the Strange Situation (Braungart & Stifter, 1991; p. 355; modified)

Behaviors	Description
Looks at environment	Eyes fix on any object (other than door or toys); eyes may also scan around, not directed at any one object. Eyes may not be looking at any person.
Looks at toys	Gaze is directed at toys; he/she is not manipulating them.
Looks at mother	Gaze directed at mother. If the mother is not in view of camera, but her location can be clearly inferred, then this is coded.
Looks at stranger	Eyes directed toward stranger. If stranger is not on camera, but her whereabouts can still be judged, this behavior is coded.
Self-comforts	Behaviors should be repetitive or include an action that is repeated more than once. Behaviors include: clasping of hands, hair, face, feet, or sucking on fingers, thumb, hand, rubbing face or clothes. Batting at face, pulling ears once, touching face or head would not be coded as self-comforting.
Toy exploration	Coded when infant is looking at and manipulating toys or is actively looking at and in close proximity to toys (e.g., searching for a toy, chasing a ball). If infant is holding a toy but is looking elsewhere, or a infant pushes toy away when a person offers him/her a toy, this behavior is not coded.

Infant negative emotionality. Infant negative emotionality during the SS was assessed using slightly modified scoring system that was originally developed by Ainsworth et al. (1978). This system allows assigning a score on a 6-point scale that reflects both frequency and intensity of crying. The modified scoring system is presented in Table 4. Two independent coders (interrater reliability = 98.3%) reviewed

the videotapes and assigned a score to each 10-second period of the SS. An averaged SS Negative Emotionality score (SS.ER) was used in the analysis to examine interaction between negative emotionality and emotion regulation in relation to infant aggression.

Table 4. Infant's Negative Emotionality Scoring System (Ainsworth et al., 1978, modified)

Score	Description of infant behavior
1	An isolated unhappy noise (vocal protest) without accompanying cry-face
2	Repeated unhappy noises with or without accompanying cry-face
3	An isolated cry (or fuss)
4	Continuous fuss or a sequence of separated fusses or muted crying
5	Definite crying but not reaching the extent of hard crying or screaming; infant is able to respond to the environment
6	Hard crying or screaming, infant is unable to respond to the environment due to severe distress

The Bayley Scales of Infant Development Assessment– Second Edition (BSID-II). The BSID-II (Bayley, 1993), a widely used assessment of infant mental, psychomotor and behavioral development, which assesses the current developmental functioning of infants and children in a 45-minute procedure. The BSID-II consists of three components: the Mental Developmental Index (MDI), Psychomotor Index Scale (PDI), and Behavior Rating Scales (BRS). The MDI is a standardized score reflecting sensory perceptual acuities, discrimination skills and the acquisition of object constancy, memory, learning, and problem solving abilities. The PDI is a measure of gross motor control, coordination abilities, and fine motor manipulation. The BSID-II provides continuous, current normative data for infants from 1 month to 42 months of

age. The Developmental Index scores (MDI and PDI) have means of 100 and standard deviations of 15 points. The instrument has sufficient validity, internal consistency and test-retest reliability (Bayley, 1993). The BRS evaluates qualitative aspects of the child's behavior during standardized developmental testing. The BRS consists of 30 items reflecting behaviors that are endorsed using a 5-point scale ranging from "1" to "5" from which standardized percentile scores are derived for the following five scales: Attention/Arousal, Orientation Engagement, Emotional Regulation, Motor Quality and a Total scale.

*Infant emotion regulation.* To assess infant emotion regulation during the BSID-II, the factor Emotion Regulation from the BRS was used in general. The Bayley Emotion Regulation factor (BS.ER) characterizes the child's activity, adaptability, cooperation, and persistence. In general, emotion regulation refers to the processes and characteristics involved in coping with heightened levels of positive and negative emotions (Kopp, 1989). The BS.ER has good reliability ( $r = .84$ ), sufficient test-retest stability ( $r = .69$ ), and good interscorer agreement for 13 – 42 month age group (percentage of agreement in classification for the BS.ER score = 83.3%). Interscorer agreement was assessed by examining the agreement in classification of the child based upon the two examiners' ratings. (Bayley, 1993). In the final analyses the BS.ER scores were used in general. For analyzing the relationship between emotion regulation (Bayley) and negative emotionality (Bayley) (Hypothesis 5) the Bayley emotion regulation score (BS.ERw) was computed like the Bayley Emotion Regulation factor but without the item 6 (Negative Affect) and the Item 18 (Frustration with Inability to Complete Task).



Infant negative emotionality. To assess infant negative emotionality during the BSID-II, we developed the Bayley Negative Emotional Reactivity (BS.NE) scale in consultation with the two Developmental Psychologists who conducted the BSID-II. Two items (Negative Affect and Frustration with Inability to Complete Task) from the BRS were used to form the BS.NE scale ( $r = .74$ ). Negative Affect (item 6) is the degree to which the child displays negative affect in response to either the test materials or to the examiner or caregiver. Negative affect includes fussing, pouting, whining, crying and vocal or physical expressions of anger. The 5-point scale from item 6 was recoded ranging from “5” (three or more intense, heightened, or prolonged displays of negative affect) to “1” (no negative affect displayed). Frustration with Inability to Complete Task (item 18) is the degree to which the child becomes frustrated when she or he is unable to understand or complete a task. The 5-point scale from item 18 was recoded ranging from “5” (consistently becomes frustrated) to “1” (never becomes frustrated). The ratings reflect both duration and intensity. The average of the two items formed the Bayley Negative Emotional Reactivity (BS.NE) scores. We used the BS.NE scores in the final analyses

### Procedures

Mothers and infants participated in a home visit and a clinic visit at the Stanford University. During the home visit, the mother filled out the questionnaires about their psychosocial functioning and infant’s social-emotional development. During the clinic visit, mothers and infants first participated in the Bayley Scales of Infant Development Assessment (BSID-II) which was administered in a laboratory in the Children’s Hospital. After each child was tested with the BSID-II mental and psychomotor scales,

the BRS was completed by a trained developmental psychologist based on observed behavior during the testing. The BSID-II took about 40 minutes. After a 30 minute break, mothers and infants participated in the Strange Situation (SS), which was conducted at the Stanford Child Psychiatry Clinic by a trained Child Psychiatrist and two research assistants. If necessary, the research team provided transportation to the clinic. As compensation for time spent, each dyad received \$30.

### Data Analyses

The present study had five main dependent measures: 1) observed infant SS Global Aggression scores (SS.AS), 2) reported infant ITSEA Aggression/Defiance scores (ITSEA.AS), 3) observed infant Bayley Negative Emotional Reactivity scores (BS.NE), 4) observed infant SS Negative Emotional Reactivity scores (SS.NE), and 5) infant ITSEA Negative Emotional Reactivity scores (ITSEA.NE) as shown in Table 5. The dependent measures were examined in relation to several independent variables, such as infant gender, mother's psychosocial functioning (SCL.D, PSI.TS, FS), infant emotion regulation scores (SS.ER, BS.ER), and attachment classification, as presented in Table 6.

Furthermore, a nonparametric technique was chosen since the data did not approximate a normal distribution and the sample size was small ( $n = 60$ ). In general, Spearman's rho Rank Correlations, Mann-Whitney U tests and Kruskal-Wallis H tests were performed to test hypotheses. All hypotheses were tested one tailed. Significant alpha levels were set at  $p \leq .05$ .

Table 5. Dependent Variables

Assessments	Dependent Variables
ITSEA (Mother Report)	ITSEA Aggression/Defiance score (ITSEA.AS) ITSEA Negative Emotionality Reactivity score (ITSEA.NE)
BSID-II (laboratory assessment)	Bayley Negative Emotional Reactivity score (BS.NE)
SS (laboratory assessment)	SS Global Aggression score (SS.AS) SS Negative Emotional Reactivity score (SS.NE)

Notes. ITSEA = Infant-Toddler Social Emotional Assessment, SS = Strange Situation, BSID-II = Bayley Scales of Infant Development Assessment.

Table 6. Independent Variables

Measurement	Independent Variables
Symptom CheckList-90-R (SCL-90-R)	Depression scores (SCL.D)
Parental Stress Index (PSI)	Total Stress scores (PSI.TS)
Demographic Questionnaire	Baby's Father Support scores (FS)
	Age (12 – 17 months)
	Gender (boys/girls)
SS	SS Emotion Regulation scores (SS.ER)
	Toy Exploration scores
	Self-comforting scores
	Environment scores
	Toy scores
	Stranger scores
	Mother scores
	Attachment status
BSID-II	Bayley Emotion Regulation scores (BS.ER)

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Notes. BSID-II = Bayley Scales of Infant Development Assessment, SS = Strange Situation.

## CHAPTER IV

## Results

Preliminary Analyses

Means and standard deviations are presented in Appendix A separately by gender for all independent and dependent variables. The number of cases for the variables differed as a result of errors in videotaping and missing BSID-II ratings.

Spearman correlations were first conducted between infant age and infant aggression scores (SS.AS, ITSEA.AS), infant negative emotional reactivity scores (BS.NE, SS.NE, ITSEA.NE), emotion regulation scores (BS.ER, SS.ER), and mothers' psychosocial functioning scores (SCL.D, PSI.TS, FS) to determine if infant age needed to be partialled in the main analyses. Infant age correlated significantly with maternal Depression scores and infant toy exploration. Mother with older infants had higher scores on the SCL Depression scale than mothers with younger infants. Additionally, older infants explored more toys ( $r = .27, p = .03$ ) during the SS than younger infants. No significant correlations were found between infant age and infant aggression scores (SS.AS, ITSEA.AS), infant negative emotional reactivity scores (BS.NE, SS.NE, ITSEA.NE), BS.ER scores, maternal PSI.TS scores and FS scores. Thus, infant age was held constant only for analyses concerning mother's psychosocial functioning and infant SS emotion regulation scores.

To examine if it would be necessary to control for gender in the main analyses, we conducted Mann-Whitney tests with gender as the independent variable and infant aggression, infant negative emotionality, infant emotion regulation, infant age and mother's psychosocial functioning as dependent variables. There were no significant

differences found between infant gender and infant aggression, infant negative emotionality, BS.ER scores, infant age and mothers' psychosocial functioning measurements.

However, there was a significant gender difference found for emotion regulative behaviors during the SS. Girls looked significantly more at the environment ( $z = -2.429$ ,  $p = .015$ ) and toys ( $z = -2.207$ ,  $p = .027$ ), and explored significantly fewer toys ( $z = -2.221$ ,  $p = .026$ ) than boys.

Finally, Spearman correlations were performed to examine if maternal psychosocial functioning measurements were related to each other. As Table 7 shows, there were significant relations between SCL.D scores and PSI.TS scores. Correlations between ratings of maternal perceived support from the father of the baby closely approached significance with SCL.D scores ( $r = .06$ ) and PSI.TS scores ( $r = .09$ ). Mothers who had higher levels of depression reported more parenting stress and slightly less support from the father of the baby compared to mothers who had lower levels of depression.

Table 7. Partial Spearman Correlations between Maternal Psychosocial Functioning Measurements (n =60)

	PSI.TS	FS
SCL.D	49***	-.20#
FS	-.17#	

Notes: SCL.D = Symptom CheckList Depression scores, PSI.TS = Parental Stress Index Total Stress scores, FS = Father Support scores

\*\*\*  $p \leq .001$

#  $p \leq .10$

### Main Analyses

#### Relations between Maternal Psychosocial Functioning and Reported and Observed Infant Aggression and Negative Emotionality

The first hypothesis was first, that lower maternal self-reported psychosocial functioning would be associated with higher reported infant aggression (ITSEA.AS) and second, that lower maternal self-reported psychosocial functioning would be associated with higher reported infant negative emotionality (ITSEA.NE). Because infant age was related to SCL.D scores, analyses were performed statistically controlling for infant age.

To test these hypotheses, a series of partial Spearman correlation was performed with SCL.D scores, PSI.TS scores, FS scores, ITSEA.AS scores and ITSEA.NE scores statistically controlling for infant age. As shown in Table 8, first, the association between maternal psychosocial functioning and ITSEA Aggression/Defiance scores was not significant. However, there was a nonsignificant trend, such that mothers who had higher PSI Total Stress scores ( $p = .06$ ) and higher SCL Depression scores ( $p = .10$ ) reported more infant aggressive behavior on the ITSEA.AS scale than mothers who had lower PSI Total Stress scores and SCL Depression scores.

Second, SCL.D scores and PSI.TS scores were significantly correlated with ITSEA Negative Emotional Reactivity scores. Mothers who had higher depression scores and parenting stress scores rated their infants higher on the ITSEA Negative Emotionality Reactivity scale than mothers who rated their infants lower on the ITSEA Negative Emotionality Reactivity scale.

Table 8. Partial Spearman Correlations between Maternal Psychosocial Functioning and Reported Infant Aggression and Negative Emotional Reactivity Statistically Controlling for Infant Age (n =60)

<i>ITSEA</i>	<i>Maternal Psychosocial Functioning</i>		
	SCL.D	PSI.TS	FS
ITSEA.AS	.18#	.16#	-.09
ITSEA.NE	.22*	.21*	-.11

Notes: SCL.D = Symptom CheckList Depression scores, PSI.TS = Parental Stress Index Total Stress scores, FS = Father Support scores. ITSEA = Infant-Toddler Social and Emotional Assessment, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

#  $p \leq .10$

To examine if relations between maternal psychosocial functioning and reported infant aggression and negative emotionality would be different for girls and boys, partial Spearman correlations were conducted separately by gender. As presented in Table 9, there were no significant relations found between maternal psychosocial functioning and boys' reported aggression and negative emotionality. However significant relations between mother's SCL.D scores and PSI.TS scores and girls' ITSEA.AS scores and ITSEA.NE scores were found. No significant relationship was found between mothers' FS scores and girls' ITSEA.AS scores and ITSEA.NE scores. In comparison to mothers who had lower depression scores and lower parenting stress scores, mothers who had higher depression scores and higher parenting stress scores rated their daughters significantly higher on the ITSEA Aggression/Defiance scale and ITSEA Negative Emotional Reactivity scale.



Table 9. Partial Spearman Correlations between Maternal Psychosocial Functioning and Reported Infant Aggression and Negative Emotionality Separate for Gender Controlling for Infant Age

	SCL.D		PSI.TS		FS	
	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>
<i>ITSEA</i>						
ITSEA.AS	-.12	.46**	-.04	.36*	-.07	-.13
ITSEA.NE	-.06	.45**	.08	.31*	-.20	.02

Notes: SCL.D = Symptom CheckList Depression scores, PSI.TS = Parental Stress Index Total Stress scores, FS = Father Support scores. ITSEA = Infant-Toddler Social and Emotional Assessment, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

\*\*  $p \leq .01$

The second hypothesis was first, that lower maternal psychosocial functioning (SCL.D, PSI.TS, FS) would be associated with higher observed infant SS Global Aggression scores. Second, that lower maternal psychosocial functioning would be associated with higher observed infant Bayley Negative Emotional Reactivity scores.

To test these hypotheses, a series of partial Spearman correlations was conducted with maternal SCL.D scores, PSI.TS scores, and FS scores and infant SS.AS scores and BS.NE scores. Analyses were performed statistically controlling for infant age.

As shown in Table 10, first, no significant correlations emerged between maternal psychosocial functioning and observed infant aggression.

Second, with one exception, there was no significant relation between maternal psychosocial functioning and observed infant negative emotionality. The one exception was that, infants with mothers who reported having less support from the baby's father

displayed significantly more observed negative emotionality than infants with mothers who reported having more support from the baby's father.

Table 10. Partial Spearman Correlations between Maternal Psychosocial Functioning and Observed Infant Aggression and Negative Emotionality Statistically Controlling for Infant Age (n = 55)

<i>BSID-II and SS</i>	<i>Maternal Psychosocial Functioning</i>		
	SCL.D	PSI.TS	FS
SS.AS	.09	.06	-.04
BS.NE	.02	-.01	-.24*

Notes: SCL.D = Symptom CheckList Depression scores, PSI.TS = Parental Stress Index Total Stress scores, FS = Father Support scores, BSID-II = Bayley Scales of Infant Development Assessment, SS = Strange Situation, SS.AS = SS Global Aggression scores, BS.NE = Bayley Negative Emotional Reactivity scores

\*  $p \leq .05$

To examine if relations between maternal psychosocial functioning and observed infant aggression and negative emotionality would be different by gender, partial Spearman correlations were conducted separately for girls and boys controlling for infant age. As presented in Table 11, there were no significant gender effects found for relations between maternal psychosocial functioning and observed infant aggression and negative emotionality. A nonsignificant trend could be seen for maternal level of perceived support from the baby's father and girls' observed negative emotionality. Infant girls with mothers who reported having less support from the father of the baby showed more negative emotionality ( $p = .06$ ) compared to girls with mothers who reported having more support from the father of the baby.

Table 11. Partial Spearman Correlations between Maternal Psychosocial Functioning and Observed Infant Aggression and Negative Emotionality Separately by Gender with Infant Age Controlled

	SCL.D		PSI.TS		FS	
	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>
SS.AS	.08	.10	-.06	.21	.10	-.24
BS.NE	-.11	.14	-.26	.23	-.19	-.33#

Notes: SCL.D = Symptom CheckList Depression scores, PSI.TS = Parental Stress Index Total Stress scores, FS = Father Support scores, BSID-II = Bayley Scales of Infant Development Assessment, SS = Strange Situation, BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = SS Global Aggression scores.

#  $p \leq .10$

Relations between Reported Measurements of Infant Aggression and Negative Emotionality and Observed Measurements of Infant Aggression and Negative Emotionality

The third hypothesis was first, that observed higher infant aggression (SS.AS) would be associated with reported higher infant aggression (ITSEA.AS) and second, that observed higher infant negative emotionality (BS.NE) would be associated with reported higher infant negative emotionality (ITSEA.NE). Spearman correlations were performed to examine relations between ITSEA.AS scores and SS.AS scores, and to examine relations between ITSEA.NE scores and BS.NE scores.

Because maternal SCL.D scores and PSI.TS scores were related to infant aggression and negative emotionality, analyses were performed with and without statistically controlling for “mother’s functioning.” The variables, SCL.D and PSI.TS, both with similar variance were added together to form the control variable “mother’s

functioning.” Infant age did not significantly correlate with infant aggression and negative emotionality; thus infant age was not held constant in these analyses.

First, Spearman correlations were computed without partialling “mother’s functioning.” As shown in Table 12a, first, observed infant aggression was not significantly correlated with reported infant aggression. Second, observed infant negative emotionality was not significantly correlated with reported infant negative emotionality

Table 12a. Spearman Correlations between Observed and Reported Infant Aggression and Observed and Reported Negative Emotionality (n = 55)

	SS.AS (observed)	BS.NE (observed)
ITSEA.AS (reported)	.06	
ITSEA.NE (reported)		.18

Note: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

Partial Spearman correlations were next computed statistically controlling for “mother’s functioning.” As shown in Table 12b, first, observed infant aggression was still not significantly correlated with reported infant aggression. Second, with “mother’s functioning” held constant, observed infant negative emotionality was now significantly correlated, but very low, with reported infant negative emotionality. Infants who showed more negative emotionality during the BSID-II perceived higher negative emotionality ratings by the mother than infants who showed less negative emotionality during the BSID-II.

Table 12b. Partial Spearman Correlations between Observed and Reported Infant Aggression and Observed and Reported Negative Emotionality Controlling for “Mother’s Functioning” (n = 55)

	SS.AS (observed)	BS.NE (observed)
ITSEA.AS (reported)	.05	
ITSEA.NE (reported)		.24*

Note: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

To examine whether the relation between reported and observed infant measurements of aggression and negative emotionality would be different for girls and boys, partial Spearman correlations were conducted separately with and without statistically controlling for “mother’s functioning.” There were no significant relations between reported and observed infant aggression and no significant relations between reported and observed infant negative emotionality found for boys and girls.

#### Relations between Infant Negative Emotionality and Aggression

The fourth hypothesis was that infant negative emotionality would be associated with infant aggression and vice versa.

Spearman correlations were conducted to examine relations between ITSEA.AS scores and SS.AS scores and ITSEA.NE scores and BS.NE scores. Because maternal SCL.D scores and PSI.TS scores were related to infant aggression and negative emotionality, analyses were performed with and without statistically controlling for “mother’s functioning.”

First, Spearman correlations were computed without partialling “mother’s functioning.” As shown in Table 13a, first, observed BS.NE scores were significantly correlated with observed SS.AS scores and reported ITSEA.AS scores. Infants who displayed more observed negative emotionality displayed more observed aggression and received higher aggression scores. Second, reported ITSEA.NE scores were significantly correlated with observed SS.AS scores and reported ITSEA.AS scores. That is, infants who received higher negative emotional reactivity scores displayed more observed aggression and received higher aggression scores.

Table 13a. Spearman Correlations between Infant Aggression and Negative Emotionality (n = 55)

	ITSEA.AS (reported)	SS.AS (observed)
BS.NE (observed)	.27*	.44***
ITSEA.NE (reported)	.48***	.23*

Note: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

\*\*\*  $p \leq .001$

Partial Spearman correlations were next computed statistically controlling for “mother’s functioning.” As shown in Table 13b, first, observed BS.NE scores were still significantly correlated with observed SS.AS scores and reported ITSEA.AS scores. Infants who displayed more observed negative emotionality displayed more observed aggression and received higher aggression scores. Second, reported ITSEA.NE scores were still significantly correlated with observed SS.AS scores and reported ITSEA.AS

scores. That is, infants who received higher negative emotional reactivity scores displayed more observed aggression and received higher aggression scores.

Table 13b. Partial Spearman Correlations between Infant Aggression and Negative Emotionality Controlling for “Mother’s Functioning” (n = 55)

	ITSEA.AS (reported)	SS.AS (observed)
BS.NE (observed)	.27*	.44***
ITSEA.NE (reported)	.48***	.25*

Note: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

\*\*\*  $p \leq .001$

To examine whether the relations between infant negative emotionality and aggression would be different for girls and boys, Spearman correlations were conducted separately statistically without (Table 14a) and with (Table 14b) controlling for “mother’s functioning.” As shown in Table 14a and 14b, for both boys and girls, significant correlations emerged for observed negative emotionality with observed aggression and for reported negative emotionality with reported aggression. There was no significant correlation between observed negative emotionality and reported aggression. For girls, but not for boys, there was a significant correlation between reported negative emotionality and observed aggression.

Table 14a. Spearman Correlations between Infant Aggression and Infant Negative Emotionality Separate by Gender

	ITSEA.AS (reported)		SS.AS (observed)	
	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>
BS.NE (observed)	.22	.32	.43**	.48**
ITSEA.NE (reported)	.37*	.56**	.11	.36*

Notes: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

\*\*  $p \leq .01$

Table 14b. Partial Spearman Correlations between Infant Aggression and Infant Negative Emotionality Separate by Gender Controlling for “Mother’s Functioning”

	ITSEA.AS (reported)		SS.AS (observed)	
	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>
BS.NE (observed)	.21	.24	.43**	.48**
ITSEA.NE (reported)	.37*	.56**	.06	.47*

Notes: ITSEA = Infant-Toddler Social and Emotional Assessment. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = Strange Situation Global Aggression scores, ITSEA.AS = ITSEA Aggression/Defiance scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores.

\*  $p \leq .05$

\*\*  $p \leq .01$

### Summary

In sum, the first hypothesis was partially supported. Mothers with higher levels of depression and/or higher levels of parenting stress reported more infant aggression and significantly more infant negative emotionality than mothers with lower levels of



depression and/or lower levels of parenting stress. Maternal perceived support from the baby's father was not significantly related to reported infant aggression and negative emotionality. With one exception the second hypothesis was not supported. The one exception was that, infants with mothers who reported less support from the baby's father showed significantly more negative emotionality during the BSID-II than infants with mothers who reported more support from the baby's father. No significant relations emerged between maternal psychosocial functioning (SCL.D, PSI.TS, FS) and observed infant aggression. Also no significant relations emerged between maternal mother's level of depression and level of stress and observed infant negative emotionality. The third hypothesis was partially supported. Observed and reported infant negative emotionality measurements were significantly correlated, but very low, with one another. Observed and reported infant aggression measurements were not significantly correlated with one another. Finally, the fourth hypothesis was supported: infant negative emotionality and aggression were significantly correlated with one another.

Several interesting gender differences emerged. In comparison to mothers who reported higher psychosocial functioning, mothers who had higher levels of depression and/or higher levels of parenting stress reported significantly more aggression and negative emotionality for their daughters but not significantly more for their sons. With one exception, no gender differences emerged with maternal psychosocial functioning in relation to observed aggression and observed negative emotionality. The one exception was that, girls had higher perceived observational negative emotional reactivity scores if their mothers reported less support from the baby's father. With one exception, no gender differences emerged with infant negative emotionality in relation

to infant aggression. The one exception was that reported infant negative emotionality was significantly correlated to observed infant aggression for girls, but not for boys.

#### Relations between Infant Negative Emotionality, Emotion Regulation and Aggression

The fifth hypothesis was first, that low infant Bayley Emotion Regulation scores (BS.ERw) and low SS Emotion Regulation scores (SS.ER) such as: 1) infant looking less at the environment, 2) infant looking less at the mother, 3) infant looking less at the stranger, 4) lower infant self-comforting, and 6) lower infant toy exploration during SS would be associated with high infant negative emotionality. Second, that low infant BS.ERw scores and low SS.ER scores would be associated with high infant aggression.

For analyzing these relationships the Bayley emotion regulation score (BS.ERw) was computed like the Bayley Emotion Regulation factor but without the item 6 (Negative Affect) and the Item 18 (Frustration with Inability to Complete Task).

To test these hypotheses, a series of partial Spearman correlations was performed with SS.ER scores, BS.ERw scores, BS.NE scores, ITSEA.NE scores, SS.AS scores, and ITSEA.AS scores. Infant age was related to one of the SS.ER scores (exploring toys); therefore analyses were performed statistically controlling for infant age.

As shown in Table 15, BS.ERw scores were significantly related to SS.AS scores, ITSEA.AS scores and BS.NE scores. No significant relations emerged for BS.ERw scores with ITSEA.NE scores. As predicted, infants who displayed less emotion regulation during the BSID-II displayed significantly more observed infant negative emotionality and observed and reported infant aggression than infants who displayed more emotion regulation. No significant correlation has been found between

SS emotion regulation and infant aggression. With one exception, no significant correlations were found between emotion regulation during SS and infant negative emotionality. The one exception was that, infants who looked less at the stranger displayed significantly more observed negative emotionality than infants who looked more at the stranger.

Table 15. Partial Spearman Correlations between Emotion Regulation and Infant Negative Emotionality and Aggression Statistically Controlling for Infant Age

	<i>BSID-II</i>		<i>SS Emotion Regulation scores</i>				
	BS.ERw	ST	MO	ENV	Toy	SC	Toy Ex
BS.NE	-.65**	-.23*	.11	.01	-.11	-.09	.07
ITSEA.NE	-.19						
SS.AS	-.34**	-.06	-.06	-.001	.19	.01	-.01
ITSEA.AS	-.20*						

Notes: BSID-II = Bayley Scales of Infant Development Assessment, SS = Strange Situation, BS.ERw = Bayley Emotion Regulation scores without item 6 and 18, ENV. = infant looking at environment during SS, Toy = infant looking at toys during SS, SC. = infant's self-comforting behavior during SS, MO = infant looking at mother during SS, ST = infant looking at stranger during SS, Toy Ex = infant's toy exploration during SS. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = SS Global Aggression scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores, ITSEA.AS = ITSEA Aggression/Defiance scores.

\*  $p \leq .05$

\*\*  $p \leq .01$

To examine whether the relations between emotion regulation and infant negative emotionality and aggression would be different for girls and boys, partial Spearman correlations were conducted separately by gender, statistically controlling for infant age. For boys and girls, significant relations emerged for emotion regulation

during the BSID-II with infant negative emotionality and aggression (Table 16). For boys, there was a significant relationship between toy exploration during SS and observed negative emotionality, and nonsignificant trends between looking at stranger and looking at toys and observed negative emotionality. Boys who explored more toys and looked slightly less at the stranger and at toys showed significantly more observed negative emotional reactivity than boys who explored less toys and looked more at the stranger and at toys. Significant relations also emerged for boys' observed aggression with looking at mother and looking at environment. Boys who looked less at the mother and at the environment display significantly more aggression during the SS than boys who looked more at the mother and at the environment. In comparison to girls who looked less at the mother and the environment and who explored more toys, girls who looked more at the mother and the environment and explored less toys displayed significantly more observed negative emotionality. Also, girls who looked more at the mother, toys and the environment displayed significantly more observed aggression than girls who looked less at the mother, toys and the environment. A significant correlation emerged for girls, but not for boys, between emotion regulation during BSID-II and maternal reported aggression.

Table 16. Partial Spearman Correlations between Emotion Regulation and Infant Negative Emotionality and Aggression Separate by Gender Controlling for Infant Age

		<i>BSID-II</i>		<i>SS Emotion Regulation scores</i>				
		BS.ERw	ST	MO	ENV	Toy	SC	Toy Ex
Boys	BS.NE	-.61**	-.27#	-.07	-.23	-.24#	-.14	.37*
	ITSEA.NE	-.23						
	SS.AS	-.27*	-.21	-.31*	-.33*	-.02	.07	.16
	ITSEA.AS	-.06						
Girls	BS.NE	-.74**	-.14	.36*	.40*	.10	-.01	-.38*
	ITSEA.NE	-.20						
	SS.AS	-.46*	.07	.51**	.40*	.43*	-.02	-.12
	ITSEA.AS	-.28*						

Notes: BSID-II = Bayley Scales of Infant Development Assessment, BS.ERw = Bayley Emotion Regulation scores without item 6 and 18, SS = Strange Situation, ENV. = infant looking at environment during SS, Toy = infant looking at toys during SS, SC. = infant's self-comforting behavior during SS, MO = infant looking at mother during SS, ST = infant looking at stranger during SS, Toy Ex = infant's toy exploration during SS. BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = SS Global Aggression scores, ITSEA.NE = ITSEA Negative Emotional Reactivity scores, ITSEA.AS = ITSEA Aggression/Defiance scores.

#  $p \leq .10$

\*  $p \leq .05$

\*\*  $p \leq .01$

The sixth hypothesis was that infant emotion regulation and infant negative emotionality would be related to infant aggression. Such that infants who have a high SS Negative Emotionality score and a low Bayley Emotion Regulation score would show significantly more infant aggression than infants who have a high SS Negative Emotionality score and a high Bayley Emotion Regulation score and infants who have a

low SS Negative Emotionality score, and infants who have either a low or high Bayley Emotion Regulation score.

The sixth hypothesis was tested via a Kruskal-Wallis test of variances for four unrelated samples. A combined variable of BS.ER/SS.NE was created as the independent variable. The observed and reported aggression scores were used as the dependent variables. Medians and means are presented in Table 17. First, Bayley Emotion Regulation and SS Negative Emotionality were split into two groups each using the mean (BS.ER: mean = 68.4, SS.NE: mean = 1.17). Infants who were above the mean for BS.ER and SS.NE were classified as high BS.ER and SS.NE, respectively. Infants below the mean on the two variables were considered low BS.ER and SS.NE. Then four quadrants were created using the two dimensions of BS.ER and SS.NE. A frequency analysis with the variable BS.ER/SS.NE yielded the following combinations: 20 (35.7%) infants had low SS.NE scores and high BS.ER scores (group 1), 15 (26.8%) had low SS.NE scores and low BS.ER scores (group 2), 11 (19.6%) had high SS.NE scores and high BS.ER scores (group 3) and 10 (17.9%) infants had high SS.NE scores and low BS.ER scores (group 4).

Table 17. Medians and means for Infant Aggression by SS.NE/BS.ER Groups (n=56)

	<i>Group 1</i> low SS.NE/high BS.ER (n = 20) median (mean)	<i>Group 2</i> low SS.NE/low BS.ER (n = 15) median (mean)	<i>Group 3</i> high SS.NE/high BS.ER (n = 11) median (mean)	<i>Group 4</i> high SS.NE/low BS.ER (n = 10) median (mean)
SS.AS.	1.11 (1.16)	1.14 (1.27)	1.07 (1.3)	1.61 (1.8)
ITSEA.AS	0.55 (0.61)	0.64 (0.72)	0.36 (0.41)	0.52 (0.62)

Note: SS = Strange Situation, SS.AS = SS Global Aggression scores. SS.NR = SS Negative Emotional Reactivity scores, BS.ER = Bayley Emotion Regulation scores. ITSEA = Infant-Toddler Social and Emotional Assessment, ITSEA.AS = ITSEA Aggression/Defiance score.

A significant observed aggression effect emerged for SS.NE/BS.ER groups ( $\chi^2 = 6.19$ ,  $df = 3$ ,  $p = .05$ ). No significant reported aggression effect emerged for SS.NE/BS.ER groups ( $\chi^2 = 3.93$ ,  $df = 3$ ,  $p = .13$ ). To determine how the SS.NR/BS.ER groups differed on each other for observed aggression Mann-Whitney tests were computed. As predicted, infants who had a high SS.NE score and a low BS.ER score (Group 4) showed significantly more observed aggression than infants who had a low SS.NE score and high BS.ER (Group 1) ( $z = -.236$ ,  $p = .01$ ), infants who had a low SS.NE score and a low BS.ER score (Group 2) ( $z = -1.67$ ,  $p = .05$ ), and infants who had a high SS.NE score and a high BS.ER score (Group 3) ( $z = -1.80$ ,  $p = .04$ ).

### Summary

In sum, a significant relationship between negative emotionality and emotion regulation in relation to infant observed aggression was found. Infants, who displayed high negative emotionality and low emotion regulation, displayed significantly more aggression than infants with high negative emotionality and high emotion regulation

and infants with low negative reactivity and either high emotion regulation or low emotion regulation.

#### Relations between Attachment Classification and Infant Negative Emotionality and Aggression

The seventh hypothesis was first, that infants categorized as insecurely attached would show significantly higher infant aggression in comparison to securely attached infants. Second, infants categorized as insecurely attached would show significantly higher infant negative emotionality in comparison to securely attached infants.

Of 60 infants, 35 (60.3%) infants were classified as securely attached, 9 (15.5%) infants were classified as insecure-avoidant, 14 (24.1%) infants were classified as insecure-resistant, and two did not fit to any main category (“cannot classify category”). In addition, five infants were classified as disorganized. Three of them had secure main classification, one was – insecure-resistant, and one was “cannot classify.” All analyses were conducted for the three main categories of attachment. A Kruskal-Wallis test of variance was performed with attachment classification as the independent variable and, SS.AS scores, ITSEA.AS scores, BS.NE scores and ITSEA.NE scores as dependent variables. Medians are presented in Table 18.



Table 18. Infant Aggression and Negative Emotionality Medians by Attachment Group

	Secure	Insecure-avoidant	Insecure-resistant
SS.AS	1.0	1.14	1.46
ITSEA.AS	0.64	0.55	0.39
BS.NE	1.75	1.5	2.0
ITSEA.NE	0.77	0.54	0.65

Notes: BS.NE = Bayley Negative Emotional Reactivity scores, SS.AS = SS Global Aggression scores, SS = Strange Situation, ITSEA = Infant-Toddler Social and Emotional Assessment, ITSEA.AS = ITSEA Aggression/Defiance score, ITSEA.NE = ITSEA Negative Emotional Reactivity score

A significant difference was found between attachment classification and observed aggression ( $\chi^2 = 11.94$ ,  $df = 2$ ,  $p = .002$ ). However, no significant differences were found between attachment classification and reported aggression ( $\chi^2 = 2.48$ ,  $df = 2$ ,  $p = .14$ ), observed negative emotionality ( $\chi^2 = 1.3$ ,  $p = .26$ ), and reported negative emotionality ( $\chi^2 = 0.80$ ,  $df = 2$ ,  $p = .20$ ).

To determine how the attachment classifications differed on each other for observed aggression, Mann-Whitney tests were computed. Insecure-resistant infants showed significantly more observed aggression than secure ( $z = -3.17$ ,  $p = .001$ ) and insecure-avoidant infants ( $z = -1.93$ ,  $p = .03$ ). No significant difference was found between secure and insecure-avoidant infants ( $z = -1.08$ ,  $p = .14$ ).

### Exploratory Analyses

#### Relations between Observed Infant Negative Emotionality and Aggression

It was also of interest to explore nonpredicted relations among observed infant negative emotionality and aggression. It was of interest to determine whether high Bayley Negative Emotional Reactivity scores are associated with high SS Duration Aggression scores (SS.DA) during the eight episodes of the SS. Spearman correlations were performed to examine how negative emotionality scores were related to aggression scores.

As shown in Table 19, the BS.NE scores were significantly correlated to SS.DA scores measured in Episodes 4, 5, 6, 7, and 8. Infants who displayed more negative emotional reactivity during the BSID-II showed significantly more aggression in Episodes 4, 6 and 7 (separation from mother) and in Episodes 5 and 8 (Reunion with mother), but not significantly more aggression in episode 1, 2 and 3 (Preseparation) than infants who displayed less negative emotionality

Table 19. Spearman Correlations between Infant Negative Emotionality and Aggression during the Eight Episodes of the Strange Situation

	<i>SS Duration Aggression Scores</i>						
	Ep 1/2	Ep 3	Ep 4	Ep 5	Ep 6	Ep 7	Ep 8
BS.NE	-.07	.15	.25*	.35**	.44***	.34**	.27*

Note: Ep 1/2 & Ep 3 = Preseparation Episodes, Ep 4, 6 & 7 = Separation Episodes, Ep 5 & 8 = Reunion Episodes

\*  $p \leq .05$

\*\*  $p \leq .01$

\*\*\*  $p \leq .001$

To examine whether there would be differences between high versus low negative reactive infants (as measured by the BS.NE scale) in term of aggressive behavior during the seven episodes (Ep1/2 to 8) of the SS, and to explore whether gender would be a factor in such differences, a 2 (Negative Emotionality) x 2 (Gender) x 6 (Episode) repeated-measures analysis of covariance of infant aggression was conducted, with negative emotional reactivity group (high BS.NE versus low BS.NE) and gender as the between-subjects factors, episode (Ep 3 to 8) as the with-in subjects factor and infant age as the covariate. Due to no aggressive behavior exhibited during episode 1/2, this episode was not included in the analysis. The sample was dichotomized into high versus low negative emotional reactive infants using the mean score of the BS.NE scale (mean = 1.9). Infants who had a mean score less than or equal to 1.9 on the BS.NE scale were labeled as low negative emotional reactive infants and infants who had a mean score higher than 1.9 were labeled as high negative emotional. Figure 2 displays the means for infant aggression during the seven SS episodes for high versus low negative emotional reactive infants and Figure 3 displays the means for infant aggression during the seven SS episodes for boys versus girls. Figure 4 displays the means for infant aggression during the seven SS episodes for high versus low negative emotional reactive girls and for high versus low negative emotional reactive boys.

As shown in Table 20, results revealed a significant main effect for negative emotional reactivity group. No significant main effects emerged for gender, age and episode. Tests of the interactions revealed a significant negative reactivity group x episode interaction, a significant gender x episode interaction and a significant negative

reactivity group x gender x episode interaction. No significant interactions emerged for negative reactivity group x gender interaction and age x episode interaction.

Table 20. A 2 (Negative Reactivity Group) x 2 (Gender) x 6 (Episode) Repeated-Measures Analysis of Covariance (Age) of Infant Aggression

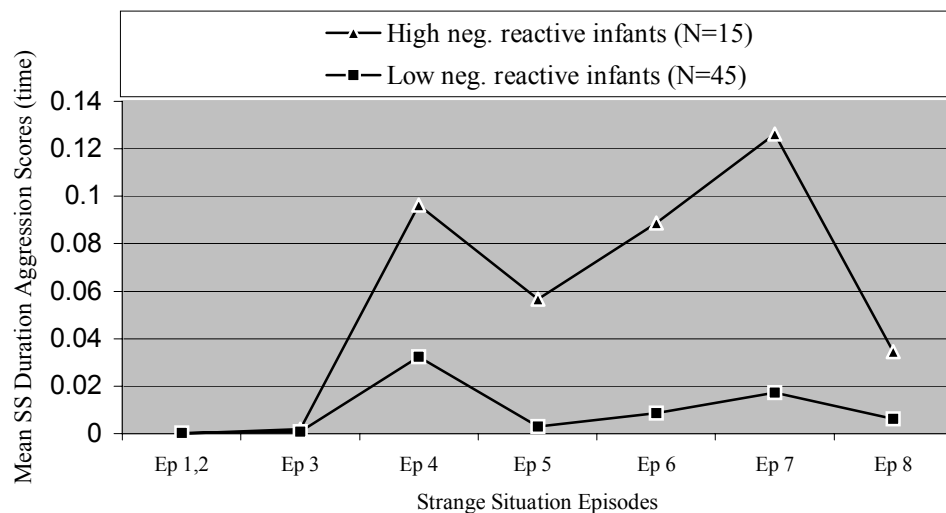
<b>Source</b>	<b>df</b>	<b>SS</b>	<b>MS</b>	<b>F</b>	<b>P</b>
<b>Between-Subjects</b>					
Neg. Reactivity Group	1	.193	.193	12.581	.001**
Gender	1	.006163	.006163	.402	.529
Neg. Reactivity Group x Gender	1	.007037	.007037	.459	.501
Age	1	.01446	.01446	.943	.336
Error	55	.843	.01533		
<b>Within-Subjects</b>					
Episode	5	.01662	.003324	1.399	.225
<b>Between-Subjects x Within-Subjects</b>					
Neg. Reactivity Group x Episodes	5	.05416	.01083	4.559	.001**
Gender x Episode	5	.04154	.008308	3.497	.004**
Neg. Reactivity Group x Gender x Episode	5	.04297	.008594	3.617	.003**
Age x Episode	5	.0120	.002240	.943	.454
Error	275	.653	.002376		

Notes: SS = Type III Sum of Square. MS = Mean Square. F = F-Value. P= P-Value

\*  $p \leq .05$

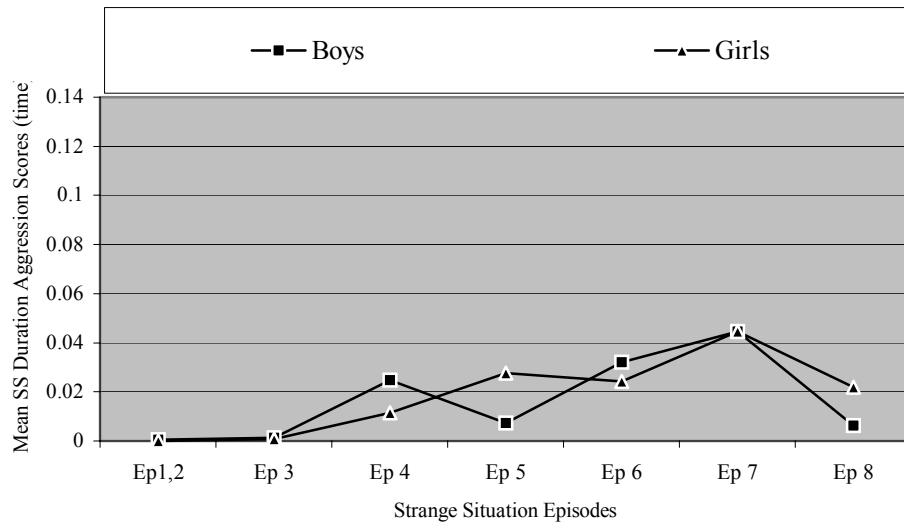
\*\*  $p \leq .01$

To examine the specific nature of the interaction effect between negative reactivity group and episode, the interaction effect between gender and episode and the interaction effect between negative reactivity group, gender and episode, univariate analyses of variance of infant aggression for each episode were conducted. As shown in Table 21, analyses indicated that negative reactivity group differed significantly during episodes 4, 5, 6, 7 and 8, but not significantly during episode 3 (preseparation). As depicted in Figure 2, high negative emotional infants showed significantly more aggressive behavior during reunion (episode 5 and 8) and during separation (episode 4, 6 and 7) than low negative emotional infants. During preseparation (episode 3) the two groups were not significantly different from each other in their aggressive behavior.



**Figure 2.** Mean infant aggression scores during Strange Situation episodes for high versus low negative emotional infants. Ep 1/ 2 & 3 = Preseparation; Ep 4, 6 & 7 = Separation; Ep 5 & 8 = Reunion

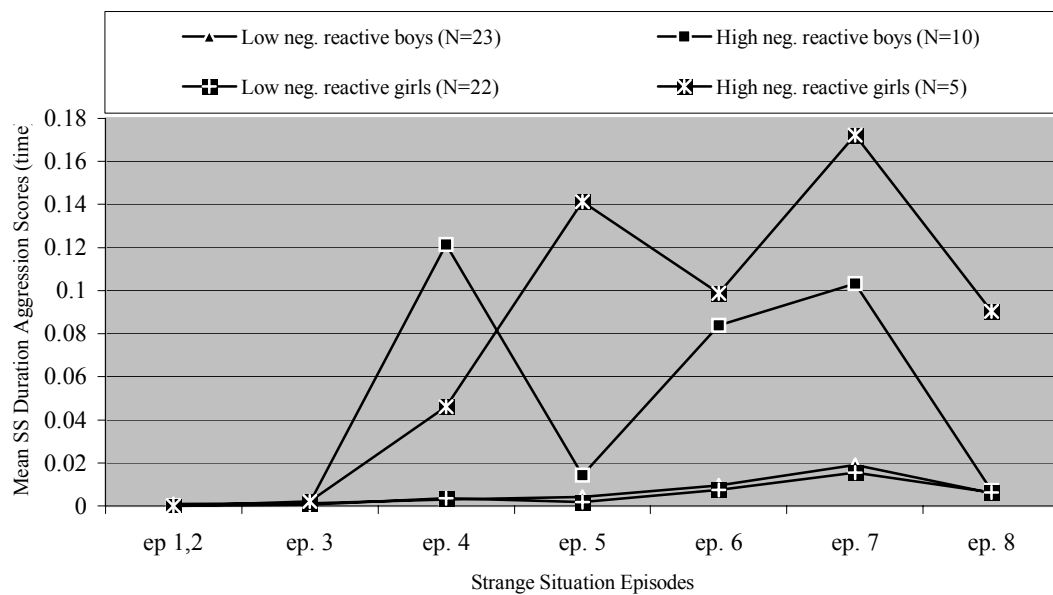
Gender differed significantly during episode 5 and 8, but not significantly during episode 3, 4, 6, and 7 (Table 21). As presented in Figure 3, girls displayed significantly more aggressive behavior than boys during episodes 5 and 8 (reunion with mother).



**Figure 3.** Mean infant aggression scores during Strange Situation episodes for infant girls versus infant boys. Ep 1/ 2 & 3 = Preseparation; Ep 4, 6 & 7 = Separation; Ep 5 & 8 = Reunion

As shown in Table 21, a significant negative reactivity group x gender interaction effect emerged for episode 5 and 8, but not significantly for episode 3, 4, 6, and 7. As depicted in Figure 4, low emotional reactive boys and girls had similar patterns of low aggressive behavior during SS. High emotional reactive girls and boys differed in their patterns of aggressive behavior. The aggressive behavior of high emotional reactive girls increased in episode 5 (first reunion with mother) whereas the aggressive behavior of high emotional reactive boys decreased. Both high emotional reactive girls' and boys' aggressive behavior decreased in episode 8 (second reunion

with mother), but the difference was, that high reactive boys' aggressive behavior decreased close to baseline whereas high reactive girls aggressive behavior decreased much less. The interpretation of the data presented in Figure 4 is limited, because of the small cell numbers.



**Figure 4.** Mean infant aggression scores during Strange Situation episodes for high and low negative reactive infant girls and boys. Ep 1/ 2 & 3 = Preseparation; Ep 4, 6 & 7 = Separation; Ep 5 & 8 = Reunion

Table 21. Univariate Analyses of Variance of Infant Aggression During SS Episodes

<b>Source</b>	<b>df</b>	<b>SS</b>	<b>MS</b>	<b>F</b>	<b>P</b>
<b>Episode 3</b>					
Neg. Reactivity Group	1	.0000138	.0000138	.662	.419
Gender	1	.00000208	.00000208	.100	.753
Neg. Reactivity Group x Gender	1	.000001138	.000001138	.055	.816
<b>Episode 4</b>					
Neg. Reactivity Group	1	.05177	.05177	8.417	.005**
Gender	1	.01205	.01205	1.960	.167
Neg. Reactivity Group x Gender	1	.0127	.0127	2.065	.156
<b>Episode 5</b>					
Neg. Reactivity Group	1	.03871	.03871	10.802	.002**
Gender	1	.02025	.02025	5.651	.021*
Neg. Reactivity Group x Gender	1	.02185	.02185	6.097	.017*
<b>Episode 6</b>					
Neg. Reactivity Group	1	.05577	.05577	12.997	.001**
Gender	1	.00000178	.00000178	.000	.984
Neg. Group x Gender	1	.0000175	.0000175	.004	.950
<b>Episode 7</b>					
Neg. Reactivity Group	1	.08727	.08727	7.448	.009**
Gender	1	.002330	.002330	.199	.657
Neg. Reactivity Group x Gender	1	.00277	.00277	.236	.629
<b>Episode 8</b>					
Neg. Reactivity Group	1	.01349	.01349	9.332	.003**
Gender	1	.01307	.01307	9.039	.004**
Neg. Reactivity Group x Gender	1	.01266	.01266	8.762	.005**

Notes: SS = Type III Sum of Square. MS = Mean Square. F = F-Value. P= P-Value

\*  $p \leq .05$ , \*\*  $p \leq .01$



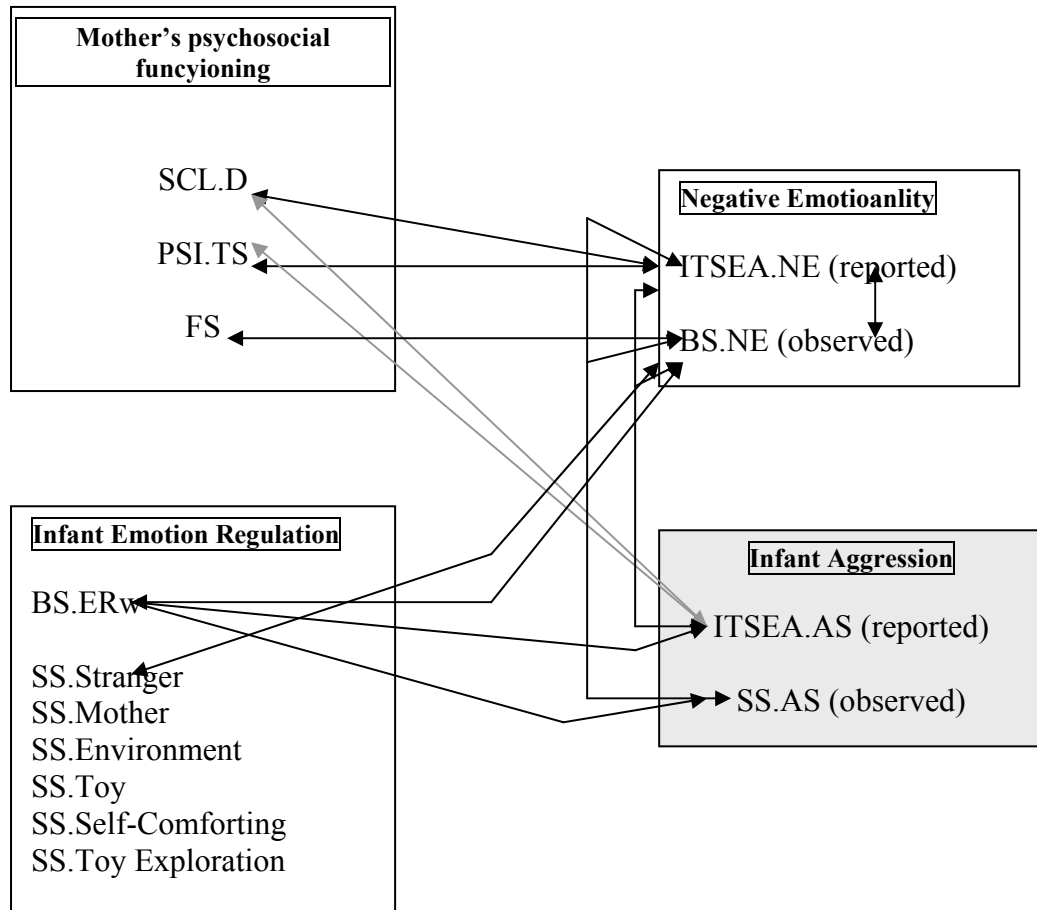
## CHAPTER V

## Discussion

Major Findings

The primary focus on the present study was to identify early risk factors for infant aggression in a sample of high risk, low-income teenager mothers and their infants. To date, very little research has been conducted to examine the early manifestations of aggression in infants. The present study explored a model of infant aggression development that emphasized infant aggression developing largely through the interaction of infant's dispositional characteristics with their caregiving environment. The study addressed the following relations: (1) Maternal psychosocial functioning with reported (maternal report on ITSEA) and observed infant aggression (observed by investigator during SS) and negative emotionality (observed by investigator during BSID-II), (2) reported measurements of infant aggression and negative emotionality with observed infant measurements of infant aggression and negative emotionality, (3) infant negative emotionality and infant aggression, (4) infant emotion regulation with infant aggression and negative emotionality, (5) a possible interaction effect between emotion regulation and negative emotionality in relation to infant aggression, and (6) attachment classification with infant aggression and negative emotionality. Finally, the question of whether these six relations would differ by gender was also addressed.

Significant relations between maternal psychosocial functioning, infant aggression, infant negative emotionality and infant aggression are illustrated in Figure 5.



**Figure 5.** Significant relations between mother's psychosocial functioning, infant emotion regulation, infant negative emotionality and infant aggression.

**Note:** SCL.D=maternal depression score, PSI.TS=maternal total parenting stress score, FS=maternal support by baby's father score, BS.ER=Bayley emotion regulation score, SS=Strange Situation, ITSEA.NE=maternal reported infant negative emotionality score, BS.NE=observed infant negative emotionality score during Bayley Assessment, ITSEA.AS=maternal reported infant aggression score, SS.AS=observed infant aggression score during Strange Situation.

Relations between Maternal Psychosocial Functioning and Reported and Observed Infant Aggression and Negative Emotionality

The first issue that was addressed was whether there were relations between maternal reported psychosocial functioning and maternal reported infant aggression and negative emotionality. It was hypothesized that mother's higher depression, higher level of parenting stress and lower level of perceived support from baby's father would be associated with higher levels of mothers' infant reported aggression and negative emotionality. First, mothers' psychosocial functioning was not significantly related to reported infant aggression. However, there was a nonsignificant trend, such that mothers who had more parenting stress and higher levels of depression reported more infant aggression than mothers who had less parenting stress and lower levels of depression. Second, as predicted, mothers who had higher levels of depression and more parenting stress reported significantly higher infant negative emotionality than mothers who had lower levels of depression and less parenting stress. No significant relations emerged between perceived support from baby's father and reported infant negative emotionality and aggression.

The second issue investigated concerned relations between maternal reported psychosocial functioning and observed infant aggression and negative emotionality. Again, it was hypothesized, that higher maternal levels of depression and parenting stress and, lower levels of perceived support from the baby's father would be associated with higher observed infant aggression and negative emotionality. With one exception, the predicted relations between maternal psychosocial functioning and observed infant aggression and negative emotionality were not found. The one exception was that,

infants with mothers who reported having less support from the baby's father displayed significantly more observational negative emotionality than infants with mothers who reported having more support from the baby's father. The same however, was not true for observed infant aggression.

The association between observed higher infant negative emotionality with perceived lack of support by the baby's father is an interesting finding because it suggests an important role for the baby's father for infant development. Previous research (see Vietze, O'Connor, & Sherrod, 1991; Zelenko et al., in press) also emphasized the powerful role of the baby's father in parenting attitudes and psychological well-being of a single adolescent. The discrepancy between observed and reported negative emotionality for infants with mothers who perceived less support in comparison to infants with mothers who perceived more support should be explored in further research.

In general, the data indicated a discrepancy between reported and observed infant behavior when maternal psychosocial functioning was considered. In comparison to infants with less depressed and/or less stressed mothers, infants with more depressed and/or more stressed mothers received higher maternal ratings on aggression and significantly higher ratings on negative emotionality, but did not display more observational negative emotionality or aggression during the SS and the BSID-II. One possible explanation for the lack of overlap between reported and observed infant behavior is that it may reflect real increases in infant aggression that are simply not reported by other informants, perhaps because children display certain symptoms at home but not in other situations (Zahn-Waxler et al., 1993 ). Alternatively, mothers who

are depressed and feel stressed may project or mistakenly identify symptoms of their own psychological states in their children (Moretti, Fine, Haley, & Marriage, 1985). Depressed mothers may be overly sensitive to, and/or be overwhelmed by, their children's behaviors and demands. Consequently, they may have unusually low thresholds for problem behaviors, tending to label age-normative or typical behavior as problematic.

Numerous studies have demonstrated a link between psychological problems in parents, especially depressive symptoms, and aggressive behavior in their preschool children (Carter et al., 2001, Carter et al., 1999; Zahn-Waxler et al., 1984). Findings consistently indicate that mothers who report more symptoms of depression are more likely to perceive their preschool children as hard to manage and also more likely to engage in conflict and coercive interactions with their children than mothers who do not report feeling depressed (Cohn & Tronick, 1989; Field et al., 1990; Lyons-Ruth et al., 1990). An elegant study by Field, Morrow, and Adlestein (1993) demonstrated that when compared to trained coders, low-income minority women ratings of videotaped maternal and infant behavior varied according to the basis of maternal depressive symptom level. The greatest discrepancy between the ratings of trained coders and mothers was found among the mothers with elevated depressive symptoms.

“Depressed” mothers rated their own and their infant's behavior as more negative than trained coders. The bias observed was above and beyond the finding that symptomatic mothers and their infants were rated as exhibiting more negative and fewer positive behaviors than non-symptomatic mothers. As parenting beliefs become instantiated in parental behavior, they may play a role in the development of children's aggressive

behavior. How parents come to form such beliefs, however, and whether beliefs contribute to, or are the product of, variations in children's behavior, remain unclear (MacKinnon-Lewis, Lamb, Hattie, & Baradaran, 2001).

The third issue that was addressed was relations between reported measurements of infant aggression and negative emotionality and observed measurements of infant aggression and negative emotionality, when maternal psychosocial functioning was held constant. It was hypothesized, first, that higher maternal reported aggression would be associated with higher observed infant aggression and second, that higher maternal reported infant negative emotionality would be associated with higher observed infant negative emotionality. There is considerable debate about the concordance of parental report and laboratory assessment (Bates, 1990; Wolk et al., 1992).

As hypothesized, observed infant negative emotionality was found to be related with reported infant negative emotionality. However, the predicted relation between observed and reported aggression did not emerge. Observed infant aggression was not significantly related to reported infant aggression.

The present findings are consistent with other studies, which also found modest to no agreement across informants and across settings and domains for children (Achenbach et al., 1987; Carter et al., 2001; Robinson & Eyberg, 1981). One possible explanation for the present findings is that mother and observer hold different views of the children's functioning, which would also explain the null finding between observed and reported aggression. For example, mothers are influenced by emotional reactions, their attributions or causal explanations for their children's aggressive behavior, the parenting goals or outcomes they want to achieve when interacting with their children

(Carter et al., 2001). Another possible explanation for the weak overlap is that some children may exhibit problem behaviors in the home and family context that they are not displayed during a two-hour laboratory assessment. Also, it is important to keep in mind that a child's functioning is dependent on numerous contextual and methodological factors. The possible impact of the type of measurement and the setting for data collection, the relationship between the person the child is observed with and the child; the larger psychosocial context, such as family and culture; the child's physical and cognitive development; and state-related factors such as illness, hunger, or fatigue (Zelenko, in progress). Another possible explanation is that parental reports are based on definitions that are likely to be specific to the parent and therefore are likely to be affected by systematic personal biases such as the parents' expectations, attributions about the child or mood (Eddy et al., 1998; Prescott et al., 2000). For example, parental report may be influenced by factors such as knowledge and expectations about child development, demographic characteristics or the parental psychological and/or psychiatric status such as level of depressive symptoms (Briggs-Gowan et al., 2001).

Results suggest a potential role for parents' perceptions in the study of the development of infant aggressive behavior. Maternal attributions may affect how the mother interacts with the infant, which may, in turn, ultimately affect the infant's behavior. For example, maternal expectations that the child will be aggressive may reinforce aggressive tendencies in the child. The model, that the mother is a more powerful determinant of adolescence outcome in this age range should be further explored in a prospective follow-up study.

### Relations between Infant Negative Emotionality and Infant Aggression

The fourth specific goal of this investigation was to examine the relation between infant negative emotionality and infant aggression. It was hypothesized that higher infant negative emotionality would be associated with higher infant aggression and vice versa. The data indicate that infant negative emotionality and infant aggression were moderately related to each other. As predicted, infants who displayed more negative emotionality also displayed more aggression than infants who displayed less negative emotionality. In addition, infants with higher reported negative emotionality received higher ratings on the aggression scale. These findings are consistent with the view that negative emotionality is associated with angry outbursts, aggression, and acting out behaviors (Teglasi & MacMahon, 1990) and suggests that this relation may already exist in infancy. Recent data on negative emotionality demonstrate that there may be a link to later externalizing problem behaviors (Eisenberg et al., 1997; Rothbart & Ahadi, 1994;). The earliest manifestations of aggression occur in the infant's first encounters with the social world. Both, anger and irritability, which correlate with and potentially antecede aggression, have been observed in infants. Berkowitz (1993) labeled reactive aggression as "emotional aggression" and noted that reactive aggression often occurs in conjunction with anger and in response to the experience of negative emotionality and is associated with the inability to regulate negative emotions. This might be a possible explanation for the only moderate overlap between infant negative emotionality and infant aggression.



### Relations between Infant Emotion Regulation, Negative Emotionality, and Aggression

The fifth issue investigated concerned relations between infant emotion regulation and infant negative emotionality with aggression. It was hypothesized that low infant Bayley Emotion Regulation scores and low SS Emotion Regulation scores would be associated with high infant negative emotionality and aggression. Low SS Emotion Regulation scores included: (1) infant looking less at the environment, (2) infant looking less at the mother, (3) infant looking less at the stranger, (4) lower infant self-comforting, and (5) lower infant toy exploration during the Strange Situation.

Consistent with the prediction, infants who displayed less emotion regulation during the BSID-II expressed significantly more negative emotionality and significantly more aggression than infants who displayed more emotion regulation. With one exception, relations between infant emotion regulation during the SS and infant negative emotionality and aggression were not found. The exception was that infants who looked less at the stranger expressed significantly more negative emotionality than infants who looked more at the stranger. One possible explanation for the generally null findings between infant emotion regulation during SS and infant negative emotionality and aggression could be a gender effect which will be discussed later. The results of our analyses support the growing scientific interest in the role of infant's regulatory capabilities in the development of aggressive behavior (Caspi et al., 1987; Rothbart & Bates, 1998), and are consistent with findings that children's lack of regulation is associated with externalizing behavior (Hart et al., 1997; Newman et al., 1997).

Whether negative emotionality is associated with aggression may depend on the individual's level of regulation. For example, if children are prone to anger or

frustration, they may not exhibit uncontrolled, emotional behavior if they can regulate their behavior well. Therefore, it was of interest to examine the interaction between infant negative emotionality and infant emotion regulation in relation to observed and reported infant aggression. In conducting these analyses, the assumption was that infants with high negative emotionality and low emotion regulation would display more aggression than infants with low emotion regulation and low negative emotionality and infants with high emotion regulation and low or high negative emotionality. Scarpa and Raine (1997) posit, that a predisposition to experience negative emotionality and the inability to regulate or soothe negative emotionality are likely to increase the potential expression of aggression. Furthermore, this tendency may be most pronounced in individuals faced with external stressors (especially unpleasant situations and aggressive environments), where negative emotionality is peaked. As predicted, a significant interaction between negative emotionality and emotion regulation in relation to infant observed aggression was found. Infants with low emotion regulation during the BSID-II and high negative emotionality during the SS displayed significantly more observed aggression than infants with low emotion regulation and low negative emotionality and infants with high emotion regulation and either low or high negative reactivity. These findings are consistent with Eisenberg et al. (1996) results that children prone to externalizing problems were found to be high in negative emotionality and low in regulation. Eisenberg et al. (1994) determined that individuals who are highly emotional in response to anger-inducing events and low in regulation skills are likely to display aggression particularly associated with negative emotionality (e.g., emotionally driven aggression; Dodge et al., 1997). Moreover, Eisenberg's data demonstrate that there are

important implications of anger and the regulation of anger for peer relations. Highly emotional children who were low on regulatory skills were also low on social skills and sociometric status (Eisenberg et al., 1993). Thus, styles of emotion regulation that may be evident in infancy and toddlerhood come to play an important role in children's interactions with others (Rubin et al., 1995). These findings of the present study are interesting from the point of infant's social and emotional development because they indicate that children as young as 12 months already display differences in their emotion regulation. The control of anger and the tolerance of frustrating circumstances are major achievements in early socialization and do not come automatically. It has been demonstrated that the ability to manage distress and anger when frustrated is critical for later adaptation. And, it is apparent that such skills begin to develop in infancy and become consolidated during toddlerhood which by the time the child enters preschool, these skills play an important role in the development of self-control and social competence (Rubin et al., 1995).

#### The Effect of Attachment Classification on Infant Aggression and Negative Reactivity

The final issue addressed in this study concerned the relation between infant-mother bond and infant aggression and negative emotionality. Kopp (1989) proposed that initial regulation is provided by the caregiver and that the task for the infant-care-giver relationship is to transfer this control to the infant. Sroufe (1997) believes that differences in attachment security will have a profound impact on the infant's later self-regulation of emotion, and therefore on aggressive behavior.

It was hypothesized that infants categorized as insecurely attached would be significantly more aggressive and have more negative emotionality. With one exception

the data did not reveal significant relationships between attachment classification and infant aggression and negative emotionality. The one exception was that infants classified as insecure-resistant showed significantly more observed aggression than infants who were classified as either secure or insecure-avoidant. No significant difference was found between secure and insecure-avoidant infants in relation to observed aggression. One possibility for the general null findings is that it is too early in development to see an effect of attachment on infant aggression.

#### The Effect on Gender of Infant Aggression, Negative Reactivity, and Emotion

##### Regulation

Ratings of infant aggression, negative emotionality and emotion regulation were also examined by infant gender. It should be noted that girls were not significantly older than boys, nor did they differ significantly on any of the other demographic characteristics such as mother's age, income, or education.

It is noteworthy that a significant difference between boys and girls in relation to infant aggression and negative emotionality has not been found. Boys did not display more observed aggression and negative emotionality than girls, nor did mothers report more aggression and negative emotionality for boys than for girls. These findings are consistent with most other studies, which have revealed relatively trivial gender differences in preschool children (e.g., Koot, 1993; Olson et al., 2000). Overall, although studies have been inconsistent, the bulk of the evidence suggests that gender differences in aggression are not marked in preschool children. However, school-age boys are consistently found to have higher rates of externalizing behaviors than school-age girls.

The significant relations between infant gender and infant aggression and negative emotionality may provide useful information about mothers' gender-based expectations for infants. Several gender differences emerged by examining the above mentioned relations separately for girls and boys. Intriguing findings emerged for maternal psychosocial functioning with maternal reported infant aggression and negative emotionality. Mothers with higher levels of depression and/or higher levels of parenting stress perceived their girls, but not their boys, as significantly more aggressive and as having significantly more negative emotionality than mothers with lower levels of depression and/or lower levels of parenting stress. No significant gender differences emerged for maternal psychosocial functioning and observed aggression and negative emotionality. Interestingly, however, after controlling for maternal psychosocial functioning, there were no significant relations between observed and reported measurements for boys or girls.

The gender differences that emerged in the association between maternal psychosocial functioning and discrepancies between observed and reported infant measurements may be interpreted in several ways. If one considers the findings to reflect maternal reporting distortions, the findings may arise from differences in mothers' expectations of boys' and girls' behaviors. Mothers may consider some externalizing behaviors to be normal for boys and therefore apply higher symptom thresholds for boys than for girls (Briggs-Gowan et al., 1996). Externalizing behavior is considered more common, and "normal" for boys and therefore may be more accepted for boys than it is for girls (Zahn-Waxler, 1993). Thus, mothers may have seen their girls who did not display significantly more aggression or negative emotionality than

boys, as more problematic or difficult than mothers of boys with similar behavior patterns. Mills and Rubin (1992) found that mothers of boys attributed aggression to transient, age-related factors to a greater extent than mothers of girls. Reported gender differences in development as a function of a set of variables is still to be understood. They may be linked to gender differences in the range and variability of psychopathology scores, differences in socialization practices, in parental expectations, or in desired outcomes for boys and girls. Studies from Carter et al. (2001) show that daughters of depressed mothers were elevated on CBCL Externalizing symptoms compared with daughters of nondepressed mothers. The one finding from Carter et al. (2001) to emerge supporting a negative impact for maternal depression on toddler problem behaviors was that depressed mothers were more likely to give their daughters high ratings on externalizing symptoms, whereas nondepressed mothers rated their daughters lower than depressed mothers of girls and lower than all mothers of boys.

Interesting gender effects also emerged for emotion regulation during the SS in relation to infant aggression and negative emotionality in the present study. Boys who displayed more observational negative emotionality looked less at toys, less at the stranger and explored significantly more toys during SS than boys who displayed less negative emotionality, whereas girls who displayed more negative emotionality looked significantly more at the mothers, significantly more at the environment and explored significantly less toys than girls who displayed less negative emotionality. Boys who displayed more observational aggression looked significantly less at the mother and the environment than boys who displayed less observational aggression, whereas girls who displayed more observational aggression looked significantly more at the mother,

significantly more at the environment and significantly more at toys. One possible explanation for the gender differences in the use of emotion regulation in infants who display more negative emotionality and aggression might be that boys are more object oriented and girls are more mother oriented (Calkins & Johnson, 1998).

Another explanation could be that in the present study mothers were less empathetic with their boys than with their girls. Gianino and Tronick (1988) found that when mothers posed a blank expression than a positive expression, 9-month-old infants averted their gaze from their mothers, redirected their attention toward objects, and returned their gaze back to the mothers more frequently. The authors hypothesized that these infants were trying to modulate their arousal and reengage their mothers. In Braungart and Stifter's study, (1991) it appeared that when infants were negatively aroused by their mother's departure, they oriented less towards their mothers and more towards objects during reunion. Calkins and Johnson (1998) suggested parents may not encourage girls as much as they do boys to harness their distress toward a more constructive solution to their problem. It could be that girls' distress typically elicits parental intervention, while their male counterparts' distress may elicit more encouragement from parents to keep trying to obtain their goal or overcome a barrier. Weinberg & Tronick (1997) posit, although it seems there is little to no evidence for gender differences in aggression in infancy, there are some differences between the sexes in emotional expressiveness and self-regulation that may predate and correlate with later gender-differentiated aggressive behavior problems. The present study found a gender difference in emotion regulation but further research in this area is needed to

fully explain the differences. As the present data suggest, different paths and processes of development may exist for young boys and girls.

#### Limitation of the Findings

The present study has a number of limitations that makes the conclusion I have drawn somewhat tentative. Among the most important limitations was the difficulty in operationally defining infant aggression, negative emotionality, emotion regulation and attachment. There is considerable overlap among the constructs and therefore clearly separating them was troublesome. However, attempts were made to make the categories as mutually exclusive as possible. A second limitation concerned the small sample size. It is possible that with more participants, more significant and robust findings would have emerged. However, the sample consisted of low-income teenage mothers, a sample at high risk for childhood aggression. A sample such as this is extremely difficult to recruit and attrition is common. Moreover, the sample was primarily Hispanic and African-American, and therefore findings may not generalize to samples of differing ethnicities, nor may findings generalize to samples with mothers who are older and/or from different socioeconomic classes.

A third limitation concerned the measures used in the present study. Although many of the self-report measures were standardized (e.g., the Depression inventory; SCL-90-R), some were not. For instance, the ITSEA, the measure of maternal reported negative emotionality and infant aggression is relatively new and has yet to be standardized with a high risk sample. Additionally, maternal psychosocial functioning and maternal reports of infant behavior were self-report, and therefore are subject to participant error and interpretation. For example, ratings of perceived support from the



baby's father may reflect the adolescent's wish to present herself in a positive light (Teagle & Brindis, 1998).

Finally, the procedures used for measuring observed infant aggression, negative emotionality, and emotion regulation were not originally designed to assess these behaviors. That is, for example, the Strange Situation procedure was created to measure mother-infant attachment, not as a measure of infant aggression. The Bayley Scales of Infant Development did, however, contain a scale for measuring emotion regulation, but not for negative emotionality. Because these procedures were not specifically designed to measure the main variables in the present study, the scoring systems have never been used with other samples. However, two independent raters achieved sufficient interrater reliability and experts were consulted. Additionally, the scoring systems were based on successful measures of infant aggression, negative emotionality and emotion regulation (see Shaw et al., 1994; Braungart & Stifter, 1991).

Furthermore the study is not longitudinal and therefore is not informative of the mechanism of how maternal psychosocial functioning, maternal attributions, emotion regulation and attachment classification affect infant aggression and negative emotionality over time. Nor can it help to understand the possible implications for later development of an early pattern of aggressive behavior, and/or poor emotion regulation. Because of limitations in sample size and not normal distributed variables, it was not possible to examine more complex multivariate risk models that might illuminate pathways for infants.

### Strengths of the Study

Despite the above limitations, the present study has several strengths and therefore adds a significant contribution to the literature on childhood aggression. The most important strength is that this is the first study to measure aggression in infancy in a multi-trait, multi-method design. As mentioned before, determining the precursors of aggression at early developmental stages may prove important in preventing and treating aggression, violence, and criminality in later developmental stages. Although the sample size was small and conclusions tentative at this point, to date, very little is known about aggression in infancy and thus, results are informative and meaningful.

A second strength is the multi-trait, multi-method design of the study. In addition to infant aggression, infant emotionality and emotion regulation were investigated, as were relations between the three constructs. Moreover, both observational (two separate observations) and maternal reports of these constructs were assessed, allowing for comparisons. A third asset was the make-up of the sample. Because the sample consisted of teenage mothers from low SES backgrounds, the likelihood of observing difficult infant behavior was high. A different sample, such as a sample of middle-class Caucasian mothers, may not be as informative to the literature on childhood aggression as the present sample. However, future studies should be conducted with a range of participants. Lastly, the present study utilized the Strange Situation and the Bayley Scales of Infant Development, both which are standardized procedures. Thus, data from other studies which also used these procedures can be compared and contrasted with the present data. Also, the methods used in the present

study will be manualized (e.g., scoring systems for infant aggression) and made available for others interested in exploring infant aggression.

### Conclusions and Directions for Future Research

Problems of juvenile aggression and delinquency are world-wide concerns. The prevention and rehabilitation of juvenile crime and criminals, respectively, are high priorities. Understanding the development of childhood aggression is crucial to the goals of prevention and intervention of juvenile delinquency. Understanding the precursors of childhood aggression that are manifest in infants is a necessary step towards the realization of these goals.

The present study was one of the first studies to examine infant aggression, negative emotionality and emotion regulation in combination. One of the main findings concerned maternal attribution and its possible role as a risk factor for later externalizing behaviors. That is, mothers, especially depressed and stressed mothers, tended to report higher levels of infant aggression and negative emotionality than was noted by more objective observers. This tendency was particularly evident in mothers with girl infants. It is possible that these negative attributions will serve to increase the likelihood of later child aggression, aggression that may not have surfaced without these attributions. On the other hand, it is also possible that the mothers are more accurate in their portrayals of their infants, and that their infants are indeed more aggressive than observed in the two brief laboratory assessments. Future research is needed to more precisely determine the link between aggression observed in infancy and aggression later in life.

Another important finding concerned emotion regulation. Even at this early age, clear differences in emotion regulation could be seen. Interestingly, infants with high negative emotionality and low emotion regulation were observed to be the most aggressive. Thus, for purposes of treatment and scientific study, the three constructs (emotion regulation, negative emotionality, and aggression) should be considered in combination. Investigating each alone may not prove fruitful in future examinations. Additionally, different emotion regulation behaviors were observed for girl and boy infants. Aggressive girls looked more at the environment, their toys and their mother, whereas aggressive boys looked less at the environment and their mother and explored their toys more, although looked at the toys less. Although difficult to interpret at this point, it is nonetheless interesting that gender differences exist at this young age in emotion regulatory behaviors.

The present findings of this preliminary study suggest female-specific pathways in developing externalizing behavior. Most research studies have only looked at the development of childhood aggression in boys. Further research is needed to look specifically at girls pathways for developing externalizing behavior as they may very different than the pathways of boys.

In conclusion, although preliminary, findings from the present study provide intriguing directions for future research. More studies need to be conducted focusing on infant aggression, as well as longitudinal studies following the infants over time. The prevention and treatment of aggression in childhood is of the utmost importance. The comprehension of the developmental pathways of childhood aggression must begin

when the aggression begins, which is why the study of infant aggression is imperative and should be continued by scientists.

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Appendix A

Descriptive Statistics for Study Variables

Table Appendix A. Descriptive Statistics for Study Variables

	<i>N</i>		<i>M</i>		<i>SD</i>		<i>Median</i>		<i>Range</i>	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Infant age	33	28	13.4	13.01	1.89	1.29	12	12	12-17	12-16
SCL.D	32	28	50	51.1	10.9	12.2	51	51.1	30-71	30-71
PSI.TS	32	28	72.3	68.3	23	26	76.4	77.5	22-99	15-99
FS	32	28	3.1	3.6	2.4	2.2	4	4	0-1	0-1
ITSEA.AS	33	28	.63	.59	.35	.41	.54	.48	.09-1.3	0-1.5
ITSEA.NE	33	28	.75	.72	.32	.35	.69	.65	0.2-1.5	.08-1.3
BS.NE	32	25	1.97	1.78	.85	.8	2	1.5	1-5	1-3.5
SS.AS	33	27	1.33	1.3	.46	.49	1.14	1.14	1-2.7	1-3.1
SS.NE	33	27	1.03	1.3	.98	1.1	.68	1.3	0-3.5	0-3.5
BS.ER	32	25	69.9	66.5	26.5	28.8	77	70	3-99	3-99
SS.Environment	33	27	.051	.076	.043	.048	.042	.061	.005-.21	.005-.21
SS.Toy	33	27	.062	.11	.041	.075	.045	.084	.004-.15	.006-.27
SS.Self-comforting	33	27	.022	.042	.023	.049	.015	.023	0-0.7	0-2.2
SS.Stranger	33	27	.087	.11	.054	.06	.081	.098	.014-.19	.02-.23
SS.Mother	33	27	.05	.051	.026	.027	.048	.046	.01-.12	.02-.12
SS.Toy exploration	33	27	.67	.59	.17	.16	.69	.59	.12-.98	.30-.89

Note: SCL.D = SCL Depression score, PSI.TS = PSI Total Stress score, FS = Father Support score, ITSEA.AS = Aggression/Defiance score, ITSEA.NE = ITSEA Negative Emotional Reactivity score, BS.NE = Bayley Negative Emotional Reactivity score, SS.AS = Strange Situation Global Aggression score, BS.ER = Bayley Emotion Regulation score, SS = Strange Situation, ITSEA = Infant-Toddler Social Emotional Assessment.