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TEMPERAMENT, ATTACHMENT, AND PARENTING STRESS IN  
INFANCY: RELATIONS TO SOCIAL COMPETENCE  
OF SECOND GRADERS

by

Gina A. Cook

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

in

Family and Human Development

## ABSTRACT

Temperament, Attachment, and Parenting Stress in Infancy: Relations to  
Social Competence of Second Graders

by

Gina A. Cook, Master of Science

Utah State University, 1999

Major Professor: Dr. Lori A. Roggman  
Department: Family and Human Development

The importance of social competence in children's development has been recognized, and evidence has been found that children who are socially incompetent are at risk for academic problems. Yet the influences that may be involved from infancy, such as temperament and attachment, have not been explored longitudinally. The purpose of this study was to investigate the influence of infant temperament characteristics on later social development and to explore the idea that this influence may be affected by the infant's attachment security mediated by parenting stress.

Eighteen-month-old infants, from a previous study, were studied as second graders to examine whether their development was influenced by early attachment and temperament. This study examined the involvement of infant temperament and attachment in relation to maternal goodness-of-fit and parenting stress to predict social problems in the school years to gain valuable insight into the potential of the infant to influence his/her own development.

Results indicate that characteristics of the infant and the mother-infant relationship have only indirect relations with how children function later in childhood. However, the child's temperament as a second grader, although not stable from infancy, is related to how well a child adapts in a school environment.

(78 pages)



## ACKNOWLEDGMENTS

In pursuit of this goal, I have had the opportunity to receive advice, support, and guidance from many colleagues. I am grateful to my supervisory committee, comprised of Shelley Lindauer, Randy Jones, and my committee chair, Lori Roggman. I appreciate the efforts and time spent on their part to make this thesis a reality. I would like to extend a special thanks to Lori Roggman for all that she has taught me over the past three years and for the opportunities and challenges she has given me.

I would like to extend my gratitude to the Cache County and Logan School Districts for allowing me to come into their schools and to the second-grade teachers who participated in this project. I would also like to acknowledge the parents for taking time out of their busy schedules to complete the many questionnaires involved in this study.

I would also like to thank the many friends I have made while working towards this goal, particularly Lisa Boyce, Vonda Jump, Lisa Newland, and Teri Morrison. Their encouragement and advice have made the path easier.

Next, I thank my parents for their support and encouragement. I am grateful for my father's love for reading and knowledge and for instilling these things in me. I am grateful for my mother's continuous advice and babysitting services. I am grateful for my sister, Robyn, who has helped me maintain my crazy schedule by chauffeuring my children and helping out in our business.

I know that my husband, Gary, and my children, Brant, Chase, and Alexa, are pleased that I have finally completed this endeavor. I would like to thank them for their patience and understanding. I am especially grateful for my wonderful

husband who has been a source of constant support and encouragement. Without his help this dream would have never been possible.

Gina A. Cook

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## CHAPTER I

### STATEMENT OF THE PROBLEM

Social competence has been defined in numerous ways, such as an "organism's capacity to interact effectively with its environment" (White, cited in Dodge, Pettit, McClaskey, & Brown, 1986, p.1), and an "effective response of the individual to specific life situations" (Goldfried & d'Zurilla, cited in Dodge et al., 1986, p. 1). Social competence is considered one of the most important areas of development for a child's future relationships, as well as for other aspects of his/her life (Cohn, 1990). Research has found evidence that socially incompetent children are at a higher risk for dropping out of school and committing crimes in adolescence and adulthood (Parker & Asher, 1987). It is important that the mechanisms involved in the development of social competence are understood.

One important factor influencing social competence is the security of infant attachment (Cohn, 1990; Howes, Matheson, & Hamilton, 1994; LaFreniere & Sroufe, 1985). Attachment can be defined as a close relationship between a child and caregiver signified by a desire for proximity and characterized by trust; it offers a secure base from which the child can explore and rely on in times of stress (Bowlby, 1988). Infants who receive low levels of maternal response and support are not as likely to be as securely attached as those who have a responsive parent (Howes et al., 1994). van den Boom's (1994) research found that mothers who were taught to be more responsive had infants who were more securely attached, more sociable, and more likely to explore. A securely attached infant is able to explore and play without worrying about security issues; his/her mother can be used as a support in times of stress. He/she trusts that his/her mother will be close and keep him/her safe.

Attachment has been referred to as "an affective tie between infant and caregiver and to a behavioral system, flexibly operating in terms of set goals, mediated by feeling, and in interaction with other behavioral systems" (Sroufe & Waters, 1977, p. 1185). The role of affective expression in attachment suggests that attachment may be related to temperament. Temperament has been described through characteristics such as a child's disposition to smile, cry, become irritable, or be physically active or inactive (Miyake, Chen, & Campos, 1985). A few studies have suggested that temperament and attachment overlap and can influence behaviors together. For example, Calkins and Fox (1992) indicated that the two together can produce outcomes such as behavioral inhibition and other social-behavioral results.

Temperament has been defined as a biologically based, stable set of personality traits that appear in infancy (Buss & Plomin, 1984). It is a factor that is thought to influence behavior across different settings and within individual environments, as well as being associated with later personality. Considerable attention has been placed on how temperament influences mother-infant interactions and related outcomes in the first year or two of life (van den Boom & Hoeksma, 1994). Most research that has found a link between infant temperament and mother-infant interaction has concluded that temperament has some relationship with attachment; yet findings are not consistent and have differed in the explanation of how attachment is affected and the degree of importance that should be placed on temperament (Bradshaw, Goldsmith, & Campos, 1987; Sprunger, Boyce, & Gaines, 1985; Vaughn et al., 1992).

The goodness-of-fit concept considers the influence of temperament on family adaptation and behavioral outcomes by suggesting that individual temperament alone does not have as large an influence as does the degree of match between the infant and its family. The level of congruence found in the mother-infant interaction, especially in the area of infant rhythmicity, has been found to be statistically significantly associated with



the mother's perceptions of competence and overall family adjustment (Sprunger et al., 1985). Temperament alone cannot predict attachment, but taken together with maternal style and the extent of congruence, it may be related to the mother's confidence level, in turn affecting future behavioral outcomes.

This "goodness-of-fit" model of temperament also emphasizes the need to consider both individuals' characteristics in interaction, as well as the environment and the influences each has on the other (Thomas & Chess, 1977). It has been suggested that the characteristics of the individuals, such as maternal temperament, infant temperament, and gender together affect the attachment relationship and that both members of the dyad together are responsible for the interactions (Ainsworth, Blehar, Waters, & Wall, 1978). There is suggestion in the literature that gender influences temperament subscales and difficulty ratings (Garcia Coll, Halpern, Vohr, Seifer, & Oh, 1992), as well as outcomes related to temperament such as social competence (Parke et al., 1997). Few studies have examined the associations between maternal personality, infant temperament, gender, and infant attachment security. One of the few studies found no indication that maternal personality by itself contributes to attachment after 9 months (Mangelsdorf, Gunnar, Kestenbaum, Lang, & Andreas, 1990). Nevertheless, some studies have followed the outcomes of temperament beyond the preschool years, although those that have gone further in their research have done so only with cross-sectional designs (Lerner, 1983; Windle et al., 1986).

Research on the effects of temperament combined with attachment and gender needs to focus on behavioral outcomes later in childhood in a longitudinal design. Because children that are not accepted by their peers are more likely to fail academically (Austin & Draper, 1984; Wentzel & Caldwell, 1997) and are at risk of dropping out of school (Parker & Asher, 1987), an important outcome to consider is social competence.

### Purpose of the Study

The purpose of this research was (a) to examine the influence of the mother-infant relationship on later social and behavioral development and (b) to examine how this influence may be affected by the infant's temperament, gender and attachment security mediated by parenting stress in childhood and in infancy. Eighteen-month-old infants from a previous study, were studied as second graders to examine whether childhood social competence is influenced by factors such as temperament, gender, attachment, and parenting stress in infancy.

### Research Questions

This research examined infant temperament and attachment in relation to maternal goodness-of-fit and parenting stress and investigated how these factors relate to later social competence. This research also examined the influence of gender on these variables, by examining each research question separately for each gender. This study explored the potential of the infant to influence his/her own social-behavioral development (see Figure 1).

The specific research questions were as follows:

1. Is temperament stable from infancy through second grade?
2. Is goodness-of-fit, a similarity of the child's temperament with mothers' expectations, related to secure attachment?
3. Does infant temperament and mother/infant goodness-of-fit predict social problems in second graders?
4. Does temperament together with attachment predict social problems in second graders?

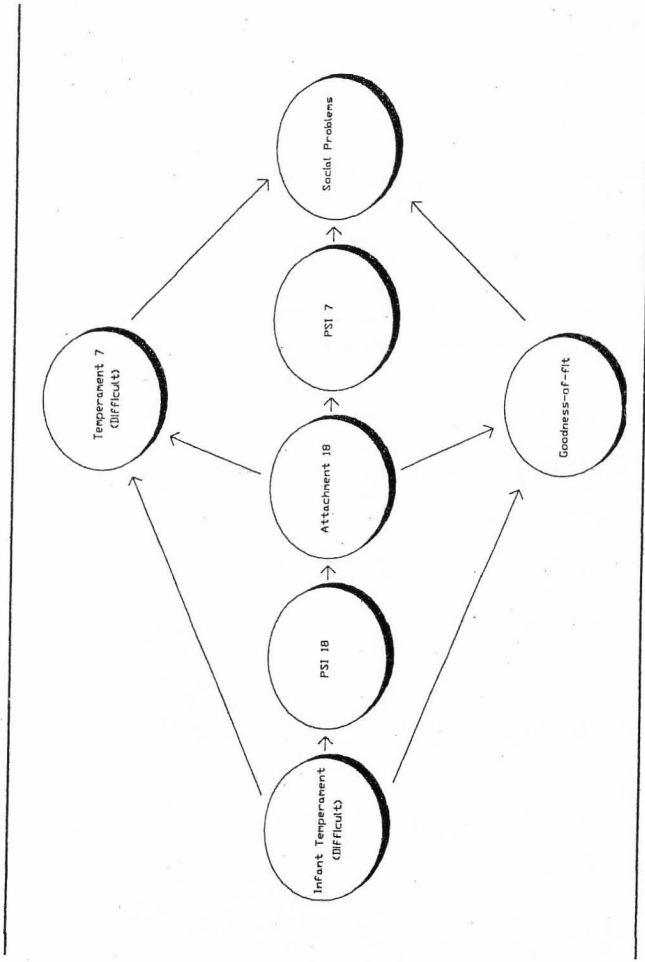


Figure 1. Path model.

5. Does attachment mediated by the amount of parenting stress reported by mothers predict social problems in second graders?
6. Do attachment, temperament, goodness-of-fit, and parenting stress combined predict social problems in second graders?

## CHAPTER II

### REVIEW OF LITERATURE

Both parents and infants come into their relationship with unique characteristics and behaviors. How these traits combine and work together to enhance or inhibit optimal development remains unclear. Nevertheless, recent research has begun to focus on infant temperament and attachment as important facilitators of later social competence. This chapter will provide an overview of the literature in these three main areas. The areas reviewed will first be social competence; secondly, temperament; and finally, attachment. Other related topics such as maternal-child interaction, parenting stress, and behavioral outcomes will be discussed in the relevant sections.

#### Social Competence

The importance of social competence in children's development has been recognized and includes the formation of relationships with peers and the shaping of a child's self-concept (Turner, 1991). A child's ability to function in social settings is an important characteristic considered to be a reliable predictor of future social competence and adaptation in later life (Cassidy & Asher, 1992; Parker & Asher, 1987). According to Howes et al. (1994), "a socially competent child is expected to be sensitive and empathetic to peers, and to engage in complex play, form friendships with peers, and be able to solve social problems" (p. 265). Research has found evidence that socially incompetent children are at a higher risk for dropping out of school and committing crimes in adolescence and adulthood (Parker & Asher, 1987). It is important that the mechanisms involved in the development of social competence are understood.

A study by Renshaw and Brown (1993) found evidence that children experiencing social difficulties become withdrawn and lonely. They end up trapped in a self-

perpetuating cycle of loneliness and social problems. This in turn leads to low self-confidence and long-term difficulties in relating to others. They found that boys tended to be more aggressive than girls and girls were reported as more withdrawn. It has also been found that children's self-perceptions in second grade are a significant predictor of self-perceptions in fifth grade. Thus, self-perception may be well established by second grade and remain fairly stable across time (Hymel & Rubin, 1985).

The factors influencing social competence may be present early in life. Social competence is influenced by the quality of the early mother-infant relationship (Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998) and the factors that influence this dyadic relationship, such as attachment and gender, should be examined further. Research indicates that mothers are more responsive to girls and report a difference in caregiving for boys and girls (Crockenberg, 1986). Attachment theory suggests that a child's introduction into peer relationships is influenced by attitudes, expectations, and social skills developed earlier within the context of the parent-infant attachment relationship. A securely attached child is more likely to have a good self-concept and an ability to approach peers with confidence (Howes et al., 1994). Securely attached children observed by their kindergarten teachers were rated as higher in social competence, higher in sociometric status, and higher in social participation (LaFreniere & Sroufe, 1985), and as having fewer behavior problems than their insecurely attached peers (Erickson, Sroufe, & Egeland, 1985). Findings in a study by Cohn (1990) suggest that infant security of attachment is associated with teacher and peer reports of behavior problems through age 5 and that it is also related to the child's relationships with not only his/her peers, but with teachers and other adults as well. The quality of the mother-child relationship may play an influential role in the development of social competencies.

One purpose of this research is to increase understanding of social development in second grade. The understanding of how attachment and related factors, such as

temperament, influence later social behaviors in childhood may be valuable for assessing the long-term effects of the mother-infant relationship.

### Attachment

The study of infant-adult attachment and the developmental outcomes associated with these relationships is a major area of research. Ainsworth et al. (1978) described attachment as an affectional bond that an infant forms with a caregiver and that endures across time and situations. Bowlby's (1988) definition of attachment is the development of a secure-base figure that provides protection, experiences, and exploration from which the infant can organize a sense of self, as well as an emotional bond. Bowlby theorized that attachments are formed around the child's first birthday and that these attachments can have a major impact on the social-emotional development of the child. Many areas of development are affected by attachment, including the formation of social relationships and social competence (Seifer & Schiller, 1995).

Attachment theory provides a framework for making predictions about patterns of attachment established in infancy that are expected to play important roles in social development and personality formation later in life (Bowlby, 1982). The importance of attachment for children's social development has been explored in depth in recent years, and it has been suggested that the mother-infant relationship is a critical factor in most aspects of development. A securely attached child has a secure base from which he/she can explore the world, as well as a sensitive caregiver who is willing to interact and provide social experiences necessary for optimal development (Jacobsen, Edelstein, & Hofmann, 1994). Securely attached infants are able to explore and interact with others. Secure attachment is a forerunner for developing social skills and eventually becoming a socially competent individual. It is this secure base that predicts ego-resiliency, self-confidence, and positive social relations (Jacobsen et al., 1994). Securely attached infants

have mothers who are sensitive in responding to the infant's needs (van den Boom, 1994). A sensitive mother knows how to pick up on a child's cues and reacts appropriately; in this way she is modeling socially competent behaviors. Children of these mothers tend to be more responsive and sociable (Howes et al., 1994). Mothers may be insensitive for a variety of reasons, but one common reason is stress.

Parenting stress is an indication of how a mother experiences parenting and may play a part in the attachment process. A study by Teti, Nakagawa, Das, and Wirth (1991) found that high levels of parenting stress in mothers of toddlers from 13 to 26 months were related to greater attachment insecurity. According to Crockenberg (1981), parental stress influences the development of attachment and has been found to be negatively related to attachment security scores. Low-income parents who report high levels of stress and no social supports were more likely to have infants with insecure attachments according to a study by Jacobsen and Frye (1991). Parents' sources of support and stress can be determinants of parental quality that can affect the outcome of the child's social competence (Creasey & Jarvis, 1994). Research has found that parenting stress has a negative effect on a child's behavior, which, in turn, can have a negative influence on parental behavior (Creasey & Jarvis, 1994). Another factor that may influence mothers' parenting stress, as well as sensitivity, is infant temperament. Temperament has the ability to influence parenting stress, as well as social development (Carey, 1990).

The purpose of this research is to explore the influence of parent-infant attachment, maternal-child goodness-of-fit, and perceptions of infant temperament on social competence in second grade and to examine how this process may be mediated by parenting stress in infancy and during childhood.



## Temperament

Temperament has been defined through characteristics such as a child's disposition to smile, cry, become irritable, or be physically active or inactive (Miyake et al., 1985) or as a child's style of individual behavior in terms of rhythm, energy, mood, focus, and tempo, that is somewhat stable over a long period of time (Chess & Thomas, 1973; Sprunger et al., 1985). It has also been described as an individual set of behaviors present from birth that influence social interactions between an infant and its family (Sprunger et al., 1985) and as enduring individual characteristics of the infant that are an early foundation of the child's personality (Bornstein & Lamb, 1992).

Thomas and Chess (1977) devised nine dimensions of temperament that have become well known and used in much of the research done on infant temperament. These nine dimensions were derived from the New York Longitudinal Study (NYLS), with a sample of 141 children over a 12-year period. These dimensions are activity level, approach-withdrawal, adaptability, quality of mood, attention span and persistence, distractibility, rhythmicity or regularity, intensity of reaction, and threshold of responsiveness. From these nine dimensions, Thomas and Chess developed four temperamental profiles that could identify a group of characteristics found in most children. These temperamental profiles are called "easy," "difficult," "slow to warm up," and "average" temperamental styles. Easy babies are described as positive, adaptable, and regular in body functions. This easy temperament was found in about 40% of the babies in the Thomas and Chess study. Difficult babies are irregular, slow to adapt, likely to withdraw and react with high intensity in new situations, negative in mood, and irregular in body functions; they comprised about 10% of the sample. Slow to warm up babies are exactly that, slow to adapt, likely to withdraw and react with low intensity in new situations, negative in mood, low in activity, and irregular in body functions. Slow to

warm up children accounted for about 15% of the sample. The remaining 35% were considered "average" babies and did not fit into any other category.

Thomas and Chess found in the New York Longitudinal Study that certain temperament characteristics or dimensions can have long-term consequences, but that later development is by no means determined by temperament. This is because of the way environment interacts with temperament to affect development. Infants' temperament differences do affect mother-infant interaction and attachment according to recent research (van den Boom, 1994; Reiser-Danner, Roggman, & Langlois, 1987).

Some studies have found significant relations between attachment and temperament dimensions such as withdrawal, distractibility, intensity, mood, and threshold (Rieser-Danner et al., 1987). To the extent that mother-infant interaction patterns are influenced by temperament, in turn influencing attachment security, infants do have an active role in influencing mother-infant interaction processes, and may have an effect on the quality of their relationship. Vaughn et al. (1992) found similar results of overlapping association between temperament and attachment. Studies have suggested that temperament and attachment overlap and can influence behaviors together. For example, Calkins and Fox (1992) indicated that there is a relation and that temperament and attachment together can produce behavioral and social outcomes. An infant's security of attachment is expected to affect his or her exploration of the world and later social competence with others (Benoit & Parker, 1994; Cohn, 1990).

One temperamental aspect of the mother-infant relationship that may influence attachment security is infant irritability. van den Boom and Hoeksma (1994) described irritability as negative emotionality that is assessed before any mother-infant interaction has occurred. Although it is not a direct test of temperament, it has been found to be related to a difficult temperament style. Indeed, infants with irritable temperaments do receive lower levels of maternal responsiveness, and infant irritability does seem to be

influential in the mother-infant relationship during the first year (van den Boom, 1994). Infants who receive low levels of maternal response and support are not as securely attached as those who have a responsive parent. According to Crockenberg (1981), many newborns with "irritable" temperaments were found to have an insecure attachment if there was little maternal social support.

Wachs and Gandour (1983) believe that individuals experience their environments differently on the basis of their temperament. They found that children with temperamentally low activity levels explored more when they had a mother who provided lots of stimulation. However, temperamentally high-activity children explored more when their mothers were not highly stimulating. Different temperamental attributes contribute to the type of environment that is optimal for a toddler to learn and explore. The study of temperament is important for providing researchers with a better picture of how each child's unique characteristics can interact with its environment to shape development. Thomas and Chess emphasize the goodness-of-fit model and have tested it in their research. This concept emphasizes the need to consider both individuals' characteristics in an interaction, as well as the demands of the social environment and how each influences the transaction process. If both persons' characteristics and expectations match the demands of the social environment, then a positive interaction is expected (Lerner & Lerner, 1994).

Few studies have examined the interaction between maternal expectations of temperament, or goodness-of-fit, and infant temperament and how it affects attachment. The studies that have indicate that introverted mothers who have difficulties in new situations have infants who are more easily distressed by strangers, separation, and new situations (Daniels & Plomin, 1985; Mangelsorf et al., 1990; Weber, Levitt, & Clark, 1986). It has also been found that mothers of securely attached infants scored higher in areas of interpersonal affection than mothers of insecurely attached infants (Belsky &

Isabella, 1988). Finally, another study found that mothers who scored high on reactivity on the Dimensions of Temperament Scale (DOTS) had more reactive or insecure/avoidant babies, but mothers of insecure/ambivalent and secure babies did not differ on any of the DOTS dimensions except adaptability: Maternal adaptability was a significant predictor of attachment (Weber et al., 1986).

Scarr and McCartney (1983) suggested that the individual characteristics of children evoke responses from those around them and that these responses affect development. They concluded that temperamental attributes are a basis for the types of responses evoked from parents and others. A person's interactions with others are thus in large part affected by her temperament. Through a child's unique traits and characteristics, he is able to evoke reactions from others in his environment. In turn these reactions provide feedback and influence future social interactions. Social interactions are an important part of development; thus temperament can have an effect on development in many areas. Early dimensions of temperament have been regarded as indicators of later temperament and psychological adjustment, including childhood social problems in school (Lengua, West, & Sandler, 1998). Childhood temperamental differences may result in behavioral problems later in life due to the responses that each child evokes from others, and the way each child reacts differently to similar experiences and environments (Scarr & McCartney, 1983). Temperament is a key concept of unique behaviors, and individuality and interaction are key concepts in social development.

Temperamental style has been linked to behavioral outcomes and it has been suggested that these early differences among individuals shape the person's future personality (Rutter, 1987). Specific temperamental characteristics of toddlers are related to particular childhood and adolescent behavioral problems (Caspi, Henry, McGee, Moffitt, & Silva, 1995). Children are active participants in their own social development; they bring their unique temperamental traits into every interaction in which they are

involved. It is through this bidirectional process that a mother and child influence one another and socialization occurs.

The purpose of this research is to increase understanding of social development in second grade and its association with infant temperament, second-grade goodness-of-fit, and attachment. Social development has been shown to be affected by attachment; therefore, it is important to understand how attachment in combination with temperament and other factors, such as parenting stress, influence later social competence.

### Gender

Another variable that may also influence the mother-infant interaction is gender. Gender may influence the mother-infant interaction leading to different outcomes for boys and girls. Crockenberg (1986) indicated that mothers are more responsive to female babies than they are to male babies. Other studies have also reported a difference in caregiving for boys and girls (Crockenberg, 1986; Maccoby, Snow, & Jacklin, 1984).

It is suggested in the literature that gender influences temperament subscales and difficulty ratings (Garcia Coll et al., 1992), as well as outcomes related to temperament such as social competence (Parke et al., 1997). Social competence ratings appear to be more stable for boys from kindergarten through second grade than they are for girls, especially for rejected boys (Parke et al., 1997). Nevertheless, other research has found that temperament characteristics of girls appear to be more stable than those of boys (Garcia Coll et al., 1992; Stevenson-Hinde & Hinde, 1986).

The purpose of this research is to increase understanding of social development in second grade and the influence of gender combined with other influences from infancy. Temperament and attachment have been found to be related to gender and to later social development. Therefore it is important to understand how gender influences these variables.

## Synthesis of Literature

Social competence in childhood is influenced by early social interactions with adults (Coley, 1998). Research has demonstrated that many aspects of social development are affected by attachment. Securely attached infants are more successful in mastering difficult or challenging tasks, and are more comfortable exploring new situations (Bornstein & Lamb, 1992). According to ethological theory, infants rely on attachment figures to protect them and provide for them, and they are able to use attachment figures as a secure base from which they can explore and learn from their world. If infants do not have a secure base, they will not be as successful interacting with their environment or with others. One way that a child's social and cognitive development is powerfully influenced is through mother-infant interaction; when mother-infant interaction is compromised, infant development is negatively affected. Mother-child attachment relationships in a low-income sample were found to influence social competence and affect peer relations (Bost et al., 1998). Secure attachment affects a child's willingness to explore the world, which is essential for its early cognitive and social development (Jacobsen et al., 1994).

If social competence is affected by attachment, it is important to understand what other factors can play into the development of attachment and consequently into future mother-infant interactions. This formation of a relationship between the mother and child is affected by both individuals' characteristics (Izard, Haynes, Chisholm, & Baak, 1991). Evidence has been found to support the idea that temperament and attachment are related, although there is no consensus about the methods to be used to determine if this is solely dependent on the infant's inborn temperament, or if it is affected by the mother's personality, expectations, stress, and relationship with the infant (Vaughn et al., 1992). Is temperament innate to the child or is it an outcome of the parent-child relationship? Calkins and Fox (1992) have suggested that temperament can be identified early and does

make an independent contribution to attachment formation, but that, in turn, attachment can interact with temperament style to influence later outcomes.

The literature indicates that social competence is an important area of development for a child's future relationships. A few studies have suggested that temperament and attachment together may be related to behavioral inhibition as well as social competence. Several studies have looked at the relation between mother-infant interactions and temperament in the first few years of life, yet very little research has examined the associations between temperament, attachment, parenting stress, and social competence. The little research that has followed the outcomes of temperament beyond the preschool years has done so with cross-sectional designs.

Therefore, this study will examine the following hypotheses:

1. Temperament remains stable from infancy through second grade.
2. Goodness-of-fit, a similarity of second-grade temperament with mothers' expectations, is related to attachment security.
3. Social problems of second graders are related to infant temperament and mother/child goodness-of-fit.
4. Temperament together with attachment is related to social problems in second grade.
5. Social problems of second graders are related to attachment and is mediated by maternal parenting stress.
6. Attachment together with temperament, goodness-of-fit, and parenting stress in combination is related to social problems in second grade.

## CHAPTER III

## METHODS

## Subjects

Subjects for this study included 65 second graders (34 boys and 31 girls) followed up from 91 mother-infant dyads studied in previous research. The infants were 18 months old when data were initially collected. Infants were located from a file of publicly announced births and were contacted by phone ( $n = 139$ ) and invited to participate in the study. The sample was a convenience sample of self-selected participants. Because of the nature of the sample, few low-income families participated; therefore, the sample consists almost entirely of two-parent Caucasian families with middle socioeconomic status ( $M = 43.67$  on the Hollingshead Four Factor Index, 1975). The only infants included were those without health problems from an intact family. Written informed consent was obtained, and all data forms were identified only by ID numbers for confidentiality purposes. Both studies received approval from the Internal Review Board of Utah State University (Appendix A).

Ninety-one subjects had completed most measures; 62 of these families were listed in the local telephone directory and were invited to participate in this longitudinal study. The remaining 29 families were sought out. Of those agreeing to participate, only those enrolled in public schools were included. Seventy-three of the subjects were located and contacted to participate in the follow-up study. Seven of the mothers contacted declined our invitation to participate and 1 child was deceased. Fifty-eight of the 65 mothers participating completed and returned all of the measures. All 65 teachers contacted returned the social competence measure. The attrition rate was 29%. Eleven of the subjects were missing data from the infant testing period. Forty-seven subjects (25 boys and 22 girls) have all necessary measures completed.



## Procedures

Mothers completed several paper and pencil measures and questionnaires in the previous study including the Toddler Temperament Scale (TTS) developed by Fullard, McDevitt, and Carey (1984), the Attachment Q-Set developed by Waters (1987), and The Parenting Stress Index (Abidin, 1987).

Additional measures, including the Dimensions of Temperament Scale--Revised (DOTS-R), child temperament version, developed by Windle and Lerner (1986a) and the Parenting Stress Index/Short Form (Abidin, 1990), were administered to the parents who agreed to participate in the continuation of this study with their second-grade children. A final measure, the Conners Teacher Rating Scale-Revised (CTRS-R, Conners, 1997), was completed by the children's second-grade teacher once consent was received from the school's administration and each parent. All of the measures were personally delivered to the teachers and picked up 3 to 5 days later. Appointments were made with the parents to administer questionnaires and an additional questionnaire (DOTS-R parent theory version) was administered over the phone approximately 2 weeks after testing.

## Measures

Infant temperament was assessed in the original study through a questionnaire completed by the mother when the infant was 18 months old. The instrument used was the Toddler Temperament Scale (TTS) developed by Fullard et al. (1984). This questionnaire consists of 97 items, and assesses nine categories of temperamental dimensions including activity, rhythmicity, approach-withdrawal, adaptability, intensity, mood, persistence, distractibility, and threshold. Scores on these categories are then used to identify which temperament cluster the child falls into (easy, difficult, slow-to-warm-up, and intermediate). In addition, a difficulty score was computed with high scores reflecting

a more difficult temperament. Arguments exist as to the validity of parent perceptions in the assessment of infant temperament (Sameroff, 1983). It is because of these arguments that the TTS was used. Its items are behaviorally specific, which tends to reduce the parental bias observed in some temperament instruments and should instead measure the biologically based differences in behavior, not merely the caregiver's perceptions. It is a temperament questionnaire that is difficult for outside observers to complete because of the familiarity with the infant that is required. The Toddler Temperament Scale (TTS) reports test-retest reliability for the nine categories ranging from .69 to .89, median  $r = .81$ . For 1- to 2-year-olds, internal consistency for the nine categories ranges from .53 to .86, median  $r = .70$  (Fullard, McDevitt, & Carey, 1978).

Mother-infant attachment in the original study was assessed with the Attachment Q-Set developed by Waters (1987). Mothers were asked to sort 90 descriptive items into nine equal piles based on the mothers' assessment of those that are "least like her child" and those that are "most like her child" similar to a Likert scale. The mothers received a list of the Q-set items 1-2 weeks prior to reporting and were asked to read over the descriptions and observe their child with these descriptions in mind. It has been reported by Waters and Deane (1985) that this is a reliable instrument when mothers are informed in advance of what is to be observed and reported. The Attachment Q-Set criterion scores were developed by averaging security sorts completed by M. Ainsworth, I. Bretherton, M. Main, A. Sroufe, B. Vaughn, and E. Waters. Higher scores reflect a more secure attachment with a score of .33 or higher reflecting a secure attachment. The alpha reliability for this composite is .96 (Waters & Deane, 1985). In the original study, mothers completed the Q-sort at 14 and 18 months; test-retest reliability for the Q-sort was estimated from a Pearson correlation between the security scores at 14 and 18 month testings,  $r = .74$ .

Parenting stress was measured in the original study by the Parenting Stress Index (PSI) developed by Abidin (1987). This scale assesses stress in the parent-child relationship including stressors related to the parenting role and consists of a 120-item, 5-point Likert scale with six subscales related to child variables (acceptability, adaptability, demandingness, distractibility, mood, and reinforces the parent). It also contains seven parent variable subscales (attachments, depression, parent health, relationship with spouse, restrictions of role, sense of competence, and social isolation; Abidin, 1987). Total scores were computed for the 120 items, with higher scores reflect more parenting stress. Scores for these Likert scale items were treated as interval-level data in the final analyses.

This study used additional questionnaire measures to assess children's temperament, maternal goodness-of-fit, parenting stress, and parent and teacher reports of social competence. The second-grade child's temperament was tested for stability from infancy using the Dimensions of Temperament Scale--Revised (DOTS-R) by Windle and Lerner (1986a). This is a seven-scale questionnaire that includes similar scales as those used by McDevitt and Carey (1978) in the TTS. These scales and subscales include activity level--general, activity level--sleep, approach--withdrawal, flexibility--rigidity, quality of mood, rhythmicity--sleep, rhythmicity--eating, rhythmicity--daily habits, distractibility, and persistence. Higher scores on these seven dimensions reflect more activity, more rhythmicity, and so forth, and thus are comparable to factor scores at age 1. In addition, a difficulty score was computed with high scores reflecting a more difficult temperament. Maternal view of child temperament was also assessed using this instrument. Goodness-of-fit scores were calculated by subtracting each parent theory item from the corresponding child behavior item and treating negative scores as positive. Higher scores reflect goodness-of-fit between parent expectations and child temperament. The Dimensions of Temperament Scale--Revised (DOTS-R) has internal consistency coefficients, Cronbach alphas, for the 10 attributes as follows: activity level--general .84,

activity level--sleep .89, approach--withdrawal .85, flexibility--rigidity .78, quality of mood .89, rhythmicity--sleep .78, rhythmicity--eating .80, rhythmicity--daily habits .62, distractibility .81, and persistence .78 (Windle & Lerner, 1986a). In a study by Windle and Lerner (1986b) Pearson product-moment correlations for test-retest stability over a 6-week period were reported for the attributes as .75, .74, .69, .64, .63, .71, .72, .62, .64, and .59, respectively. In this study, the internal consistency coefficient, Cronbach alpha, for the total temperament scores was a .81, with subscale alphas ranging from .79 to .91.

Social competence outcomes were measured by assessing social problems with the Conners' Teacher Rating Scale-Revised (CTRS-R). It is a 59-item checklist answered on a 4-point scale by the teacher. This measure consists of nine subscales: oppositional, cognitive problems, hyperactivity, anxious-shy, perfectionism, social problems, Conners' Global Index, ADHD Index, and *DSM-IV* symptoms. Scale items were totaled into raw scores and a mean score was computed. These scores were treated as interval-level data, with higher scores reflecting more problem behaviors. These scales identify a variety of behavioral problems in children 4 to 12 years old. Studies indicate sufficient reliability and validity. Total reliability coefficients, Cronbach alphas, ranged from .88 to .95, and test-retest correlations ranged from  $r = .47$  to .88 on the nine subscales (Conners, 1997). In this study, internal consistency coefficients, Cronbach alphas, ranged from .69 to .96 on the nine subscales.

The Parenting Stress Index Short Form (PSI/SF; Abidin, 1990), a 36-item version of the original Parenting Stress Index, was administered to examine stability in maternal stress and effects on second grade social competence. Total scores were computed for the 36 items, higher scores reflecting more parenting stress. Scores for these Likert scale items were treated as interval level data in the final analyses. The PSI/SF has test-retest reliability of  $r = .84$  and alpha reliability of .91 for the total score (Abidin, 1990). Pearson correlations between the PSI/SF and the long form range from  $r = .68$  to .82 on the

subscales and .94 for the total stress score. For this study an internal consistency coefficient, Cronbach alpha, of .82 was obtained.

### Research Design

This study represents an assessment of second graders' social-behavioral development in relation to attachment at infancy, temperamental characteristics measured at both 18-months and in second grade, and maternal qualities including goodness-of-fit and parenting stress. There is no known intervention introduced between 18 months and second grade, so therefore the research design can be characterized as a longitudinal, developmental study, in which correlational relations were examined.

### Analysis of Data

Initial data analyses explored relations between dependent and independent variables. Pearson correlation coefficients were used to provide a picture of the univariate relations among the variables. Regression analyses were used to determine which relations among the several interrelated variables contribute to outcomes independently of the other variables. The variables that were included in this analysis were infant temperament, school-age temperament, temperamental goodness-of-fit, attachment, parenting stress at 18 months and in second grade, with social problems in second grade as the dependent variable.

Several statistical techniques were used to analyze data, depending on the level of measurement each instrument provides. Data analysis techniques were used to test the following hypotheses:

Hypothesis 1: Temperament remains stable from infancy through second grade. Correlations between temperament dimension scores at 18 months and dimension scores in second grade were examined.

Hypothesis 2: Goodness-of-fit, a similarity of second-grade temperament with mothers' expectations, is related to attachment security. Correlations between attachment scores at 18 months and goodness-of-fit scores in second grade were examined.

Hypothesis 3: Social problems of second graders are related to infant temperament and mother/child goodness-of-fit. Goodness-of-fit scores in second grade and temperament scores at 18 months were compared to social problem scores in second grade using correlation and regression analyses, with social problems as the dependent variable.

Hypothesis 4: Temperament together with attachment is related to social problems in second grade. Attachment and temperament scores at 18 months were compared to social problem scores in second grade using correlation and multiple regression analyses, with social problems as the dependent variable.

Hypothesis 5: Social problems of second graders are related to attachment and are mediated by maternal parenting stress. A partial correlation was computed to test the relation between attachment and social problems controlling for parenting stress. A series of regressions was also computed to test mediation as suggested by Baron and Kenny (1986). Susman-Stillman, Kalkoske, Egeland, and Waldman (1996) stated that "a mediator model attempts to discern why or how effects may occur rather than informing under what conditions an effect may occur. Thus, it gets closer to a causal explanation. A variable is considered to be a mediator when it accounts for all or part of the relation between the independent variable and the dependent variable" (p. 36).

Hypothesis 6: Attachment together with temperament, goodness-of-fit, and parenting stress in combination is related to social problems in second grade. Attachment,

temperament, goodness-of-fit, and parenting stress scores were compared to social problem scores in second grade using correlation and regression analyses, with social problems as the dependent variable.

Finally, a path analysis was used to explore the relations of all four predictor variables to the outcome of social problems in second grade. Figure 1 was used to guide these analyses.

## CHAPTER IV

### RESULTS

This chapter includes results obtained through analysis of several measures including the Attachment Q-sort, the Toddler Temperament Scale, the Parenting Stress Index, the Dimensions of Temperament Scale-Revised, and the Connors' Teachers Rating Scale-Revised. The measures utilized to investigate the research questions, as well as scoring procedures for each measure, were outlined in Chapter III. The results of each research hypothesis are presented in this chapter. Discussion of these results is presented in Chapter V.

#### Data Analysis

Frequencies, means, and standard deviations were calculated for all measures and are presented for each variable. Correlations and regressions were calculated to analyze the data. These analyses showed the relations among the variables of temperament, quality of mother-infant attachment, mother-infant goodness-of-fit, and social problems.

#### Number of Subjects per Analysis

The number of subjects used for each analysis varied due to incomplete measures at the 18-month assessment or attrition and noncompletion of measures at the second-grade testing. The maximum number of subjects was used whenever possible. A different  $n$  size was reported for each variable, with a minimum of 47 subjects and a maximum of 65 subjects. For correlation and regression analyses between 18-month variables and second-grade variables, only subjects with complete data on all variables were included. Thus, an  $n$  size of 58 was reported for longitudinal temperament correlations and an  $n$  size of 47 was reported for most regression analyses.



## Frequencies and Means

Means and standard deviations were calculated for all measures; the 18-month and the second-grade measures are listed in Table 1. Distributions of temperament scores, attachment scores, and infant parenting stress were fairly normal based on criterion of the mean plus or minus 2 standard deviations covering the range of scores. Distributions of social competence scores and parenting stress in second grade were positively skewed.

Table 1

Means and Standard Deviations for 18-Month and Second-Grade Variables

Variable	Mean	Std Dev	Range	n
<u>18-month variables</u>				
Attachment	.30	.18	-.20 - .75	64
Parenting stress	271.96	40.32	174.00 -344.00	51
Temperament (difficulty)	3.20	.47	2.03 - 4.27	65
<u>Second grade variables</u>				
Social problems	.44	.46	.01 - 2.15	65
Temperament (difficulty)	144.00	11.89	117.00 -179.00	58
Goodness-of-fit	58.41	15.21	26.00 - 89.00	58
Parenting stress (short form)	35.64	8.84	23.00 - 66.00	59

### Hypothesis Testing

Hypothesis 1: Temperament will remain stable from infancy through second grade. It was hypothesized that temperament scores at 18 months (as measured by the Toddler Temperament Scale) and temperament scores in second grade (as measured by the Dimensions of Temperament Scale--Revised) would be positively correlated.

The total difficulty scores had a weak correlation,  $r = .10$ , indicating that difficult temperament was not stable across time. Correlations of the temperament subscale scores at infancy and in second grade are shown in Table 2. The correlation between scores of rhythmicity at 18 months and in second grade was statistically significant,  $r = .36$ . The only other statistically significant correlation was the infant temperament subscale of approach with the second-grade temperament subscale of activity,  $r = -.26$ . This lack of association between variables was not expected. However, when correlations between temperament dimensions were computed for each sex, the results differed (see Tables 3 and 4). There were no statistically significant correlations on any of the subscales for the boys, but the girls had strong correlations on several subscales. For girls, rhythmicity at 18 months was correlated with rhythmicity in second grade,  $r = .43$ ; approachability at 18 months was correlated with approachability,  $r = .38$ , general activity level,  $r = -.38$ , and activity in sleep,  $r = -.49$ , in second grade. And activity level at 18 months was correlated with flexibility in second grade,  $r = -.41$ . In addition, six other correlations between infant and second grade temperament subscales were either significant or approached statistical significance for girls, while only two correlations even approached statistical significance for boys.

Hypothesis 2: Goodness-of-fit, a similarity of second-grade temperament with mothers' expectations, will be related to attachment security. The association between

Table 2

## Correlations Between Second-Grade and Infant Temperament Subscales

	Second-grade temperament						
	Activity	Active/Sleep	Approach/Withdraw	Flex/Rigid	Attention/Distract	Mood	Rhythm
<u>18-month temperament</u>							
Activity	.21	.13	.20	.12	.03	-.08	.04
Rhythmicity	.03	.06	.16	-.05	.20	.07	.36**
Approach	-.26*	-.22+	.12	.07	-.18	-.18	.02
Adaptability	.07	-.03	.13	.15	-.12	.12	-.14
Intensity	-.02	-.02	.05	.07	.09	.23+	.10
Mood	-.07	-.15	.22+	.05	-.02	-.10	-.01
Persistence	-.11	-.04	.13	.17	.14	.21	.01
Distractability	-.11	.07	.07	.14	-.16	.14	.05
Threshold	.18	-.05	.08	.14	-.01	-.12	-.19

(n = 58)

+p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

Table 3

## Correlations Between Second-Grade and Infant Temperament Subscales for Girls

	Second-grade temperament						
	Activity	Active/Sleep	Approach/Withdraw	Flex/Rigid	Attention/Distract	Mood	Rhythm
18-month temperament							
Activity	.34+	.24	-.21	-.41*	-.21	-.02	-.21
Rhythmicity	-.12	.14	.17	.13	.18	-.05	.43*
Approach	-.38*	-.49**	.38*	.18	-.14	.05	.14
Adaptability	-.06	-.07	.00	-.05	-.29	.33+	-.24
Intensity	-.05	-.01	-.20	-.02	.03	.40*	-.33+
Mood	-.10	-.10	.29	.31	-.02	.34+	.02
Persistence	.28	.24	.09	.16	.40*	-.13	.02
Distractability	-.20	-.18	-.14	-.06	.08	.19	-.06
Threshold	-.26	.16	-.04	.12	.19	-.06	-.23

(n = 28)

+p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

Table 4

## Correlations Between Second-Grade and Infant Temperament Subscales for Boys

	Second-grade temperament						
	Activity	Active/Sleep	Approach/Withdraw	Flex/Rigid	Attention/Distract	Mood	Rhythm
<u>18-month temperament</u>							
Activity	.09	.03	-.20	.02	.11	.10	-.12
Rhythmicity	.08	-.01	.14	-.18	.19	.04	-.31
Approach	-.04	.00	-.05	.08	-.15	-.18	.10
Adaptability	.10	-.01	.21	.23	-.03	.30	.07
Intensity	.21	-.02	.05	-.03	-.11	-.04	-.08
Mood	-.03	-.19	.18	-.07	-.02	.04	.04
Persistence	-.10	-.19	.16	.18	-.15	.25	-.01
Distractability	-.07	.33+	-.02	-.20	.24	-.13	.03
Threshold	-.35+	-.04	.17	.25	-.09	-.11	.20

(n = 30)

+p &lt; .10

attachment and goodness-of-fit was not statistically significant (see Table 5). This result does not support the notion that a similarity of children's temperament with maternal expectations is related to infant attachment formation. Goodness-of-fit and attachment are not related based on the weak association between the measure of infant attachment and the goodness-of-fit measure. Squaring the Pearson  $r$  value indicates that 3% of the variability in attachment scores was associated with maternal goodness-of-fit. When analyzed by gender, results were similar.

Hypothesis 3: Social problems of second graders will be related to infant temperament and mother/child goodness-of-fit. The relations of goodness-of-fit in second grade and temperament scores at 18 months were examined in relation to social problem scores in second grade using correlation and regression analyses. The social problem scores were the dependent variables. Results of the correlation analyses, reported in Table 5, and the regression analyses, reported in Table 6, indicate that infant temperament and goodness-of-fit scores are not associated with second-grade social problems. Results of the correlation (see Tables 7 and 8) and regression analyses by gender were similar.

Hypothesis 4: Temperament together with attachment will be related to social problems in second grade. Attachment and temperament scores at 18 months were examined with social problem scores in second grade using correlation and multiple regression analyses, with social problems as the dependent variable. Results of the correlation analyses, reported in Table 5, and the regression analyses, reported in Table 9, indicated that there was no association of temperament and attachment with social problems in second grade. However, when correlations were run separately for each sex, there was a strong association between infant temperament and second-grade social problems for the girls on four of the nine subscales of mood,  $r = -.41$ ,  $p < .05$ ; intensity,  $r = .38$ ,  $p < .05$ ; threshold,  $r = -.62$ ,  $p < .01$ ; and activity,  $r = .39$ ,  $p < .05$ . Girls with

Table 5

## Correlation Matrix of Measured Variables

	1	2	3	4	5	6	7
1. Attachment	...						
2. Infant temperament	-.59**	...					
3. 2nd-grade temperament	.03	.10	...				
4. Goodness-of-fit	.18	-.08	-.07	...			
5. Infant parenting stress	-.38**	.36**	-.15	-.34*			
6. 2nd-grade parenting stress	-.27*	.05	-.32*	.07	.36*	...	
7. Social problems	.04	-.16	-.41**	.26+	.06	.20	...

+p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

Table 6

## Summary of Regression Analyses Examining the Predictors of Infant Temperament and Goodness-of-Fit on Social Problems

Variable	B	SE B	B
Infant temperament (difficulty)	-.10	.12	-.11
Goodness-of-fit	1.98	.00	.25+

Note.  $R^2 = .08$ 

(n = 57)

+p &lt; .10

Table 7

## Correlation Matrix of Measured Variables for Boys

	1	2	3	4	5	6	7
1. Attachment	...						
2. Infant temperament	-.57**	...					
3. 2nd-grade temperament	-.08	-.02	...				
4. Goodness-of-fit	-.09	.00	.03	...			
5. Infant parenting stress	-.24	.30	-.12	-.48*			
6. 2nd-grade parenting stress	-.37*	.21	-.28	.08	.36+	...	
7. Social problems	.21	-.20	-.35+	-.23	.08	.26	...

+p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

bad moods, high intensity, low threshold, and high activity levels had more social problems in the second-grade. The subscales of persistence,  $r = -.32$ ,  $p < .10$ , and adaptability,  $r = -.35$ ,  $p < .10$ , approached significance as well. Activity,  $r = .32$ ,  $p < .10$ , was the only subscale that approached significance for the boys while none of the subscales were statistically significant. Boys with high activity levels had more social problems. Regression analyses were not significant when run separately by gender and showed no differences between boys and girls.

Hypothesis 5: Social problems of second graders are related to attachment and are mediated by maternal parenting stress. A partial correlation was computed to test the relation between attachment and social problems controlling for parenting stress when the child was in second grade. The association between attachment and social problems



Table 8

## Correlation Matrix of Measured Variables for Girls

	1	2	3	4	5	6	7
1. Attachment	...						
2. Infant temperament	-.58**	...					
3. 2nd-grade temperament	.03	.20	...				
4. Goodness-of-fit	-.30	.18	.08	...			
5. Infant parenting stress	-.27	-.11	-.24	-.21	...		
6. 2nd-grade parenting stress	-.13	-.27	-.37+	-.22	.34	...	
7. Social problems	-.21	.18	-.37+	-.32+	.10	.08	...

+p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

Table 9

## Summary of Regression Analyses Examining the Predictors of Attachment and Infant Temperament on Social Problems

Variable	B	SE B	B
Attachment	-.13	.38	-.05
Infant temperament (difficulty)	-.18	.14	-.18

Note.  $R^2 = .03$ 

(n = 63)

\*p &lt; .05

\*\*p &lt; .01

was low,  $r = .01$ . A series of regressions was also computed to test a path model with parenting stress as a mediator. The first regression tested the relation between attachment and social problems and found no significant association with a path coefficient of .04. The next regression tested the relation between attachment and parenting stress with social problems and found no significant association as well with a path coefficient of .01 for the path from attachment, although the path from parenting stress did approach significance with a path coefficient of .20. The third regression tested the relation between parenting stress and attachment with parenting stress as the dependent variable. Results of this regression analysis indicate that attachment is associated with parenting stress and is statistically significant with a path coefficient of  $-.27$ ,  $p < .05$ . Together these results indicate that although attachment is not associated directly with second-grade social problems, parenting stress may mediate attachment and social problems. Similar results were indicated for both boys and girls when these regressions were computed by gender.

Hypothesis 6: Attachment together with temperament, goodness-of-fit, and parenting stress in combination will be related to social problems in second grade. Attachment, temperament, goodness-of-fit, and parenting stress scores were examined with social problem scores in second grade using correlation and regression analyses, with social problems as the dependent variable. Temperament in the second grade was the single best predictor of social problems, reported in Table 10, with a statistically significant path coefficient of  $-.47$ ,  $p < .01$  and a statistically significant univariate correlation,  $r = -.41$  (see Table 5). Goodness-of-fit was also related to social problems with a statistically significant path coefficient of  $.32$ ,  $p < .05$ . When analyses were computed by gender, the results were similar for girls. Temperament in the second grade was also the single best predictor of social problems, with a path coefficient of  $-.65$ ,

Table 10

## Summary of Regression Analyses Examining Multiple Predictors of Social Problems

Predictor	B	SE B	B
Attachment	-.55	.39	-.22
Infant temperament	-.18	.16	-.18
2nd-grade temperament	-1.82	.01	-.47**
Goodness-of-fit	1.26	.01	.32*
Infant parenting stress	6.17	.00	.06
2nd-grade parenting stress	-3.76	.01	-.08

Note.  $R^2 = .28$

( $n = 47$ )

\* $p < .05$

\*\* $p < .01$

$p < .01$ , and goodness-of-fit was also a strong predictor, with a path coefficient of .60,  $p < .05$ . Both had statistically significant univariate correlations. For boys, the results of the regression analyses indicate that the best indicator of social problems was also second-grade temperament, and although the univariate correlation approached statistical significance, the path coefficient of  $-.26$ ,  $p > .10$ , did not. Finally, a path analysis was used to explore the relations of all four predictor variables to the outcome of social problems in second grade (see Figure 2).

As shown in Figure 2, the hypothesized path model structure of social problems and predictor variables was only partially supported. While temperament in the second grade was the only statistically significant first-order factor and, therefore, the only direct predictor of social problems, there were other indirect paths that were statistically significant. A series of regression models was used to explore the relations among mothers' reports of infant temperament, parenting stress, infant attachment security,

goodness-of-fit, temperament in second grade, and teachers' reports of social problems in second grade.

The first model (see Figure 3) used infant temperament as a direct path to temperament in second grade, with a path coefficient of .15, and indirect paths to second grade temperament from infant parenting stress through attachment, with a path coefficient of .05. The second model (see Figure 4) includes a direct path from infant temperament to goodness-of-fit, with a path coefficient of .01, and indirect paths from infant temperament and parenting stress through attachment to goodness-of-fit, with a path coefficient of .05. The third model (see Figure 5) was used to explore the indirect paths from infant temperament through second-grade temperament, parenting stress, attachment, and goodness-of-fit to social problems with a path coefficient of .23.

These models suggest that although the only first-order factor that contributes to social problems in the second grade is second-grade temperament, there appear to be other indirect influences on the development of problems. There are indirect effects of infant temperament, parenting stress, attachment, and goodness-of-fit on social problems.

The hypothesized path model structure was not supported for either boys or girls, but when indirect effects were calculated by gender, different paths indicated the strongest model for boys and girls. The best model for girls (see Figure 6) included the indirect paths from infant temperament through infant parenting stress, attachment, and goodness-of-fit to social problems, with a path coefficient of .32. The best model for boys (see Figure 7) included the indirect paths from infant temperament through infant parenting stress, attachment, and second-grade parenting stress to social problems, with a path coefficient of .29.

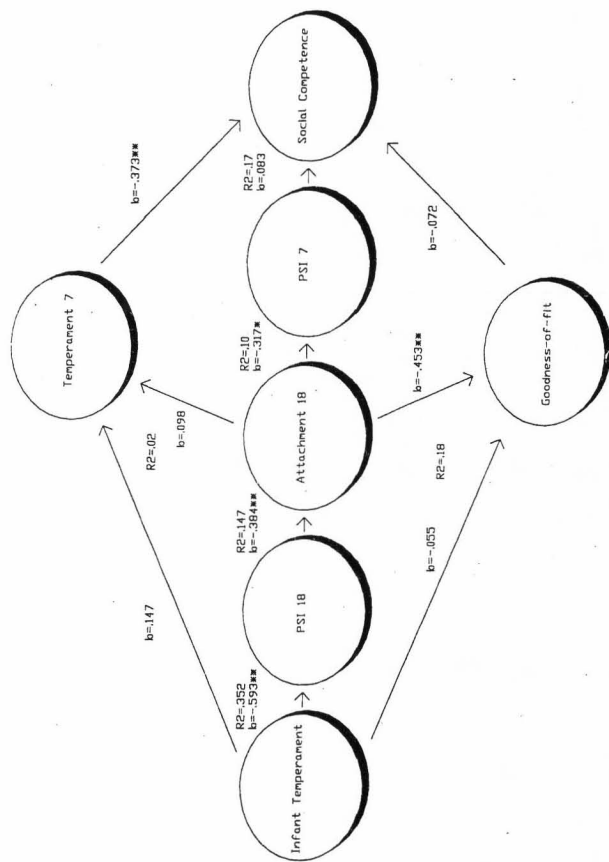
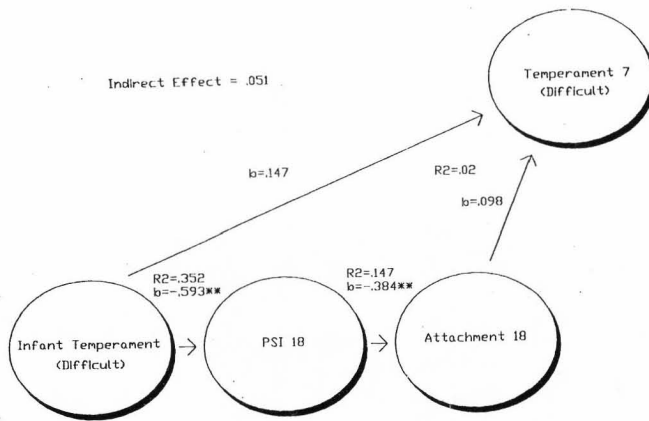
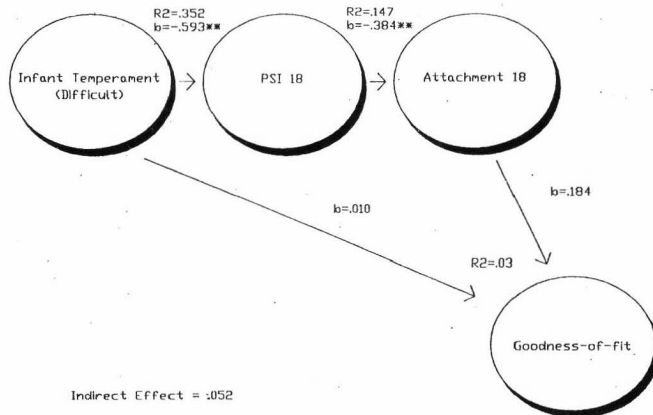


Figure 2. Path model coefficients.



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Figure 3. Model 1--Indirect effect on second-grade temperament.



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Figure 4. Model 2--Indirect effect on goodness-of-fit.

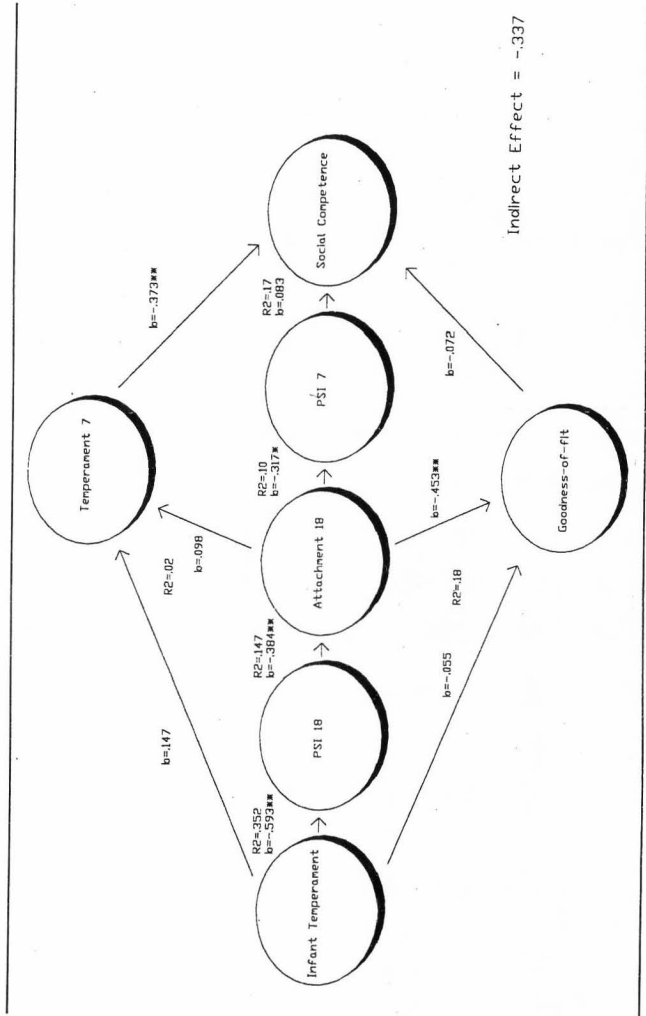


Figure 5. Model 3--Indirect effect on social problems.



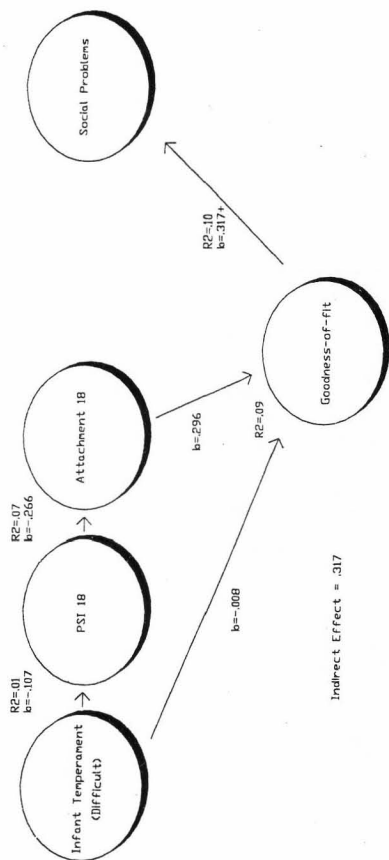
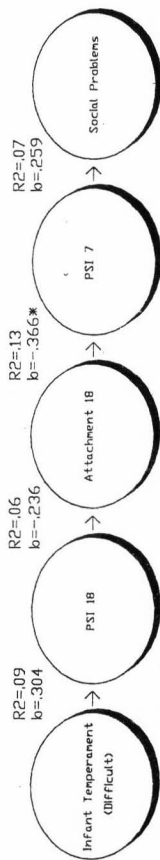


Figure 6. Path model for girls.



Indirect Effect = .289

Figure 7. Path model for boys.

## Summary of Results

The findings of this study are summarized as follows.

### Temperament

Overall temperament scores did not show stability. However, the rhythmicity subscales were highly correlated, and the infant approach subscale was moderately correlated with activity level in second grade. When tested separately by gender, several of the infant temperament subscales were highly correlated with the second-grade temperament subscales for the girls. It was also found that second-grade temperament was correlated with social problems. Infant temperament was correlated with parenting stress at 18 months, but not a good indicator of later goodness-of-fit between child temperament and maternal expectations.

### Attachment

Attachment was not related to social problems. However, attachment scores at 18 months were a good predictor of parenting stress in second grade, as well as goodness-of-fit and temperament in second grade. Attachment was also related to parenting stress and temperament in infancy.

### Social Competence

In general, infant predictor variables were not related to social problems in the second grade. The only variable that was correlated with social problems was temperament at the second-grade level. However, four of nine infant temperament subscales did predict social problems in second grade for girls only.

## CHAPTER V

### DISCUSSION

This chapter includes a discussion of the results obtained in this study and explores the involvement of infant temperament and attachment in relation to maternal goodness-of-fit and parenting stress to predict social problems in the school years.

#### Summary of Research Questions

Social competence is considered one of the most important areas of development for children's future relationships, as well as for other aspects of their lives (Cohn, 1990). It was hypothesized that attachment together with temperament, goodness-of-fit, and parenting stress in combination would be related to social problems in second grade. Temperament in the second grade was the only statistically significant correlate of social problems in second grade. These correlations are important because there were independent observers for the two measures; the second-grade temperament ratings were completed by the mother, and social competence measures were completed by the second-grade teacher.

When path models were analyzed separately by sex, it was found that different paths predict social problems for boys than those that predict social problems for girls. The strongest path for the boys was from infant temperament through infant parenting stress, attachment, and second-grade parenting stress to social problems. The best path for the girls was from infant temperament through infant parenting stress, attachment, and goodness-of-fit to social problems. Other studies have also found different influences on social competence for boys and girls and suggest that it may be due to different maternal interaction styles (Crockenberg, Jackson, & Langrock, 1996) or different developmental rates (Parke et al., 1997).

While most researchers believe that infant temperament influences the mother-child interaction, in turn affecting the formation of attachment, and that goodness-of-fit influences this transactional relationship, few if any have looked at how this group of variables influences school-age outcomes such as social problems. Those that have taken into consideration the influence these variables have on social outcomes individually have found mixed results. One positive finding for parents from this and other studies is that a difficult temperament in infancy is not a strong predictor of poor outcomes (Sanson, Oberklaid, Pedlow, & Prior, 1991). Failure to obtain many statistically significant associations between temperament, attachment, goodness-of-fit, and social problems may indicate that these associations are not direct. This can be further seen in the path model where the only direct effect on social problems was second-grade temperament, yet several indirect effects can be seen. This may suggest that influences on school-age social problems may be mediated by parenting stress. Surprisingly, second-grade temperament and goodness-of-fit predict social problems in the opposite direction of what was expected. The model suggests that poor fit between temperament and maternal expectations is related to fewer social problems reported by teachers. Few studies have looked at the influence of goodness-of-fit on social problems and none have found similar results. It may be that mothers are more responsive to difficult babies, thus leading to greater social competence. It is also possible that teacher/child goodness-of-fit is more important in regards to socially competent behaviors in school. Lerner and Lerner (1983) believe that goodness-of-fit may be associated with positive or negative mother-child interactions, depending on the mothers' expectations or values concerning the child's temperament.

Another hypothesis of this study was that infant temperament together with attachment would be related to social problems in second grade. This hypothesis was not supported by the data. Although numerous studies have found a strong relation between

attachment and social problems or between temperament and social problems, few studies have looked at the combination of the two in a longitudinal study such as this one.

Although the previous hypothesis was not supported, the hypothesis that social problems of second graders would be related to attachment as mediated by maternal parenting stress was supported. Attachment alone does not predict social problems, but when mediated by parenting stress there is an indirect relation. Previous studies have found that parents who reported problem behaviors in their 2-year-olds also rated higher on levels of parenting stress (Creasey & Jarvis, 1994). One explanation may be that disruptions in maternal behaviors due to high levels of stress may have a direct impact on the child's behaviors and functioning capabilities. An alternative explanation is that behavior problems associated with the child may influence the parents' perceptions of stress. Research indicates that parents experiencing high levels of stress put their children at risk for developing a number of behavior problems, including social and emotional difficulties (Downey & Coyne, 1990).

It was also hypothesized that goodness-of-fit would be related to attachment security. Findings did not support this assumption and it appears that a similarity of second-grade temperament with maternal expectations is not related to infant attachment. It may be that the mother's awareness of difficult temperament traits takes these differences into account through her adjustment in caregiving (Thompson, 1986). Research has found that mothers are more responsive to irritable babies (Crockenberg, 1986). This may lead to a secure attachment for babies that are not seen as "ideal" by their mothers.

One characteristic that may influence interactions and future social problems is that of temperament. A fourth hypothesis of this study was that temperament, along with goodness-of-fit, would influence second-grade social problems. This hypothesis was not supported, and although second-grade temperament was correlated with social problems,

there was no relation between infant temperament or goodness-of-fit and second-grade social problems. Lerner and Lerner (1983) attributed a lack of association between temperament, goodness-of-fit, and outcome measures to an incidence where the same temperament attribute may be associated with either positive or negative mother-child interactions, depending on the mothers' expectations or values concerning the attribute. Infants that exceed their mothers' expectations, as well as infants that are seen as extremely challenging, are considered a poor fit. It may be that mothers with children that are less demanding than was expected have positive outcomes washing out the effects of those children with a poor fit due to difficult temperaments.

When correlations were computed separately by sex, the relation between infant temperament and social problems was strongly supported for girls. Four of the infant temperament subscales were related to social problems in the second grade and two other subscales along with the difficulty score approached significance. And although none of the temperament subscales were significantly associated with social problems for boys, their difficulty score also approached significance. It may be that there should be different definitions of social problems for males and females. Or this may be due to a difference in maternal interactions between boys and girls. Crockenberg (1986) indicated that mothers are more responsive to female babies than they are to male babies. Other studies have also reported a difference in caregiving for boys and girls (Crockenberg, 1986; Maccoby et al., 1984).

Temperament was hypothesized to be stable from infancy to second grade, but most correlations between infant and later temperament in this study were not statistically significant. The findings of this study conflict with previous studies, which found that temperament was stable from infancy to age 8 in six of eight subscales tested, with approach and rhythmicity showing the highest stability (Pedlow, Sanson, Prior, & Oberklaid, 1993). Although the results of the present study also found that rhythmicity

was stable and approach in infancy was moderately correlated with activity level in the second grade, these results did not indicate stability in any other subscales. Subscales differed and thus could not be directly compared. Temperamental stability findings may have been affected if these temperament measures were incompatible. In the New York Longitudinal Study, Thomas and Chess (1977) reported modest year-to-year correlations from around .15 to .35 for temperamental stability from age 1 to 5 for activity, adaptability, threshold, intensity, and mood. They found even weaker correlations for the subscales of approach and persistence.

Temperament subscales were also tested separately by sex, because there is suggestion in the literature that gender influences temperament subscales and difficulty ratings (Garcia Coll et al., 1992), as well as outcomes related to temperament such as social problems (Parke et al., 1997). Results were different from those found for the combined group. The girls had strong correlations on several subscales. For girls, rhythmicity and approachability were found to be stable from infancy to second grade, and the subscales of mood and activity approached statistical significance for stability. In addition, girls' approachability at 18 months was correlated with general activity level and activity in sleep in second grade, and their activity level at 18 months was correlated with flexibility in second grade. However, only two subscales even approached significance for the boys. These findings are supported by previous research that has found that temperament characteristics of girls appear to be more stable than those of boys (Garcia Coll et al., 1992; Stevenson-Hinde & Hinde, 1986).

Although most temperament theorists believe that temperament is a heritable, relatively stable behavioral style, they also agree that it can be influenced by the environment as well as by reciprocal interactions between the individual and others (Goldsmith et al., 1987). Hubert, Wachs, Peters-Martin, and Gandour (1982) presented a meta-analysis of temperament studies and reported correlations from .20 to .50. Several



studies of temperamental stability in infancy reported weak correlations of stability at .20 and under and have viewed the instability of their findings as a result of developmental and environmental influences (Field, Vega-Lahr, Scafidi, & Goldstein, 1987; Hagekull & Bohlin, 1981). Pedlow et al. (1993) stated that, according to Thomas and Chess (1977), "temperament is viewed as being expressed differently at different ages depending on the changing behavioral repertoire of the child" (p. 1005). Thompson (1986) stated that "the manifestations of temperament attributes are likely to change as they interact with environmental demands" (p. 38). Several studies have concluded that temperament is a fairly malleable behavioral style in the first year that becomes increasingly stable and predictable towards the end of the second year (Lee & Bates, 1985; Matheny, Wilson, & Nuss, 1984; Pedlow et al, 1993). Goldsmith and Campos (1986) believe that developmental and maturational changes along with genetics are among a few of the potential influences on temperament development and that temperament is both modified and influenced by social interactions. The results of this study may have been affected by the developmental changes that have occurred between 18 months and 7-8 years or changing environmental influences, but the use of different scales for the infant and school age testing may have also influenced the results.

#### Strengths and Limitations

Two strengths of the current study are its longitudinal design and its use of reliable and valid measures, both of which contributed to the validity of the current findings. There are several limitations to this study.

One limitation is limited sample size due to attrition. Only 91 infants began the study and although this was a longitudinal study, only 65 subjects were involved in the follow-up, which is a relatively small sample size. This study is also comprised of a convenience sample, and thus the subjects were not randomly selected. These factors limit

generalizability of the results. Also, the small sample size limits power, especially in complex analyses of path models for separate genders.

Another limitation is the characteristics of the sample. This study represents a fairly homogenous group of White, middle class, intact families. There were no minorities represented, and, as infants, all subjects came from two-parent households. This sample population limits the generalizability of results to other populations. Future studies should examine the same constructs with lower socioeconomic and ethnically diverse groups.

With the exception of one family, where the mother was deceased, the study was comprised solely of maternal report. This may imply that mothers are the only caregivers who impact the child's development. Future studies should include fathers and other caregivers associated with the child.

One significant limitation of this study is the use of different temperament scales for the infant and school ages. Although a difficulty rating was obtained for both scales, subscales differed and thus could not be directly compared. The temperament scales were developed by different researchers and with different age groups. Temperamental stability findings may have been affected if these temperament measures were incompatible. The strongest findings for stability of temperament have been those that use direct observations of temperament as opposed to parent questionnaires. To examine stability of temperament, future studies should use direct observation to rate temperament when possible.

Finally, the use of maternal report for temperament and attachment ratings may have biased the results due to maternal personality, attitude, behavior, or a response to the mother-infant interaction. Future studies should incorporate stronger and possibly multiple measures, such as the Ainsworth's Strange Situation and observational temperament ratings or ratings by others who know the child, such as another parent or a teacher.

## Conclusion

This study examined the possible relations among several variables, including temperament, quality of mother-infant attachment, mother-infant goodness of fit, and social problems. The finding of both direct and indirect effects of temperament on social problems and indirect effects of parenting stress, attachment, and goodness-of-fit on social problems partially validates the model as seen in Figure 1 and encourages further examination of the multiple variables involved in the development of social problems. The results suggest that temperament is not stable from infancy to second grade, yet when examined separately, girls show stability in five of the nine subscales. These results suggest characteristics of the infant and the mother-infant relationship in infancy have only indirect effects on how the children function later in childhood and that different paths for boys and girls may predict social problems. However, the personality or temperament of the child during the school years, even if not stable from infancy, influences how well a child adapts in a school environment.

It appears that the mechanisms of temperament and attachment in infancy do not influence the second-grade measures. It seems to be more important to focus on second-grade temperament traits and parenting stress, as they have been shown to be more influential on second-grade social problems than any of the infancy variables. We are only beginning to understand the influence of temperament and mother-infant interactions on school-age social competence. Future research should examine these influences further, but may need to focus on temperament and parenting stress during the school years. It is also important to get a better understanding of the role of temperament in an educational context by looking further into school-age social competence, focusing on teacher/child fit, as well as mother/child fit.

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## APPENDICES

## Appendix A:

## Institutional Review Board Information



UTAH STATE UNIVERSITY · LOGAN, UTAH 84322-1450

OFFICE OF THE VICE PRESIDENT  
FOR RESEARCH  
Telephone (801) 750-1180

MEMORANDUM

TO: Dr. Lori A. Roggman  
FROM: Sydney Peterson *SP*  
DATE: February 20, 1991  
SUBJECT: Institutional Review Board Approval

The following proposals were reviewed by the Institutional Review Board: (1) "Children's Responses to Peers' Clothing;" (2) "The Effects of Physical Appearance on Others' Expectations and Preferences;" (3) "Temperament and Attractiveness as Predictors of Children's Selection as Observation Subjects by Undergraduate Students;" and (4) "Parent-Toddler Plan in Relation to Mother-Infant Attachment and Cognitive Abilities." The Institutional Review Board members requested that some of the basic elements of informed consent be included, particularly with regard to the photographs and videotapes that will be taken of children. You need to clarify for parents where the current photos will be used, how long they will be used, if they are for the current study only or for further research and training purposes, and if they will be destroyed upon completion of the study. The informed consent forms should also include: (1) a list of each procedure to be used in the study (no checklist); (2) withdrawal from the project without penalty (withdrawal should include withdrawal of photos and videotapes); (3) the expected duration of the subject's participation; and (4) the name of the institution and phone number of the principal investigator. The proposals were approved with the above changes. Please call me at 750-6924 if you have any questions.

**Utah State**  
UNIVERSITY

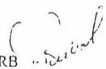
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March 2, 1998

## MEMORANDUM

TO: Lori Roggman  
Gina Cook

FROM: True Rubal, Secretary to the IRB



SUBJECT: Temperament, Attachment and Parenting Stress in Infancy: Relations to Social Competence of Second-Graders

The above referenced proposal was reviewed and approved by the IRB. You may consider this letter to be your approval for your study.

Any deviation from this protocol will need to be resubmitted to the IRB. This includes any changes in the methodology of procedures in this protocol. A study status report (stating the continuation or conclusion of this proposal) will be due in one year from the date of this letter.

Please keep the committee advised of any changes, adverse reactions or the termination of this study. I can be reached at x71180.



## Appendix B:

## Informed Consent Form



COLLEGE OF FAMILY LIFE  
Office of the Dean  
Logan, UT 84322-2900  
Phone: (801) 797-1536  
Fax: (801) 797-3845

CONSENT FORM  
PARENT-TODDLER FOLLOW-UP STUDY

You and/or your child are invited to participate in a follow-up study of how early development is related to how well children are doing in the school years. We are inviting subjects to participate who were in our Parent-Toddler play study as infants.

If you decide to participate, we will be asking you to:

1. answer questions about you (family demographic information, parenting practices, parenting stress, temperament).
2. answer questions about your child (temperament, behavior).
3. give permission to contact your child's school teacher for getting information about your child (behavior, social skills) and standardized test scores (state testing).
4. give permission to test your child's reading and math and ask questions about self-perceived competence and acceptance.

There are no risks or discomforts in any of these procedures, and it is likely to be interesting for both you and your child.

Any information obtained in connection with this study that can be identified with you or your child will remain confidential. All forms, questionnaires, and data files will be labeled by an ID number only (no names) and kept in a locked cabinet in a locked room. Reports based on this data will include group summary information and will not include information that could be identified with any individuals. Only the Principal Investigator and trained researchers will have access to the data. After all data are entered, analyzed, and printed in hard copy form, the original forms will be destroyed.

Your decision whether or not to participate will not affect your (or your child's) future relations with Utah State University.

If you have any questions, Dr. Roggman of the Department of Family & Human Development at USU (797-1544), will be happy to answer them. You may have a copy of this form to keep. Your signature indicates that, having read the above information, you have decided to participate. You may withdraw your permission to participate at any time without penalty.

Your Signature \_\_\_\_\_ (print name) \_\_\_\_\_

Researcher's Signature \_\_\_\_\_ Date \_\_\_\_\_



Family and Human Development  
Human Environment  
Apparel Merchandising  
Consumer Sciences  
Family and Consumer Sciences Education  
Interior Design  
Fashion and Textile Sciences

# Utah State UNIVERSITY

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## PERMISSION TO CONTACT SCHOOL AND TEACHER

As the parent of (child's name) \_\_\_\_\_,  
I give my permission for researchers working for the Parent-Toddler Follow-Up study at  
Utah State University to contact my child's school teacher and to test my child.

Teacher \_\_\_\_\_

Grade \_\_\_\_\_

School \_\_\_\_\_

City \_\_\_\_\_

School District \_\_\_\_\_

Parent's Name \_\_\_\_\_

Parent's Signature \_\_\_\_\_



Family and Human Development  
Human Encounters  
Applied Skills Learning  
Customer Service  
Family and Consumer Sciences Education  
Service Design  
Research and Field Services