

## ABSTRACT

Title of Document: PATHS TO COMPLIANCE: DIFFERING  
INFLUENCES OF MATERNAL BEHAVIOR  
IN TEMPERAMENTALLY FEARFUL AND  
EXUBERANT INFANTS

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The goal of this study was to describe the expression of compliance in temperamentally positive and negatively reactive children and the factors that contribute to individual differences in expression of compliance within and between these groups. As part of a larger project examining temperament over time, 244 infants and their mothers were evaluated at 9- and 36-months of age. At 9 months of age, maternal responsiveness and sensitivity (see Kochanska, 1998) were evaluated and infants underwent the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith and Rothbart, 1999), while mothers and infants were jointly evaluated for expression of mutually positive affect (Kochanska, 1998). At 36 months, maternal discipline and child compliance were observed in the home (see Kochanska & Aksan, 1995).

Regardless of temperament, children displayed more situational compliance during a forbidden toy paradigm as compared to a clean-up context. During

forbidden toy, temperamentally positive children displayed more situational compliance than their negative counterparts, while no such differences were found during clean-up.

Structural equation modeling techniques revealed differential contributors to the display of compliance based on child temperament and context of interaction. During clean-up, no direct contributors to the display of compliance were found for temperamentally positive children; however avoidant behavior on the part of the child led to suboptimal maternal behavior. For temperamentally negative children, approach behaviors were associated with more optimal maternal behavior. Maternal responsiveness led to increased situational compliance for these children.

In the forbidden toy context, the path from avoidance to affect was significant and negative for both temperamentally reactive groups. For temperamentally negative children, increased avoidant behavior was associated with decreased gentle discipline, while approach behaviors were associated with increased gentle discipline. Additionally, any type of discipline, gentle or punitive, was significantly, negatively predictive of committed compliance.

For temperamentally positive children, displays of avoidance decreased displays of mutually positive affect. Also, use of gentle discipline was significantly, inversely related to child displays of committed compliance, as well as significantly, positively related to their displays of situational compliance. Discipline also mediated the relation between affect and compliance, as well as responsiveness and compliance, for the temperamentally positive group.

PATHS TO COMPLIANCE: DIFFERING INFLUENCES OF MATERNAL  
BEHAVIOR IN TEMPERAMENTALLY FEARFUL AND EXUBERANT  
INFANTS

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## Dedication

It has most certainly taken a village to help me complete this project. Therefore this work must be dedicated to all those who have helped me see this through to its end. Most of all, I dedicate this to my children- Nole Robert and Quinn Xavier. They have taught me more about child development and maternal behavior than I could have imagined. They are my living dissertation. I hope that someday they may pursue their dreams, whatever they may be, as I have- learning how to balance all aspects of their lives. Most importantly, I hope that they find their passion and follow it with all their ability; always remembering to be gentle with all things, most of all themselves.

I also dedicate this to my mother, Yvonne Alwin Hack. She was, and still is, an inspiration. It was her life as a woman, wife, and mother that I inspire to emulate. She taught me that while it may look like you can 'have it all'; you must remember what is most important and never put it second. Through all of life, we start and end with family. Thanks Mom.

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## Chapter 1: Theoretical Rationale

The capacity to behave in socially appropriate ways has been theorized to be the hallmark of successful socialization (Kochanska, 1993). Compliance with parental directives is an early-occurring and meaningful index by which socially appropriate behavior can be gauged (Kopp, 1982; Kuczynski & Kochanska, 1990; Maccoby & Martin, 1983). Differences in the development of compliance have traditionally been studied as a product of the environment, resulting from the quality of the mother-child relationship in particular. Researchers have found that high levels of shared positive affect (Kochanska & Aksan, 1995), synchronicity and flexibility (Rocissano, Slade, & Lynch, 1987), and maternal responsiveness (Goin & Wahler, 2001) are associated with increased compliance.

There is emergent evidence to suggest that temperamental reactivity is also an important correlate of compliance. It has been conceptualized that temperamental traits, specifically fearfulness or lack of fearfulness, are contributors to internalization of societal standards (Kochanska, 1993). Maternal behaviors characterized by high levels of warmth and sensitivity have been shown to predict increased levels of compliance, especially in temperamentally fearless children. For fearful children, gentle discipline, and not warmth and sensitivity, was associated with increased compliance (Kochanska, 1995). Moreover, it has been suggested that temperament may influence compliance by its influence on parenting behaviors, and other aspects of individual functioning (e.g., regulation) (Stifter, Spinrad, & Braungart-Rieker, 1999). The purpose of this study was to examine the influence of maternal behaviors on compliance within the framework of individual differences in temperament.

The current study begins with the premise that groups of children are qualitatively dissimilar from one another based in part due to differences in temperament. This categorical differentiation therefore begets differing interactions with the caregiver and, in turn, variant pathways to compliance. The developmental pathways to compliance behavior at 36 months were evaluated in each group of temperamentally different children, temperamentally negative (fearful) and temperamentally positive (exuberant). Specifically, the study examined differential influences of and interactions between temperamental reactivity, specifically displays of approach and avoidance at 9 months of age, and maternal behaviors (sensitivity, responsiveness, and dyadic affect) at 9 months, and maternal discipline at 36 months in each group of children as they predicted compliance and noncompliance.

## Chapter 2: Review of Literature

### 2.1 Compliance

Over the past several decades, several theories regarding the processes of socialization have been postulated. It is increasingly evident that parent-child interactions involve circular, reciprocal processes (Kochanska, 1993; Maccoby & Martin, 1983). In their review of maternal responsiveness and child compliance, Parpal and Maccoby (1985) outline the history of theories regarding compliance and discuss the placement of such theories within the current examinations of socialization. The authors specifically discuss three main theories of compliance: Reinforcement theory, social deprivation theory, and reciprocity theory. This section will follow the format put forth by Parpal and Maccoby (1985), examining the same theories detailing the history of socialization and compliance.

#### 2.1.1 Historical theories of compliance

Reinforcement theory suggests that compliance is the outcome of punishment and reinforcement in an operant conditioning fashion. The goal of behavior under this theory is for a child to feel pressured to please a parent and follow the parent's directives under fear of retribution. Punishment is used to diminish noncompliant behaviors while positive reinforcement strengthens the targeted behaviors, specifically seeking to increase child obedience. To avoid punishment, the child follows parental requests and is therefore considered to be compliant.

Patterson's coercion hypothesis (1982) examines the controlling nature of children's deviant behavior and suggests that such behavior gives children power within



the parent-child relationship. By behaving in defiant ways, the child manipulates (coerces) the parent into decreasing the demands place upon the child, in effect wearing the parent down and winning the parent-child battle for control. Control is won only when one member of the relationship acquiesces to the other; thereby losing the battle for power. Given the physical and social inequalities between parent and child, the child would have no choice but to surrender their power or face the consequences of defiance. Patterson therefore expresses that punishment is effective in curbing deviant behavior because the child will, most likely, want to avoid a reoccurrence of such consequences and, as such, relinquish power to the parent.

In contrast, Wahler (1976) stressed the role of positive reinforcement in shaping deviant behavior. By attending to a child's disobedience, Wahler (1976) suggests that a parent will reinforce such behavior and thus lead to an increase in the behavior and a decrease in child compliance. Additionally, Wahler suggests that if a parent gives positive reinforcement to acts of compliance, the child will adopt a prosocial approach (Wahler, Herring, & Edwards, 2001; Wahler & Meginnis, 1997). In opposition to Patterson's view stressing the squelching of child disobedience through punishment, Wahler examines the other side of operant conditioning, postulating that if a parent were to ignore inappropriate or unwanted behavior as well as to reward the desired action, socialization of the child will be successful.

Social deprivation theory describes compliance as an outcome of motivational state (see Maccoby & Masters, 1970). Social deprivation, according to this theory, increases affiliation motivation. With this increase in social relations as the goal, social deprivation serves to orient the child towards others and increases the child's readiness to

please those around them (Parpal & Maccoby, 1985). In his examination of love withdrawal, Hartup (Hartup, 1958) paralleled Maccoby's social deprivation with love withdrawal and stated that the efficacy of non-nurturance was seated in generating anxiety in the child. This could be due to the fact that such deprivation, or lack of nurturing behavior from a caregiver, undermines the very core of attachment relationships deemed to be so important in childhood; the security of the parent-child bond, thereby supplying a greater motivation for the child to gain reassurance from a caregiver/adult (Hartup, 1958).

The final theory that has been applied to the development of compliance is reciprocity theory. This theory has been discussed in seminal papers on mother-child interaction (Maccoby & Martin, 1983) and is the foundation of current applications and investigations of the development of conscience, or internalized societal standards of behavior (Kochanska, 1991, 1993; Kochanska & Aksan, 1995). Reciprocity theory stresses the contribution of the parent-child relationship to the development of the child and, as will be discussed in depth in relation to Kochanska's model of conscience development, has evolved into contemporary theory regarding socialization.

Both reinforcement theory and social deprivation theory, while excellent investigations of the top-down approach to socialization, have several hindrances when trying to place them within the bidirectional framework of contemporary research. Reinforcement theory, while appropriate for the time in which it was examined, needs to now be expanded upon. This theory evaluates obedience as a target behavior while developmentally appropriate noncompliance has been overlooked. While some believe noncompliance to be a cycle of coercive interactions that is maintained by parents'

unsuccessful management of their children's behavior (Patterson, 1982), it has been suggested that non-aversive noncompliance that is not directly contradictory to parental requests (e.g., negotiation, bargaining) can be a positive function of social development. Non-aversive noncompliance aids in providing a context within which a child can assert autonomy within the parent-child relationship (Kuczynski, Kochanska, Radke-Yarrow, Girmuis-Brown, 1987). Additionally, noncompliance can assist the child in developing social skills and strategies they can use to express such autonomy in a socially appropriate manner (Kuczynski et al., 1987).

Social deprivation theory, from an attachment perspective, has numerous problems as well. According to attachment theory, the core of a child's social development and understanding about relationships is rooted within the parent-child relationship (Ainsworth, Blehar, Waters, & Wall 1978). If a parent is unresponsive to a child's needs, the child is at risk for developing an insecure attachment bond with that parent. Such bonds are constructed and represent internal working models of the attachment figure as insensitive and of the self as unworthy of care (Main, Kaplan, & Cassidy, 1985). These beliefs, in turn, can affect other relationships that the child may have throughout his or her lifetime. By withdrawing positive social interactions from a child's relationship with the parent in hopes of increasing child compliance, the very foundation of the parent-child relationship may be threatened.

Reciprocity theory, while not as explicitly examined as the other two theories, holds the most promise for understanding the development of compliance within the framework of the parent-child relationship. Researchers such as Kochanska have taken

reciprocity theory and modeled the development of conscience in childhood based on the belief of contributions from the parent-child relationship.

#### 2.1.2 Kochanska's model of the development of conscience

Implicit in current research examining the development of compliance in children is the view that socialization is a process. Over the first several years of development, there is a gradual shift from external regulation of behavior (i.e., by parents) to internal regulation by the child (Kochanska, 1993). Such a shift has been stated to be the hallmark of successful socialization and illustrates a child's ability to conform with society as well as to restrain impulses to act, even in absence of parental supervision (Kochanska, 1993).

In her model of the development of conscience, Kochanska stresses the importance of individual differences in child development, specifically the contribution of child temperament. In her theory, Kochanska outlines two possible modes of socialization, affective discomfort and behavioral control, each of which may be influenced by a child's temperament (Kochanska, 1993). Specifically, individual differences in a child's temperamental propensity to experience anxiety or fear are related to the child's emotional upset experienced by committing a transgression, while that same child's inhibitory control is associated with behavioral control to act within societal standards of behavior (Kochanska, 1993). A parent using psychologically based discipline, designed to elicit a child's experience of arousal, fear, deviation anxiety, and/or guilt in response to a transgression may increase the probability of a child displaying compliance behavior. If the child is especially sensitive to affective discomfort, the experience of such emotions will, in turn, lead the child to comply with

the demands to modulate this state of arousal. Over time, this obedience will be internalized and the child will act in a compliant fashion by their own accord (Kochanska, 1991). According to this view, for parents to effectively assist their children in the development of conscience, parents must be able to understand a child's emotional arousal level and effectively modulate it so that the child's state is optimized for compliance.

The behavioral control mechanism of the development of conscience (Kochanska, 1993) involves the child's ability to physically resist forbidden actions and exercise self-restraint. Following from this restraint of desired action, is the child's ability to perform a demanded action. Kochanska (1993) states that compliance encompasses the child's ability to resist temptation of a forbidden impulse, but also to modulate frustration and delay gratification to carry out an action consistent with maternal standards.

### 2.1.3 Obedience and the delineation of compliance

An important point to recognize when evaluating child compliance behavior is that Reciprocity theory, as well as Kochanska's approach, distinguishes between obedience and compliance. The former is viewed as compliance based on situational factors and the fear of punishment (Maccoby & Martin, 1983), while the latter demonstrates an individual readiness to accept parental influence as long as the child believes it is part of a reciprocal relationship (Parpal & Maccoby, 1985). Piaget and other theorists have long emphasized that young children may conform to behavioral norms due to external parental control but this conduct, although compliant, is not internalized and cannot be deemed "moral" (Kochanska & Aksan, 1995). The simple evaluation of parental teaching (e.g., "please clean up the toys now so we won't lose

them/they won't get broken") only allows for the examination of child obedience, rather than internalized values regarding rules and norms. The steps leading to moral behavior and internalized values have delegated compliance as an antecedent to such later, advanced behaviors (Gralinski & Kopp, 1993). Investigation of child behaviors cannot therefore simply evaluate whether the child follows parental requests but must also evaluate the internalization of such requests; the level at which the child demonstrates that they believe such requests fall within their own framework of values.

Compliance has been detailed as a multifaceted phenomenon that involves varying underlying levels of motivation (Kochanska & Aksan, 1995). Children may feel motivated to accept or reject parental directives and they may do so with varying degrees of internalization of given agendas (Kochanska & Aksan, 1995). Compliance, as a general concept, is an intermediate step between simple obedience and general internalization of rules when a parent is absent (Kochanska, 2002). Therefore, qualitative differences between types of compliance and noncompliance may be linked to varying outcomes of socialization, such as the display of externalizing problems versus socially competent behavior.

Kochanska and Aksan (1995) outline several types of compliance and noncompliance reflecting differing levels of motivation to accept parental agendas. The first type, *committed compliance*, is a wholehearted embracing of parental directions and reflects an eagerness to adopt the parent's values as their own. This type of compliance is illustrated by behaviors reflecting the internalization of parental values (Kochanska & Aksan, 1995). *Situational compliance*, in contrast, is compliance driven by external forces (i.e., parental pressure). This type of behavior reflects submission to authority

demands rather than internally driven action (Kochanska & Aksan, 1995). While there are other modes of behavior that, while noncompliant, are not aversive (e.g., negotiation, passive noncompliance/selective deafness), the difference between committed compliance and situational compliance is most reflective of the distinction between compliance and obedience.

#### 2.1.4 Influence of the parent-child relationship

Contemporary work examining the development of conscience and compliance does not separate the interactive influences of both parent and child on a child's social development, although this was not always the case. Internalization of values has, as of late, been outlined as a complex occurrence that integrates multiple developmental domains including parent-child interaction, a child's information processing skills, child temperament, and the ecology of development (Kochanska, 1994). Even so, most existing literature focuses on the contribution of parents and the parent-child relationship.

While most contemporary researchers would agree that both parent and child contribute to the existing relationship, present research debates what specific behaviors of parents lead to children acting in an internalized, compliant fashion. Kochanska believes that the beginnings of internalization are in early affective communication; using techniques designed to elicit a child's anxiety, such as control, punishment, expression of negative affect in response to transgression, etc. as well as positive techniques designed to motivate the child to identify with parental values (Kochanska, 1993; Maccoby & Martin, 1983).

Hallmark to Kochanska's writings on conscience development is the concept of mutually responsive relationships between parents and their children (Kochanska, 2002;

Kochanska & Murray, 2000). Mutually responsive mother-child dyadic relationships are characterized by mutually binding, cooperative, affectively positive interactions (Kochanska, 2002; Kochanska & Aksan, 1995). Such relationships are believed to foster the development of conscience insofar as children who grow up with parents who are pleasant to interact with and who are also responsive to their needs develop an approach to interactions with caregivers that are generally pleasant and adopt a more willing, acceptance of parental influence and values (Kochanska, 2002). Such children are then more likely to not only follow parental directives but to internalize them as their own belief systems as well (Kochanska, 2002). Dyads with high levels of “mutually responsive orientation” (MRO; Kochanska & Murray, 2000) included children who were more likely to demonstrate higher levels of “internalized conscience” (complying with rules without supervision) as compared to dyads with lower MRO (Kochanska & Murray, 2000). Children who develop in an environment of mutually responsive interactions are anticipated to behave in a more prosocial manner because the interactional history of the dyad reflects the child’s emerging working model of cooperation and reciprocity within a mutually accommodating relationship; where parents help each other without decreasing an individual’s autonomy (Kochanska, 2002). While not all studies found support for the affect of antecedent parenting, concurrent relations between parenting and compliance are rather consistent (see van der Mark, Bakermans-Kronenburg, & van IJzendoorn, 2002).

#### 2.1.5 Influence of specific parenting behaviors

The first component of parental (maternal) behavior that is needed for a child to internalize values is appropriate parental interaction with the child (*responsiveness and*



*sensitivity*). Westerman (1990) postulated that child compliance may be promoted by parental interactive behaviors that are well coordinated with child actions. The relational synchrony of the parent-child relationship may increase compliance through the continual exchange of actions and understanding of intentions between the parent and child. The author also stated that effective scaffolding (support or guidance a parent or caregiver provides to demonstrate appropriate behavior for a child) and sensitivity leads to increased child willingness to comply (Lehman, Steier, Guidash, & Wanna, 2002; Westerman, 1990), thus demonstrating the need for structure, yet not control, within the parent-child relationship.

Empirical studies have demonstrated that maternal interactive behavior facilitates child compliance because it makes it possible for the child to be involved in the mother-child relationship. In infancy, researchers have found that early obedience is associated with a mother's sensitive responsiveness to her child (Stayton, Hogan, & Ainsworth, 1971). Westerman and Havstad (1982) found that appropriate maternal responsiveness that increases interaction within the dyad lead to increased compliance. Martin (1981) also found that increased interaction between mother and child that was specifically in response to a child's bid for attention, as well as decreased interaction when a child was not requesting it, led to increased compliance. Such maternal interaction creates the opportunity for the mother to reward good behavior and may prevent the child from seeking attention in negative ways. Additionally, children of mothers who were highly synchronous in their interactions with their child have children who are more compliant (Rossiano, Slade, & Lynch, 1987). Moreover, maternal responsiveness alone accounted for 46% of the variance in child compliance (Goin & Wahler, 2001). Responsive and

gentle parenting in toddlerhood has directly predicted internalized conscience in childhood, although this finding was only true for securely attached children (Kochanska, Aksan, Knaack, & Rhines, 2004), while Secure attachment itself, rooted in responsive, sensitive interactions, was a direct predictor of compliance directly in toddlerhood (Londerville & Main, 1981). These findings illustrate that mother-child interaction must not only occur, but that it must be attentive (Martin, 1981), appropriate, and in tune with the child's behavior (Strand, Wahler, & Herring, 2001). Such a conclusion demonstrates that compliance is a form of reciprocity designed to sustain maternal attunement to child's current behavior and promote dyadic functioning (Bugental & Goodnow, 1998; Frankel & Bates, 1990; Matas, Arend, & Sroufe, 1978).

In addition to mutually responsive, synchronous interaction, *positive affect*, either child-based, maternal, or dyadic, is another facet of the mother-child relationship that has been linked to compliant child behavior. As stated by Maccoby, a positive interaction between parent and child renders a child ready and motivated to respond to parental socialization (Maccoby & Martin, 1983). Empirically, Lay, Waters, and Park (1989) found that when a positive mood has been induced in a child, the child is more likely to comply with mother's direction. In support of her model, Kochanska also found a relation between dyadic shared positive affect and child compliance. Specifically, Kochanska and Aksan (1995) found noncompliant children were in dyads that shared less positive affect. Inversely, committed compliance occurred more often by children who were members of a dyad with high levels of positive affect. Additionally, shared positive affect between mothers and toddlers is related to increased internalization (Kochanska, Aksan, & Koenig, 1995; Laible & Thompson, 2000). In one study, children left alone in

a room were asked to perform a mundane sorting task and asked to not touch a set of attractive toys. Findings revealed that children who were in dyads characterized by high levels of mutually positive affect were more able to refrain from transgressing (i.e., touching the prohibited toys) at preschool age (Kochanska et al., 1995).

The *discipline strategies* a parent uses to shape their child's behavior have also been associated with child compliance. As seen regarding theories of compliance, early theories of parent-child interaction stressed the disproportionate contribution of parents to the development of their child. Such theories stressed parental control and guidance in the development of children's compliance behavior (Baumrind, 1967; 1971; Lytton, 1977). These theories suggested that a firm but non-punitive parental hand in discipline was the key to child compliance. Emphasis on discipline was the cornerstone of many studies examining socialization, specifically studies involving physical punishment or power assertive strategies (Dodge, Bates, & Pettit, 1990). While conventional wisdom and the generational transmission (Deater-Deckard, Lansford, Dodge, Pettit, & Bates, 2003) of such approaches to child discipline gave the appearance that such parenting did not have deleterious effects on child development, research findings are mixed. Some studies have concluded that corporal punishment is both effective and desirable when used sensibly in the context of a warm, rational parent-child relationship (Baumrind, 1996; 1997; Lazerlere, 2000), while others state that the use of physical force is ineffective and possibly harmful (Lytton, 1977; Straus, 1994). Most effective in the generation of compliance behaviors, specifically in fearful children, is the use of gentle discipline (Kochanska, 1991; Kochanska, Coy, & Murray, 2001). The use of discipline,

constructed to modulate arousal levels of a child may be the key to leading a child into compliance.

While conclusions regarding the effects of harsh discipline on overall child development may be at odds, studies investigating the effects of control and discipline on moral development are clear. Investigators have found that children of mothers who use power assertion show less mature social cognition (Kochanska, Aksan, & Nichols, 2003) and that high levels of parental control are in fact related to decreased moral development (e.g., guilt) (Hoffman, 1970). The use of force to guide child behavior comes directly from reinforcement theory and therefore has the same limitations as seen with that theory; a lack of internalization of values for one's self. If children are simply following directions without making the rules part of their own schema for social action, no assimilation of societal values can occur and, therefore, moral development is not advanced.

Additionally, committed compliance was found to be related to gentle guidance or non-controlling social exchange, while situational compliance was linked to increased maternal control (Kochanska & Aksan, 1995). Further delineating the link between specific forms of compliance and maternal behavior, Kuczynski and Kochanska (1990) found passive noncompliance (selective deafness) was predicted by increased use of physical force and decreased use of positive reinforcement, while power assertive techniques were negatively related to both maternally reported and observed behaviors indexing conscience and internalization (Kochanska, 1991; Kochanska, Padavich, & Koenig, 1996). In sum, studies indicate that use of force and control will not assist a

child demonstrating internalized compliance and may even lead the child to poor developmental outcomes.

#### 2.1.6 Age, gender, and compliance

While the aforementioned contributors to the development of compliance in children have been presented as applicable to the general population, there are gender and age differences that are found within the parenting and compliance literature.

In general, children are compliant with parental demands. In fact 60% of children tend to follow parental directions (Lehman, Steier, Guidash, & Wanna, 2002). However, the path to compliance is different for children depending on a number of factors. Age differences in compliant behavior are the first and most apparent. It would come as a shock to few that toddlers are less compliant than older children. Due both to cognitive development as well as increasing complexity of social dynamics, as children age, the levels of noncompliance, specifically defiance and passive noncompliance, decrease (Kuczynski et al., 1987). Additionally, straight obedience, or situational compliance, follows suit (Kochanska et al., 1995). Rates of more effective methods of social exchange such as child-driven negotiation or bargaining, as well as committed compliance also increase with age (Kochanska et al., 1995). In general, older children are more “internalized” than younger children (Kochanska, 1997). In her study, Kochanska's 'older' children ranged from 43 to 56 months of age, while younger children were 21 to 42 months of age (see Kochanska et al., 1995), while children in the current study were approximately 36 months of age. Therefore, children in the current study are assessed at an age consistent with the 'younger' age group and were anticipated to display similar levels of compliance. Additionally, developmental changes in display of

compliance were not a focus of the current study both pragmatically, as compliance was assessed at only one time point, but theoretically as well, with contributors to the display of compliance being the focus.

The two genders have also demonstrated differing levels of compliance, as well as receive differing types of maternal care. Research has found that, as compared to boys, girls display higher levels of moral conduct (i.e., internalized behavior) and cognition (Kochanska, 1997; Kochanska, et al., 2003). This finding is most likely tied to the fact mothers treat the two genders differently. Specifically, during the investigation of compliance behaviors, Kochanska, Forman, and Coy (1999) found that mothers used more power assertive discipline with boys than with girls. Additionally, girls received more gentle discipline than boys (Kochanska, 1997). In light of research illuminating the negative relations between power assertion and compliance, the above findings are not surprising. This is especially true because, in addition to receiving less aversive parenting, girls received higher levels of parenting shown to aid in the development of compliance behaviors. Since the genders do indeed display differing levels of compliance, and both were included in the current sample, gender was addressed as a covariate within the analyses for the current study.

#### 2.1.7 Compliance and later development

Although a good percentage of children do indeed perform actions that can be classified as complaint, for children who do not display such behaviors, deleterious outcomes have been demonstrated. Noncompliance itself has been stated as a risk factor for a chain of negative events including coercive family interactions, poor peer relationships, poor academic performance, and delinquency (Patterson, DeBaryshe &

Ramsey, 1989). While compliance behaviors are negatively correlated with both internalizing and externalizing behaviors on the Achenbach Child Behavior Checklist, passive noncompliance (selective deafness), the ignoring of parental requests, as well as defiant behaviors are related to externalizing actions (Kuczynski & Kochanska, 1990). Interestingly, frequent compliance, is associated with *increased* internalizing problems (Kuczynski & Kochanska, 1990). This finding may be explained by the invoking of the affective system, specifically anxiety, in temperamentally fearful children to yield children who are not committedly compliant, but who follow directions out of fear or desire to please, but this arena needs further exploration.

Kuczynski and Kochanska (1995) found mothers of oppositional children were more likely to make demands for social regulation of behavior and prohibit their child's actions, but made few requests for passive submission to demands or for future prosocial actions. Additionally, increased demands for appropriate action by their children lead to increased externalizing behavior. Bryant and Crockenberg (1980) had similar results insofar as mothers who used high levels of control to try to direct their child's behavior had children who displayed more antisocial tendencies.

As has been indicated, the development of compliance involves a complex set of antecedents and also has ties to future development. While the literature reviewed above has demonstrated the role of the parent in the socialization of their child, the role of the child, while theoretically implied, has been empirically neglected. But for a few studies (e.g., Braungart-Rieker, Garwood, & Stifter, 1997; Kochanska, 1991; Stifter et al., 1999), any unique contribution of the child to the socialization process is missing from current research regarding compliance. Specifically the contribution of a child's temperament to

the parent-child relationship, as well as the contribution of temperament directly to the development of compliant behavior, are areas that need further exploration.

## 2.2 Temperament

Temperamental traits are defined as stable, constitutionally based characteristics that form the core of personality and influence development (Rothbart & Bates, 1998). These traits permeate many aspects of development including parent-child interactions, thus making them a core component of the study of development in infancy and childhood.

### 2.2.1 Historical views of temperament

The concept of individual differences has been prevalent since the times of Hippocrates and Galen. These physicians believed that the balance of elements or humors within the body was the core of personality and the reason for individual differences in mood and emotion (Kagan, 1994). Interest in individual differences abated for several centuries until the European researchers of Pavlov and Teplov reignited interest in the early 1900's. In the United States however, while Allport (1937) defined temperament as a component of an individual's nature involving "susceptibility to emotional stimulation" and "fluctuation and intensity of mood" (Strelau, 1998, p.54), no real research evaluated the construct of temperament until Thomas and Chess began their New York Longitudinal Study (NYLS) in the 1960's. This study categorized infant behavior patterns along nine dimensions (activity level, rhythmicity, approach/withdrawal, adaptability, intensity, sensory threshold, mood, distractibility, attention span/persistence), further classifying them as "easy", "difficult", or "slow to



warm up” (Thomas, Chess, Birch, Hertzig, & Korn, 1963). Thomas and Chess conceptualized temperament as the stylistic component of behavior; the processes and functions that distinguish individuals with similar motivation and ability from one another (Goldsmith, Buss, Plomin, Rothbart, Thomas, et al., 1987). The authors also stressed that temperament should be rated within the social context in which it is expressed; stating, while temperamental traits and patterns are unchanged, the social context can intensify or minimize their expression (Goldsmith et al, 1987).

In another examination of the construct of temperament, the original NYLS dimensions were expanded upon to include fussiness, sociability, adaptability, and soothability (Bates, Freeland, & Lounsbury, 1979). Bates and colleagues specifically wanted to examine the concept of “difficultness” in infancy as a precursor to possible behavior problems in childhood (Bates, 1980). The fussy-difficult factor presented by Bates, Freeland, and Lounsbury (1979) combined the mood and intensity components of the Thomas and Chess (Thomas, Chess, & Birch, 1970) definition of “difficult” (irregular biological functioning, slow adaptability, intense affect, negative mood) with the negative emotionality factors of the Buss and Plomin (1975) model of temperament (Bates, 1980). Bates’ research regarding temperament was crucial because it illuminated the role of maternal characteristics in the reporting of temperament; specifically that maternal characteristics can influence the perception of displayed infant temperamental traits (Bates et al., 1979).

Rothbart’s Model of Temperament (Rothbart, 1981) defines temperament as stable, biologically based individual differences in reactivity and self-regulation (Rothbart & Derryberry, 1981). Reactivity refers to the arousability of behavioral,

endocrine, and nervous system responses as assessed through threshold, latency, intensity, rise time, and recovery time, while self-regulation involves processes such as attention, approach, avoidance, and inhibition that serve to decrease or increase reactivity (Rothbart, Ahadi, Hershey, & Fisher, 2001; Rothbart & Derryberry, 1981).

Behaviorally, temperament is observed through patterns of emotionality, activity, and attention; expressed through energy, interest, and affect (Goldsmith et al, 1987).

Specifically, Rothbart's model examines the domains of activity level, smiling and laughter, fear, distress to limits (frustration), soothability, and duration of orienting (Rothbart, 1981). While similar to the nine dimensions of Thomas and Chess, these domains of individual differences involve more than simply behavioral styles; specifying predispositions to react in certain ways and to experience certain emotions (Goldsmith et al, 1987).

### 2.2.2 The role of emotion

Inherent in all definitions of temperament is the dimension of emotionality. Since Allport's writings on the individual differences in the expression of emotion (Allport, 1937), temperament theorists and researchers have sought to understand the expression of emotion within the construct of temperament. Emotionality can be manifested in brief states or as longer moods, or furthermore as traits, patterns of expression, manifested over periods of time (Goldsmith, 2003). The expression of emotion as it refers to temperament has most often been examined as the propensity to enter a state or to remain in a mood; with some viewing the temperamental relation of emotion as an "emotional biases" (Malatesta, 1990).

Kagan and Snidman (1991), as well as the work of Fox and colleagues (Fox et al., 2001) have focused their assessment of temperament on motor arousal and emotionality. Specifically, the study of temperament according to this rubric has focused on the identification of two groups of children, selected for their categorical uniqueness. The children are categorized based on level and intensity of emotion, both positive and negative, as well as motor activity, and are called either “behaviorally inhibited” or “exuberant” (see also Calkins, Fox, & Marshall, 1996). It must be noted that the conceptualization of children in this fashion is based on the premise that they are two qualitatively different groups of children; not simply opposite ends of a continuum of reactivity. As such, these children, while in some respects opposed to one another, are not simply opposites, but are very *different* from one another. Therefore, the interaction between each group and the environment cannot simply evaluate high versus low levels of interaction, but must evaluate each group separately, as they are compared to random or non-extreme control groups.

### *Behavioral Inhibition*

Many researchers have found that there are specific behaviors that can be identified in infancy and can predict a child’s later socially reticent or withdrawn behaviors (Fox et al., 2001; Garcia-Coll, Kagan, & Reznick, 1984; Kagan, Snidman, & Arcus, 1998; Rubin, 1993). Specifically, children identified in infancy to display high degrees of negative *reactivity to novelty*, in conjunction with other factors such as cerebral asymmetry and lack of contact with peers, have been found to be more inhibited later in life (Fox et al., 2001). The concept of an inhibited temperament assumes that a child may display avoidant behavior to novel situation, either social, non-social, or both

(Kagan et al., 1998). This type of child has often been labeled as “difficult” due to the continual display of negative affect in new or changing situations (Bates, 1980; Thomas et al., 1968).

Inhibited, or highly negatively reactive, children typically comprise approximately 15-20% of the total population (Kagan & Snidman, 1991). And, while some of these children may simply “outgrow” this type of behavior, an equal percentage of children remain fearful in novel situations (Fox et al., 2001; Pfiefer, Goldsmith, Davidson, & Rickman, 2002). Additionally, inhibited behavior has been associated with a number of poor social outcomes including poor self-esteem (Schmidt & Fox, 1995), increased internalizing behaviors (Rubin, Coplan, Fox, & Calkins, 1995), and social reticence (Fox & Henderson, 1999), as well as anxiety disorders (Rosenbaum, Biederman, Bolduc-Murphy, Faraone, Chaloff, et al., 1993; Kagan, Reznick, & Snidman, 1988; Kagan, Snidman, Zentner, & Peterson, 1999; Schmidt & Fox, 1995).

*Behavioral exuberance, surgency, and uninhibited behavior*

In sharp contrast to infants and children classified as inhibited are infants who manifest a differing pattern of reactivity characterized by extreme positivity and activity. This group, least defined over the years, is thought to be at risk for *distress to limits*, or frustration given that they display strong approach tendencies. This group has been labeled “exuberant” (Fox et al., 2001), “surgent” (Adahi, Rothbart, & Ye, 1993), or “uninhibited” (Kagan, 1989). While all approaches to defining these children are seemingly trying to index the same qualities, the foci of assessment differs.

Fox and colleagues have defined 'exuberant' infants as those displaying high levels of positive affect and motor behavior in reaction to novel stimuli (Fox et al., 2001).

Gunnar & Rothbart, on the other hand, call these children ‘surgent,’ describing high levels impulsivity, high approach to novelty, and sensation seeking (Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003; Adahi et al., 1993). Finally, Kagan, describes sociable, uninhibited behavior; again comprising 10-15% of the population (Kagan, 1989). Kagan’s uninhibited children (1989) are described as consistently sociable and affectively spontaneous. Regardless of the label given to these children, it is believed that they are qualitatively different from inhibited children (Kagan, 1989). Within these descriptions though is one important distinction, the discussion of surgent children places the children along the opposite end of a continua of behaviors, with inhibited behavior being at the opposing pole. While the description of the behaviors of children classified as high on surgency maps well onto the descriptions of exuberant or uninhibited behavior, the lack of distinction for each group as qualitatively variant is problematic. Children displaying behaviors that would classify them as exuberant or surgent are not simply less inhibited than inhibited children, but display a different type of reactivity specifically geared towards frustration, anger, and positive affect. Additionally, it is believed that the biological basis for their behavior is different; even though a phenotypic continuum may seem apparent (see Fox, 1994).

Additionally, while these children may appear socially approachable and well fit for a social society, surgency is also associated with more disruptive and externalizing behavior, as well as subsequent poor peer relations (Dettling, Gunnar & Donzella, 1999; Rimm-Kaufman, Early, Cox, Saluja, Pianta, et al, 2002; Rubin et al., 1995). Whether such a temperamental type is advantageous or maladaptive may be due to a child’s ability to regulate their own behavior. Rubin and colleagues (Rubin et al., 1995) found that

when exuberant children possessed high levels of behavioral regulatory ability, exuberance was not related to behavior problems; but without the ability to regulate one's behavior, externalizing behavior may become apparent.

### 2.2.3 The biology of temperament

As has been evidenced above there is much debate among researchers as to whether or not temperament lies along a continua or is composed of categorical types. The current study follows the argument that children with different temperaments are qualitatively different from one another; exuberant children are not simply less inhibited, but are variant from inhibited children both behaviorally and neuroanatomically. It is this qualitative difference that presupposes the belief that the two groups of children should have different interactions with their environment and, in turn, different pathways to compliance. Neuroanatomical studies of children with different temperaments elucidate this difference, specifically drawing from theory about approach and withdrawal systems.

#### *Approach and withdrawal systems*

Schneirla (1959) hypothesized that multiple approach and withdrawal systems existed across species. Approach processes involved movement toward a stimulus, while withdrawal systems involved movement away. He postulated that these systems worked in opposition so that individual variability in each of these systems would increase the likelihood of either approach to or withdrawal from a situation (Schneirla, 1959).

Approach and withdrawal behaviors have been linked to the experience and expression of emotions and affective states (Fox & Davidson, 1984; Izard, 1977). The physiology of human approach and withdrawal behaviors have been examined within the framework of basic neural excitation and inhibition (Eysenck, 1970). His investigations

focused on the influence of biological processes on affective behavior over time (Eysenck & Eysenck, 1985). Eysenck's work on the personality, specifically the dimensions of introversion and extraversion was a major force behind the development of Gray's neuropsychological model of temperament (see Martin & Fox, 2006).

Gray (1982) outlined the neural circuitry involved in interaction with appetitive or aversive stimuli as part of either approach or withdrawal systems. These two distinct systems have unique circuitry and are associated the differing patterns of reactivity. Thus, the broader model of the approach-withdrawal systems subsumes the prior two representations of temperament that focused on emotionality and reactivity-regulation processes (see Martin & Fox, 2006). Specifically, Gray (1979; 1982) outlines two systems, the behavioral approach system (BAS) and the behavioral inhibition system (BIS). These systems are hypothesized to regulate behavior regarding approach and withdrawal within a punishment-reinforcement framework.

The BIS is sensitized to react to cues of punishment and stimuli that are novel, aversive, or fear provoking. The conditions that activate this system have been implemented in many models of anxiety and social withdrawal (i.e., Fowles, 1980; Fowles, Kochanska, & Murray, 2000). The amygdala and brainstem are the areas of the brain specifically examined regarding activation of the BIS. The lateral nucleus of the amygdala processes aversive sensory input and transmits this information through the hippocampus and the thalamus, to amygdalae's central nucleus. The central nucleus projects to the brainstem, which controls the activation of fearful behavior patterns such as freezing, startle response, or increased heart rate (Derryberry & Rothbart, 1997).

Alternatively, the BAS responds to appetitive motivation, reward signals, and is associated with approach behaviors. Gray postulated that the BAS is a major contributor to the experience of positive affect including feelings of joy and trust (Carver & White, 1994) as well as impulsivity. A portion of the BAS is related to the emotions of anger and aggression. The approach system can elicit these emotional responses progression toward appetitive stimuli is impeded (Depue & Iacono, 1989). The general neural circuitry involved with this system is the basolateral amygdala, which activates dopaminergic neurons in the brainstem that facilitates approach behavior to rewarding stimuli (Derryberry & Rothbart, 1997).

The approach and withdrawal dimensions are viewed as the basic organizational structure of affective processes and are believed to work in a mutually exclusive format (Davidson, 2003). The core of the belief of individual differences in emotional response lies in differences in the neural circuitry believed to guide affective tone in response to environmental stimulation. Activation of the neural substrates underlying the BIS is associated with negative affect while activation of the neural substrates of the BAS is associated with positive affect. Fox and Davidson (1984) reported that the approach and withdrawal systems are related to affect expression and exploratory behavior in infants. The authors found 10-month old infants who displayed greater relative-right frontal EEG asymmetry (i.e., lower power/increased activation) displayed more distress upon separation from their mother than those displaying left frontal asymmetry (Fox & Davison, 1984). Increased distress, in turn, diminishes the infant's ability to explore the environment (see Ainsworth et al. 1978). Such basic neural differences in reactivity to the environment are the starting point for examining individual differences in behavior.



If the basic circuitry of a child differs from another, the way that child reacts to the environment, as well as any developmental pathways have no choice but to vary from one another.

#### 2.2.4 The relation between temperament and parenting

The interaction between parenting and temperament has a long and convoluted history. Specifically, the degree to which infant temperamental traits influence a caregiver's behavior has evidenced the importance of examining infant contributions to early caregiver-infant social relationships (Rothbart & Ahadi, 1994; Thomas & Chess, 1977). Previous studies have shown that distress-prone (easily frustrated) infants are at risk for receiving unresponsive (Owens, Shaw, & Vondra, 1998), insensitive (Crockenberg & McClusky, 1986; Mangelsdorf, Gunnar, Kestenbaum, Lang, & Andreas, 1990; van den Boom & Hoeksma, 1994), or intrusive maternal interventions (Park, Belsky, Putnam, & Crnic, 1997). As temperamentally fearful infants are also at risk for the development of behavioral inhibition (Rubin, Burgess, Hastings, 2002; Fox et al., 2001), further evidence indicates that suboptimal maternal care places such infants at an even greater risk of poor outcome (Hane, Rubin, Cheah, & Fox, 2007). Consequently, the understanding of the impact of infant reactivity on the quality of maternal behavior is a critical step in identifying the ideal temperament-by-parenting "fit" that can serve to either protect vulnerable infants or push them towards a poor outcome, with compliance and its derivatives as an initial indice.

#### *Approach, distress to limits, frustration, and parenting*

While there is evidence to suggest that extremely reactive infants may be likely to experience suboptimal mother-child dyadic relations, findings are varied. Crockenberg

and Acredolo (1983) found the mothers report of distress to limitations to be concurrently related to decreased maternal contact with her infant, after controlling for earlier maternal contact. In a study of 6 month old infants, irritable infants were found to receive less positive and lower levels of interactive caregiving than infants characterized as less irritable over the first six months of life (van den Boom & Hoeksma, 1994). Braungart-Rieker and colleagues (Braungart-Rieker et al., 1997) found that 30 month old children rated by their mothers as highly negative received less guidance and more controlling behavior from their mothers than their less reactive peers. Additionally, lower levels of maternal sensitive support at infant age nine months have been linked to increased reported proneness to distress (Mangelsdorf et al., 1990), while maternal intrusiveness was predicted by higher levels of infant frustration (Calkins, Hungerford, & Dedmon, 2004). These findings suggest that infant negative reactivity is associated with insensitive parenting and may actually elicit poor parenting.

However, another set of findings suggests an opposite pattern of interaction whereby negatively reactive infants elicit more sensitive caregiving from the caregiver. Sroufe (1985) suggested that infants who demand a lot of attention will receive it because parents will adapt to a child's changing needs. Following from this statement, Crockenberg and Smith (1982) reported that neonates identified as irritable received more involved contact with their parents at 3 months of age. Warm, supportive caregiving has been linked to decreased irritability in at-risk samples (van den Boom, 1994), as well as in populations not classified as such (Fish, Stifter, & Belsky, 1991).

Crockenberg (1986) has advanced three possible types of temperament-by-parent relations, suggesting that temperament may impact maternal behavior either (1) directly,

such that mothers may simply be less responsive to infants who display high degrees of negative reactivity; (2) jointly, such that there are no direct relations between negative emotionality and caregiving, but associations between caregiving and child outcomes that vary as a function of temperament, or (3) indirectly, such that associations between negative emotionality and responsiveness will vary in direction depending on characteristics of the caregiver and/or context. The current study aligns itself with a combination of the second and third statements. The premise of this study is that children displaying differing temperamental traits will interact with caregivers differently, based on temperamental type, thereby experiencing differing paths to the development of compliance behavior, thus demonstrating Crockenberg's second premise. Additionally, research has illustrated that temperament is differentially salient across contexts (Hane, Fox, Polak-Toste, Ghera, & Guner, 2006). In their examination of the convergence on mother report and observer ratings of temperament, these researchers found that maternal and observer ratings of infant distress converged when infants manifested high degrees of negative affect during routine caregiving activities. Maternal and observer ratings of low infant positive emotionality were in agreement when infants experienced low mutually positive affect during play. Researchers concluded that maternal perceptions of infant temperament were based on mothers' experience with their children, but that the degree to which mothers are influenced by their infants depends upon the context of interaction and valence of emotion (Hane et al., 2006).

#### *Avoidance, temperamental fear and parenting*

The examination of the relation between infant reactivity to fearful situations and parenting behaviors is less well-defined. Most of the literature examining fearful

temperament and parenting has focused on developmental periods from toddlerhood on. Rubin and others have shown that overly intrusive, or overly affectionate maternal behavior is associated with inhibited behaviors. Findings from a study of 3 year old males suggested that stability of inhibited behaviors may be associated with sensitive parenting (Park et al., 1997). Authors interpreted this finding in terms of parents willingness to accept their child's inhibited behaviors; when a parent accepted such behaviors and parented in a responsive, sensitive manner, children continued to behave as such. On the other hand, when parents were not encouraging of a child's fearful behaviors and were less sensitive, this lack of conformity forced change in the child's behavior, thus decreasing the likelihood of continuity of inhibition. One problem with this study was that the initial indice of "inhibition" in infancy was actually an aggregate of maternal report of distress to limits and distress to novelty to form a "negative emotionality" composite, therefore it is unclear if the relation between parenting and temperament is specific to the fear or frustration components of the child's temperament. In their study examining socially wary toddlers and their parents, Rubin and colleagues (Rubin, Hastings, Stewart, Henderson, & Chen, 1997) found that such children who experienced intrusive, controlling, albeit affectionate, interactions with their mother during a free-play session, were more likely to display inhibited behaviors in a social situation with peers. In a study of older children, Rubin, Burgess, & Hastings (2002) found that inhibited toddlers who experienced overly intrusive or harsh parenting were more likely to appear socially reticent at 4 years of age, as compared to their inhibited peers who did not experience such care.

Given the unclear or sparse results delineating relations between infant distress to limits and parenting and infant fearful reactivity and parenting, specific evaluation of differential interactions is an important step in understanding the parent-child relationship.

It is feasible, given the existing research, that mothers of fearful children who do not want their children to be fearful, will behave in seemingly insensitive ways, in hopes that their child will change his or her way of responding. Also, if fearful children begin to display behaviors incongruent with their earlier behavior (e.g., decreased avoidance, or increased approach), that parents will respond sensitively, viewing this as the turning point in helping their children become less fearful.

With regard to parents of children who display distress to limits or high approach behaviors, it stands to reason that, after repeated encounters marked by frustration, negativity or disobedience, that mothers of these children may in fact get ‘worn out’ and react to their children’s approach negatively- tired of continually needed to intervene. Given the world of the toddler, if a child continually approaches situations, with an apparent disregard for parental directives, over time, the parents of these children may become frustrated and react punitively.

### 2.3 Summary

While studies have evaluated the role of temperament in relation to compliance, none have evaluated the behavior of qualitatively distinct temperamental groups within such a framework. Studies evaluating maternal reports of fearful or negative temperamental reactivity have found relations to compliant behavior. Lehman et al., (2002) revealed significant negative correlations between maternally reported (TBAQ)

fear as well as anger and later compliance in a clean-up paradigm, such that more compliant toddlers were perceived by mothers as being less fearful and less anger-prone. Similarly, Braungart-Rieker, Garwood, & Stifter (1997) found that negative reactivity, a composite of maternally reported fear and anger, was significantly associated with children's style of compliance/ noncompliance. Children rated as highly reactive demonstrated more passive noncompliance during a delay of gratification task and more assertive, and less committedly-compliant behaviors during clean-up requests.

Kochanska's (1991) evaluation of the development of conscience from toddlerhood to early childhood revealed that children who were rated by their mothers as highly fearful, and who received gentle maternal discipline, were more likely to display compliant behaviors, while fearful children who received maternal discipline characterized by power-assertion were less compliant. Kochanska suggested that power assertive techniques may produce a level of arousal that is too high for anxiety-prone children and therefore interferes with their development of conscience (Kochanska, 1991). While the interpretation of results in relation to anxiety arousal fits with contemporary views regarding the relation between temperament and subsequent socialization (see also Dienstbier, 1984), unfortunately, most studies evaluate the role of *fearfulness* in relation to compliance. While Braungart-Rieker, Garwood and Stifter (1997) did examine a composite of maternally-reported distress to limits and distress to novelty, no one to date has explored the differential role of approach and avoidance in the development of conscience according to the behavioral methodology set forth by Kochanska.

In another assessment of children, ages 14-45 months, Kochanska (Kochanska, Coy, & Murray, 2000) found differences in compliance based upon context of directive (“Do” (clean-up) versus “Don’t (prohibited toy)), type of compliance (committed versus situational), level of fearfulness of a child, and effortful control. In this study, children’s fearfulness was observed at 14, 22, 33, and 45 months, while effortful control was coded at 22, 33, and 45 months. Results indicated that fearfulness was positively related to committed compliance, but only after 22 months of age and in the “don’t” context, where children had to inhibit a response to play with a desired toy. Observed effortful control was also significantly positively related to committed compliance, but again, mainly in the context of prohibited toys (“don’t”) (Kochanska et al., 2001). Unfortunately, this study presents with some serious concerns that limit the applicability of its findings. First, since, temperamental fearfulness was evaluated based upon an aggregate of reactions to a Risk-room paradigm at 22 and 33 months, averaged across both ages, only the temperamental category of fearful children could be evaluated; no information on children who are distressed to limits, or who demonstrate high approach tendencies, and their predictors of compliance could be garnered. Also, that lack of examination of *noncompliant* behaviors in both the “Do” and “Don’t” contexts is a limitation. Kuczynski and colleagues (Kuczynski et al., 1997) have proposed that the examination of noncompliant behaviors is necessary for understanding development of conscience. As Kopp (1992) stated, if noncompliance is not evaluated, some of the “richness” of behavior is lost; noncompliance reflects differential levels of a child’s maturity and should be evaluated individually.

The preceding theoretical and empirical review supports the contention that compliance is an important developmental contributor in the process of socialization. While there has been much research examining individual contributors to the development of compliance, much of the literature has ignored the contribution of the child, specifically the role of temperament, in his or her own development as it relates to compliance. The development of compliance must be examined from a bi-directional standpoint, not contributions of the parent only. Additionally, the extant literature that has addressed the issue of temperament in the development of compliance has done so mainly in older children, and examined, predominantly, the influence of fearful temperament. These findings provide an excellent grounding from which to examine the role of avoidance, as it relates to the development of compliance. Within the typological approach to temperament, children demonstrating higher levels of fearfulness or inhibition tend to be more avoidant in the face of novel stimuli (Kagan et al., 1998). Given increased displays of fearfulness to the environment, examination of avoidance as a contributor to compliance is a theoretical correlate.

However, while the relation with fearfulness is well-established via inhibition and avoidance, the compliance behavior of children demonstrating behavioral profiles characterized by exuberance, namely high levels of distress to limits and/or approach behavior, have not been examined.

Approach and withdrawal have been stated to be the basic organizational structure of affective processes (Davidson, 2003), therefore understanding the contributions of children with differing underlying motivational biases is crucial in constructing a more



complete theory of the development of compliance behavior, especially in multiple contexts (e.g., following directives versus inhibiting behavior)

### 2.3.1 The current study

In sum, the first purpose of the current study was to examine the contribution of child temperament in the development of compliance. Differential pathways of temperamentally negative and positive infants were evaluated as they predicted compliance behaviors in early childhood, both within and between groups. Specifically, infant expression of approach and withdrawal were evaluated as they differentially influenced the display of compliance at age 3. The second goal was to evaluate the role of maternal behavior both as an individual contributor to compliance, as well as via the interaction with temperamental reactivity. Thirdly, the study evaluated the role of discipline in the development of compliance as it interacted with other maternal behaviors as well as infant temperamental reactivity within each temperamental group.

It was anticipated that temperamentally negative (fearful) infants would appear more compliant and display less noncompliance, as compared to exuberant infants. In regard to the development of compliance and noncompliance, maternal behavior (sensitive responsiveness and dyadic affect) and gentle discipline were anticipated to be most predictive of compliance for fearful children.

For the second group of children, high positive, approach-oriented children, we hypothesized that these children would display lower rates of compliance and higher rates of defiance as compared to their fearful counterparts. The development of compliance, for these children, would hinge upon mutually harmonious, responsive parenting and will be inversely predicted by the use of power assertive discipline.

## Chapter 3: Method

### 3.1 General Overview

The current study incorporated data from 3 separate visits; a lab visit and a home visit, both at infant age 9 months, and a home visit when the children were 36 months of age. The laboratory visit consisted of episodes designed to elicit various emotions, based upon Goldsmith and Rothbart's Lab-TAB schema (Goldsmith & Rothbart, 1999). This visit was coded for temperamental reactivity, specifically approach and avoidance. The 9-month home visit consisted of several paradigms designed to assess mother-child interaction. Mothers and their children completed several structured and unstructured segments, all of which were coded for interactive affect, maternal sensitivity, and maternal responsiveness. Finally, at 36 months, mother-child dyads were again visited in their homes and underwent a series of structured and unstructured tasks. These episodes were coded for child compliance, as well as maternal discipline strategies.

The present study examined the differential contributions of infant approach and avoidance behavior, maternal behavior in infancy, and maternal discipline in early childhood on the display of behaviors indicative of child compliance. This study was part of a larger, longitudinal investigation of the developmental trajectories of infant temperament. While numerous individuals were involved in the collection of data, the author contributed to the larger project by developing and applying the coding schema of child compliance and maternal discipline to the project, in addition to other coding responsibilities. As such, the study sought to extend current project hypotheses and knowledge regarding the developmental trajectory of infant temperament, specifically examining its influence on the development of compliance.

Specifically, the goals of the study were to:

1. Examine differences in the display of compliance for temperamentally negative versus temperamentally positive children.
2. Assess contributors to the display of child compliance for temperamentally negative versus temperamentally positive children.

### 3.2 Participants

Participants were 244 (113 male), 9-month old infants and their mothers selected as part of a larger longitudinal study (for details, see Fox et al., 2001). Average age for infants at their 9-month home assessment was 9.44 months ( $SD = .38$ , range = 8.71-11.28). Tables 1 and 2 present the details of the infant characteristics.

The sample was relatively homogeneous, with approximately 72% of the sample identifying themselves as Caucasian, 15 % as African American, 6% as Hispanic, 3% as Asian, and the remainder of the sample classifying themselves as of 'other' ethnicity. All mothers had at least a high school education and the average maternal age was approximately 32 years ( $M = 32.29$ ,  $SD = 5.3$ ) (See Table 3).

#### 3.2.1 Participant recruitment and selection

Families were contacted by mail using commercially available lists of names and addresses compiled from the birth records of area hospitals. Interested parents completed a background survey and were scheduled for laboratory visits with their infants. Families were excluded from further participation if the infant was pre-term, experienced any serious illnesses or problems in development since birth, or if the infant was on any long-term medication.

When infants were 4 months old, they were evaluated in the laboratory for degree of reactivity to novel stimuli. Infants were then classified into one of three possible groups: a randomly selected control group, negatively reactive, or positively reactive group. During this screening, infants were presented with a series of visual and auditory stimuli in the laboratory, including mobiles of varying hanging objects and sentence and syllable audio clips of varying voices and intensity. Independent raters subsequently coded the videotaped sessions according to the degree of motor activity and positive and negative affect displayed by the infant. Fussing, fretting and crying were measured on the Negative Affect Scale (Fox et al., 2001), while the Positive Affect Scale indexed smiling, neutral or positive vocalization behaviors. The motor scale rated infants for level of gross motor activity (e.g., kicking, waving, back arching) during the presentation of novel stimuli.

### 3.2.2. Group formation

Based on the scores of the 92 randomly selected infants, mean scores for positive affect, negative affect, and motor reactivity were computed. These values were then used to create the positively reactive and negatively reactive groups. Positively reactive infants ( $n = 82$ ) scored above the mean on positive affect and motor behavior, and below the mean on negative affect. In contrast, negatively reactive infants ( $n = 82$ ) scored above the mean on negative affect and motor behavior, and below the mean on positive affect (see Hane, Fox, Henderson, & Marshall, 2007). For this study, children who were part of the randomly selected group, but whom scored below the mean on all scales served as the control group ( $n = 80$ ). Children in this control group as well as those meeting criteria for one of the temperamental groups were invited back to the laboratory

at 9 months of age, as well as other longitudinal assessment timepoints. Children seen at two out of three evaluations (9 month lab, 9 month home, 36 month home) were included in these analyses.

### 3.2.3 Attrition

Within the larger study of temperament over time, 779 children were screened for reactivity at four months of age. Of the 279 infants invited to participate at 9 months, 247 participated. The selected children who did not return at 9 months were compared to those who remained in the study on degree of positive, negative, and motor reactivity displayed at 4 months, and no significant differences were found on positive or negative reactivity,  $t$ 's  $< 1$ ,  $p = \text{n.s.}$  for both. For motor reactivity, a significant difference was found, such that children who did not return demonstrated more motor reactivity than those who did not ( $t(266) = -2.96$ ,  $p < .01$ ). As designation into group was based on reactivity on multiple dimensions, examination of loss by temperament group found no differential attrition ( $\chi^2 = 3.63$ ,  $p = \text{n.s.}$ ).

For the 36 month visit, after re-clarifying of group cut-off criteria which identified and included another group of children<sup>1</sup>, 283 children were invited to participate, and 273 participated. Comparison of the children who dropped out between 9 and 36 months and those who remained revealed no significant differences on mutually positive affect ( $t(224) = 1.11$ ,  $p = \text{n.s.}$ ), maternal sensitivity ( $t(234) < 1$ ,  $p = \text{n.s.}$ ), maternal responsiveness ( $t(213) < 1$ ,  $p = \text{n.s.}$ ), or child approach ( $t(158) < 1$ ,  $p = \text{n.s.}$ ), or avoidance ( $t(150) < 1$ ,  $p = \text{n.s.}$ ).

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<sup>1</sup> At 24 months of age, an additional group of children, selected for reactivity to novelty although not seen at 9 months, were invited to return as part of the study ( $n = 65$ ).

### 3.3 Measures

Tables 2-7 outline the ages of participants at assessment, location of assessment, and behaviors coded at each age, and number of children seen at each timepoint.

Detailed descriptions are below.

#### 3.3.1 Temperament at 9 months: Laboratory Assessment Temperament Battery

To examine individual differences in reactivity and affect expression in the laboratory, the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith and Rothbart, 1999) was administered. The Lab-TAB consists of 20 standardized episodes that are designed to elicit anger, fear, interest, pleasure, and activity level. The episodes included in this study include the, *Masks*, *Unpredictable Toy*, and *Puppet Play*. All episodes conducted were carried out in accordance with Lab-TAB guidelines.

In accordance with the Lab-TAB manual, the order of the episodes was the same for each infant. For all of the episodes, the infant was seated in a high chair with a table directly in front of them on which all of the stimuli were presented. During each of the episodes, the mother remained in the room with her infant and was instructed to sit behind the child and to remain neutral. Each episode began with the infant in a neutral state. Episodes were terminated if the infant became too upset or if the mother indicated that she thought the infant was becoming too upset to continue. Specific scoring is described below and relevant portions of the coding manual are contained in the Appendix of this document (see Appendix A).

#### *Fear*

Two Lab-TAB episodes were used to assess fear: *masks* and *unpredictable toy*. During masks, a large cardboard screen with a door was placed in front of the infant.

Two masks, an old man mask and a clown mask, were presented to the infant through this door. The duration of presentation of each mask lasted 10-seconds. Each mask was only presented once. During the unpredictable toy episode, a long track, approximately 1.5 meters in length was placed on the table in front of the infant. The track was used to guide a noisy and unpredictable remote controlled dog toward the infant. One trial would consist of the dog walking down to the end of the track, approximately 15 cm in front of the infant, and sitting down and barking. This was repeated across a total of three trials. Each trial was approximately 10-sec in length.

A *fear* score was obtained by rating the intensity of vocal distress (0-3) and intensity of escape (0-3) from the *masks* and *unpredictable toy* episodes. A higher score indicated more fear. Prior to coding, interrater reliability was achieved by 2 independent observers who were blind to all other data in the study. Reliabilities were achieved separately for each of the scales entering into the fear composite, with kappas ranging from .74 to .97 for the *masks* episode, and from .59 to .98 for the *unpredictable toy* episode. Mean kappa values for *masks* and *unpredictable toy* were .85 and .80, respectively.

### *Joy*

The *puppet* episode was used to assess *joy*. For this episode, the infant was seated in a high chair as an experimenter manipulated two colorful puppets engaged in a scripted and standard dialogue. During the puppet show, the infant was tickled three times by the puppets; first by one, next by the other, and finally by both puppets simultaneously. One trial was equal to the time between tickles, for a total of four trials. After the puppet

show, the experimenter placed the puppets on the table in front of the child for 30-seconds.

For the joy scoring, the intensity of smiling (0-2), intensity of positive motor activity (0-2), and the presence or absence of laughter and approach were averaged in order to obtain a *joy* composite. Higher scores represent higher degrees of joy.

Reliabilities were achieved separately for each of the scales entering into the joy composite, with kappas ranging from .75 to .87 and averaged .77.

*Approach* and *avoidance* scores were then computed based on these episodes, and were relative to each other. Approach was computed based on behaviors displayed during the puppet episode. Specifically, the sum of approach behaviors, intensity of smile, positive vocalizations, and duration of attention, minus avoidance, with higher score indicates higher degrees of approach relative to avoidance. Avoidance scores were created based on behavior during the mask and unpredictable toy episodes. Specifically, avoidance was calculated as escape minus intensity of smiling minus positive motor behavior minus approach behaviors. Higher scores indicated more avoidance relative to approach.

### 3.3.2 Mother-Infant interactions at 9 months: Affect, sensitivity, & responsiveness

In order to evaluate various aspects of the mother-child relationship, infants and their mothers were evaluated in a home-based procedure at 9-months of age. All visits were videotaped and coded for *interactive affect*, *maternal responsiveness*, and *maternal sensitivity*. During the home visit, each mother-infant dyad participated in a series of interactive contexts, including mother busy in the kitchen (8 min), snack (5 min), free



play (10 min), model building (3 min), unpredictable toy (3 min), and caregiving/changing (5 min). During each context, mothers were instructed to interact with their infants as they normally do. Two experimenters, trained to be non-intrusive during the mother-infant interactions, completed all home visits.

### *Interactive affect*

In order to assess degree of mother-infant affect during home-based interactions, Kochanska's (1997; 1998) scales for rating the affective quality of mother-infant interaction were employed (see Appendix B). Kochanska's affect scales involve rating the mother and infant separately in 30-second segments according to signs of tenderness/affection, joy, neutral positive, neutral negative or discrete negative affect. Each 30-second segment can be coded for multiple discrete affects, including *tenderness/affection* (hugging, kissing), *joy* (smiling, laughing), and *discrete negativity* (frowning, fussing or crying). In the absence of a single discrete event (in a given 30 second segment) a general mood code is assigned. A *positive mood* code was given when the individual (mother or infant) being judged manifested a state of contentment and a *negative mood* code was given if the individual manifested signs of distress, fear, fatigue, or disinterest. Two independent raters who were blind to all infant temperament data coded home-based affect. Each rater first achieved training reliability with the first author, with kappa values ranging from .89 to .98 across 18 cases. The affect raters achieved sound interrater reliability with each other, achieving a kappa value for the quality of infant affect of .78 and a kappa value for the quality of maternal affect of .84 (see Hane, Ghera, Quinn, & Fox, 2007).

### *Maternal Sensitivity*

Maternal sensitivity was determined based on a modified version of Ainsworth's system for rating Maternal Care Behavior (Ainsworth, Bell & Stayton, 1972). This scale consists of nine, 9-point Likert-type scales, with scale points 1, 3, 5, 7 and 9 anchored in detailed behavioral descriptions. Of Ainsworth's original 28 scales, the following were selected based on their conceptual relevance to infant temperament (See Kochanska, 1997; 1998) and to each individual episode of the home visit: Acceptance-Rejection scale, Sensitivity-Insensitivity, Effectiveness of Soothing, Degree of Availability, Appropriateness of Pace in Feeding, Appropriateness of Play, Amount of Delight, and Degree of Encouragement (see Appendix C). Two coders were trained on coding of the system. Intraclass correlations between the 2 independent raters across 40 cases were computed for each sensitivity composite (within each episode) and ranged from .59 to .84, with an overall sensitivity reliability coefficient of .80

#### *Maternal Responsiveness*

Maternal responsiveness to her child's bids was coded using an adaptation Kochanska's (1998) coding system (see Appendix D). This system utilizes a combination of time-sampled and event-triggered approaches entailing two passes through the video, using 60-second intervals. In the first pass of coding, coders decided, for each 60-second interval, whether the infant directed a bid or signal toward the parent that presented the opportunity for the parent to respond. Such discrete child related codes were coded according to the following schema: Redirection required (child wandering or distracted), *Negativity* (child fussy, crying, etc.), Neutral/Positive (child vocalizing, switching attention during play, social referencing), or Physical event (child manifesting internal state (e.g., sucking on fist, tugging on ear) or bid requires physical intervention

from mother (e.g., child drops toy from high chair, etc.). If no discrete events occurred, a global code symbolizing general tone of the segment was given. The possible global codes were: no mother-infant interaction; mother driven interaction, caregiving without protest or other children related event, or 'interaction driven by child's activity.

During the second pass, coders evaluated the parental response to a child's discrete bid using one of four mutually exclusive codes: poor, fair, good, or excellent. Representations incorporated the parent's degree of attention to the child and his/her needs, promptness of parental response, and level of engagement. For example, for a code of excellent to be given, a mother's response must be immediate, empathetic, a performed with complete devotion to the child and his/her needs.

For each pass, two coders were trained on coding of the system and reliability was achieved on a 20% ( $n = 40$ ) case overlap. For first pass, Kappas ranged from .62-.99. For second pass, Kappas ranged from .64-.96.

### 3.3.3 Mother-Child Interaction at 36 months: Maternal discipline and child compliance

At 36 months of age, mothers and their children participated in a series of structured and unstructured activities that were subsequently coded for child compliance/noncompliance, and maternal discipline according to an adaptation of Kochanska's coding scheme (Kochanska & Aksan, 1995). Both Clean-up ('Do') and Forbidden toy ('Don't') contexts were evaluated. During this home visit, each mother-child dyad completed a series of interactive episodes, including mother-child free play (7 min), clean-up (5 min., up to 10 if needed), model building (3 min), draw a family portrait (10 min.), unpredictable toy (3 min), and play with forbidden toys (7 min), and a

reward session (5 min). At the beginning of the session, immediately after free-play had started, experimenters brought out a clear, lidless bin of attractive toys and instructed the mother to tell her child that these toys were "forbidden" and not to be played with now. This bin remained out and in the child's view for the duration of the visit. During each episode, mothers were instructed to interact with their children as they normally do. Two experimenters, trained to be non-intrusive during the mother-child interactions, completed all home visits.

#### *Contexts of interaction*

##### *The "Do" Task (Clean-up: Compliance to request)*

For free play, mothers and their children were supplied several toys including, Bristle blocks, a stringing bead set, a Magna-Doodle drawing easel, a set of sea creatures, and a wooden tool set with which they were instructed to play freely for 7 minutes. After this period of mother-child free play, the experimenter asked the mother to have the child clean up the toys by placing them back in a bin provided for them. The mother was instructed that she and the child will have at least 5 minutes to complete this task and up to 10 minutes. If the dyad finished before the first 5 minutes is completed, they were instructed by the experimenter to "wait for one minute while I (the experimenter) get the next task ready". Each 60-second epoch was coded for the predominant quality of child compliance/noncompliance behavior and maternal discipline. Two coders were trained on coding of the system and reliability was achieved on a 20% ( $n = 40$ ) case overlap. Kappas ranged from .78-.83.

##### *The "Don't" Task (Forbidden toy: Compliance to prohibition)*

This form of compliance was assessed over the course of the entire home visit. At the beginning of the home visit, the free play toys were set out and the dyad began to play. After mother and child were engaged in the free play toys, the experimenter brought out a clear plastic, lidless bin of “forbidden toys”. At that time, the experimenter asked the mother to direct the child’s attention to the toys, but to inform them that they are not allowed to play with the “forbidden toys” now, but will be able to later. We asked that the mother prohibit the child from touching any of the forbidden toys until the end of the visit, approximately 40 minutes.

Unlike the clean-up task, event triggered coding was used to capture child’s attention and behavior toward the forbidden toys. Every time the child’s attention or behavior turned to the toys, such behavior indicated the beginning of a codeable episode. An episode began at such an attention shift and was subsequently coded in 30-second segments for both child compliance/noncompliance, and maternal discipline.

This coding system applied a two-pass approach to coding. In a first pass, a coder watched a home visit in its entirety and noted the time the child’s attention or behavior turned to the bin of forbidden toys. In a second pass, coders assigned values capturing the predominant quality of child compliance/noncompliance, and maternal discipline. For each pass, two coders were trained on coding of the system and reliability was achieved. For first pass, percent agreement was calculated on a 10% overlap (see also Kochanska & Aksan, 1995), with agreement equaling 82%. For the second pass, reliability was achieved on a 20% case overlap ( $n = 40$ ), with Kappa values ranging from .79-.90.

#### *Child compliance*

Mutually exclusive codes, reflecting qualitatively different forms of compliance and noncompliance will be evaluated (see Appendix D). Conceptually similar codes were utilized for both the “Do” and “Don’t” contexts.

The 8 codes for clean-up are as follows: Off task/parent clean-up (parent cleans up toys herself; child is off task), relational play (no clean-up behavior from child, nor attempt at directing clean-up from parent, dyad continues with play after direction to clean-up has been given), committed compliance (child fully embraces parental directive, staying on task and cleaning up with little parental directives), situational compliance (child is responsive to parental directive, but only with continued parental guidance/intervention), negotiation (child is good natured, not angry, but states they do not want to clean-up; bargaining with parent), passive noncompliance (selective deafness; child ignores parental directive and may respond but only after lengthy conversations with parent about request), overt resistance (child is rejecting of parental request to clean-up; child is not angry but may be whiny, attempting to assert autonomy), and defiance (child forcefully rejects parental requests; may be angry; child does not comply, even with parental prompting; child may cry, yell, or have a tantrum).

The 9 codes for prohibited toys are as follows: maternal permission to touch toys (mother gives child permission to play even though experimenter has not directed as such), looking/no touching: self-corrected behavior (child looks at toys but does not touch and re-directs self to task without direction from mother), looking/ no touching: parental intervention (situational compliance)(child looks at toys and may begin moving towards them, but stops due to parental reminder or intervention), touching toys: self-corrected behavior (child touches toys, but parent does not intervene before child stops

play and redirects self to task), touching toys: parental intervention (child touches toys and stops only due to parental verbal or physical intervention); negotiation (child is good natured, not angry, but states they do not want to clean-up; bargaining with parent), passive noncompliance (Child touches toys, parent verbally intervenes; child does not overtly refuse to stop playing, but rather pretends not to hear parent), overt resistance (Child plays with toys, and parent verbally or physically intervenes; child responds with a non-angry “no” and tries to assert autonomy by stating an agenda different from parent), and defiance (forceful rejection of parental directive; child wholeheartedly plays with toys in direct opposition to repeated parental requests to stop; child may become angry if parent intervenes further).

Distribution of the number of coded episodes ranged from 1-36 codeable episodes ( $M = 10.01$ ,  $SD = 5.23$ ). There were no differences between groups in terms of frequency of coded episodes, with the means for the positive, negative, and control groups being 10.64, 10.50, and 9.03 episodes, respectively ( $F = 2.29$ ,  $p = \text{n.s.}$ ,  $\text{Eta}^2 = .002$ ).

### *Maternal Discipline*

Eight identical codes were issued to code maternal discipline in both the “do” and “don’t” contexts. For the “do” context, 60-second epochs were used for the duration of clean-up, whereas for “don’t” segments, event-triggered markers of child behavior were coded for maternal response. Codes were mutually exclusive and symbolized varying degrees of maternal use of power. Codes are as follows: No maternal interaction (mother is not interacting with child), social exchange: directive (parent does not attempt to influence child’s behavior away from toys, but are directing child regarding other activities such as potty break, etc.), social exchange: playful (parent does not attempt to

influence child's behavior away from toys, but interacts with child in playful manner, possibly joking or tickling), gentle guidance (parent directs child regarding toys in a gentle manner; not verbal or physical force present), intense positive guidance (parental :cheerleading;” parent directs child away from toys by getting excited about task at hand or another distraction), control (parent controls child in non-forceful, matter of fact manner; yet is assertive in request) , forceful, negative control (parent directs child behavior regarding toys in a forceful, power assertive manner; may be threatening or negative; possible physical involvement), forceful negative control with physical punishment (parent directs child behavior regarding toys in a forceful, power assertive manner; may be threatening or negative; uses harsh physical discipline such as slapping hands or spanking).

In addition to discrete discipline codes, conceptually identical codes identifying level of physical involvement were assigned for both “do” and “don’t contexts. Multiple codes may be used within the same epoch, therefore all relevant codes were checked as they occur. Codes are as follows: no physical control (Parent uses no physical intervention), distal physical signs (parent points to task, or facilitates involvement such that it nonverbally suggests to child to move away from toys or to clean up), gentle physical control/guidance (direct physical contact occurs, contact may be mediated through use of a toy; no indication of clash of wills), assertive physical control (parent firmly, physically directs child clean-up or movement from toys; physically removing toys from child's hands, etc.), forceful, negative physical punishment (parent shakes, spansks, or treats child roughly; there may also be threatening motions meant to hurt or frighten child).



### 3.4 Summary

The present study examined the differential contributions of infant approach and avoidance behavior, maternal behavior in infancy, and maternal discipline in early childhood on the display of behaviors indicative of child compliance. Temperamental reactivity was coded based on frequency and intensity of the expression of approach and avoidance at 9 months of age. Mother-infant interaction was coded for maternal sensitivity, maternal responsiveness, and degree of dyadic positive affect when the infant was nine months of age. Child compliance and noncompliance, as well as maternal discipline were assessed within the context of the mother-child dyad when children were three years of age.

### 3.5 Hypotheses

1. Temperamentally negative children will display more behaviors indicative of compliance.
2. Temperamentally positive children will display more noncompliant behaviors.
3. Different contributors to the development of compliance behavior exist for temperamentally negative versus positive children (specific hypotheses below).

#### 3.5.1 Hypotheses for temperamentally positive children

Figures 1 and 2 present the hypothesized path model predicting committed compliance for the sample of temperamentally positive infants. This model predicts that committed compliance behavior at 3 years of age can be explained by 3 factors: temperamental reactivity, mutually harmonious responding, and maternal discipline. In accordance with literature examining the influence of temperament on parenting, was

anticipated that children who display more approach behavior will invoke less sensitive parenting (e.g., Mangelsdorf et al., 1990). Research has also illustrated the influence of parenting on compliance; specifically, mutually harmonious responding was expected to lead to increased compliance (Kochanska, 1991). Given the role of uninhibited temperament, in the prediction of externalizing problems (Burgess, Marshall, Rubin, & Fox, 2003; Diener & Kim, 2004) it is anticipated that approach behavior will directly lead to decreased compliance as well as increased maternal power assertive discipline (see Kochanska et al., 2003). Previous work has displayed negative relations between power assertive discipline and compliance and these same decreases in compliance are expected to be displayed (Kochanska & Aksan, 1995). Additionally, it is anticipated that power assertive discipline techniques will independently contribute to the display of aversive noncompliance, specifically defiance. The paths described are anticipated to be the significant contributors to compliance and noncompliance for children classified as temperamentally positive in infancy. Additional paths including withdrawal and gentle discipline will be present but were not anticipated to be significant.

### 3.5.2 Hypotheses for temperamentally fearful children

Figures 3 and 4 present the hypothesized path models predicting committed compliance and noncompliance for the sample of temperamentally fearful infants. This model predicts that compliance/noncompliance behavior at 3 years of age can be explained by 3 factors: reactivity to fearful stimuli, mutually harmonious responding, and gentle maternal discipline. Based on existing literature (Rubin et al., 2002), it was anticipated that fearful infants will elicit higher levels of mutually harmonious responding and higher levels of gentle discipline (Kochanska, 1991). It was also

anticipated that in fearful children, displaying high levels of fear reactivity will lead to increased committed compliance. Gentle discipline was found to be predictive of compliance in fearful children (Kochanska, 1991), and was anticipated to be so in this model as well. In this model, it was also anticipated that MHR would lead to decreases in noncompliance. Additionally, gentle discipline was hypothesized to be inversely related to noncompliance. A lack of gentle discipline, directly as well as combined with decreased MHR, will lead fearful children to demonstrated increased noncompliance (see Kuczynski & Kochanska, 1990). Additional paths were not anticipated to be significant.

## Chapter 4: Results

### 4.1 Introduction

#### 4.1.1 Data analytic strategy

Data analysis took a multi-step approach involving 9 main steps. First, data were cleaned and outliers and entry errors addressed. Next, data was reduced from raw form to workable, scored variables. Third, composites were formed for maternal behavior data based on results from principal components analyses (see Tables 8-10 for means and standard deviations). Forth, histograms and frequencies of all composites and relevant variables were evaluated for normality (see also Table 11). Fifth, possible covariates, were evaluated in relation to all composites/variables. Sixth, correlations between all variables were evaluated (Tables 12-16). Seventh, evaluations of group differences between the temperament groups were conducted (Figures 11-12). In step eight, an evaluation of the latent factor of mutually harmonious responding was performed and models re-specified (see Figure 13). And finally, in step nine, to test the main hypotheses of the current study-differing influences of maternal behavior and temperament from infancy to early childhood- structural equation modeling techniques were utilized (Tables 17-32 (summary tables 23, 24, 31, 32); Figures 14-25).

#### 4.1.2 Data reduction

##### *Positive Affect*

In all episodes (e.g., free play, prohibited plant, etc.), mutually positive discrete affect (MPD) was calculated by tallying the epochs in which a mother and her infant both

displayed discrete positive affect, either joy or tenderness/affection. This score was then proportionalized across each episode.

#### *Maternal Sensitivity*

Scoring for sensitivity occurred by taking composites of the various scales for each episode. In addition to the sensitivity in each episode, a grand sensitivity composite was also computed by calculating the mean of all of the scales, across episodes. For each sensitivity score, a higher score represented higher degrees of maternal sensitivity.

#### *Maternal Responsiveness*

Maternal responsiveness scores were determined by computing the average responsiveness score for each bid type in each episode. Average maternal responsiveness to child bids requiring redirection, negativity, social/positive bids, and physical assistance were generated in each episode of the visit (prohibited plant, mechanical dog, and caregiving/changing). Additionally, the mean of the means for each bid type and episode type was calculated separately to generate overall responsiveness scores.

#### *Child Compliance and Maternal Discipline*

Child Compliance and Maternal Discipline codes were proportionalized across the number of epochs completed. This was performed for the 'Do' and 'Don't' contexts separately.

#### 4.1.3 Composite formation

Composites of sensitivity, responsiveness, and dyadic affect were formed based on principal components factor analyses (PCA). Individual factor analyses were performed using each variable created for affect, sensitivity, and responsiveness individually.

### *Positive affect*

Principal components analysis involving mutually positive discrete affect revealed only one factor, across interactive contexts of the home visit, accounting for 36% of the variance. Therefore a composite of ‘All MPD’, computed as the mean of all proportionalized MPD scores, across episodes, was created.

Due to the fact that proportionalized variables can include values of 0 or 1, to ensure that all possible data could be utilized for modeling the mutually positive discrete affect proportion was windsorized to allow for inclusion of data. The Windsor procedure takes values at the tail of a distribution (e.g., 0 or 1) and transforms them to just inside the tail. In short, it takes extreme values and transforms them into more reasonable values. For example, a value of 0 would be transformed (recoded) into a value of .01, thereby allowing for inclusion in other analytic procedures.

Finally, affect data underwent a LOGIT transformation to balance the scale of proportionalized variables from an apex of 0 to a value of approximately .5. The formula for such a transformation is  $\text{LOGIT}x = \ln((x/(1-x)))$  where  $x$  is the variable being transformed. It is this LOGIT value that was used in modeling analyses, while the non-transformed value is displayed in the mean table and was used in correlational analyses (see Table 8).

### *Sensitivity*

Results of PCA involving sensitivity scores revealed one factor demonstrating that sensitivity was consistent, across interactive contexts. This factor accounted for 49% of the variance and, therefore, the sensitivity composite was created by taking the mean of maternal sensitivity, across interactive contexts.

### *Responsiveness*

The PCA for responsiveness, using oblimin rotation, was performed using the mean of the mean for each bid type. This type of analysis creates a simple structure while also allowing factors to be correlated. This analysis yielded 2 factors, one involving bid types 0, 1, and 3 (off task, negative, and redirection required respectively) accounting for 43% of the variance; the other involving bid type 2 (social bids) accounting for 36% of the variance. Given the infrequency of social bids, the responsiveness composite consisted of the average of the means of for bid types 0, 1, and 3.

### *Child Compliance*

Child Compliance codes were proportionalized across the number of epochs completed. This was performed for the 'Do'(clean-up) and 'Don't' (forbidden toy) contexts separately. Composites were then formed as conceptually valid. In the 'Do' clean-up scenario, committed compliance and situational compliance were indexed by the behavior coded as indexing such behavior (see Appendix E for description). In the 'Don't' forbidden toy scenario 'Looking' or 'Touching Toys' 'self-corrected behavior' were combined to form the 'Committed Compliance' variable for the forbidden toy context. 'Looking' or 'Touching Toys' 'parental intervention required/given' variables were combined to form the 'Situational Compliance' variable for the forbidden toy context. For both the clean-up ('Do') and forbidden toy ('Don't') contexts, the noncompliance variable consisted of all forms of noncompliance aggregated into an overall noncompliance variable (e.g., negotiation, passive noncompliance, overt resistance, and defiance). Figures 5-10 illustrate the distribution of each composite;

committed compliance, situational compliance, and noncompliance in the clean-up and forbidden toy contexts.

Since compliance variables were proportionalized scores, as was demonstrated with the affect variables, compliance variables were windsorized and underwent further LOGIT transformation for utilization of the maximum amount of data in modeling procedures, while untransformed values are displayed in mean tables and correlations (see Table 9).

#### *Maternal Discipline*

Maternal Discipline codes were proportionalized across the number of epochs completed. This was performed for the ‘Do’ and ‘Don’t’ contexts separately. In both the ‘Do’ clean-up and ‘Don’t’ forbidden toy contexts, coded behaviors indexing gentle discipline and controlling maternal discipline were used as indexes of gentle and power-assertive, controlling discipline styles.

Again, given the proportionalized nature of maternal discipline variables, these variables were windsorized and underwent further LOGIT transformation for utilization of the maximum amount of data in modeling procedures, while untransformed values are displayed in mean tables and correlations (see Table 10).

## 4.2 Structural equation modeling

### 4.2.1 General Overview

Structural equation modeling (SEM) is a powerful, confirmatory extension of the general linear model (GLM). Based in theoretical determinations set forth by the researcher, an SEM tests causal hypotheses while taking into account measurement error, correlated errors, and multiple latent independents indexed by multiple indicators. SEM



can test overall models rather than solely individual coefficients, while including multiple indicators, mediating variables, and error terms across multiple between-subject groups.

Three main approaches can be utilized under the framework of SEM (see Garson, 2006 for summary):

- 1.) *Strictly confirmatory approach*: This approach tests the fit of a model using goodness-of-fit tests to determine if the pattern of variances and covariances within a given data set is consistent with a structural model theoretically specified by the researcher. In this approach, a model may fit well, but this does not disconfirm the possibility of other, equally-good, or better fitting comparable models.
- 2.) *Alternative models approach*: This approach tests two or more causal models to determine which model has the best fit. This, however, requires a second, theoretically based model to test against.
- 3.) *Model development approach*: This approach combines exploratory and confirmatory steps; a model is tested and found to be deficient according to model fit tests, and an alternative model is created based upon suggestions from SEM modification indexes (e.g., Wald or Lagrange Multiplier tests).

#### 4.2.2 Model testing and specification

There are two steps in the structural equation modeling process (see Kline, 1998): Validation of the measurement model and fitting of the structural model. During the measurement model validation, the researcher specifies a model based on theory. Latent factors are tested via CFA and, after validation of the model has occurred, fit of the structural model is compared and modified to improve fit.

Several statistics can be used to modify a model. The *Chi-square difference statistic* measure the significance of the difference between two nested models of the same data, comparing the modified model chi-square to the original model chi-square. However, this statistic is sensitive to sample size and therefore may eliminate significant differences if a sample is too small. The *Lagrange Multiplier* test is a type of modification index often used to modify models by adding paths, resulting in lowering of the chi-square statistic, and an overall better model fit. This modification of the model, however, must be theoretically justified. The *Wald Test* is test used to trim a model by eliminating non-significant parameters, again resulting in a lowering of the chi-square value and an overall better model fit if theoretically justifiable.

#### 4.2.3 Testing for invariance across groups

To test for invariance, identical models are tested within each group separately first to ensure that the model is tenable for each group. After this exploratory step, to formally determine if a model fits equally well across groups (e.g., males and females), a researcher must test for measurement invariance between the unconstrained model for all groups combined, then for a model where certain parameters are constrained to be equal across the groups. If the chi-square difference test between the original and the constrained models is not significant, then one may assume the model is invariant across groups (applies to both groups). If the model is found to fit in both groups, then individual parameters may be evaluated for differences by comparing unstandardized path coefficients. To do this, each path of interest is constrained and released, one at a time. If the fit significantly improves after the constraint of the given path is released, then one can assume that that specific direct path differs significantly across groups (see

Kline, 1998). Additionally, differences between groups on total effects can be computed by hand using the following formula:

$$z = \frac{TE_1 - TE_2}{\sqrt{(SE(TE_1))^2 + SE(TE_2)^2}}$$

This equation yields a z score which can then be evaluated using the +/- 1.96 cutoff criteria where values greater than 1.96 can be considered a significantly different total effect of one variable on another, between groups. This comparison allows the researcher to see if the overall effect of one variable on another differs significantly between groups. In this procedure, unspecified mediating paths may account for the differences between groups, but specific mediators are not evaluated in this calculation (G.Hancock, personal communication, November 8, 2006). To evaluate mediators, the formula TE (total effects) = DE (direct effects) + IE (indirect effects) is examined for predictors *within* each group. Paths where significant total effects are found are then examined for partial or total mediation. If the DE is significant, but the IE is not, it can be assumed there is no mediation between variables. If the IE is significant but the DE is not, total mediation is assumed. Finally, if both the DE and the IE are significant, partial mediation has been demonstrated (G. Hancock, personal communication, January 8, 2007).

Testing for invariance can also be performed across 3 groups. In this evaluation, constraints are imposed on paths across all 3 groups and the models are run simultaneously. Chi-square difference test can be employed to evaluate invariance across groups. Evaluation of constraints is, however, broken into evaluation of constraints between 2 groups at a time, on the premise that, If Group 1 = Group 2, and Group 2 = Group 3, then Group 1 must equal Group 3 (see Byrne, 1994).

#### 4.2.4 Covariates and missing data

Structural Modeling procedures require for a covariate to be evaluated within a modeling format, the covariate variable must be included in the model and corresponding paths to each of the endogenous variables evaluated. This approach controls for differences in *mean levels* of each of the variables, however differing *relations* between variables based on the covariate are not evaluated.

To account for missing data, an interaction term must be modeled (see Enders, 2006). A significant path from the interaction term is where the regression line crosses the y-axis, signifying that the given value differs significantly from zero, however it is not relevant to evaluation of model fit or cross-group comparisons.

#### 4.2.5 Sample size and power

For SEM path analyses, the recommended sample size 5 cases per parameter to be specified (Bentler & Chou, 1987).

### 4.3 The current study

In the current study, analyses began by evaluating a confirmatory factor analysis for the factor of Mutually Harmonious Responding (MHR). Following this evaluation, models were restructured and structural models were analyzed using confirmatory structural equation modeling (SEM) with the EQS 6.1 software (Bentler, 2004), specifically, full information maximum likelihood estimation. After ensuring model fit within each group (temperamentally positive, temperamentally negative, and control), evaluation of total effects within each group were completed, followed by comparison of cross-group direct and total effects. As per Hu and Bentler (1999), primary fit indices

selected to evaluate data model fit were Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). Cutoff criteria were evaluated per recommendations in existing literature (Hu & Bentler, 1999). Each of the specific hypotheses involving expected direct effects between various model constructs were evaluated by comparing unstandardized path values, although standardized paths were also reported.

#### 4.3.1 Preliminary Analyses

Table 7 details the number of participants included at each age for each assessment. In this table, only participants with final, transformed, values for composite variables used for modeling purposes are listed. For all measures, the mean and standard deviation were calculated and are displayed for untransformed variables in Tables 8-10. Additionally, point-biserial correlations between gender and all variables were calculated. Percentage of display of child compliance and maternal discipline styles were evaluated and considered in model re-specification (see Table 11). Pearson product-moment correlations for 9- and 36-month variables were computed and are displayed for 9 month variables in Table 12 and for 36 month variables in Table 13 (see also, Tables 14-16 for relations within temperament groups).

##### *Relations with gender*

Given differences in the display of compliance based in gender (see Kochanska, 1997), gender was evaluated as a possible covariate for this study. Point biserial correlations between gender and all variables for the entire sample revealed a relation between gender and the display of committed compliance in the forbidden toy ('Don't) context ( $r = .171, p < .05$ ) as well as a relation with noncompliance in the same context ( $r$

= -.157,  $p < .05$ ), however all other relations were non-significant. Further evaluation of group differences revealed that girls displayed significantly more behaviors indicative of committed compliance in the forbidden toy context as compared to boys ( $t(168) = -2.25$ ,  $p < .05$ ). In the evaluation of noncompliance, girls displayed significantly less noncompliance in the forbidden toy context ( $t(168) = 2.06$ ,  $p < .05$ ). Finally, mothers of girls demonstrated more gentle discipline during the forbidden toy context as compared to mothers of sons ( $t(168) = 1.96$ ,  $p = .05$ ). Examination of gender differences within each of the groups revealed that, while there were no differences on any measures within the control group, mothers of temperamentally negative boys displayed more sensitive maternal behavior than mothers of temperamentally negative girls ( $t(79) = 2.21$ ,  $p < .05$ ). Additionally, the gender differences in the display of committed compliance held, although they were only at trend level in the temperamentally negative group ( $t(57) = -1.90$ ,  $p = .06$ ), while they were significant in the temperamentally positive group ( $t(54) = -2.15$ ,  $p < .05$ ). Additionally, in the positively reactive group, results revealed that, again, girls displayed increased levels of committed compliance in the clean-up context ( $t(53) = -2.02$ ,  $p < .05$ ). Given these findings, gender was a covariate in modeling analyses.

#### *Compliance in context*

Table 11 illustrates that, across both temperament groups, more committed compliance was demonstrated in the clean-up ('Do') context as compared to the forbidden toy context ( $t(166) = -9.21$ ,  $p = .000$ ). By the same token, more situational compliance was displayed during the forbidden toy ('Don't') context ( $t(166) = 16.58$ ,  $p = .000$ ). In the examination of total noncompliant behavior, it was found that this type of behavior only occurred 9.9% of the time during the clean-up context, and 4.5% of the

time during the forbidden toy context. Given these small displays of noncompliance and the complexity of the model being evaluated, the comparison of displays of noncompliance within the structural equation modeling format was not possible, and therefore, the focus of further analyses centered around the display of committed compliance and situational compliance in both the clean-up ('Do') and forbidden toy ('Don't') contexts.

#### *Interrelations among variables*

Correlations between variables for the entire sample are displayed in tables 12 and 13 for 9-month and 36-month variables, respectively. Interrelations among 9-month variables demonstrated significant relations between mutually positive discrete affect (MPD) and sensitivity ( $r = .302, p < .01$ ). Additionally, there was a significant relation between sensitivity and responsiveness ( $r = .306, p < .01$ ). These relations indicate that, in the combined sample, sensitivity is tied to displays of both increased mutually positive discrete affect, as well as increased responsiveness. In relations between maternal variables and infant temperament variables, significant relations were found whereby responsiveness demonstrated by mothers was associated with increased approach behavior by children ( $r = .202, p < .05$ ), as well as decreased avoidance ( $r = -.211, p < .05$ ).

Examination of relations at 36 months revealed significant correlations between committed compliance and power assertive discipline in the clean-up context ( $r = -.185, p < .05$ ). In the forbidden toy context, relations were found between gentle discipline and both committed ( $r = -.466, p < .05$ ), as well as situational compliance ( $r = .300, p < .01$ ).

Also, situational compliance was associated with increased levels of power assertive discipline ( $r = .478, p < .01$ ).

#### 4.3.2 Differences based in temperament

##### *Correlations among maternal variables within temperament groups*

While significant relations between 9-month maternal and dyadic variables were found across the entire sample, relations were examined within each temperament group to ensure that a factor structure for these variables would be feasible. Tables 14, 15, and 16 illustrate these results. As shown, significant relations were not sustained across all temperament groups. Within the temperamentally positive group, only the relation between sensitivity and responsiveness was significant ( $r = .326, p < .01$ ) (see Table 14). Within the temperamentally negative group, the relation between affect and sensitivity was significant ( $r = .279, p < .05$ ) (see Table 15). Only within the control group were relations among all 3 variables significant (see Table 16).

##### *Display of approach and avoidance*

Evaluation of mean differences between the 3 groups on behavioral displays of approach and avoidance revealed no significant omnibus result for either approach ( $F(2,161) = 2.28, p = \text{n.s.}$ ), nor avoidance ( $F(2,152) = 2.10, p = \text{n.s.}$ ). However, post-hoc Fisher LSD comparisons revealed significant differences between groups. Subsequent 2-group evaluations showed that the temperamentally positive children demonstrated significantly more approach as compared to the control group ( $t(107) = -1.94, p = .05$ ).

##### *Maternal behavior*

Mean differences in maternal behavior at 9 months revealed no significant differences between groups for responsiveness ( $F(2,216) = .126, p = \text{n.s.}$ ), nor sensitivity



( $F(2,237) = .056, p = \text{n.s.}$ ). However, in the display of mutually positive affect, dyads with children in the control group demonstrated higher levels of MPD than dyads with either temperamentally positive or negative children ( $F(2,227) = 4.19, p < .05, \text{Eta}^2 = .036$ ). At 36 months, no differences were found in the use of maternal discipline in either the clean-up or forbidden toy contexts, for either gentle or power assertive discipline styles.

#### 4.4 Hypothesis 1: Temperamentally negative children will display more behaviors indicative of compliance than their positive counterparts

Univariate ANOVAs were computed to evaluate group differences in the display of committed and situational compliance in both the clean-up ('Do') and forbidden toy ('Don't') contexts between all 3 groups.

In the evaluation of committed compliance, no mean differences between temperamentally negative, temperamentally positive, and control children were found in the clean-up ('Do') context ( $F(2,166) = 2.18, p = \text{n.s.}, \text{Eta}^2 = .026$ ). However, in the forbidden toy ('Don't') context, significant differences were found ( $F(2,167) = 3.62, p < .05, \text{Eta}^2 = .042$ ). Post hoc LSD tests revealed that temperamentally positive children displayed significantly less committed compliance than either their negative or control agemates. Figure 11 illustrates these findings.

Examination of group differences in situational compliance again revealed significant group differences for the display of such behaviors in the forbidden toy context only ( $F(2,167) = 3.55, p < .05, \text{Eta}^2 = .041$ ; see Figure 12). Again, positively reactive children displayed more situational compliance than their negatively reactive or

non-reactive peers. Differences in situational compliance in the clean-up scenario were not significant ( $F(2,166) = 1.17, p < .05, \text{Eta}^2 = .014$ ).

#### 4.5 Hypothesis 2: Temperamentally positive children will display more noncompliance than temperamentally negative children

While the frequency of noncompliant behaviors was low, differences in the display of overall noncompliance were evaluated in both the clean-up and forbidden toy contexts. Results of ANOVAs evaluating differences between temperamentally negative, temperamentally positive, and control children showed no significant differences in either the clean-up ( $F(2,166) = 1.35, p = \text{n.s.}, \text{Eta}^2 = .016$ ) or forbidden toy ( $F(2,167) = .178, p = \text{n.s.}, \text{Eta}^2 = .002$ ) contexts.

#### 4.6 Confirmatory factor structure of maternal behavior

Prior to running SEM models, a confirmatory factor analysis of the Mutually Harmonious Responding (MHR) factor was to be conducted. However, given the resulting lack of correlation among the variables within each temperament group, a latent factor structure for these variables was no longer deemed warranted. Each of the variables -- affect, sensitivity, and responsiveness -- were still theoretically related to the outcome of compliance; therefore, they were included in the model as covarying measured predictors and the model was re-formatted. The re-formatted, tested model, including covariates and intercept terms, is shown in Table 7.

#### 4.7 Hypothesis 3: Different contributors to the development of compliance exist for temperamentally positive versus negative children

##### 4.7.1 SEM model adjustment and re-specification

Given the relations between gender and the outcome of committed compliance, gender was evaluated as a covariate in all models. Paths from gender to all endogenous variables were examined to account for mean differences in these variables. An intercept variable was used to account for missing data. There was no evidence of statistically significant non-normality in the data; therefore ROBUST estimation procedures were not needed. Since limited relations between maternal behavior factor indicators at 9 months were found, the factor was removed and the individual variables were used (see Figure 13 for re-specified model). Raw data was used with full information maximum likelihood estimation procedures and standard errors were estimated using Fisher scores (see EQS manual).

Although the factor utilizing maternal variables at 9 months was not used, the direction of relations between temperament variables (approach and avoidance), as well as from affect, sensitivity, and responsiveness to discipline and compliance variables were hypothesized to be the same.

##### 4.7.2 Overall model fit

The models evaluated were just-identified, meaning that the model had the same number of parameters to be estimated as there were unique pieces of information in the covariance matrix. Hence the model had zero degrees of freedom, and had to fit perfectly. Therefore, the Bentler- Bonett Normed Fit Index (NFI) for each model had

value of 1.00. Given this, no further demonstration of model fit was evaluated. However, in comparison of differential influence of individual paths, improvement in Chi-square values was illustrated. The model demonstrating tested relations between 9 month temperament (approach and avoidance), 9 month maternal behavior (responsiveness, sensitivity, mutually positive discrete affect), 36 month maternal discipline, and compliance is illustrated in Figure 13.

#### 4.7.3 Clean-Up Context: Committed Compliance

##### *Within group findings*

Path values from the model predicting committed compliance in the clean-up context, tested within each group, are illustrated for each group in Table 17. While the results described in this section discuss the standardized path values only, unstandardized as well as standardized path values appear in the table. These results show that, within the temperamentally positive group, the path from avoidance to mutually positive discrete affect was significant, with a path value of  $-.272$ . This means that, within this group, a one standard deviation increase in avoidance, causes on average, a  $.272$  standard deviation decrease in mutually positive discrete affect, holding all else constant. Additionally, the path from sensitivity to power assertive discipline was significant within the temperamentally positive group whereby a one standard deviation increase in sensitivity caused, on average, a  $.279$  standard deviation decrease in power assertive discipline, holding all else constant (see Figure 14).

Within the temperamentally negative group, paths from approach to responsiveness and gentle discipline, as well as power-assertive discipline were statistically significant. Increases in approach caused increases in both responsiveness

and gentle discipline for temperamentally negative children (standardized path values .368 and .574 respectively), while leading to a decrease in power-assertive discipline (path = -.333). Additionally, a one standard deviation increase in sensitivity lead to a .323 standard deviation increase in gentle discipline for these children, as well as a .368 standard deviation decreased in power assertive discipline (Figure 15).

For the control group, approach behavior lead to decreased use of gentle discipline by mothers (path = -.323), while, in turn, the use of gentle discipline lead to increased displays of committed compliance (path = .338; see Figure 16).

#### *Total Effects*

Evaluation of total effects was conducted within to identify paths that may be significant, but mediated by other variables. No additional paths were found to be significant within the positive or negative groups. However, within the control group, the path from responsiveness to committed compliance was found to be significant (standardized path value = .353). This path could be mediated by either gentle or power assertive discipline, however this evaluation did not address if there was mediation, only that it could exist. The existence of mediators was evaluated post-hoc.

#### *Between group findings*

To evaluate differences in direct effects between the temperamentally negative, temperamentally positive, and control groups in the model predicting committed compliance in a clean-up context, an evaluation of cross-group constraints was conducted. First, paths were constrained across all 3 groups. Then comparison between each of the 2 groups was completed (1=2, 1=3, 2=3). Here, all paths were constrained

and released one by one, evaluating a significant decrease in Chi-Square and thereby concluding that that specific path differed between the groups.

Evaluation of constraints across all 3 groups illustrated significant differences involving committed compliance and gentle discipline, as well as power-assertive discipline. These constraints were predicted to improve the Chi-Square for the model by 9.43 and 4.22 units, respectively.

In the comparison of the model between the positive and negative groups, releasing the path from approach to responsiveness was suggested to improve the Chi-Square value by approximately 5.23 units ( $p = .022$ ). After release of this constraint, the Chi-Square dropped from 30.80 ( $df = 23$ ), to 25.32 ( $df = 22$ ), thereby illustrating that the direct path from approach to responsiveness did indeed significantly differ across these 2 groups (see Table 18). Between these 2 groups, increases in approach behavior for negative infants caused increased maternal responsiveness, while there was no effect of child approach on maternal responsiveness for temperamentally positive children.

Comparison of the positive and control groups revealed significant differences in the path from avoidance to gentle discipline (anticipated Chi-Square change = 6.89,  $p = .009$ ). In this case, while the model run for positive children suggested that avoidance increased mothers' use of gentle discipline, the model for the control children demonstrated the reverse- that increased avoidance caused mothers to use less gentle discipline in a clean-up context.

Finally, the comparison of temperamentally negative children to the control group revealed several significantly differing paths. First, while the path from gentle discipline to committed compliance was significant and positive in direction for children in the

control group, it was negative and not statistically significant for negative children. Releasing the constraint between these 2 variables improved the Model Chi-Square by approximately 9.58 units ( $p = .002$ ). As had been seen in other comparisons, the path from approach to responsiveness also differed between these 2 groups. Releasing this constraint was anticipated to improve the Chi-Square by 7.23 units ( $p = .007$ ). While both groups had a positive relation between these variables, the relation was stronger for the negative group. Finally, the path constraints from approach to both gentle and power-assertive discipline were found to be significant. The path from approach to gentle discipline was significant and positive for the negative group, while significant and negative in direction for the control group. Therefore, release of this constraint improved the Chi-Square by 4.22 units ( $p = .04$ ). In kind, the relation from approach to power-assertive discipline was negative in direction for negative children, while positive for control children. Therefore, a 7.32 unit change in a Chi-Square value was found when this constraint was released (see Table 18).

Next, a comparison of total effects was performed. This step involved the manual calculation of a z-score for each path in the model. As this formula can only be completed using 2 groups at a time, calculations were run for each path between 2 groups at a time (neg-pos, pos-control, neg-control). This analysis outlined significant differences in path values between variables between the two groups that may have been mediated by other factors, although these analyses did not test for specific mediators. For the comparison of total effects between the positive and negative groups, this analysis revealed a significant difference in the total effect of approach on gentle discipline (see Table 19), possibly mediated by any of the three 9 month maternal variables, sensitivity,

responsiveness, or mutually positive affect. Comparison of positive and control groups revealed significant differences in total effects on the path from avoidance to gentle discipline, possibly mediated by 9 month maternal variables as well. Finally, in the comparison of negative and control children, significant differences in total effects were found between approach and power-assertive discipline, possibly mediated by 9 month maternal variables, as well as total effects of sensitivity on committed compliance, possibly mediated by either of the discipline variables, as well as responsiveness on committed compliance, with the same possible mediators.

#### 4.7.4 Clean-Up Context: Situational Compliance

##### *Within group findings*

Path values for all groups from the model evaluating relations between 9 month temperament (approach and avoidance), 9 month maternal behavior (responsiveness, sensitivity, mutually positive discrete affect), 36 month maternal discipline, and situational compliance during a clean-up paradigm is illustrated in Table 20 in standardized and unstandardized form. The path from avoidance to mutually positive affect was significant, with a value of  $-.268$ ; indicating that when positively reactive children demonstrated behavior indicative of avoidance, the level of mutually positive affect in the dyad was lower. Additionally, within the temperamentally positive group, the path from sensitivity power assertive discipline was significant, with a standardized path value of  $-.281$ . Therefore, within this group, a one standard deviation increase in sensitivity, caused on average, a  $.281$  standard deviation decrease in power assertive discipline, holding all else constant (see Figure 17).



Within the temperamentally negative group, paths from approach to responsiveness, gentle discipline, and power assertive discipline were statistically significant, whereby a one standard deviation increase in approach caused a .370 standard deviation increase in responsiveness, as well as a .566 standard deviation increase in gentle discipline, and a .327 standard deviation decrease in mother's use of power assertive discipline for temperamentally negative children. Additionally, increases in sensitivity lead to increased gentle discipline for these children (standardized path value = .323), as well as decreased power assertive discipline (standardized path value = -.368). However, increased responsiveness caused an increased display of situational compliance (see Table 20, Figure 18).

Finally, within the control group, approach caused decreased use of gentle discipline (standardized path value = -.325). Also, at 9 months of age, mutually positive affect lead to increased use of power assertive discipline techniques, while responsiveness decreased the use of such discipline (path values .280 and -.335, respectively). Maternal power assertive discipline was found to cause increased display of situational compliance for these temperamentally unreactive children (see Table 20, Figure 19).

#### *Total Effects*

Evaluation of total effects in the model predicting situational compliance in the clean-up context found, again, a significant total effect of responsiveness on situational compliance, possibly mediated by either one of the discipline behaviors for the control group only (standardized path value = -.408).

#### *Between group findings*

In this model, evaluation of constraints across all 3 groups illustrated significant differences involving avoidance and gentle discipline. These constraints were predicted to improve the Chi-Square for the model by 5.29 units.

To evaluate differences in direct effects between the temperamentally negative and temperamentally positive groups in the model predicting situational compliance in a clean-up paradigm, an evaluation of cross-group constraints was again conducted. In this model, releasing the path from approach to responsiveness was suggested to improve the Chi-Square value by approximately 5.47 units. After release of this constraint, the Chi-Square dropped from 28.45 ( $df = 23$ ), to 22.73 ( $df = 22$ ), thereby illustrating that the direct path from approach to responsiveness did indeed significantly differ across groups.

Comparison of positive and control groups found the path from avoidance to responsiveness to differ significantly such that release of this constraint improved the Chi-Square value 6.012 units. Finally, in evaluating differences between the negatively reactive and control groups, several differences were found. First, the path from responsiveness to situational compliance was found to differ whereby release of this constraint improved the model Chi-Square from 21.19 to 14.50. The path from approach to gentle discipline, after release of the constraint decreased the Chi-Square approximately 4.04 units, while releasing the constraint from approach to power assertive discipline decreased the Chi-Square 7.40 units.

Next, a comparison of total effects was performed. This analysis revealed, as seen in the prediction of committed compliance, a significant total effect of approach on gentle discipline positive and negative groups, as well as negative and control groups (see Table 22), possibly mediated by any of the three 9 month maternal variables, sensitivity,

responsiveness, or mutually positive dyadic affect. Similarly, a significant difference was found for the total effect of approach on power assertive discipline between temperamentally positive and temperamentally negative children as well as negative control children, possibly mediated by any of the 9 month maternal variables as well (see Table 22). The total effect of the path from approach to situational compliance was found to be significantly different between positively reactive and control children, as well as for negatively reactive and control children, however, the positive and negative children did not differ.

#### 4.7.5 Conclusions for Clean-Up Context

These analyses illustrate that, within this context, while the paths differed between groups in terms of significance in the prediction of committed or situational compliance, within each group, there were some similarities regardless of outcome (committed or situational compliance) (see Table 23 for summary). For the temperamentally positive group, the paths from avoidance to mutually positive affect and sensitivity to power assertive discipline were found to be significant, regardless of whether the outcome was committed compliance, or situational compliance. Within the temperamentally negative group, paths from approach to responsiveness, gentle and power assertive discipline, as well as the paths from sensitivity to gentle and power assertive discipline were significant, regardless of outcome. Finally, in the control group, the influence of approach on gentle discipline was significant, regardless of outcome.

These findings suggest that, while situational compliance may not involve the whole hearted embracing of a parental agenda, the mechanisms by which it develops are similar to those of committed compliance. Therefore illustrating that situational

compliance, in the clean-up context, is in fact, still a form of compliance (versus noncompliance)

Between groups, there was a significant difference in the direct effect of infant approach on maternal responsiveness between temperamentally negative and temperamentally positive children within the clean-up context, again, whether examining committed or situational compliance whereby approach caused an increase in maternal responsiveness for temperamentally negative (fearful) children, but a decrease in responsiveness for temperamentally positive (approach-oriented) children. Additionally, the total effect of approach on gentle discipline, as well as approach on power assertive discipline differed between groups whereby approach caused decreases in the use of gentle discipline and increases in the use of power assertive discipline for temperamentally positive children, but had the reverse effect for temperamentally negative children (see Table 24 for summary).

Between positive and control children, the only significantly different path was between avoidance and gentle discipline. In this instance, when positively reactive children demonstrated increased avoidant behaviors, mothers responded with increased gentle discipline, however the reverse was true of the mothers of control children.

Finally, the most numerous differences were found between negative and control children. For the temperamentally fearful children, displays of approach increased positive maternal behavior (e.g., responsiveness) and decreased negative maternal behavior (power-assertive discipline), however, for the control children this relation was either inverse or nonexistent. These findings illustrate how mothers of fearful children

may in fact encourage more outgoing behavior in an effort to ‘bring out’ their child (see Early et al., 2002).

Therefore, while few specific differences in the direct contributors to compliance behavior within the clean-up context were found, the process of interaction between temperamentally different children does in fact differ from 9 months to 3 years within the clean-up context.

#### 4.7.6 Forbidden Toy Context: Committed Compliance

##### *Within group findings*

Results for the models evaluating relations between 9 month temperament (approach and avoidance), 9 month maternal behavior (responsiveness, sensitivity, mutually positive discrete affect), 36 month maternal discipline, and committed compliance during a forbidden toy context illustrated in Table 25. These results demonstrate that, within the temperamentally positive group, a one standard deviation increase in avoidance caused a .315 standard deviation decrease in mutually positive discrete affect. Additionally, a one standard deviation increase in maternal sensitivity caused decreased use of power assertive discipline (standardized path value = -.344). Finally, the prediction of committed compliance, discipline, either gentle or power assertive illustrated an inverse causal relation with committed compliance. In the former, a one standard deviation increase in gentle discipline caused a .749 standard deviation decrease in committed compliance in temperamentally positive children. Additionally, a one standard deviation increase in power assertive discipline, cause, on average, a .587 standard deviation decrease in the demonstration of committed compliance in the forbidden toy context (see Figure 20).

Within the temperamentally negative group, the path from approach to responsiveness was statistically significant, whereby increases in approach caused increases in maternal responsiveness for temperamentally negative children (standardized path value = .438). Additionally, increases in avoidance lead to decreases in mutually positive affect (standardized path value = -.324), as well as gentle discipline (standardized path value = -.314). Finally, as seen in their temperamentally positive counterparts, increases in gentle discipline caused a .440 standard deviation decrease in the display of behaviors indicative of committed compliance, as did an increase in power assertive discipline (path value = -.845) (see Figure 21).

For the control group, increased maternal responsiveness lead to decreased use of power assertive discipline (standardized path vale = -.503) and, again, the use of any type of discipline decreased the display of behaviors indicative of committed compliance (see Table 25; Figure 22).

#### *Total Effects*

Evaluation of total effects within the positively reactive group identified two additional significant paths. The first was between MPD and committed compliance (standardized path value = -.373), while the second was from responsiveness to committed compliance (standardized path value = -.275). Both paths were possibly mediated by maternal discipline (either power assertive or gentle). Within the negatively reactive group, the path from approach to gentle discipline, possibly mediated by 9 month maternal variables was found to be significant (standardized path value = -.012). For the model utilizing control children, no additional paths were found.

#### *Between group findings*

To evaluate differences in direct effects between the temperamentally negative and temperamentally positive groups in the model predicting committed compliance in a forbidden toy paradigm, 3 group constraints revealed at least one significant path, therefore 2 group analyses were conducted. In this model, between positive and negative children, releasing the path from MPD to committed compliance improved the Chi-Square approximately 5.79 units. Additionally, again, releasing the path from approach to responsiveness was suggested to improve the Chi-Square value, this time by approximately 5.79 units, thereby illustrating that the direct path from approach to responsiveness did indeed significantly differ across groups. Finally, the release of the constraint between approach and gentle discipline significantly improved model fit by approximately 4.51 units, to a final model Chi-Square value of 13.22, ( $df = 20$ ) (see Table 26).

Between positive and control children, only the path from responsiveness to power discipline was found to differ. Here, release of the path improved the Chi-Square 7.12 units to a final value of 14.90 ( $df = 22$ ).

The release of the constraint between approach and responsiveness improved the Chi-Square in the evaluation of paths between negative and control children. This release changed the Chi-Square value 6.10 units (see Table 26).

The analysis of total effects revealed additional significant effects. For the evaluation of effects between the positive and negative groups, the relation between approach and gentle discipline, possibly mediated by maternal variables at 9 months, was found. Additionally, the total effect of affect on committed compliance, possibly mediated by gentle or power assertive discipline was illustrated (see Table 27).

Between the positive and control groups, again, the possibly mediated relation between affect and committed compliance was found. Additionally, the effect of responsiveness on committed compliance was found to be significant between the positive and control groups.

Finally, between the negative and control groups, the total effect of avoidance on gentle discipline, possibly mediated by 9 month maternal behavior, was illustrated.

#### 4.7.7 Forbidden Toy Context: Situational Compliance

##### *Within group findings*

The model evaluating relations between 9 month temperament (approach and avoidance), 9 month maternal behavior (responsiveness, sensitivity, mutually positive discrete affect), 36 month maternal discipline, and situational compliance during a forbidden toy has results illustrated in Table 28. For the positively reactive group, these results show that, an increase in avoidance was related to a .309 standard deviation decrease in mutually positive discrete affect. In terms of the effects of 9 month maternal behavior, maternal sensitivity was related to a significant decrease in power assertive discipline for temperamentally positive children (path value =  $-.349$ ), while an increase in responsiveness caused an increase in power assertive discipline (standardized path value =  $.264$ ). Finally, both power assertive and gentle discipline were related to the display of behaviors indicative of situational compliance insofar as an increase in either form of discipline caused increased situational compliance (see Figure 23).

Within the temperamentally negative group, the path from approach to responsiveness was statistically significant, whereby increases in approach caused increases in maternal responsiveness for temperamentally negative children (path value =



.440). Approach was also causally related to increase use of gentle discipline behaviors for these children (path value = .293). Additionally, increases in avoidance lead to decreases in gentle discipline as well as mutually positive discrete affect and situational compliance for these children (see Table 28). Finally, as seen in their temperamentally positive counterparts, increases in power assertive discipline, caused increases in the display of behaviors indicative of situational compliance (path value = .859) (see Figure 24).

Within the control group, increase responsiveness lead to decreased power assertive discipline (path value = -.516). A .714 standard deviation increase in situational compliance was attributable to a one standard deviation increase in gentle discipline, and a one standard deviation increase in power assertive discipline caused a .704 standard deviation increase in situational compliance for these children, holding all else constant (see Figure 25).

#### *Total Effects*

Within the positive group, evaluation of total effects revealed a significant path from MPD to situational compliance, possibly mediated by discipline behaviors (standardized path = .269). No additional paths were found for the negative or control groups.

#### *Between group findings*

To evaluate differences in direct effects between the temperamentally negative and temperamentally positive groups in the model predicting committed compliance in a forbidden toy context, an evaluation of cross-group constraints was conducted. In this model, again, releasing the path from approach to responsiveness was suggested to

improve the Chi-Square value (by approximately 5.74 units). After release of this constraint, the Chi-Square dropped from 29.70 ( $df = 23$ ), to 23.54 ( $df = 22$ ). Release of the constraint between gentle discipline and situational compliance improved the model fit approximately 5.08 units, to a value of 17.85. Finally, the release of the constraint between approach and gentle discipline significantly improved model fit by approximately 4.58 units, to a final model Chi-Square value of 12.49, ( $df = 20$ ).

Between positively reactive children and the control group, one path was found to differ significantly- that from responsiveness to power assertive discipline. Release of this path improved the Chi-Square approximately 7.75 units, to a value of 14.63 ( $df = 20$ ).

The release of constraints between the negative and control children illustrated, again, a significant difference between the groups with regard to the path from approach to responsiveness. Release of this constraint improved the model fit by reducing the Chi-Square 6.52 units. Additionally, release of the constraint on the path from gentle discipline to situational compliance dropped the Chi Square 6.39 units (see Table 29).

The analysis of total effects revealed, for the comparison of positive and negative groups, a significant total effect of approach on gentle discipline, possibly mediated by 9 months maternal variables, as well as significant differences in total effects of avoidance on responsiveness and MPD on power assertive discipline (see Table 30).

Between positive and control groups, a significant difference in the total effect of sensitivity on power assertive discipline was found. While the same path was found to differ between negative and control children.

#### 4.7.8 Conclusions for Forbidden Toy Context

These analyses illustrate that there is again a significant difference in the direct effect of infant approach on maternal responsiveness between temperamentally negative and temperamentally positive children, whether examining committed or situational compliance, whereby approach caused an increase in maternal responsiveness for temperamentally negative (fearful) children, but there was no significant relation from approach to responsiveness for temperamentally positive (approach-oriented) children. Additionally, the path from approach to gentle discipline was found to be significantly different between these two groups, in either the committed or situational compliance models, whereby approach behaviors demonstrated by fearful children elicited increased use of gentle discipline (as compared to power assertive discipline), while causing a significant decrease in the use of such discipline by mothers of temperamentally approach-oriented, positive children. Finally, while MPD would be expected to contribute to the expression of behaviors indicative of committed compliance, this was only true for negative infants, while MPD was negatively related to the display of committed compliance for temperamentally positive children (see Table 31 for summary).

Between temperamentally positively reactive and control children, the path from responsiveness to power assertive discipline was significantly different in both models (predicting committed compliance or situational compliance). For positive children, this relation was positive, indicating an increase in power assertive techniques from mothers who were also highly responsive to their temperamentally positive child. However,

mothers of non-reactive control children demonstrated decreased use of power assertive techniques, rooted in a responsive history of engagement with their child.

Finally, the path from approach to responsiveness was again variant involving comparison to the temperamentally fearful group. Again, these children demonstrated a significant positive relation, while the control children showed a positive, but weak relation between approach and responsiveness (see Table 32 for summary).

#### 4.7.9 Post-Hoc Analyses

##### Evaluation of possible mediating variables

Given the differences in total effects within the groups, within each context, an evaluation of possible mediators of these relations was conducted. In SEM, total effects are equal to the sum of direct effects plus indirect effects (mediating, etc.). To evaluate the presence of a possible mediating variable, the significance of the direct effects and indirect effects within the significant total effect relations was conducted. Here, if the indirect effect is significant, but the direct effect was not, it can be assumed that there is total mediation by another variable. If the indirect effect is significant, and the direct effect is also significant, this is evidence of partial mediation. Finally, if the indirect effects are not significant, but the direct effects are, this simply illustrates a direct relation between two variables. This comparison is conducted within each group (i.e., temperamentally positive and temperamentally negative).

In the model evaluating committed compliance in the clean-up context, there were no possible mediating relations within the temperamentally positive group. In the temperamentally negative group however, significant total effects were found for relations between approach and gentle discipline, as well as approach and power assertive

discipline; with either of these relations possibly mediated by any one of the 9 month maternal behavior variables. In both these relations, however, the direct effect was significant, but the indirect effects were not, therefore there was no evidence of mediation in either case. For the control group, significant total effects were found for the effect of approach on gentle discipline, as well as responsiveness in committed compliance. However, the indirect effect was not significant in either case, therefore, no mediation was found.

In the prediction of situational compliance, a similar situation was found. There were no potential mediating relations in the temperamentally positive group. For the negative group, there was a significant total effect of approach on gentle discipline, as well as controlling discipline. However, in both cases, the indirect effect was not significant, thereby showing no evidence of mediation. Additionally, the total effect of responsiveness on situational compliance was found, however this too revealed a non-significant indirect effect, thereby demonstrating a direct relation only. For the control group, both significant total effects that could demonstrate mediation, the path from approach to gentle discipline, and that from responsiveness to situational compliance, failed to do so. Therefore, overall, all effects illustrated in the clean-up scenario for either the prediction of committed compliance or that of situational compliance were composed on solely direct effects.

In the forbidden toy context, there were two possible mediating relations evidenced in the temperamentally positive group. In the model with committed compliance as the outcome, for the path from affect to committed compliance, as well as from responsiveness to committed compliance, direct effects were found to be not

significant, while indirect effects were significant, hence evidencing a total mediation scenario for both paths. Here, the relation between affect and committed compliance, as well as the relation between responsiveness and committed compliance was mediated completely by discipline. Also, in the prediction of situational compliance for temperamentally positive children, this same type of mediating situation was found between affect and situational compliance thus demonstrating the salience of discipline during a restrictive activity for temperamentally positive children. In both models, predicting committed and situational compliance, no mediating relationships were found for the temperamentally negative children or the control children.

#### Relations with other maternal variables

To evaluate possible relations between demographic characteristics and parenting variables that were not modeled in this study, relations Pearson product-moment correlations between maternal education and maternal age and maternal variables at both 9- and 36 months were computed. Results revealed a significant correlation between maternal age and the display of maternal sensitivity at infant age 9 months such that older mothers displayed significantly more sensitivity ( $r = .306, p = .000$ ). Additionally, when their children were 36 months, older mothers displayed significantly more gentle discipline ( $r = .186, p < .05$ ) and less controlling discipline ( $r = -.309, p = .000$ ) in the forbidden toy context than their younger counterparts.

Additionally, examination of group differences in maternal behavior based upon self-reported ethnic groups revealed significant differences in several of the maternal behavior variables. First, in regard to the display of maternal sensitivity when their infants were 9 months of age, significant group differences were found ( $F(4,234) =$

8.405,  $p = .000$ ,  $\text{Eta}^2 = .126$ ). Post-hoc LSD comparisons revealed, specifically, that Caucasian mothers displayed the highest levels of sensitivity, and this level was significantly different from both African American and Hispanic mothers. Also, at 9 months, Hispanic mothers were found to be in dyads characterized by lowest levels of mutually positive affect ( $F(4,224) = 2.42, p < .05, \text{Eta}^2 = .041$ ). Finally, at 36 months, differences were found in the use of power assertive discipline in the clean-up context such that Caucasian mothers used significantly less of this discipline as compared to Asian mothers ( $F(4,163) = 2.44, p < .05, \text{Eta}^2 = .056$ ).

Although it is beyond the scope of the current study, these findings regarding age, education, and ethnic differences in maternal behavior are supported by existing literature (see Deater-Deckard, Dodge Bates, & Pettit, 1996; Kelley, Sanchez-Hucles, & Walker, 1993; Pederson, Moran, & Sitko, 1990; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000) and constitute an important area for further research.

## Chapter 5: Discussion

### 5.1 General Implications

Why do some parents ask their children to clean-up their toys once and the child does so straight away while others have to repeatedly ask and ask and ask? Why do some children run headlong through a mall full of strangers, with an anxious mother trailing behind; while others are permanently affixed to their father's leg? These behavioral differences have long been attributed, by parents, as their child being 'scared' or 'fearless' and, while these temperamental differences penetrate every level of the parent-child relationship, they are particularly salient as children enter toddlerhood and early childhood when issues of safety and rule-conformity become ever-pressing. It is the balance between a child's behavior and a parent's reaction that can make any given day 'good' or 'bad' - and can create the growing pains experienced by both.

Parents are the primary socializers of their children; therefore, understanding the delicate balance between child temperament and parental behavior is crucial in helping parents navigate the world of their young children. By unraveling what parenting behaviors 'work' for which children, parents can assist their child in acclimating into the role of a member of society and, hopefully, minimize the battles along the way.

The present study sought to delineate the contributors to the display of compliance for temperamentally negative and temperamentally positive children. In doing so, this study outlined the differential contributions of temperamental approach and avoidance, maternal behavior in infancy, as well as maternal discipline to the socialization process for temperamentally different children.



Historically, literature has focused mainly on the influence of parents on their children, from a top-down approach, in examining the development of compliance behavior (e.g., Patterson, 1982; Wahler, 1976). And, while the influence of parental behavior is in fact important, the issue of ‘child effects’ is crucial as well. This study illustrated that children with differing temperamental types displayed not only varying levels of compliance behavior, but evidenced differing contributors to the process of socialization as well.

## 5.2 Compliance in Context

In the current study, the first hypothesis- temperamentally negative children would display more behaviors indicative of compliance than their positive peers- was not supported. In line with earlier work, as a whole, children displayed more noncompliance during a clean-up paradigm, as compared to the forbidden toy paradigm (10.6% of the time versus 4.2% in each context, respectively) (see Kochanska, & Aksan, 1995). However, in the examination of types of compliance, specifically delineating committed compliance and situational compliance, results indicated that, overall, children displayed less committed compliance and more situational compliance in the forbidden toy context versus a clean-up task. This finding was exacerbated when the issue of temperament was introduced. No temperamental differences in the display of committed compliance were found in the clean-up context. However, there were differences in the display of both committed as well as situational compliance, by temperament group, within the forbidden toy context. These differences illustrated that temperamentally positive children displayed more behaviors involving continual parental intervention (situational compliance), as well as less internalized behavior as compared to their temperamentally

negative counterparts. While this finding did illustrate the differences between the two groups, results were carried by the positively reactive group. Therefore, this finding is indicative of a lack of internalization of the parental agenda during the forbidden toy paradigm for temperamentally positive children, whereby compliant behavior is only evident when accompanied by sustained maternal control.

Given the age of the participants, the differentiation between compliance in the ‘Don’t’ and ‘Do’ scenarios is not surprising. By early childhood, parents are focused on rules emphasizing safety and respect for others, while it is not until later in childhood that rules about manners or family routines are found (Gralinski & Kopp, 1993). Statements most directed to two- and three-year-olds involve a focus on ‘Don’ts’- “Don’t touch the stove”, “Don’t go in the street”, “Don’t color on the furniture”, “Don’t hit your brother”- While it is not until later into the third year or older that parents switch their focus to clean-up or other chores (e.g., ‘Do’s’).

Also, while the current study failed to find significant differences between children of differing temperament groups on indices of approach and avoidance, other studies have in fact demonstrated them. Hane and colleagues (Hane et al., 2007) found that temperamentally negative infants demonstrated significantly higher levels of avoidance, while temperamentally positive infants demonstrated significantly higher levels of approach. Given this, it stands to reason that a paradigm such as the forbidden toy paradigm, where children are asked to inhibit a behavioral impulse, would be particularly difficult for approach-oriented children. In her examination of the development of conscience, Kochanska discussed two main systems that were at play, an affective system- which focused on the arousal of anxiety, as well as a behavioral control

system (Kochanska, 1993). The arousal of anxiety in approach-oriented, exuberant children, is not particularly useful in curbing undesirable behavior (e.g., Kochanska, 1993). For these children, the ability to refrain from acting, behaviorally, is closely tied to other possible problem behaviors such as impulsivity and risk-taking (e.g., Calkins, 1994; Kochanska, Murray, & Coy, 1997). As temperamentally positive children demonstrated heightened approach behaviors in infancy (e.g., Hane et al., 2007), the continuity of such behaviors into early childhood illustrates continuity in temperament. Also, given a relationship between mother and child characterized by such behavior on the part of the child, it is possible that, not only is compliance more difficult for these children, but that the mother continually reinforces the goal of an exercise to the child (i.e., don't touch the toys) as a pre-emptive strike against possible transgressions, although the current analyses did not contain the time-series component needed to analyze such relational mechanisms.

The second hypothesis-temperamentally positive children will display more noncompliance than temperamentally negative children- was not supported. Theory would suggest that, given the propensity for exuberant children to be at risk for various kinds of problem behaviors (e.g., Hirshfeld et al., 1992), that these children would in fact display more noncompliant behaviors. This is especially true as noncompliance, specifically aversive forms of noncompliance, have been found to be a risk factor for delinquency and other behavioral problems (Kuczynski & Kochanska, 1990; Patterson et al., 1989). The current finding may be explained by two factors: 1) given the demographics of the current population, the frequency of noncompliant behaviors in the current sample was insufficient to diagnose such differences in subgroups, or 2) for

noncompliance to be a risk-factor for behavior, approach-related tendencies is a necessary-but-not-sufficient condition for demonstration of noncompliance.

Firstly, consistent with other research, children behaved in ways classified as compliant for the majority of the time (see Kochanska, 1993). As such, children only displayed noncompliant behavior during a small portion of the time. Given the apparent lack of noncompliant behaviors demonstrated at all, the lack of differentiation between temperamentally positive and temperamentally negative children could be simply a statistical limitation.

It is noteworthy that the current population is a low-risk, racially and economically homogeneous sample; denoted by high levels of education and predominantly Caucasian racial distribution. While highly correlated, maternal education and socioeconomic status have large impacts on development. Maternal education has been related to child outcomes in numerous studies examining behavior problems (Anhalt, Telzrow, & Brown, 2007), social information processing (Schultz & Shaw, 2003), and academic achievement (NICHD, 2002), with low maternal education relating in poorer child outcomes in all areas.

In kind, low socioeconomic status (SES) has also been linked to suboptimal development. Children in lower SES environments do not have the same opportunities or resources as their higher SES peers; this disadvantage may put them at risk for developmental problems (Brooks-Gunn & Duncan, 1997). As noted in a recent review (see Bradley & Corwyn, 2002), while there is variability in problems associated with SES, in general, children reared in low SES environments, especially children in poverty, are at risk for health problems both prenatally (DiPietro, Costigan, Hilton, & Pressman,

1999) and postnatally (U.S.Department of Health and Human Services, 2000), as well as impaired school achievement (Duncan, Brooks-Gunn, & Klebanov, 1994; Pianta, Egeland, & Sroufe, 1990), and increased risk for maladaptive psychiatric and social outcomes (Brooks-Gunn & Duncan, 1997; Patterson, DeBaryshe, & Ramsey, 1989; Sameroff, Seifer, Zax, & Barocas, 1987).

This factor, in combination with socioeconomic status and racial minority status have been combined to form a block of ‘underprivileged’ or ‘at-risk’ characteristics that are predictive of suboptimal development (see Bradley & Corwyn, 2002; Ramey & Ramey, 1998; Spornak, Schottenbauer, Ramey, & Ramey, 2006). In such an ‘at-risk’ population, research has noted greater frequencies of behavior problems, specifically externalizing problems (Nguyen, Huang, Arganza, & Liao, 2007). Therefore, while noncompliance itself is not a behavior problem, it is closely associated with such issues (e.g., Patterson et al., 1989) and hence, in a more diverse sample, a greater proportion of noncompliant behavior might be observed. In concert with this reasoning, the current findings may not be generalizable to a more ethnically heterogeneous or socioeconomically disadvantaged population.

Regarding the second point, temperamental exuberance or approach-related tendencies, are not direct risk-factors for behavioral problems. While research has found that children demonstrating high levels of approach have displayed increased rates of oppositional disorder (Hirshfeld et al., 1992) or other externalizing behaviors (see Derryberry & Reed, 1994; Rothbart et al., 1994), this is not true for all children. As discussed in a recent review by Gunnar (Polak-Toste & Gunnar, 2006), the development of the self-regulatory system and its corresponding neural pathways can allow a child to

override tendencies to approach. The mechanism of effortful control (see Rothbart, Derryberry, & Posner, 1994) allows a child to act, whether it be by inhibiting approach or overcoming avoidance, to accomplish a goal. Research has in fact demonstrated that children who were rated as high in exuberance and low in regulatory abilities were observed to have more social difficulties (in peer relations) and displayed more externalizing problems than their well-regulated, exuberant counterparts (Rubin et al., 1995). Therefore, simply being classified as high positive or demonstrating increased levels of approach does not necessitate noncompliant or problematic behavior. In the current sample, while not tested, it is possible that a good portion of the temperamentally positive children possessed high levels of regulatory abilities, thereby accounting for the lack of display of noncompliant behavior.

The third, most extensive, goal of the study was to explore the various contributors to the development of compliance, over time, for fearful and exuberant children. As seen in temperamental differences in the display of compliance, the contributors to compliance broke down, not only along temperament lines, but by context as well.

### 5.3 Pathways to Compliance

#### 5.3.1 The Clean-Up Context

Within the Clean-Up paradigm, similar precursors to both committed compliance and situational compliance were found. For the temperamentally negative group, no significant, direct predictors to committed compliance were found. However, the influence of temperament on maternal behavior was clear. Fearful infants who displayed approach behavior elicited more responsive maternal behavior in infancy, as well as

gentle discipline, from their mother. Within this model, maternal sensitivity in infancy was also predictive of increased gentle discipline in early childhood, as well as decreased power-assertive discipline, for mothers of temperamentally negative children.

Recent research, illustrating the role of continuity of temperament in the prediction of maternally reported behavior problems in childhood has demonstrated the importance of continuity in behavioral displays of temperamental characteristics (Hane, Ghera, Quinn, & Fox, 2007; see also, Hane et al., 2006). This research suggests that congruence between earlier behavioral displays of temperament (i.e., positivity or negativity) and later displays of such behavior is in fact salient to a mother. When incongruence occurs, as in evidenced here, with fearful children demonstrating approach behavior, the mother takes note and responds. Fearful behavior is often looked upon as problematic by parents and, as such, may be a behavior that some parents try to change. In kind, Early and colleagues found that inhibited infants entering kindergarten were more likely to remain inhibited if they were paired with maternally insensitive mothers, whereas mothers with higher levels of sensitivity helped their children to overcome their inhibition (Early, Rimm-Kaufman, Cox, Saluja, Pianta, Bradley, et al., 2002). Henceforth, when a mother was sensitive to her child's behavior, she could take steps to help 'bring the child out' of their fearfulness. A similar effect is demonstrated in the current study, with mothers of fearful children reacting to their approach behavior with responsiveness and tenderness, seemingly attempting to encourage this behavior, versus reacting punitively. However, when an incongruence in behavior occurred for the temperamentally positive children, in demonstrating avoidant behaviors, these children were met with decreased mutually positive affect.

It is important to note that these very same paths are the ones that differed significantly between the temperamentally negative and temperamentally positive infants. While approach behavior was indicative of responsive, gentle maternal behavior for fearful children, for approach-oriented, temperamentally positive children, the opposite was true. Mothers whose children were approach-oriented normally, did not react to their behavior with such gentleness, but rather with decreased responsiveness and gentle discipline. For these children, their exuberant nature appears to have worn their mother down, so to speak, and caused her to be less responsive and more punitive in her approach to getting her child to follow commands (i.e., clean-up).

#### 5.3.2 The Forbidden Toy Context

The most substantial evidence in differing paths to compliance based in temperament is found within the forbidden toy context. As in the clean-up context, the path from approach to maternal responsiveness was found to differ significantly between the negative and positive children for models involving both committed and situational compliance, such that increased approach elicited increased responsiveness for fearful children, and decreased responsiveness for exuberant children. Given its consistency across models, this finding strongly demonstrates how approach-oriented children may be at risk for suboptimal parental behavior. These children, while seemingly positive in affect, require a lot of parenting. Although not necessarily negative in their responses, a mother of this type of child is always 'on'. The exuberant child is always looking, exploring, interested in the environment; therefore, a mother must continually check on and direct the child's behaviors to ensure that the child is, not only productively engaged in a task, but not in danger.



In the prediction of committed compliance, the path from avoidance to mutual affect was significant and negative for both groups; illustrating that avoidant behavior does not create a mutually positive relationship for any children (and their mothers). For temperamentally negative children, increased avoidant behavior also caused decreased gentle discipline. Again, this could be due to parents attempting to minimize such behavior (inhibited), even if via ‘tough love’. Additionally, for negative children, any type of discipline, be it gentle or punitive, was significantly, negatively predictive of committed compliance. This result indicates that, to get fearful children to comply and to internalize parental values, their parent must not act via discipline. As has been indicated in the literature, it is with these children that scaffolding may be most effective in bringing about compliance (see Kochanska, 1991). Drawing on Kochanska’s (1993) model of the affective component of the development of conscience, for fearful children, discipline in any form may over-engage the anxiety component of their affective system, causing decreased compliance.

For temperamentally positive children, the salience of continuity in temperament was again illustrated. Displays of avoidance by the children did not increase positive affect between the children and their mothers, but rather decreased it. For these dyads, while other aspects of the child’s temperament, such as their approach-oriented nature, may pose difficulties in parenting, positivity is the cornerstone of interaction for these dyads. Therefore, displays of behavior that detract from the interaction of the dyad also detract from the positive nature of their dyadic interactions.

It is also plausible that, as these constructs (affect and avoidance) were both evaluated at 9 months of age that the effect was in the reverse direction. Specifically, it

could be that temperamentally positive children who experienced poor quality parenting (low in positive affect) displayed more avoidant behavior. Mutually positive dyadic affect has in fact been evaluated as an index of the quality of the mother-infant relationship (Kochanska, 2002) and previous research has demonstrated that lower quality mother-infant interaction may shape avoidant, fearful behavior (Hane & Fox, 2006), while insecure attachment is related to future wariness with strangers (Calkins & Fox, 1992; Kochanska, 1998; Stevenson-Hinde & Shouldice, 1990). Therefore inasmuch as an experimenter is a 'stranger' (in the laboratory setting), the outgoing, positive nature of these children may be curtailed by their experience of lower quality parenting, hence causing them to retreat inward somewhat and become more avoidant.

Additionally, for these children, the use of gentle discipline techniques is simply not effective. This style of discipline was significantly, inversely related to child displays of committed compliance, as well as significantly, positively related to their displays of situational compliance. Additionally, discipline totally mediated the relation between affect and compliance, as well as responsiveness and compliance, for the temperamentally positive group.

Finally, an important path was found to differ between the temperamentally negative and temperamentally positive groups in the forbidden toy context. In the prediction of committed compliance, the path from mutually positive affect directly to committed compliance was found to differ. For the temperamentally positive children, the path value was negative, indicating that dyads characterized by high levels of mutually positive affect were not useful in assisting temperamentally positive children display behaviors indicative of committed compliance and, in turn, internalize the rules of

the forbidden toy context. However, for the temperamentally fearful children, the path from mutually positive affect to committed compliance was positive, illustrating that the induction of positive mood in fearful children assisted in their socialization. This latter finding is reminiscent of earlier work demonstrating the influence of positive mood on internalization of values (Kochanska & Aksan, 1995; Kochanska et al., 1995; Lay et al., 1989).

#### 5.4 Limitations of the Current Study

While the current study sought to contribute much to the understanding of the development of compliance, specifically the interplay of temperament and parenting as they impact both child and maternal behavior, it is not without limitation. Most notably, the impact of parenting on and with child behavior was solely observational in nature. No information regarding maternal beliefs of self-efficacy, maternal social support, or maternal psychological well-being (e.g., stress or depression) was gathered. All of these aspects of a mother's experience have been implicated as factors affecting not only maternal behavior, but the parent-child dynamic as well (Albright & Tamis-LeMonda, 2002; Crockenberg & Leerkes, 2003; Leerkes & Crockenberg, 2002; Stifter, Bono, & Spinrad, 2003). Without self-reported information from a mother on her experience of parenting, especially when her experience is parenting a temperamentally challenging child, this limits the understanding of her role as parent and also limits knowledge regarding other, non-observable, aspects of the parent-child relationship.

Additionally, research has revealed that, as expected, fathers play a critical role in a child's development (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Research has shown that fathers may have very different relationships with their children

as compared to mothers (Parke, 1996), although this is unclear (see Lamb & Lewis, 2004). Additionally, fathers are often cited as disciplinarians (see Jain, Belsky, & Crnic, 1996). Given the importance of discipline in the development of behaviors indicative of compliance, evaluation of the contribution of paternal behavior is critical for understanding the process of child socialization.

Thirdly, the evaluation of temperament via observational versus self-report measures has long been debated. The incongruence between such measures has been noted in many studies and has been attributed to various reasons (see Bates et al., 1979; Crockenberg & Acredolo, 1983; Hane, et al., 2006; Isabella, Ward, & Belsky, 1985). One may argue that, when dealing with a mother's behavior towards her child, especially in infancy, it is the mother's perception of her child's temperament that drives her interactions with her child. Research has shown that a mother's perceptions of her child's soothability moderates her behavior towards her child (Ghera, Hane, Malesa, & Fox, 2006). However, without this attribution (e.g., soothability) modeled within the current framework, this relation is lost.

Finally, the use of gender as a covariate also has several limitations. First, the covarying or trying to tease apart any intrinsic quality such as gender, race, or ethnicity has been debated in the literature (e.g., McLoyd & Steinberg, 1998; Newcombe, 2003; Rogoff, 2003). Controlling for "background factors" may not be prudent if the goal of research is to understand the process or functioning of families (Newcombe, 2003). In the current study, modeling gender as a covariate, while it controls for mean differences in associated variables, does not evaluate potential differing relations among variables based on participant gender. While beyond the scope and ability of this study, the

evaluation of differing relations between contributors to compliance rooted in gender would be an interesting and important contribution.

### 5.5 Future Directions

While a child's relationship with a parent is their primary socialization experience, children also must learn to incorporate the lessons learned within this dyad into their broader social experience. Therefore, applying this model to other social situations such as the daycare or preschool environment is an important extension of this study. Also, children do not behave with parents as they do with other authority figures; for better or worse. Therefore, contributors to compliance with other adults would be an important piece in understanding a child's incorporation into society. Additionally, given the temperamental, gender, and ethnic differences found in both compliance and discipline, further evaluation of the development of compliance within these subgroups is a logical extension of the current study.

For example, qualitatively different cultural experiences regarding socialization and societal structure have been illustrated and should be evaluated from a 'within culture' approach. In writings about African American culture, researchers have discussed a topic called 'verve'. Verve is the preference for heightened levels of stimulation; this may be based in part of a number of Afro-cultural themes emphasizing affective expression, communalism, and physical, rhythmic movement (see Boykin, 1983). This cultural ethos creates a completely different standard for the evaluation of compliance and socialization in general. In the current sample, high levels of approach and impulsivity toward a forbidden object would be deemed 'noncompliant'. However, from this Afro-cultural perspective, such a categorization would be incorrect and

approach may be simply an expression of a child's verve. Therefore, examining the expression of compliance and socialization within cultures would be an important contribution to understanding development.

## 5.6 Conclusions

The current study demonstrated temperamental differences in the display of, as well as predictors of, compliance behavior in early childhood. In order to assist parents in dealing with their children in ways which will forward their goal of appropriate socialization and aid children in following rules and directives in place in both their home and society, specific parental behaviors to assist in this task must be identified- this study did just that.

For parents of fearful, temperamentally negative children, approach behavior, responsive, sensitive parenting led to increased compliance. These findings parallel those in the literature (Kochanska, 1991; 1993), evidencing how use of the affective system, leads to compliant behavior for anxiety-sensitive children.

For approach-oriented, temperamentally positive children however, sensitive, affectually positive mothering was not associated with increased compliant behavior. In fact, it was inversely related. For these children, the use of power assertive, as well as gentle discipline was also ineffective. Therefore, the question of how to foster internalization and compliance in exuberant children remains unclear. While existing literature has noted that a mutually responsive relationship was predictive of compliance in fearless children (see Kochanska, 1991), that finding was not supported here. It could be that neither positive relationships, nor discipline alone are sufficient in predicting

compliance behavior for temperamentally positive children. Perhaps there is some sort of moderating role with these variables, whereby temperament interacts partially with each in a 3-way interaction scenario. Additionally, effective contributors to compliance could work for differing context and periods of time- in short, what worked today may not work tomorrow. Perhaps parents of exuberant children need to use a ‘change up’ approach to socialization, mixing reward, punishment, and positive parenting depending on the goal of the exercise.

The socialization of our children is a very important goal for any parent- any society. By taking into account our children’s our unique attributes, we can find ways of making this process go a bit smoother, for parent and child. For, as a saying attributed to Margaret Mead states, “The solution to adult problems tomorrow depends in large measure on how our children grow up today”.

Table 1.

*Gender distribution of participants (n = 244) for overall sample and temperament groups*

	Combined		Positively		Negatively		Control	
	Sample		Reactive		Reactive		Group	
Gender	N	%	N	%	N	%	N	%
Females	131	53.7	39	47.6	51	62.2	41	48.8
Males	113	46.3	43	52.4	31	37.8	39	51.3

*Note.* Chi Square calculations were not significant ( $\chi^2 = 3.82, p = \text{n.s.}$ ).

Table 2.

*Children's age at assessment for overall sample and temperament groups*

	Combined		Positively		Negatively		Control	
	Sample		Reactive		Reactive		Group	
Infant Age	N	M(SD)	N	M(SD)	N	M(SD)	N	M(SD)
9 mo.	241	9.44 (.38)	82	9.45 (.39)	81	9.40 (.45)	78	9.46 (.29)
36 mo	179	36.43 (1.77)	61	36.28 (1.56)	62	36.42 (2.37)	56	36.50 (1.12)

*Note.* No differences were found between temperament groups on age at assessment



Table 3.

*Maternal characteristics for overall sample*

Ethnicity (n = 243)	N	%
African American	37	15.2
Asian	6	2.5
Caucasian	174	71.6
Hispanic	16	6.6
Other	10	4.1
Education (n = 242)	N	%
High School	42	17.2
College Graduate	98	40.2
Graduate School Graduate	88	36.1
Other	14	5.7

Table 4.

*Overview of assessments and coding*

Age/Time of Assessment	Place of Assessment	Behavior Assessed
4 months	Laboratory	Temperamental reactivity: Positive affect Negative affect Motor behavior
9 months	Laboratory	Temperamental reactivity: Fear, Joy; (Approach, Avoidance)
	Home	Maternal behavior: Sensitivity Responsiveness  Interactive affect: Mother & child mutually discrete positivity
36 months	Home	Maternal discipline: Gentle discipline Power-assertive Discipline  Child compliance: Committed compliance Situational compliance Noncompliance

Table 5.

*36 month assessments*

Context of interaction	Behaviors coded
Clean-Up Paradigm (‘Do’ )	Committed compliance
	Situational compliance
	Noncompliance
Forbidden Toy Paradigm (‘Don’t)	Committed compliance
	Situational compliance
	Noncompliance

Table 6.

*Composite formation*

Composite variable	Computation
9 mo. Maternal Sensitivity	Mean of maternal sensitivity scores across episodes of interaction
9 mo. Maternal Responsiveness	Mean of maternal responsiveness scores in response to child's off task, negative, and redirection required bids, across episodes of interaction
9 mo. Interactive Affect	Mean of mutually positive discrete affect across interactive episodes
36 mo. Maternal Gentle Discipline, Clean-Up	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Maternal Power-Assertive Discipline, Clean-up	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Maternal Gentle Discipline, Forbidden toy	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Maternal Power-Assertive Discipline, Forbidden toy	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Committed Compliance, Clean-up	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Situational Compliance, Clean-up	Proportionalized score of behaviors coded as indicative of behavior across episode
36 mo. Noncompliance, Clean-up	Sum of proportions of any form of noncompliance (negotiation, passive noncompliance, overt resistance, defiance)
36 mo. Committed Compliance, Forbidden Toy	Sum of proportions of behaviors coded as 'looking at toys, no touching' and 'touching toys, self-corrected'
36 mo. Situational Compliance, Forbidden Toy	Sum of proportions of behaviors coded as 'looking at toys, no touching, parental intervention' and 'touching toys, parental intervention'
36 mo. Noncompliance, Forbidden Toy	Sum of proportions of any form of noncompliance (negotiation, passive noncompliance, overt resistance, defiance)

Table 7.

*Number of participants seen at each age for each assessment*

Age/Time of Assessment	Behavior Assessed	N
4 months	Temperamental reactivity:	
	Positive affect	244
	Negative affect	244
	Motor behavior	244
9 months	Temperamental reactivity:	
	Approach	164
	Avoidance	155
	Maternal behavior:	
	Sensitivity	240
	Responsiveness	219
	Interactive affect:	
	Mother & child mutually discrete positivity	230
36 months	Maternal discipline:	
	Gentle discipline	Clean-up context: 169 Forbidden toy context: 170
	Power-assertive Discipline	Clean-up context: 169 Forbidden toy context: 170
	Child compliance:	
	Committed compliance	Clean-up context: 169 Forbidden toy context: 170
	Situational compliance	Clean-up context: 169 Forbidden toy context: 170
	Noncompliance	Clean-up context: 169 Forbidden toy context: 170

Table 8.

*Means and standard deviations on measures of temperament and mother-infant behavior in the home and laboratory at 9 months for the overall sample and temperament groups*

Measures	Combined Sample		Positively Reactive		Negatively Reactive		Control Group	
	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>
Lab-TAB								
Avoidance	164	-.055(2.04)	53	-.516(1.85)	54	.148(1.80)	48	.226(2.43)
Approach	155	.149(1.95)	54	.596(2.01)	55	.026(1.67)	55	-.167(2.10)
Mother-Infant Interactive Behavior								
Sensitivity	240	6.44(.736)	81	6.45(.629)	81	6.42(.742)	78	6.45(.836)
Responsiveness	219	2.38(.400)	75	2.48(.386)	78	2.47(.375)	66	2.50(.446)
Mutually Positive Affect	230	.180(.146)	78	.163(.126)	75	.159(.124)	77	.219(.175)

Table 9.

*Means and standard deviations on measures of child compliance behavior in the home at 36 months for the overall sample and temperament groups*

Measures	Combined Sample		Positively Reactive		Negatively Reactive		Control Group	
	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>
Committed Compliance								
Clean-Up	169	.694(.311)	55	.763(.305)	60	.645(.327)	54	.679(.294)
Forbidden Toy	170	.430(.247)	56	.360(.231)	59	.454(.256)	55	.477(.242)
Situational Compliance								
Clean-Up	169	.154(.204)	55	.120(.201)	60	.177(.193)	54	.163(.218)
Forbidden Toy	170	.524(.238)	56	.592(.231)	59	.497(.248)	55	.484(.221)
Noncompliance								
Clean-Up	169	.099(.171)	55	.079(.194)	60	.128(.170)	54	.089(.142)
Forbidden Toy	170	.045(.120)	56	.048(.127)	59	.049(.130)	55	.037(.102)

Table 10.

*Means and standard deviations on measures of maternal discipline in the home at 36 months for the combined sample and temperament groups*

Measures	Combined Sample		Positively Reactive		Negatively Reactive		Control Group	
	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>	<i>N</i>	<i>M(SD)</i>
Gentle Discipline								
Clean-Up	169	.758(.292)	55	.773(.272)	60	.697(.354)	54	.809(.218)
Forbidden Toy	170	.241(.210)	56	.227(.213)	59	.235(.203)	55	.262(.216)
Power Assertive Discipline								
Clean-Up	169	.078(.161)	55	.053(.127)	60	.100(.183)	54	.090(.163)
Forbidden Toy	170	.221(.224)	56	.258(.210)	59	.209(.248)	55	.197(.210)



Table 11.

*Percentage of displays of compliance and noncompliance behavior at 36 months across groups*

% of time behavior was displayed	
Clean-Up Context	
Committed Compliance	69.4
Situational Compliance	15.4
Non-Compliance	9.9
Forbidden Toy Context	
Committed Compliance	43.0
Situational Compliance	50.4
Non-Compliance	4.5

Table 12.

*Interrelations among 9 month indices of maternal behavior and infant temperament*

	Sensitivity	Responsiveness	Avoidance	Approach
MPD	.302** (230)	-.102 (211)	-.099 (146)	-.044 (155)
Sensitivity		.306** (219)	.067 (15)	.100 (162)
Responsiveness			-.211 (143)	.202* (146)
Avoidance				-.228** (151)

Note. Number of participants in parentheses. MPD = Mutually Positive Discrete Affect

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

Table 13

*Interrelations among 36 month indices of child compliance and maternal discipline*

	SC.Do	CC.Don't	SC.Don't	GD.Do	CD.Do	GD.Don't	CD.Don't
CC.Do	-.674** (169)	.075 (167)	-.043 (167)	.118 (169)	-.185 (169)	-.087** (167)	.033 (167)
SC.Do		-.135 (167)	.130 (167)	.031 (169)	.140 (169)	.014 (167)	.159* (167)
CC.Don't			-.877** (170)	.021 (167)	-.033 (167)	-.466** (170)	-.458** (170)
SC.Don't				-.062 (167)	.057 (167)	.300* (170)	.478** (170)
GD.Do					-.591** (169)	.159* (167)	-.146 (167)
CD.Do						-.086 (167)	.158* (167)
GD.Don't							-.378** (170)

Note. Number of participants in parentheses. CC = Committed Compliance, SC = Situational Compliance, Do = Clean-up context,

Don't = Forbidden toy context

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

Table 14.

*Interrelations among 9 month indices of maternal behavior within the temperamentally positive group*

	Sensitivity	Responsiveness
MPD	.200 (78)	.060 (73)
Sensitivity		.326* (75)

*Note.* Number of participants in parentheses. MPD = Mutually Positive Discrete Affect

\*  $p < .05$

Table 15.

*Interrelations among 9 month indices of maternal behavior within the temperamentally negative group*

	Sensitivity	Responsiveness
MPD	.279* (75)	-.076 (73)
Sensitivity		.152 (78)

*Note.* Number of participants in parentheses. MPD = Mutually Positive Discrete Affect

\*  $p < .05$

Table 16.

*Interrelations among 9 month indices of maternal behavior within the control group*

	Sensitivity	Responsiveness
MPD	.368** (77)	.302* (65)
Sensitivity		.440** (66)

Note. Number of participants in parentheses. MPD = Mutually Positive Discrete Affect

\*  $p < .05$

Table 17.

*Model path values: Committed compliance, clean-up (unstandardized/standardized)*

Path	Temperamentally	Temperamentally	Control
	Positive	Negative	
Approach, Affect	-.006/-.012	-.062/-.084	.054/.085
Approach, Sensitivity	.038/.122	.003/.007	.073/.181
Approach, Responsiveness	-.001/-.004	.083*/.368*	.012/.056
Approach, Gentle Discipline	-.115/-.106	1.08*/.574*	-.318*/-.323*
Approach, Power Assertive Discipline	.173/.246	-.373*/-.333*	.194/.238
Approach, Committed Compliance	.042/.034	.077/.050	-.017/-.015
Avoidance, Affect	-.155*/-.272*	-.178/-.256	-.019/-.035
Avoidance, Sensitivity	.043/.128	.017/.039	.036/.103
Avoidance, Responsiveness	-.011/-.054	-.033/-.155	-.022/-.114
Avoidance, Gentle Discipline	.370/.312	-.054/-.030	-.185/-.220
Avoidance, Power Assertive Discipline	.089/.116	.001/.001	-.034/-.048
Avoidance, Committed Compliance	-.251/-.186	.021/.015	-.105/-.105
Affect, Gentle Discipline	.285/.137	-.075/-.029	-.223/-.145
Affect, Power Assertive Discipline	.139/.103	-.072/-.048	.348/.273
Affect, Committed Compliance	.103/.044	.165/.078	.165/.091
Sensitivity, Gentle Discipline	.024/.007	1.36*/.323*	.621/.254
Sensitivity, Power Assertive Discipline	-.631*/-.279*	-.922*/-.368*	-.177/.087
Sensitivity, Committed Compliance	-.537/-.135	.407/.117	-.590/-.204
Responsiveness, Gentle Discipline	.689/.121	-.892/-.107	1.02/.230
Responsiveness, Power Assertive Discipline	-.145/-.039	-.543/-.109	-1.12/-.305
Responsiveness, Committed Compliance	.083/.013	-1.06/-.154	.997/.190
Gentle Discipline, Committed Compliance	.048/.042	-.156/-.188	.399*/.338*
Power Assertive Discipline, Committed Compliance	-.470/-.267	-.143/-.102	-.400/-.281

Note. \* =  $z > \pm 1.96$

Table 18.

*Evaluation of direct effects between groups: Committed compliance, clean-up*

Cross-Group Constraint	Chi-Square Change (Significance)		
	Pos/Neg	Pos/Control	Neg/Control
MPD, Approach	NS	NS	NS
Sensitivity, Approach	NS	NS	NS
Responsiveness, Approach	5.23 ( $p = .022$ )	NS	7.23 ( $p = .007$ )
Gentle Discipline, Approach	NS	NS	4.22 ( $p = .04$ )
Power Assertive Discipline, Approach	NS	NS	NS
Committed Compliance, Approach	NS	NS	NS
MPD, Avoidance	NS	NS	NS
Sensitivity, Avoidance	NS	NS	NS
Responsiveness, Avoidance	NS	NS	NS
Gentle Discipline, Avoidance	NS	3.89 ( $p = .009$ )	NS
Power Assertive Discipline, Avoidance	NS	NS	7.32 ( $p = .007$ )
Committed Compliance, Avoidance	NS	NS	NS
Gentle Discipline, MPD	NS	NS	NS
Power Assertive Discipline, MPD	NS	NS	NS
Committed Compliance, MPD	NS	NS	NS
Gentle Discipline, Sensitivity	NS	NS	NS
Power Assertive Discipline, Sensitivity	NS	NS	NS
Committed Compliance, Sensitivity	NS	NS	NS
Gentle Discipline, Responsiveness	NS	NS	NS
Power Assertive Disc., Responsiveness	NS	NS	NS
Committed Compliance, Responsiveness	NS	NS	NS
Committed Compliance, Gentle Disc.	NS	NS	9.58 ( $p = .002$ )
Committed Compliance, Power Assert. Disc.	NS	NS	NS

Table 19.

*Significance of differences in total effects: Committed compliance, clean-up*

Path	Groups Compared		
	Positive / Negative	Positive/ Control	Negative/ Control
Approach, Affect	.4415	-.5260	-.8354
Approach, Sensitivity	.4679	-.4962	-.8442
Approach, Responsiveness	-2.103*	-.2986	1.574
Approach, Gentle Discipline	-3.103*	.6843	-.6420
Approach, Power Assertive Discipline	1.288	-.0983	2.862*
Approach, Committed Compliance	.2001	.4304	.3237
Avoidance, Affect	.1866	-1.197	-.0017
Avoidance, Sensitivity	.3658	.8593	-.1009
Avoidance, Responsiveness	.5351	.2438	-.2758
Avoidance, Gentle Discipline	1.012	4.530*	.6795
Avoidance, Power Assertive Discipline	.1289	.3746	.1962
Avoidance, Committed Compliance	-1.023	-.2994	.8073
Affect, Gentle Discipline	.8660	1.423	.4089
Affect, Power Assertive Discipline	.4517	-.8045	-1.637
Affect, Committed Compliance	-.5238	.0271	.6177
Sensitivity, Gentle Discipline	-1.941	-.9968	1.255
Sensitivity, Power Assertive Discipline	.6693	-1.043	-1.787
Sensitivity, Committed Compliance	-.4505	.0717	2.769*
Responsiveness, Gentle Discipline	1.258	-.2633	-1.600
Responsiveness, Power Assertive Discipline	-.8705	1.282	.6892
Responsiveness, Committed Compliance	-.4877	-1.254	-2.028
Gentle Discipline, Committed Compliance	.8512	-1.377	-2.300*
Power Assertive Discipline, Committed Compliance	-.8644	-.2020	.7446

Note. \* =  $z > \pm 1.96$ .

Table 20

*Model path values: Situational Compliance, clean-up (unstandardized/standardized)*

Path	Temperamentally Positive	Temperamentally Negative	Control
Approach, Affect	-.008/-.015	-.059/-.080	.054/.084
Approach, Sensitivity	.038/.121	.005/.011	.074/.184
Approach, Responsiveness	.002/.009	.084*/.370*	.011/.048
Approach, Gentle Discipline	-.107/-.098	1.07*/.566*	-.319*/-.325*
Approach, Power Assertive Discipline	.164/.232	-.367*/-.327*	.196/.239
Approach, Situational Compliance	.147/.023	.125/.108	.025/.025
Avoidance, Affect	-.153*/-.268*	-.177/-.253	-.020/-.036
Avoidance, Sensitivity	.043/.126	.018/.042	.038/.109
Avoidance, Responsiveness	-.016/-.078	-.032/-.153	-.020/*-.108*
Avoidance, Gentle Discipline	.347/.292	-.077/-.043	-.188/-.224
Avoidance, Power Assertive Discipline	.112/.145	.008/.007	-.034/-.048
Avoidance, Situational Compliance	.676/.117	.119/.110	.125/.144
Affect, Gentle Discipline	.264/.127	-.088/-.035	-.236/-.154
Affect, Power Assertive Discipline	.149/.111	-.064/-.042	.358*/.280*
Affect, Situational Compliance	-.448/-.248	-.194/-.126	-.142/-.090
Sensitivity, Gentle Discipline	.014/.004	1.36*/.323*	.622/.255
Sensitivity, Power Assertive Discipline	-.635*/-.281*	-.921*/-.368*	-.157/-.077
Sensitivity, Situational Compliance	.039/.013*	-.144/-.056	.531/.211
Responsiveness, Gentle Discipline	.724/.127	-.930/-.112	1.09/.246
Responsiveness, Power Assertive Discipline	-.130/-.035	-.524/-.106	-1.23*/-.335*
Responsiveness, Situational Compliance	.580/.117	1.52*/.298*	-1.38/-.301
Gentle Discipline, Situational Compliance	.082/.095	.177/.291	.135/.130
Power Assertive Discipline, Situational Compliance	.182/.136	.206/.201	.515*/.415*

Note. \* =  $z > \pm 1.96$



Table 21.

*Evaluation of direct effects between groups: Situational compliance, clean-up*

Cross-Group Constraint	Chi-Square Change (Significance)		
	Pos/Neg	Pos/Control	Neg/Control
MPD, Approach	NS	NS	NS
Sensitivity, Approach	NS	NS	NS
Responsiveness, Approach	5.47 ( $p = .019$ )	NS	NS
Gentle Discipline, Approach	NS	NS	4.04 ( $p = .044$ )
Power Assertive Discipline, Approach	NS	NS	NS
Situational Compliance, Approach	NS	NS	NS
MPD, Avoidance	NS	NS	NS
Sensitivity, Avoidance	NS	NS	NS
Responsiveness, Avoidance	NS	6.01 ( $p = .014$ )	NS
Gentle Discipline, Avoidance	NS	NS	NS
Power Assertive Discipline, Avoidance	NS	NS	NS
Situational Compliance, Avoidance	NS	NS	NS
Gentle Discipline, MPD	NS	NS	NS
Power Assertive Discipline, MPD	NS	NS	NS
Situational Compliance, MPD	NS	NS	NS
Gentle Discipline, Sensitivity	NS	NS	NS
Power Assertive Discipline, Sensitivity	NS	NS	NS
Situational Compliance, Sensitivity	NS	NS	NS
Gentle Discipline, Responsiveness	NS	NS	NS
Power Assertive Disc., Responsiveness	NS	NS	NS
Situational Compliance, Responsiveness	NS	NS	8.07 ( $p = .055$ )
Situational Compliance, Gentle Disc.	NS	NS	NS
Situational Compliance, Power Assert Disc.	NS	NS	NS

Table 22.

*Significance of differences in total effects: Situational compliance, clean-up*

Path	Groups Compared		
	Positive / Negative	Positive/ Control	Negative/ Control
Approach, Affect	.4069	-.5369	-.8129
Approach, Sensitivity	.4382	-.5185	-.8365
Approach, Responsiveness	-.2055	-.2025	1.624
Approach, Gentle Discipline	-3.597*	.7320	4.245*
Approach, Power Assertive Discipline	2.789*	-.3008	-2.850*
Approach, Situational Compliance	-.1348	-4.308*	-2.744*
Avoidance, Affect	.1890	-1.180	-1.206
Avoidance, Sensitivity	.3405	1.164	-.2565
Avoidance, Responsiveness	.4027	.0997	-.2744
Avoidance, Gentle Discipline	.9884	1.638	.6181
Avoidance, Power Assertive Discipline	.2214	.5003	.2084
Avoidance, Situational Compliance	.4848	.3395	-.1554
Affect, Gentle Discipline	.8432	1.393	.4095
Affect, Power Assertive Discipline	.8113	-.8069	-1.659
Affect, Situational Compliance	-.5336	-1.177	-.7480
Sensitivity, Gentle Discipline	-1.943	-1.010	1.255
Sensitivity, Power Assertive Discipline	-1.043	-1.101	-1.836
Sensitivity, Situational Compliance	.0328	-1.044	-1.236
Responsiveness, Gentle Discipline	1.306	-.3585	-1.691
Responsiveness, Power Assertive Discipline	.4975	1.456	.8436
Responsiveness, Situational Compliance	-.6431	2.447*	3.052*
Gentle Discipline, Situational Compliance	-.5376	-.2326	.2094
Power Assertive Discipline, Situational Compliance	-.0846	-1.120	-1.172

Note. \* =  $z > \pm 1.96$ .

Table 23.

*Summary of significant paths within each group: Clean-up context*

Group		
Temperamentally Positive	Temperamentally Negative	Control
<b>Outcome to Committed Compliance</b>		
Avoidance- Mutually positive affect (-)	Approach-Responsiveness (+)	Approach- Gentle discipline (-)
Sensitivity- Power assertive discipline (-)	Approach- Gentle-discipline (+)	Gentle discipline- Committed compliance (+)
	Approach-power assertive discipline (-)	
	Sensitivity- Gentle discipline (+)	
	Sensitivity-Power assertive discipline (-)	
<b>Outcome to Situational Compliance</b>		
Avoidance- Mutually positive affect (-)	Approach-Responsiveness (+)	Approach- Gentle discipline (-)
Sensitivity- Power-assertive discipline (-)	Approach- Gentle-discipline (+)	Mutually positive affect- Power assertive discipline (+)
	Approach-Power assertive discipline (-)	Responsiveness- Power assertive discipline (-)
	Sensitivity- Gentle discipline (+)	Power assertive discipline- Situational compliance (+)
	Sensitivity-Power assertive discipline (-)	
	Responsiveness- Situational compliance (+)	

Note. Direction of relation shown in parentheses.

Table 24.

*Summary of significant paths between groups (direct or total): Clean-up context*

Group		
Positive-Negative	Positive-Control	Negative-Control
<b>Outcome to Committed Compliance</b>		
Approach-responsiveness (0/+)	Avoidance-Gentle discipline (+/-)	Gentle discipline-Committed compliance (-/+)
Approach-Gentle Discipline (-/+)		Approach-responsiveness (+/+)
		Approach-Gentle discipline (+/-)
		Approach-Power assertive discipline (-/+)
		Sensitivity- Committed compliance (+/-)
		Responsiveness-Committed compliance (-/+)
<b>Outcome to Situational Compliance</b>		
Approach-responsiveness (0/+)	Avoidance-responsiveness (-/-)	Responsiveness-Situational compliance (+/-)
Approach-Gentle discipline (-/+)	Approach-Situational compliance (+/0)	Approach-Gentle discipline (+/-)
Approach-Power assertive discipline (+/-)	Responsiveness- Situational compliance (+/-)	Approach-Power assertive discipline (+/+)
		Approach-Situational compliance (+/0)

Note. Direction of relation for each group shown in parentheses.

Table 25.

*Model path values: Committed compliance, forbidden toy (unstandardized/standardized)*

Path	Temperamentally Positive	Temperamentally Negative	Control
Approach, Affect	-.020/-.038	-.086/-.118	.037/.058
Approach, Sensitivity	.033/.105	.001/.002	.071/.178
Approach, Responsiveness	.000/.000	.097*/.438*	.020/.094
Approach, Gentle Discipline	-.232/-.253	.286/.273	-.079/-.091
Approach, Power Assertive Discipline	.223/.278	-.271/-.209	.104/.107
Approach, Committed Compliance	-.007/-.009	-.039/-.043	.084/.112
Avoidance, Affect	-.182*/-.315*	-.224*/-.324*	-.034/-.063
Avoidance, Sensitivity	.036/.106	.011/.027	.024/.071
Avoidance, Responsiveness	-.017/-.081	-.020/-.096	-.026/-.140
Avoidance, Gentle Discipline	-.103/-.103	-.290*/-.314*	.088/-.119
Avoidance, Power Assertive Discipline	.210/.240	.263/.214	.126/.151
Avoidance, Committed Compliance	.106/.123	.167/.197	.067/.106
Affect, Gentle Discipline	.279/.162	.014/.010	.163/.119
Affect, Power Assertive Discipline	.209/.138	-.177/-.100	-.105/-.068
Affect, Committed Compliance	-.254/-.170	.187/.152	.038/.032
Sensitivity, Gentle Discipline	.627/.217	.107/.048	.283/.130
Sensitivity, Power Assertive Discipline	-.873*/-.344*	-.168/-.057	.249/.102
Sensitivity, Committed Compliance	.120/.048	-.017/-.008	-.031/-.016
Responsiveness, Gentle Discipline	.256/.054	-.110/-.025	.642/.160
Responsiveness, Power Assertive Discipline	1.07/.259	.106/.108	-2.26*/-.503*
Responsiveness, Committed Compliance	-.336/-.082	-.375/-.093	-.272/-.079
Gentle Discipline, Committed Compliance	-.650*/-.749*	-.404*/-.440*	-.635*/-.742*
Power Assertive Discipline, Committed Compliance	-.580*/-.587*	-.584*/-.845*	-.555*/-.726*

\*Note. \* =  $z > \pm 1.96$

Table 26.

*Evaluation of direct effects between groups: Committed compliance, forbidden toy*

Cross-Group Constraint	Chi-Square Change (Significance)		
	Pos/Neg	Pos/Control	Neg/Control
MPD, Approach	NS	NS	NS
Sensitivity, Approach	NS	NS	NS
Responsiveness, Approach	5.79 ( $p = .106$ )	NS	6.10 ( $p = .014$ )
Gentle Discipline, Approach	4.51 ( $p = .034$ )	NS	NS
Power Assertive Discipline, Approach	NS	NS	NS
Committed Compliance, Approach	NS	NS	NS
MPD, Avoidance	NS	NS	NS
Sensitivity, Avoidance	NS	NS	NS
Responsiveness, Avoidance	NS	NS	NS
Gentle Discipline, Avoidance	NS	NS	NS
Power Assertive Discipline, Avoidance	NS	NS	NS
Committed Compliance, Avoidance	NS	NS	NS
Gentle Discipline, MPD	NS	NS	NS
Power Assertive Discipline, MPD	NS	NS	NS
Committed Compliance, MPD	5.79 ( $p = .016$ )	NS	NS
Gentle Discipline, Sensitivity	NS	NS	NS
Power Assertive Discipline, Sensitivity	NS	NS	NS
Committed Compliance, Sensitivity	NS	NS	NS
Gentle Discipline, Responsiveness	NS	NS	NS
Power Assertive Disc. Responsiveness	NS	7.12 ( $p = .008$ )	NS
Committed Compliance, Responsiveness	NS	NS	NS
Committed Compliance, Gentle Disc.	NS	NS	NS
Committed Compliance, Power Assert Disc.	NS	NS	NS

Table 27.

*Significance of differences in total effects: Committed compliance, forbidden toy*

Path	Groups Compared		
	Positive / Negative	Positive/ Control	Negative/ Control
Approach, Affect	.5336	-.4963	-.9022
Approach, Sensitivity	.4416	-.5456	-.8629
Approach, Responsiveness	-2.461*	-.4695	1.749
Approach, Gentle Discipline	-2.555*	-.8801	1.564
Approach, Power Assertive Discipline	1.832	.5789	-1.224
Approach, Committed Compliance	.4889	-.1757	-.6313
Avoidance, Affect	.3427	-1.304	-1.484
Avoidance, Sensitivity	-.6486	.1751	-.1705
Avoidance, Responsiveness	.0737	.2093	-1.161
Avoidance, Gentle Discipline	.7954	-1.194	-2.102*
Avoidance, Power Assertive Discipline	-.7587	-.3624	.4342
Avoidance, Committed Compliance	.5577	.8538	-.0935
Affect, Gentle Discipline	.9300	.3798	-.5609
Affect, Power Assertive Discipline	1.176	1.067	-.2208
Affect, Committed Compliance	-3.234*	-2.075*	1.156
Sensitivity, Gentle Discipline	1.117	.6822	-.4081
Sensitivity, Power Assertive Discipline	-1.330	-2.314*	-.7966
Sensitivity, Committed Compliance	.4295	1.300	.9460
Responsiveness, Gentle Discipline	.4418	-.4330	-.8613
Responsiveness, Power Assertive Discipline	.9528	3.849*	2.194*
Responsiveness, Committed Compliance	-.9413	-2.188*	-1.161
Gentle Discipline, Committed Compliance	-1.783	-.1280	1.778
Power Assertive Discipline, Committed Compliance	.0282	-.2062	-.2791

\*Note. \* =  $z > \pm 1.96$ .

Table 28.

*Model path values: Situational Compliance, forbidden toy(unstandardized/standardized)*

Path	Temperamentally Positive	Temperamentally Negative	Control
Approach, Affect	-.018/-.034	-.081/-.110	.031/.048
Approach, Sensitivity	.034/.108	.004/.008	.076/.189
Approach, Responsiveness	.001/.005	.098*/.440*	.021/.095
Approach, Gentle Discipline	-.223/-.255	.287*/.293*	-.068/-.078
Approach, Power Assertive Discipline	.225/.280	-.285/-.219	.116/.119
Approach, Situational Compliance	-.028/-.038	.097/.112	-.115/-.173
Avoidance, Affect	-.179*/-.309*	-.226*/-.327*	-.033/-.061
Avoidance, Sensitivity	.039/.113	.010/.024	.032/.092
Avoidance, Responsiveness	-.016/-.077	-.013/-.064	-.025/-.137
Avoidance, Gentle Discipline	-.122/-.123	-.302*/-.326*	-.077/-.103
Avoidance, Power Assertive Discipline	.219/.251	.264/.215	.133/.160
Avoidance, Situational Compliance	-.151/-.192	-.216*/-.262*	-.061/-.108
Affect, Gentle Discipline	.282/.164	-.005/-.004	.165/.120
Affect, Power Assertive Discipline	.206/.136	-.170/-.095	-.094/-.061
Affect, Situational Compliance	.118/.087	-.104/-.087	-.030/-.029
Sensitivity, Gentle Discipline	.631/.218	.092/.041	.274/.126
Sensitivity, Power Assertive Discipline	-.887*/-.349*	-.162/-.055	.230/.094
Sensitivity, Situational Compliance	.113/.049	.269/.136	-.127/-.076
Responsiveness, Gentle Discipline	.241/.051	-.036/-.008	.623/.155
Responsiveness, Power Assertive Discipline	1.089*/.264*	.060/.010	-2.318*/-.516*
Responsiveness, Situational Compliance	.199/.054	.371/.094	.454/.148
Gentle Discipline, Situational Compliance	.488*/.617*	.188/.211	.546*/.714*
Power Assertive Discipline, Situational Compliance	.534*/.593*	.575*/.859*	.480*/.704*

\*Note. \* =  $z > \pm 1.96$



Table 29.

*Evaluation of direct effects between groups: Situational compliance, forbidden toy*

Cross-Group Constraint	Chi-Square Change (Significance)		
	Pos/Neg	Pos/Control	Neg/Control
MPD, Approach	NS	NS	NS
Sensitivity, Approach	NS	NS	NS
Responsiveness, Approach	5.74 ( $p = .017$ )	NS	6.52 ( $p = .011$ )
Gentle Discipline, Approach	4.56 ( $p = .032$ )	NS	NS
Power Assertive Discipline, Approach	NS	NS	NS
Situational Compliance, Approach	NS	NS	NS
MPD, Avoidance	NS	NS	NS
Sensitivity, Avoidance	NS	NS	NS
Responsiveness, Avoidance	NS	NS	NS
Gentle Discipline, Avoidance	NS	NS	NS
Power Assertive Discipline, Avoidance	NS	NS	NS
Situational Compliance, Avoidance	NS	NS	NS
Gentle Discipline, MPD	NS	NS	NS
Power Assertive Discipline, MPD	NS	NS	NS
Situational Compliance, MPD	NS	NS	NS
Gentle Discipline, Sensitivity	NS	NS	NS
Power Assertive Discipline, Sensitivity	NS	NS	NS
Situational Compliance, Sensitivity	NS	NS	NS
Gentle Discipline, Responsiveness	NS	NS	NS
Power Assertive Disc., Responsiveness	NS	7.75 ( $p = .005$ )	NS
Situational Compliance, Responsiveness	NS	NS	NS
Situational Compliance, Gentle Disc.	5.08 ( $p = .024$ )	NS	6.39 ( $p = .011$ )
Situational Compliance, Power Assert Disc.	NS	NS	NS

Table 30.

*Significance of differences in total effects: Situational compliance, forbidden toy*

Path	Groups Compared		
	Positive / Negative	Positive/ Control	Negative/ Control
Approach, Affect	.5029	-.4270	-.3644
Approach, Sensitivity	.4105	-.5937	-.8834
Approach, Responsiveness	-2.440*	-.4548	1.750
Approach, Gentle Discipline	2.621*	-.9331	1.567
Approach, Power Assertive Discipline	1.930	.5400	-1.35
Approach, Situational Compliance	-.3978	.4049	.7451
Avoidance, Affect	.3864	-1.279	-1.508
Avoidance, Sensitivity	.3923	.1049	-.2806
Avoidance, Responsiveness	-4.988*	.2195	.3048
Avoidance, Gentle Discipline	.7673	-.3088	-1.125
Avoidance, Power Assertive Discipline	-.7308	-.3675	.4025
Avoidance, Situational Compliance	-.5401	-.9289	-.2983
Affect, Gentle Discipline	1.014	.3836	-.6391
Affect, Power Assertive Discipline	1.143	1.027	-.2340
Affect, Situational Compliance	2.224*	1.420	-.9052
Sensitivity, Gentle Discipline	1.164	.7055	-.4239
Sensitivity, Power Assertive Discipline	-1.372	-2.314*	-.7523
Sensitivity, Situational Compliance	-.5922	-.4535	.1338
Responsiveness, Gentle Discipline	.3390	-.4296	-.7602
Responsiveness, Power Assertive Discipline	1.030	-3.981*	2.230*
Responsiveness, Situational Compliance	.6576	1.6980	.9091
Gentle Discipline, Situational Compliance	2.103*	-.4685	-2.839*
Power Assertive Discipline, Situational Compliance	-.3192	.4142	.9466

\*Note. \* =  $z > \pm 1.96$ .

Table 31.

*Summary of significant paths within each group: Forbidden toy context*

Group		
Temperamentally Positive	Temperamentally Negative	Control
<b>Outcome to Committed Compliance</b>		
Avoidance- Mutually positive affect (-)	Approach- Responsiveness (+)	Responsiveness- Power assertive discipline (-)
Sensitivity- Power assertive discipline (-)	Avoidance- Mutually positive affect (-)	Gentle discipline- Committed compliance (-)
Gentle discipline- Committed compliance (-)	Avoidance- Gentle discipline (-)	Power assertive discipline- Committed compliance (-)
Power assertive discipline- Committed compliance (-)	Gentle discipline- Committed compliance (-) Power assertive discipline- committed compliance (-)	
<b>Outcome to Situational Compliance</b>		
Avoidance- Mutually positive affect (-)	Approach-Responsiveness (+)	Responsiveness-Power assertive discipline (-)
Sensitivity- Power assertive discipline (-)	Approach-Gentle discipline (+)	Gentle discipline- Situational compliance (+)
Responsiveness-Power assertive discipline (+)	Avoidance- Mutually positive affect (+)	Power assertive discipline- Situational compliance (+)
Gentle discipline- Situational compliance (+)	Avoidance- Gentle discipline (-)	
Power assertive discipline- Situational compliance (+)	Power-assertive discipline- Situational compliance (+)	
	Avoidance-Situational compliance (-)	

Note. Direction of relation shown in parentheses.

Table 32.

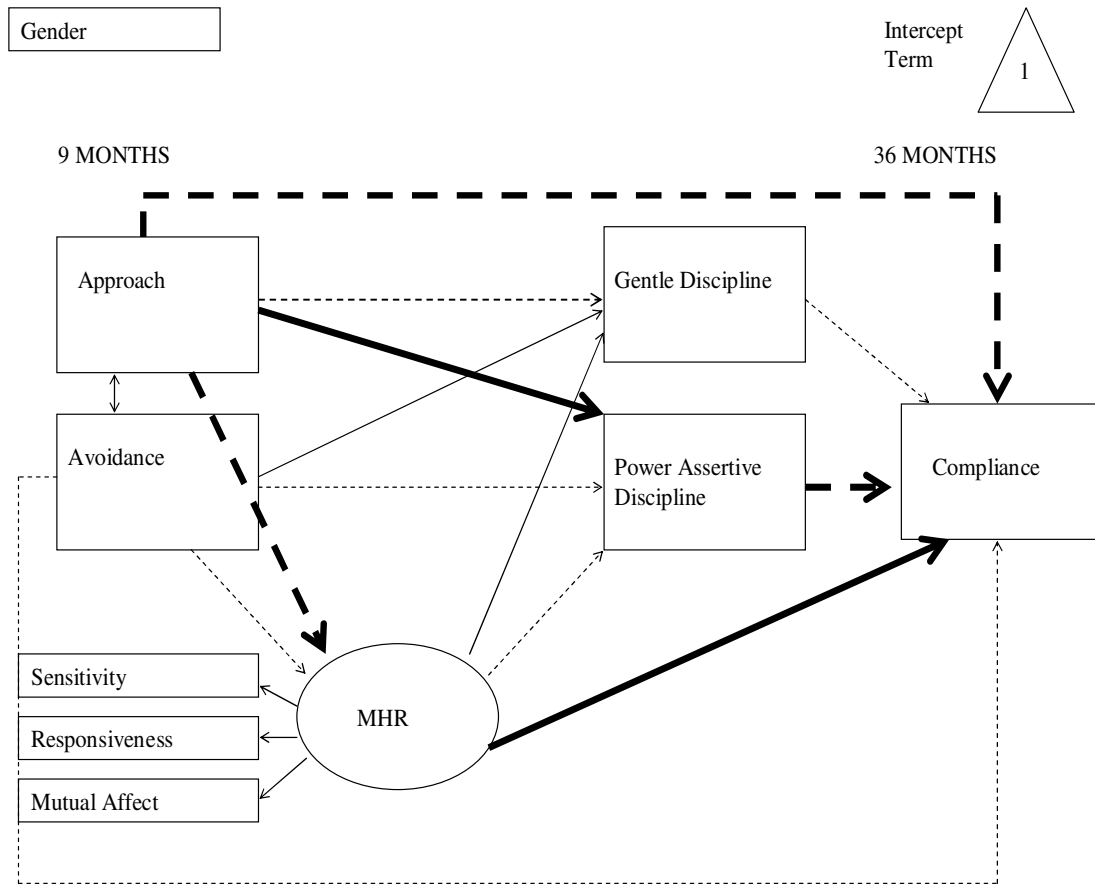
*Summary of significant paths between groups (direct or total): Forbidden toy context*

Group		
Positive-Negative	Positive-Control	Negative-Control
<b>Outcome to Committed Compliance</b>		
Mutually positive affect-Committed compliance (-/+)	Responsiveness-Power assertive discipline (+/+)	Approach-Responsiveness (+/+)
Approach-Responsiveness (0/+)	Mutually positive affect-Committed compliance (-/+)	Avoidance- Gentle discipline (-/+)
Approach-Gentle Discipline (-/+)	Responsiveness-Committed Compliance (-/-)	Responsiveness- Power-assertive discipline (+/-)
	Sensitivity- Power assertive discipline (-/+)	
<b>Outcome to Situational Compliance</b>		
Approach-responsiveness (0/+)	Responsiveness- Power assertive discipline (+/+)	Approach-Responsiveness (+/+)
Approach-Gentle discipline (-/+)	Sensitivity- Power assertive discipline (-/+)	Responsiveness-Power assertive discipline (0/-)
Avoidance- Responsiveness (-/-)		Gentle discipline-Situational compliance (+/+)
Gentle discipline-Situational compliance (-/-)		
Mutually positive affect-Power assertive discipline (+/-)		

Note. Direction of relation for each group shown in parentheses.

Figure 1.

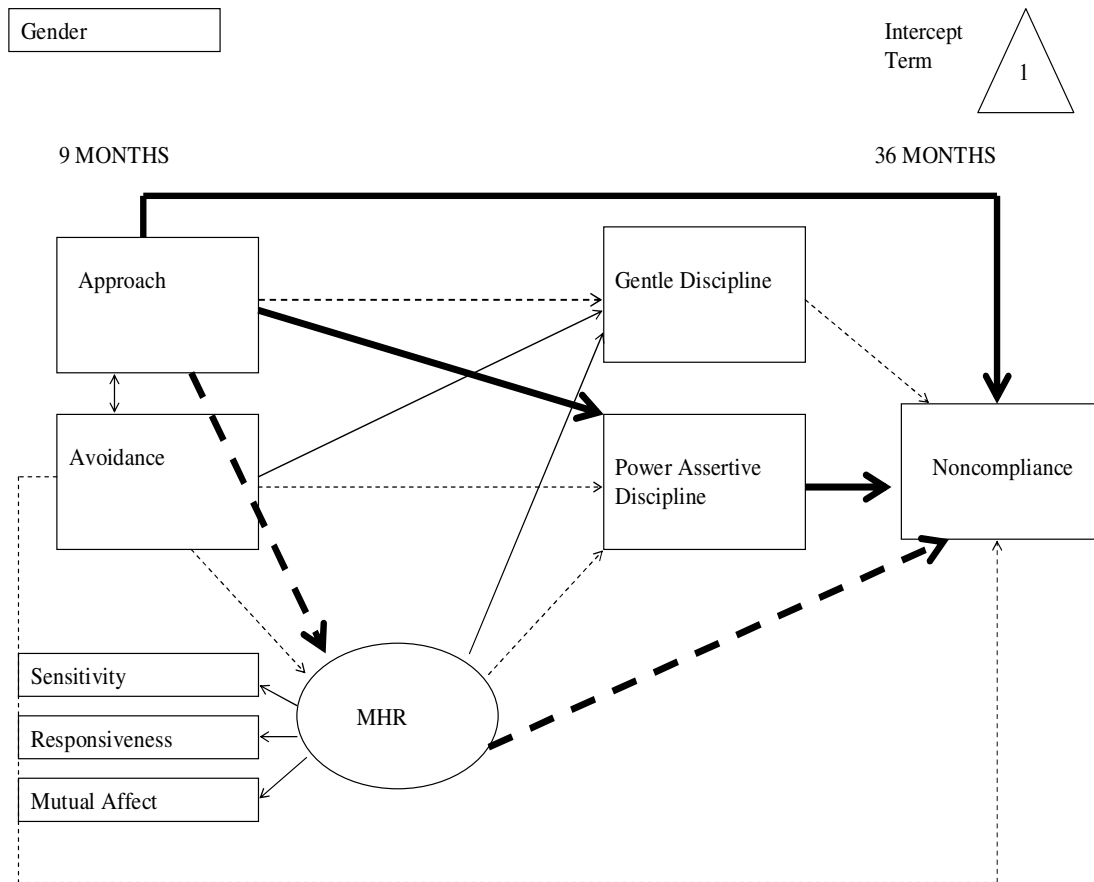
*Hypothesized path model for the prediction of compliance in temperamentally positive children.*



Note. Solid arrows indicate hypothesized positive associations. Dashed arrows indicate hypothesized negative associations. Bolded paths are anticipated to be significant

Figure 2.

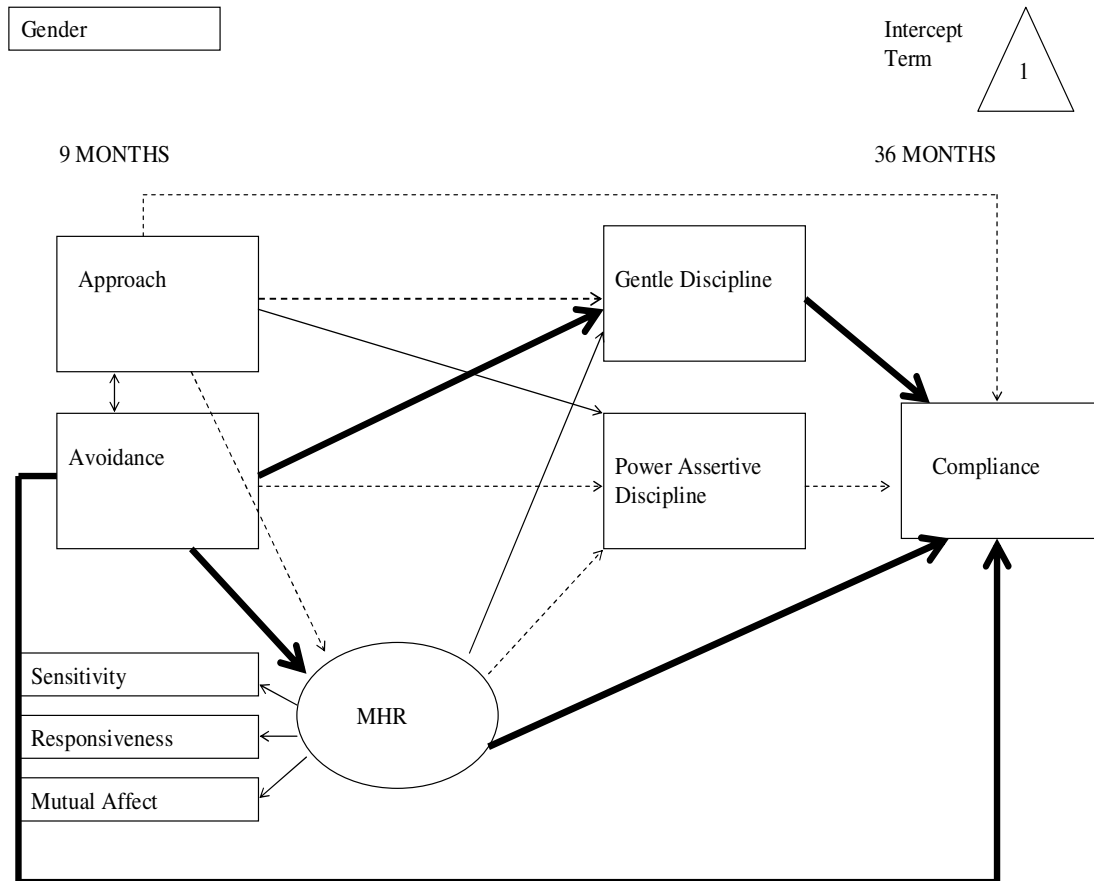
*Hypothesized path model for the prediction of noncompliance in temperamentally positive children.*



Note. Solid arrows indicate hypothesized positive associations. Dashed arrows indicate hypothesized negative associations. Bolded paths are anticipated to be significant.

**Figure 3.**

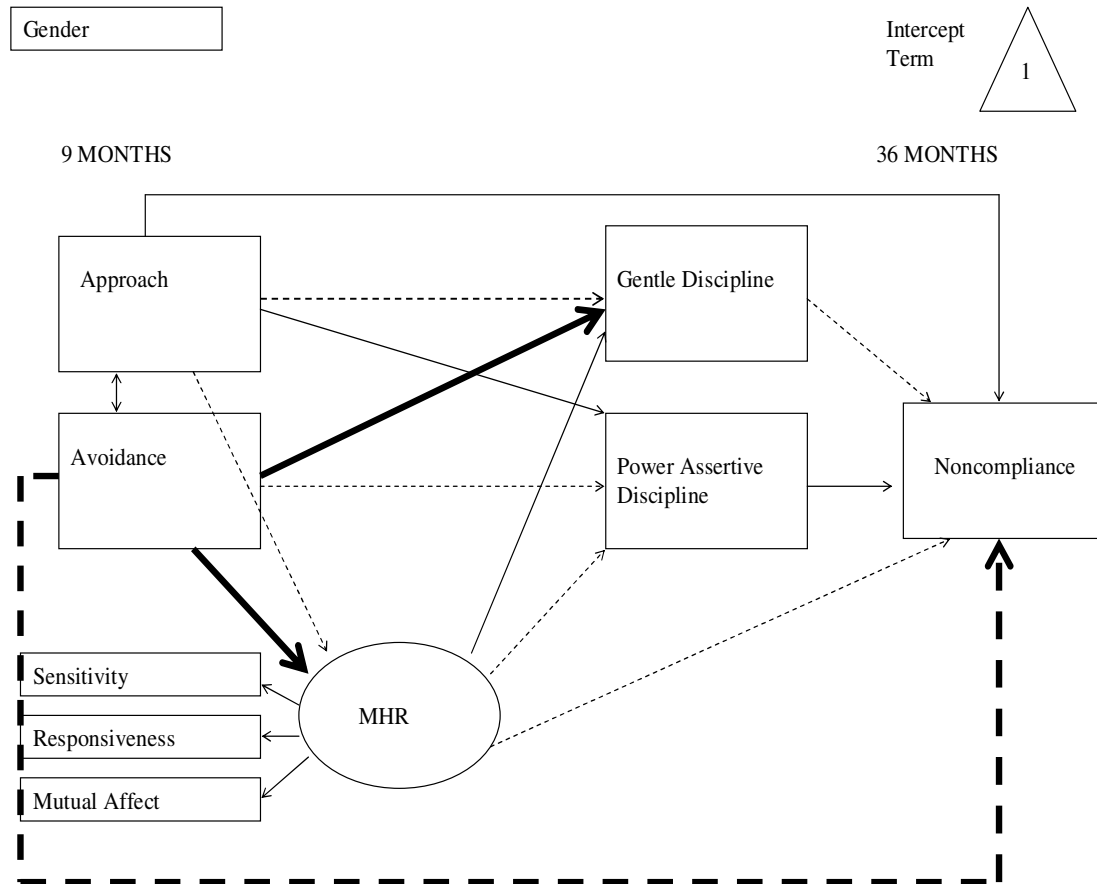
*Hypothesized path model for the prediction of compliance in fearful children.*



Note. Solid arrows indicate hypothesized positive associations. Dashed arrows indicate hypothesized negative associations. Bolded paths are anticipated to be significant.

Figure 4.

*Hypothesized path model for the prediction of noncompliance in fearful children.*



Note. Solid arrows indicate hypothesized positive associations. Dashed arrows indicate hypothesized negative associations. Bolded paths are anticipated to be significant.



Figure 5.

*Distribution of display of committed compliance, clean-up context*

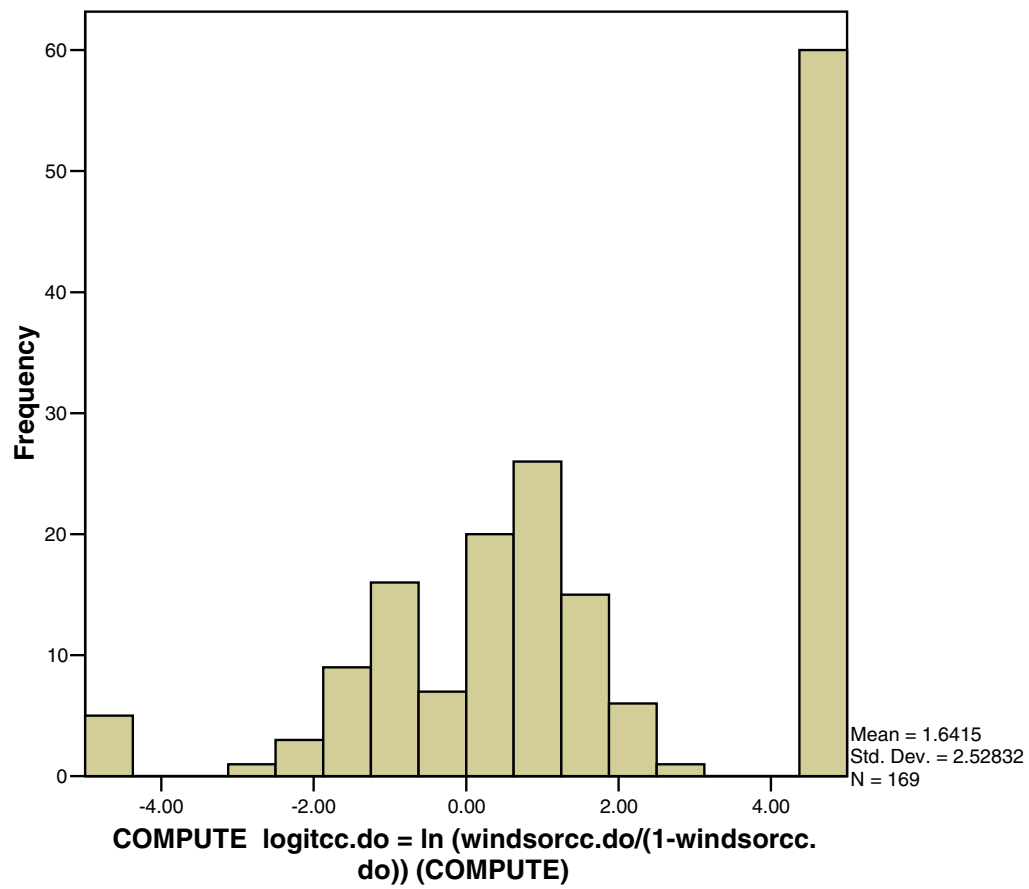


Figure 6.

*Distribution of display of situational compliance, clean-up context*

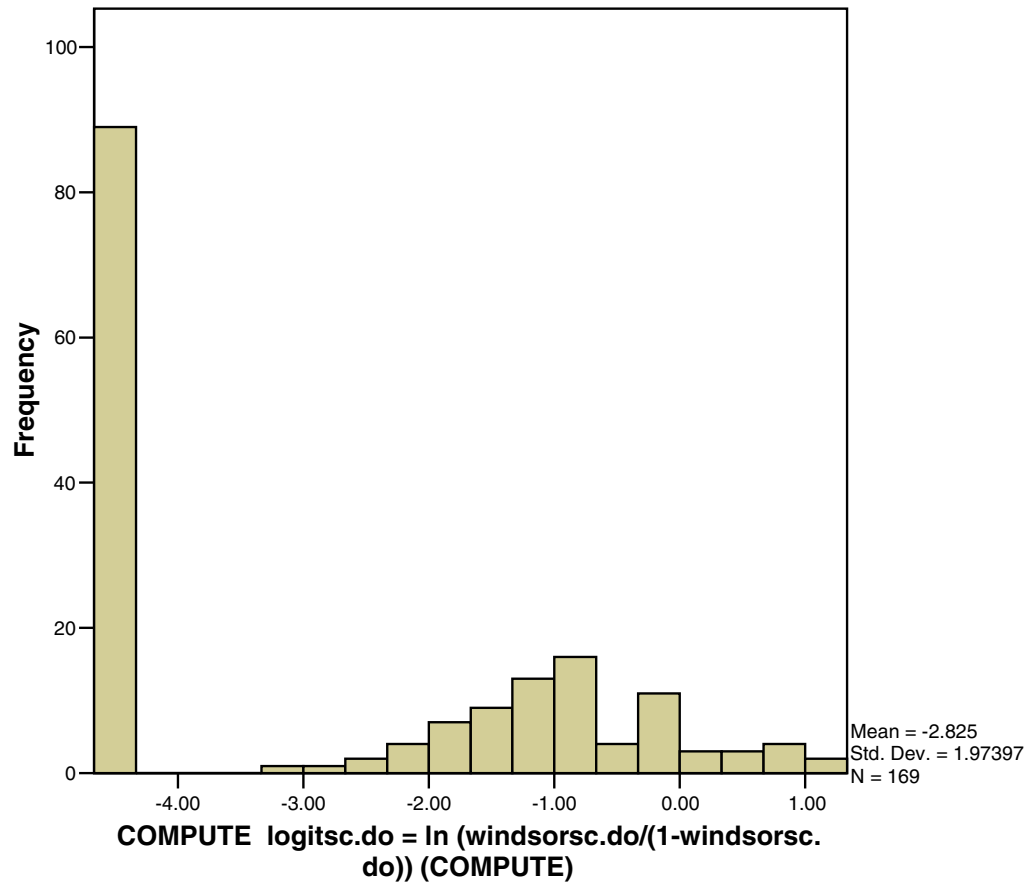


Figure 7.

*Distribution of display of noncompliance, clean-up context*

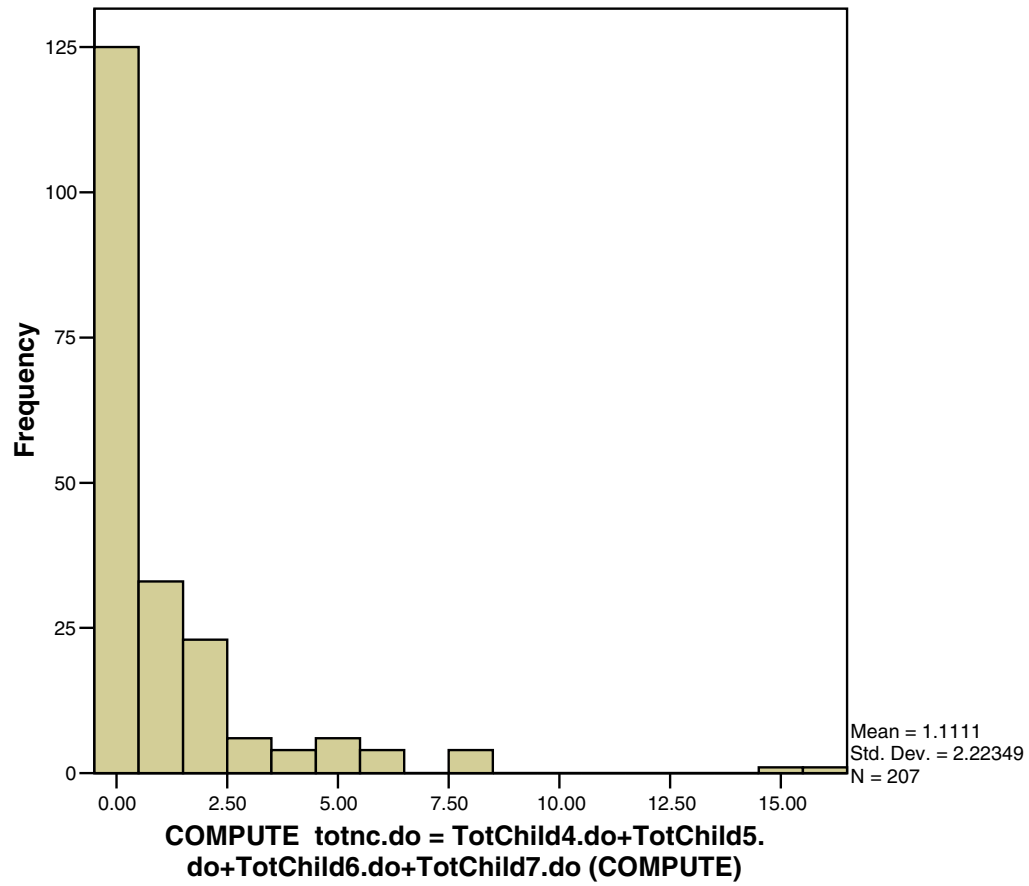


Figure 8.

*Distribution of display of committed compliance, forbidden toy context*

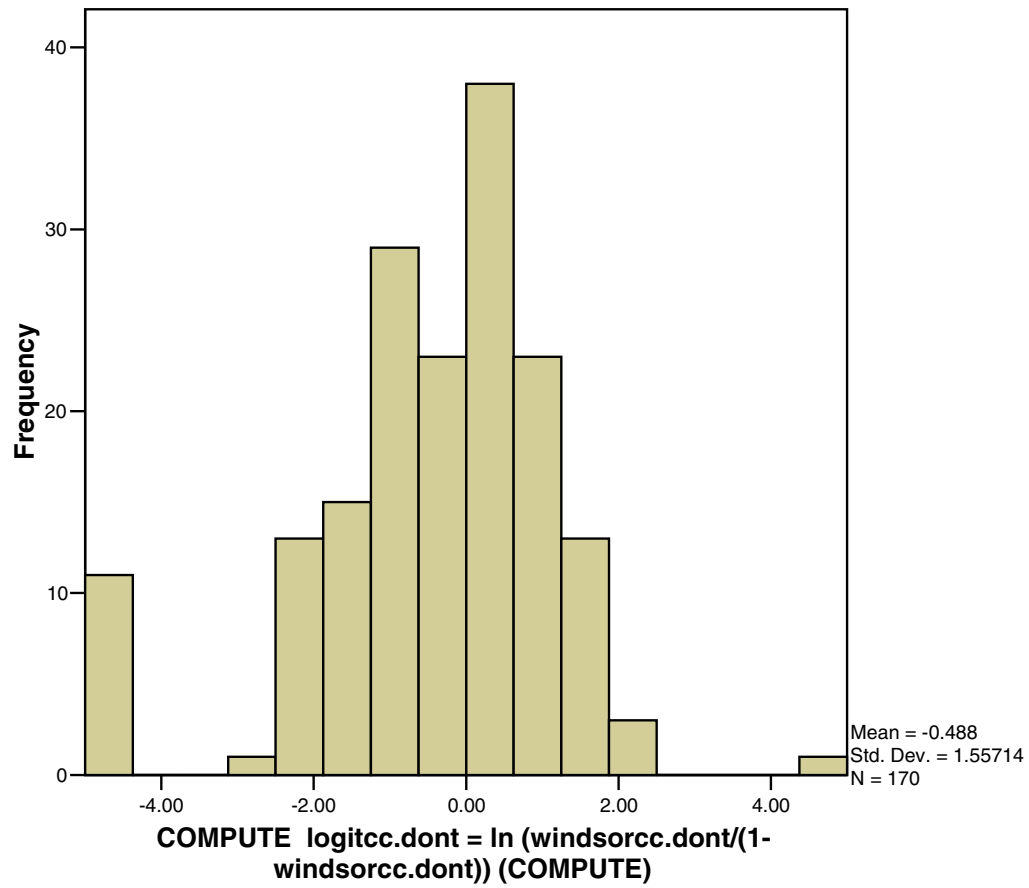


Figure 9.

*Distribution of display of situational compliance, forbidden toy context*

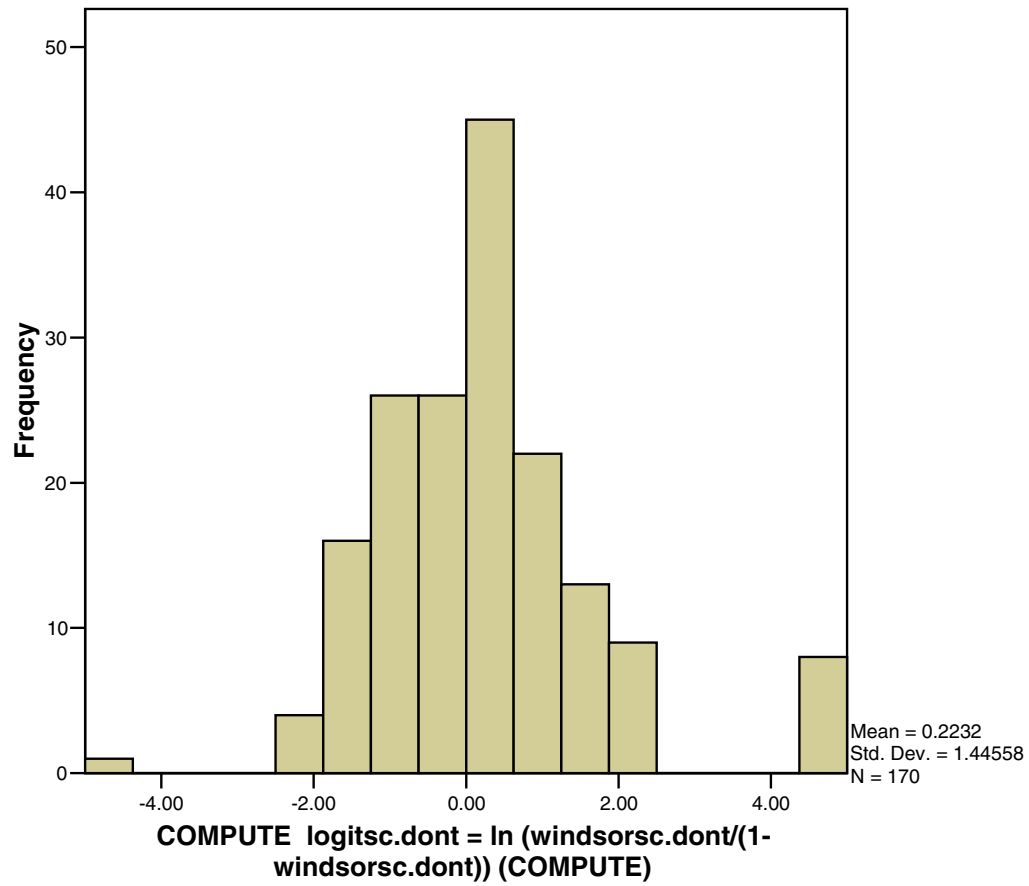


Figure 10.

*Distribution of display of noncompliance, forbidden toy context*

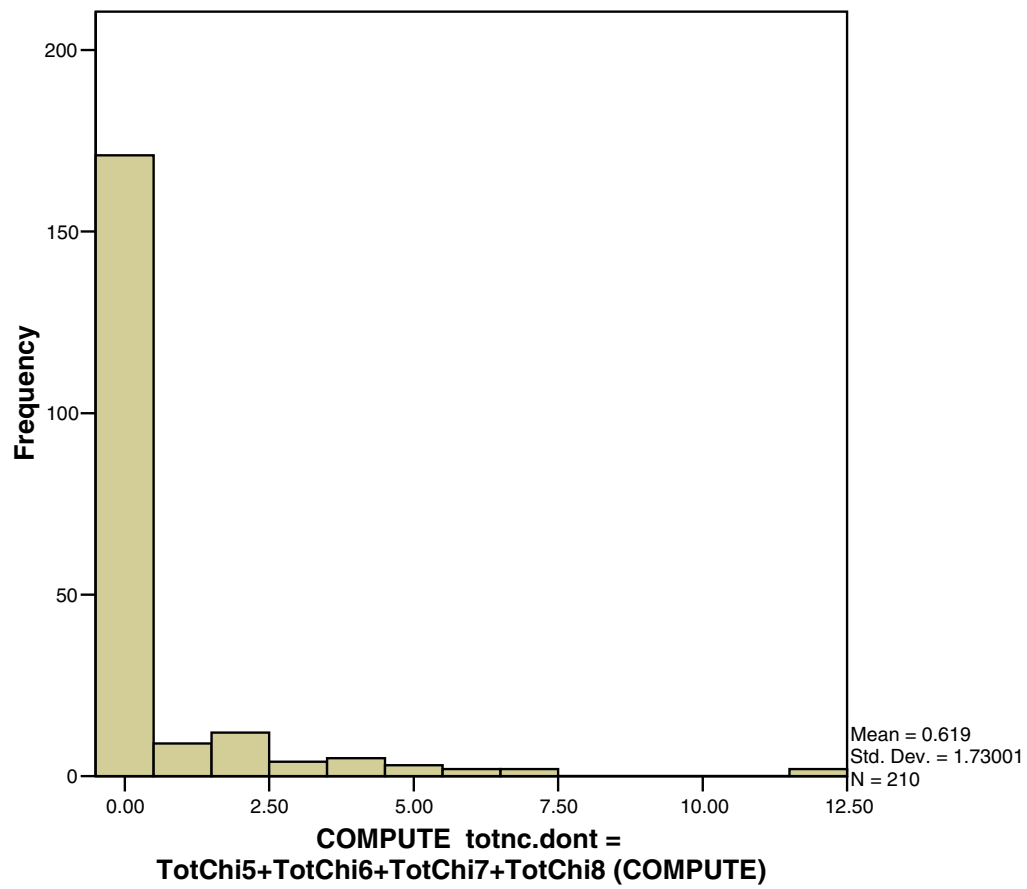


Figure 11.

*Group differences in the proportion of committed compliance displayed at 36 months*

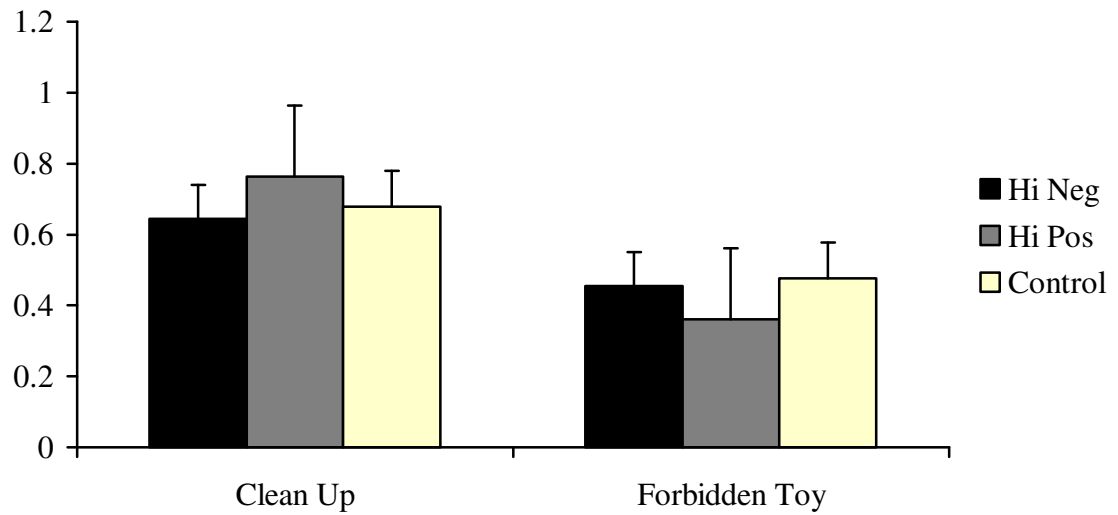


Figure 12.

*Group differences in the proportion of situational compliance displayed at 36 months*

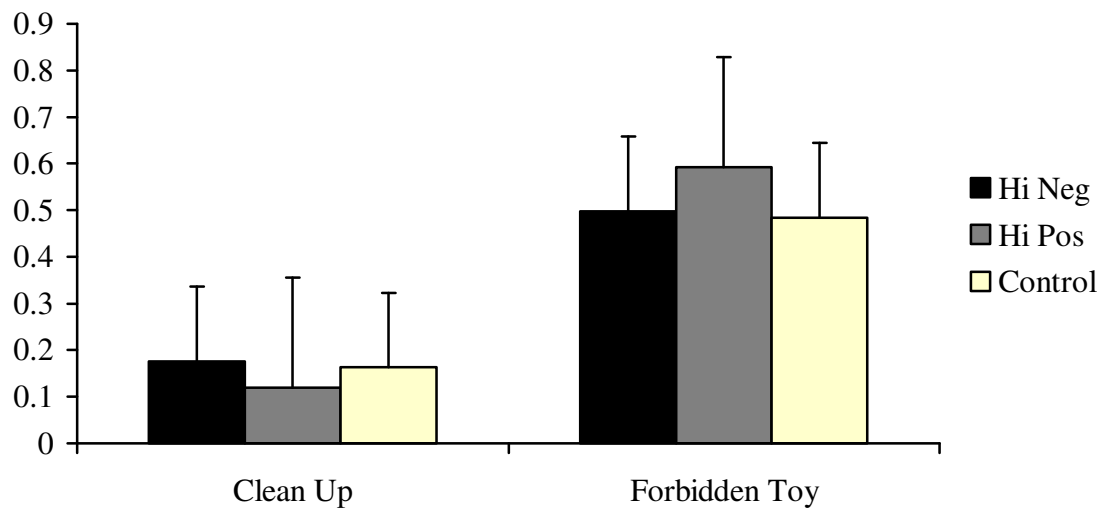


Figure 13.

*Re-specified structural model predicting compliance*

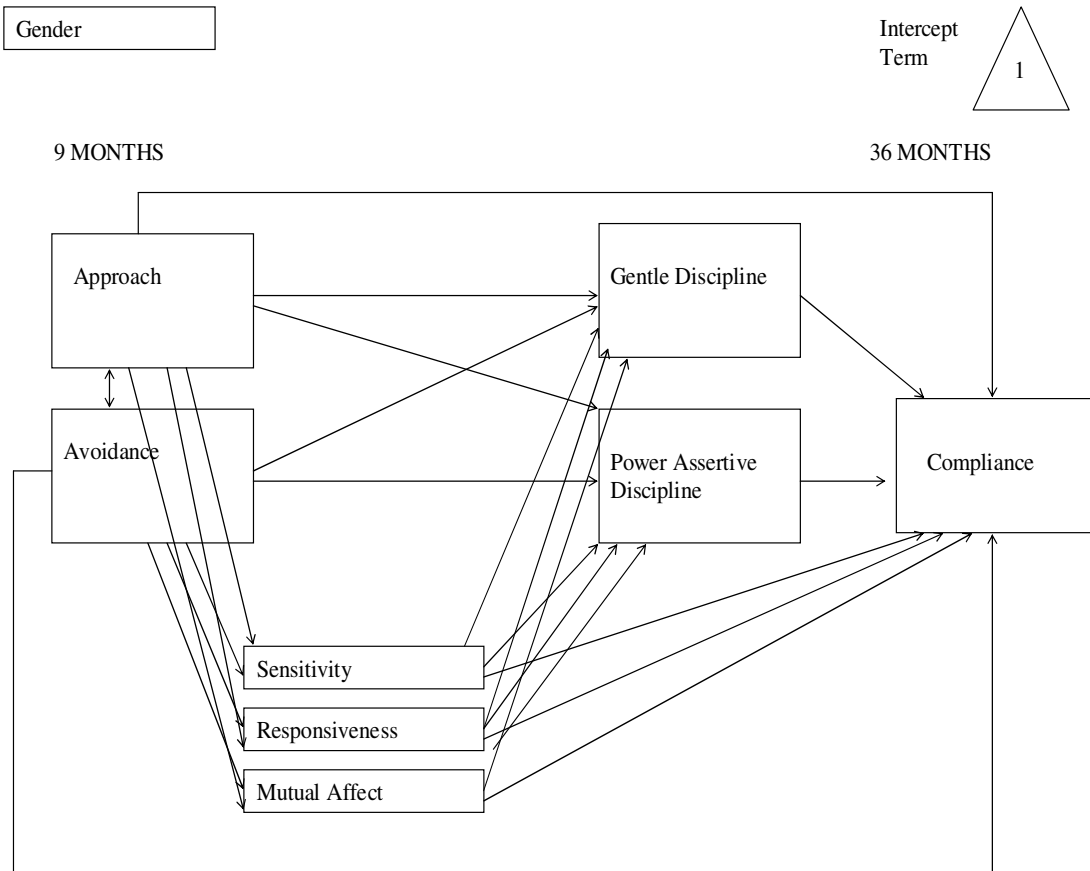
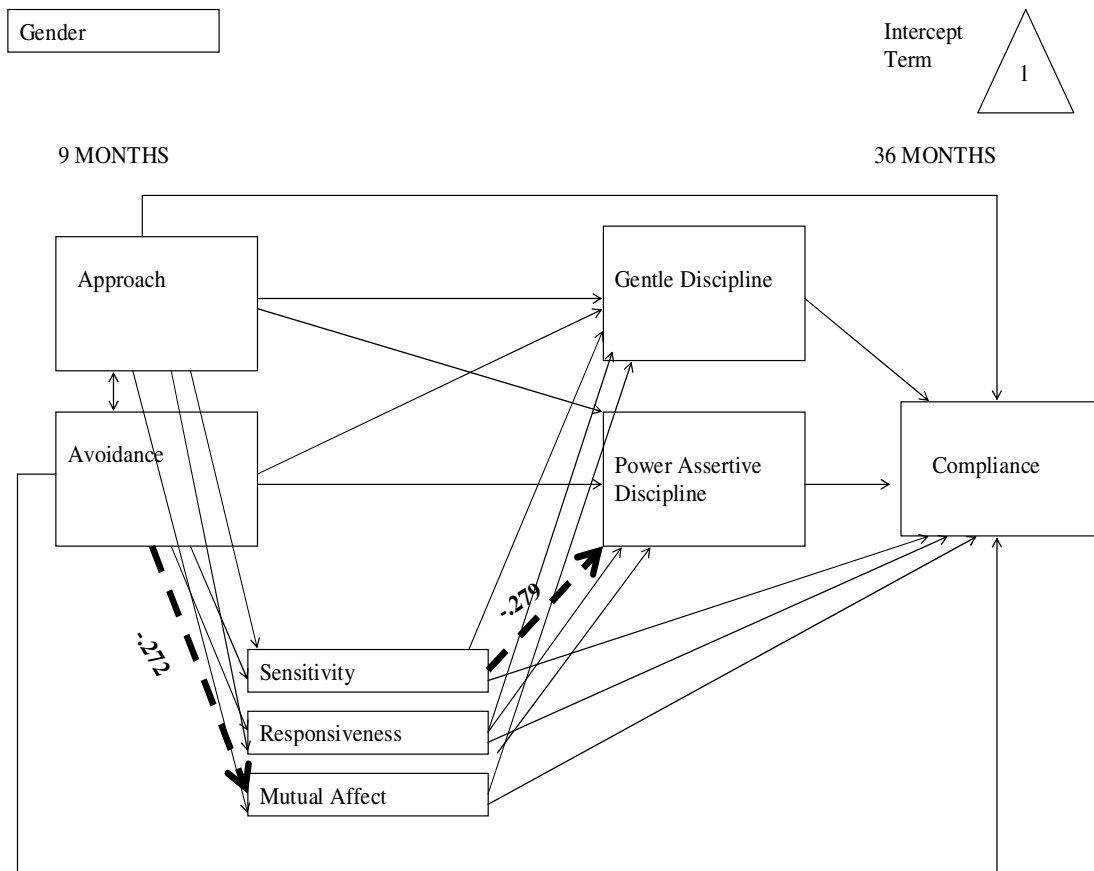




Figure 14.

*Significant paths for temperamentally positive children: Committed compliance, clean-up context*

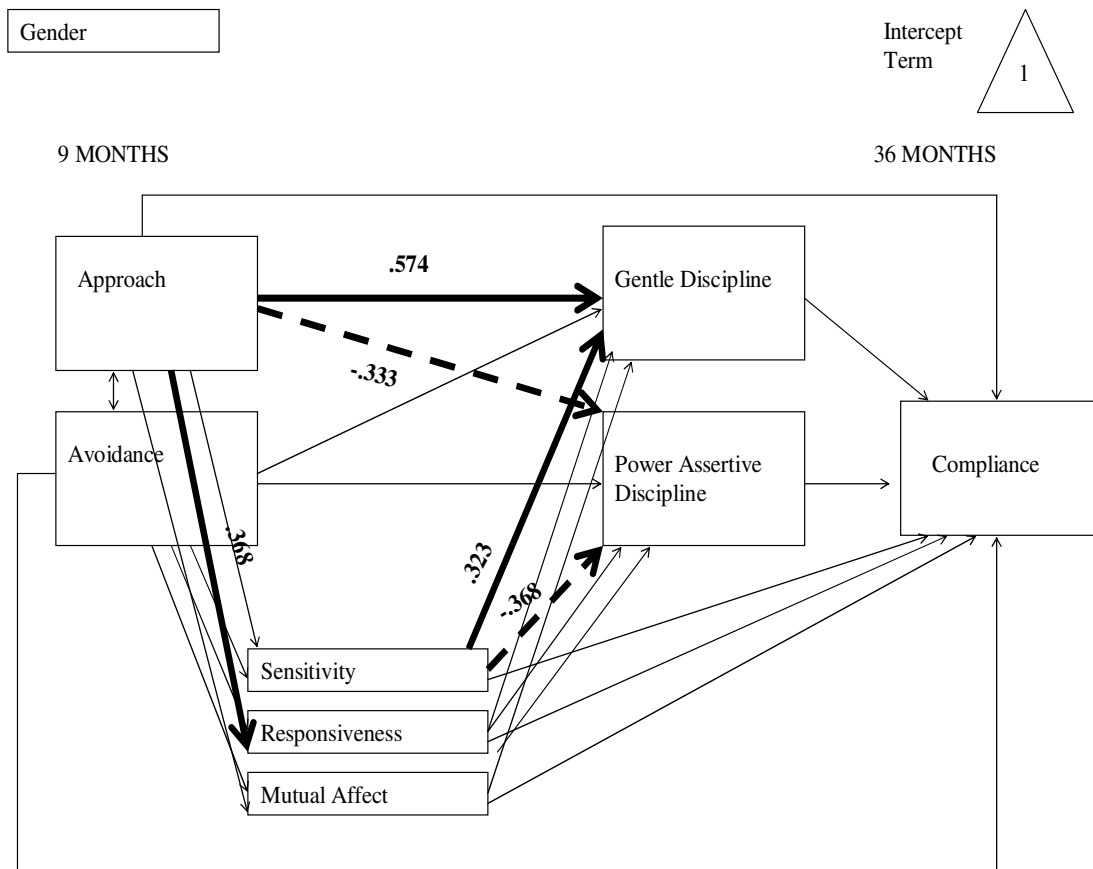


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 15.

*Significant paths for temperamentally negative children: Committed compliance, clean-up context*

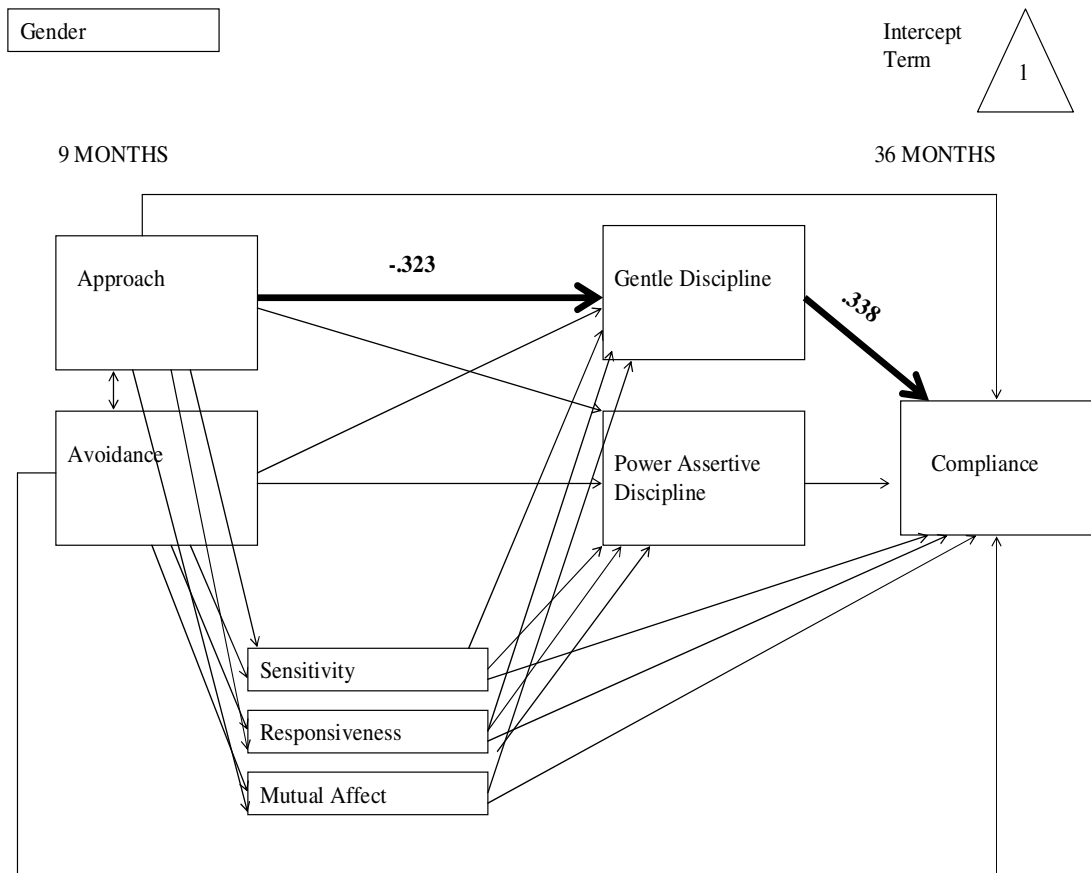


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 16.

*Significant paths for control children: Committed compliance, clean-up context*

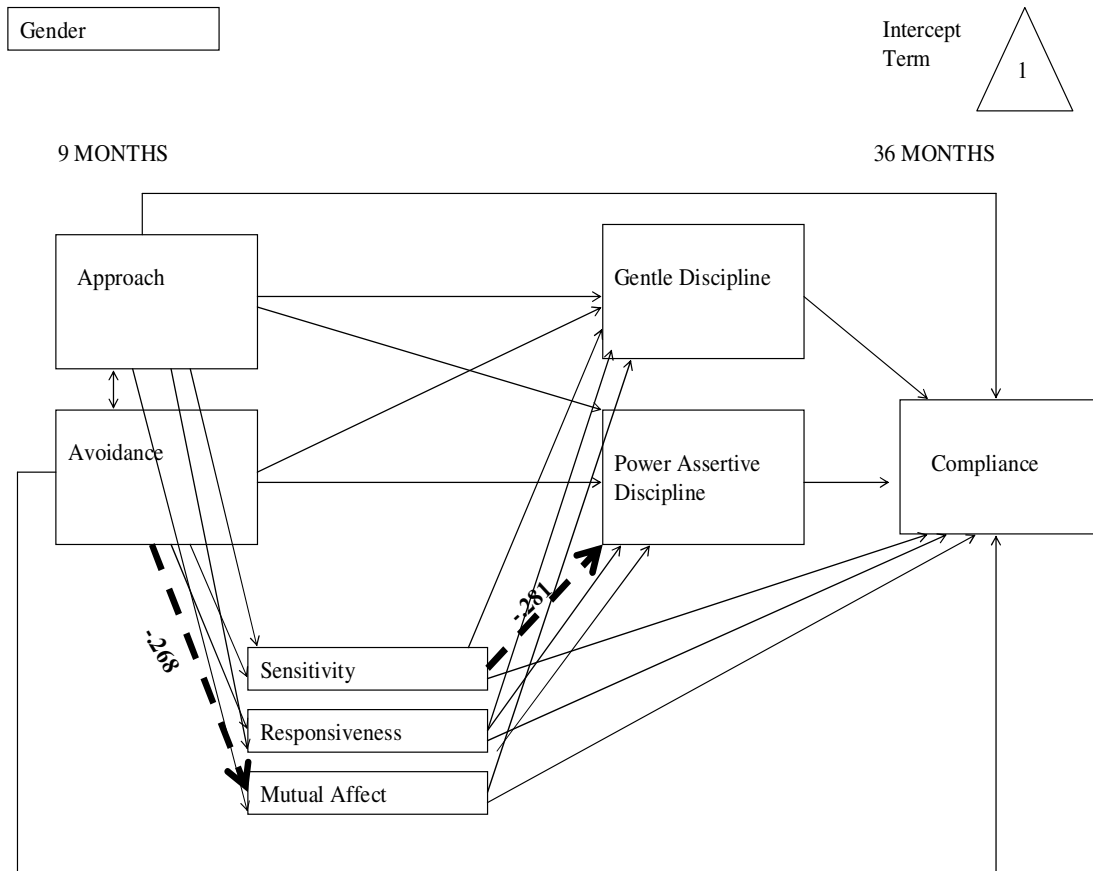


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 17.

*Significant paths for temperamentally positive children: Situational compliance, clean-up context*

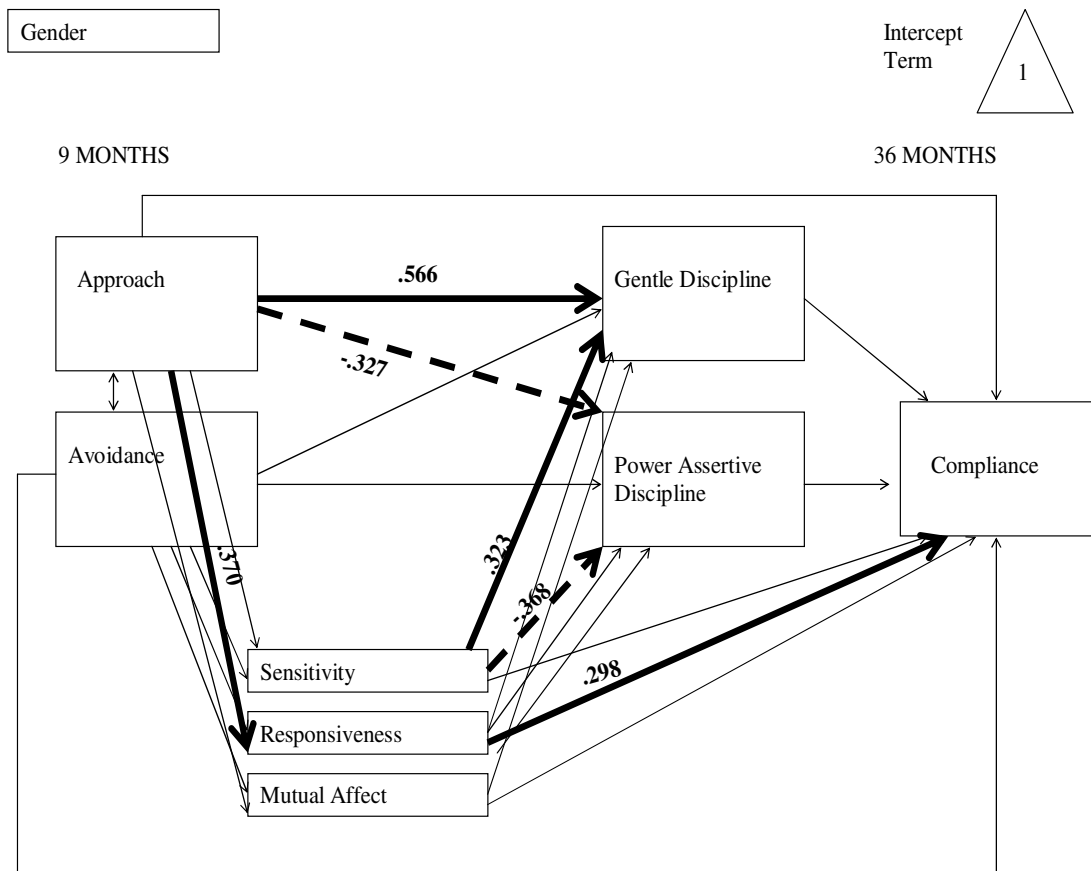


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 18.

*Significant paths for temperamentally negative children: Situational compliance, clean-up context*

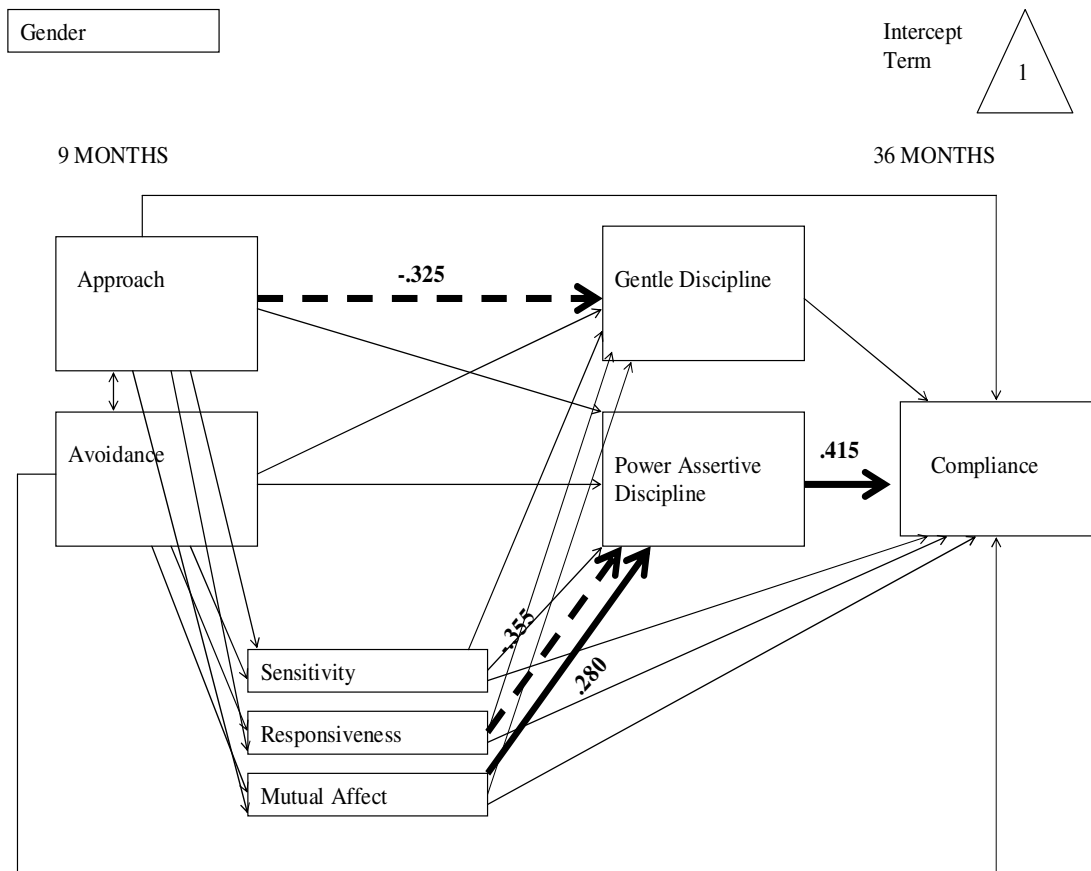


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 19.

*Significant paths for control children: Situational compliance, clean-up context*

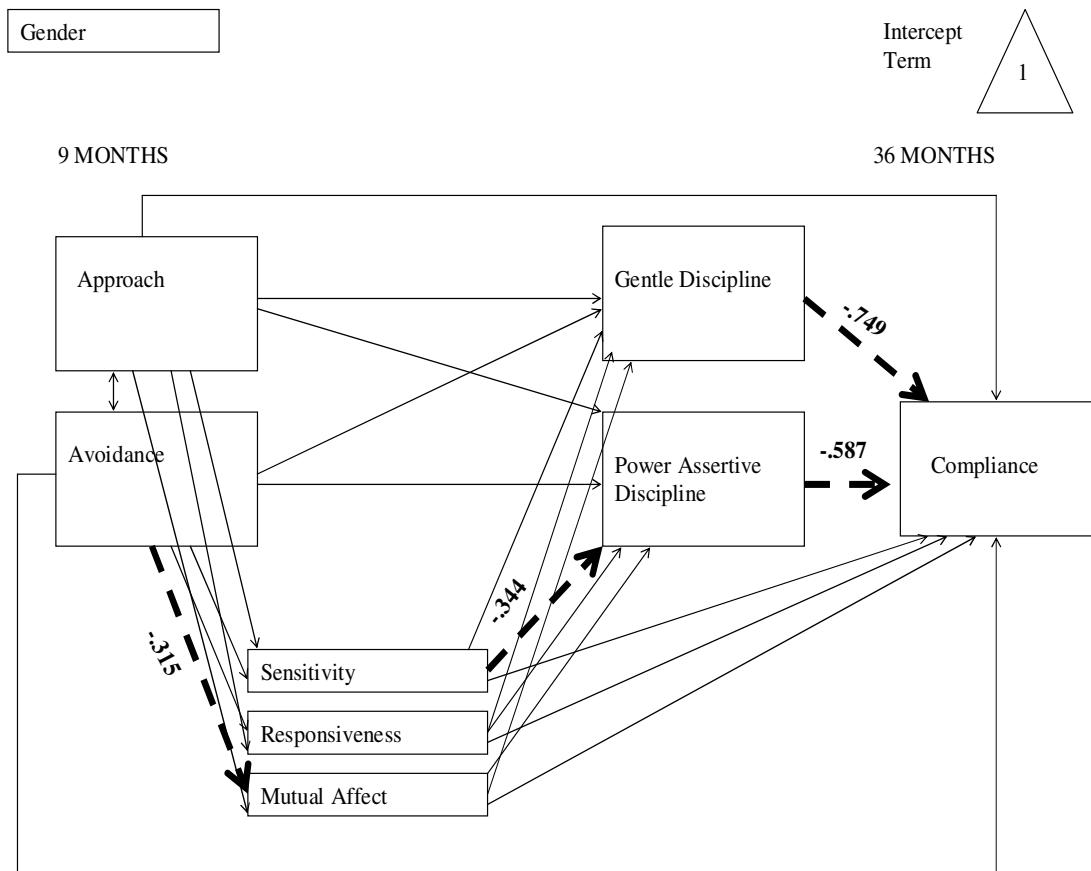


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 20.

*Significant paths for temperamentally positive children: Committed compliance, forbidden toy context.*

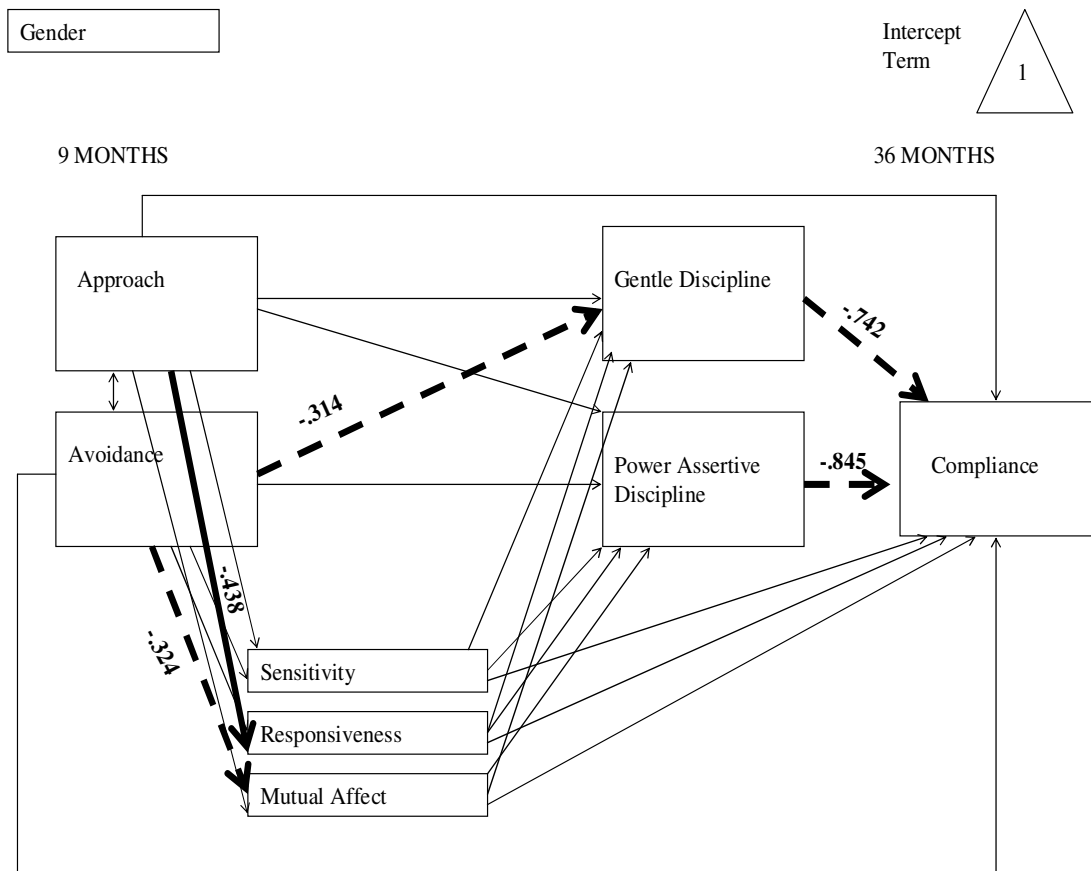


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 21.

*Significant paths for temperamentally negative children: Committed compliance, forbidden toy context.*



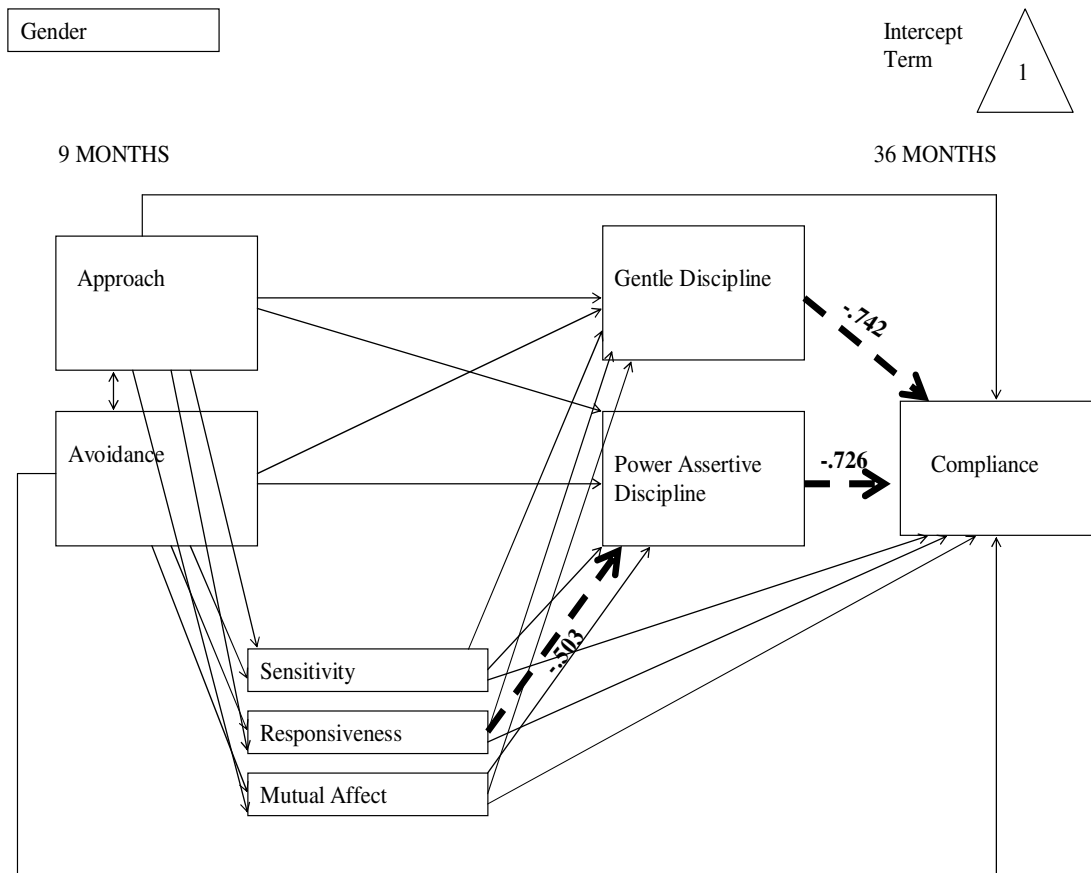
Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.



Figure 22.

*Significant paths for control children: Committed compliance, forbidden toy context*

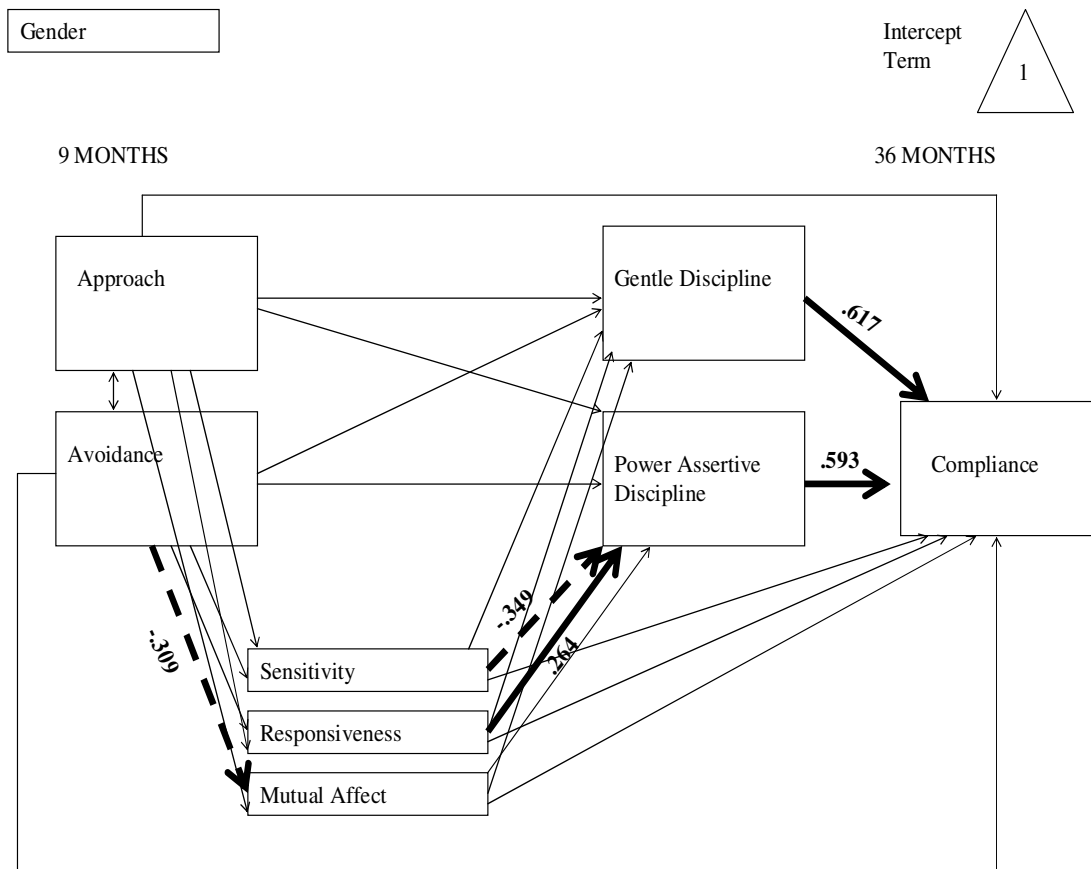


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 23.

*Significant paths for temperamentally positive children: Situational compliance, forbidden toy context.*

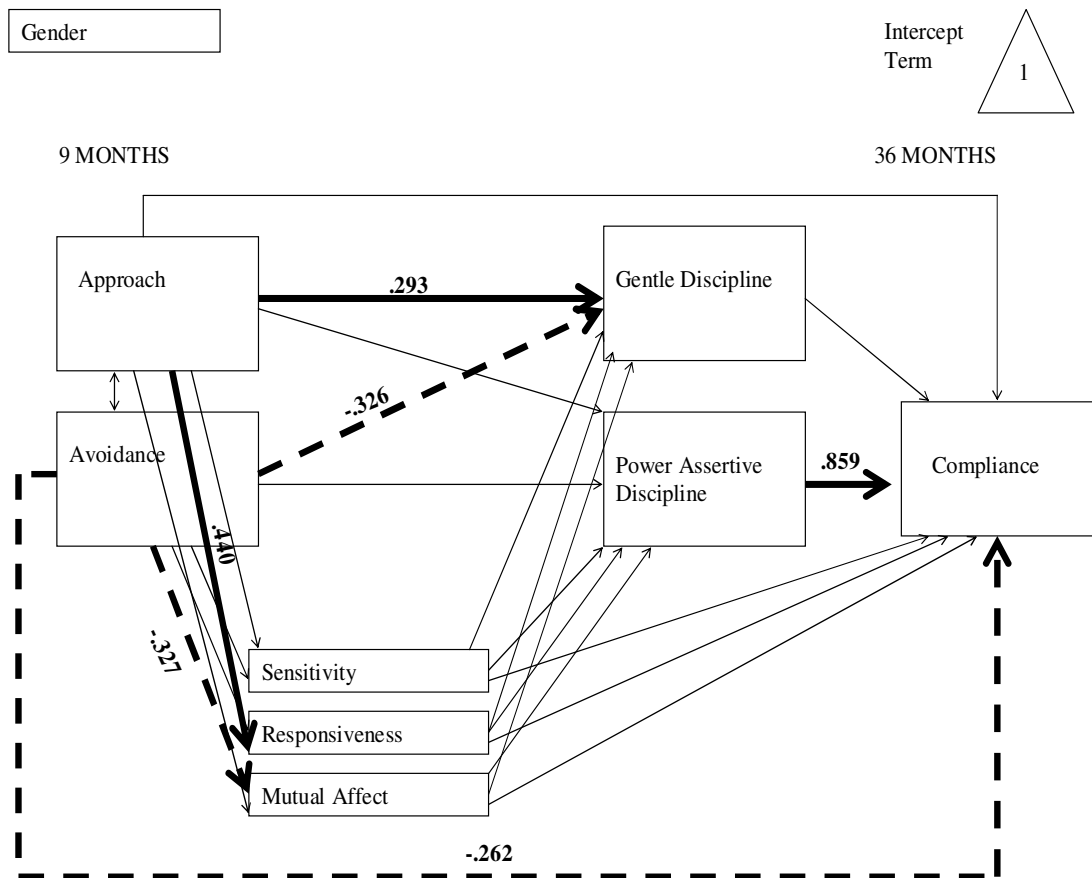


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 24.

*Significant paths for temperamentally negative children: Situational compliance, forbidden toy context.*

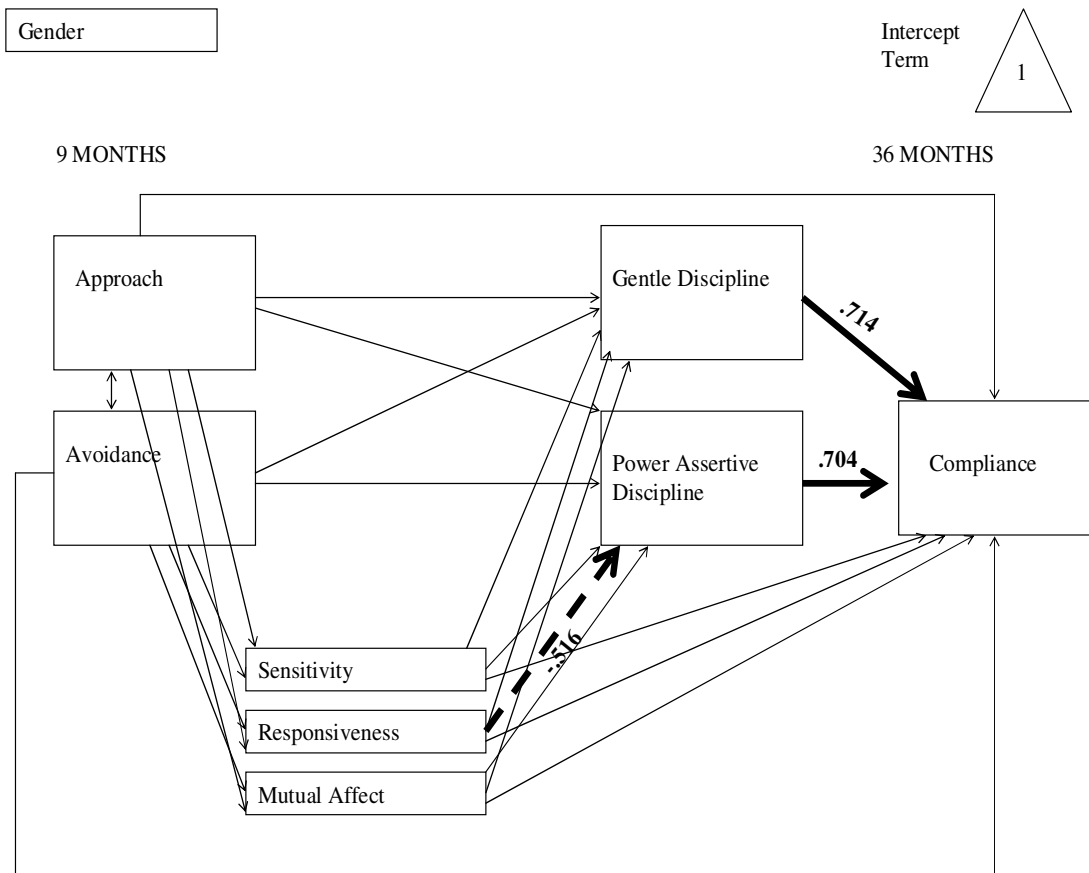


Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

Figure 25.

*Significant paths for control children: Situational compliance, forbidden toy context*



Note. Bolded paths are significant. Dashed arrows indicate negative associations.

Standardized path values shown.

## APPENDIX A: Lab-TAB coding and scoring sheets

### EC 1,2. Unpredictable Mechanical Toy

#### Rationale

A noisy and unpredictable remote controlled toy dog approaches the child in a relatively nonsocial setting. The elements of novelty and intrusiveness should elicit signs of fear. Given the context, the stimulus is relatively inescapable. Repeated trials should allow observations of change in reactivity.

#### Physical setting



The child (C), mother (M), and familiar experimenter (E) are seated at a medium-sized table (approximately 80 cm x 140 cm) which is placed near a one-way mirror for videotaping. C is secured in a high chair at one end of the table. M is seated next to C, approximately .5 m to C's left. E is seated on C's right, also approximately .5 m away. The table is turned at an angle to facilitate videotaping C's face. A large

cardboard barrier, painted black, is placed on the far end of the table. The barrier contains a door from which the dog appears. A runway extends from the door of the barrier to help guide the toy dog to within 15 cm of C. Another experimenter is seated out of C's view behind the barrier. This experimenter operates the toy -- a remote controlled robot dog that can sit up, bark, and move forward and backward.

#### Procedure

Before beginning, the procedure is explained to M, and she is instructed to remain uninvolved throughout the episode unless C becomes distressed. M is shown a picture of the toy before the episode. The episode begins with the remote controlled dog being placed outside the barrier door by the hidden experimenter. Once E sees C attend to the toy, E says "OK" to cue the beginning of the trial. The hidden experimenter then moves the toy forward until it stops 15 cm directly in front of C; the toy remains in front of C for 10 s. The toy moves quite rapidly. If C reaches for the toy, it is moved slightly back, out of C's reach. The dog is then moved backward until it is directly in front of the barrier door where it remains silent and stationary for 5 s. After the 5 s pause, the entire procedure is repeated two more times for a total of three trials. At the end of the last trial, the forward and backward buttons are pressed off and on twice to make the dog bark and sit up for an additional 10 s. (NOTE: When the dog is brought back to the barrier, it may need to be adjusted so that on the next trial it again moves directly toward C.)

Both M and E should remain as uninvolved as possible. They should have neutral faces and only react if C is clearly distressed. After the episode, C is offered the toy

and given the opportunity to play with it. A latency to touch measure is coded at this time.

#### Camera instructions

Because C is in a high chair, only the upper torso and head will be visible. It is important that both the torso and head be clearly videotaped for scoring purposes. Special emphasis should be placed on getting clear, full frontal shots of the face. If possible, the camera should include both C and the toy in the frame when the toy is rearing up in front of C.

#### Scoring

This episode consists of three trials, each beginning with E's "OK" and the beginning of the approach of the toy dog. Each trial is divided into three epochs. The first epoch consists of the approach (~ 5 s). The second epoch is the first 5 s of the following pause, and the third epoch is the last 5 s of the pause. If the pause is shorter than 10 s, the coder should divide the pause in half, and treat each half as an epoch. The period in which the toy dog returns to the barrier is not coded. The epochs are coded by indicating the occurrence of the specified behavior, or by rating the intensity of the behavior. When an intensity rating is requested, the highest intensity observed should be coded.

#### **Variables to be coded:**

- a) Latency to fear response
- b) Presence of facial fear
- c) Intensity of distress vocalizations
- d) Presence of bodily fear
- e) Intensity of avoidance
- f) Presence of startle response
- g) Presence of gaze aversion
- h) Presence of approach
- i) Presence of self stimulation
- j) Baseline state
- k) Parent behavior
- l) Child location
- m) Presence of facial sadness
- n) Positive facial intensity
- o) Positive motor intensity
- p) Effectiveness of experimenter
- q) Toy error
- r) Total time of trials
- s) Total duration of attention

## Definitions of Variables

a) Latency to Fear Response: Interval, in seconds, from the start of the trial or episode to the first definite fear response (facial, vocalic and postural, which includes bodily fear and escapes behavior, but does not include approach or vocal distress with a intensity of 1). A definite fear response is any response that would be coded as a '1' or higher on the coding sheet.

b) Presence of Facial Fear: Presence of facial fear should be noted in each epoch  
0= No facial fear shown in any region of the face  
1= fear displayed: drawing back of lips, straightening of brows, widening of eyes.

c) Intensity of Distress Vocalizations: Peak intensity of distress vocalizations is noted in each epoch and rated on the following scale.

0= No distress.

1= Mild vocalization that may be difficult to identify as hedonically negative

2= Low intensity protest. Definite whimpering, mild fussing, or whining, limited to short duration (1-2 seconds).

3= Definite non-muted crying usually lasting the entire epoch or trial

d) Presence of Bodily Fear: Presence of bodily fear is noted in each epoch and rated on the following scale:

0= No sign of bodily fear

1= Decreased activity: an apparent and sudden decrease in the activity level of the child, tensing: visible and sustained tensing of the muscles, associated with decreased activity, and/or freezing or trembling: tensing of the entire body with no motion, or trembling due to extreme muscular tension.

e) Intensity of Avoidance: Peak intensity of avoidance is noted in each epoch and rated on the following scale:

0= No escape behavior or social referencing

1= Mild or fleeting escape behavior (e.g. turning head away, sinking into chair).

2= Moderate escape behavior resulting in significant, but not extreme attempts to get away or resist. Full body movements such as arching back, twisting away, and leaning away are included as well as hitting, pushing and/or slapping.

3= Vigorous escape behavior, usually involving linked, intense full body movements like those found in '2'. These movements usually last the entire epoch.

f) Presence of Startle Response: Within each epoch the presence of absence is noted

0= No startle response

1= Startle response

g) Presence of Gaze Aversion: Child averts eyes and attention from masks for a short duration. Child's head does not have to move, but it may.

0= No gaze aversion present.

1= Gaze aversion present

h) Presence of Approach: Child approaches the stimuli. Approach can include leaning forward or reaching.

0= No approach

1= Approach present

i) Presence of Self-Stimulation: Child uses a body part to engage in repetitive manipulation (e.g. sucking thumb)

0= No self-stimulation

1= Self-stimulation present

j) Baseline:

1=Drowsy

2=Alert/calm (little body movement)

3=Alert/active (large amount of body movement)

4=Fussy

5=Crying

k) Parent Behavior

0= Interfering; emotionally loaded statements to C, soothing, reprimanding C, commanding, or generally disrupting

1= Mild interference; 1-2 comments directed at C or adjustments of C. These comments or adjustments are not emotionally loaded.

2= No interference, neutral

l) Child Location

0= Mother's lap

1= High chair

m) Presence of facial sadness: Presence of facial sadness is noted for each trial

0= No facial sadness present

1= Facial sadness displayed by lip corners drawn down; bottom lip may be pushed up and out by the chin which may be tense or wrinkled, and cheeks looking lower than usual or having a droopy appearance



n) Positive Facial Intensity: Peak intensity of facial joy is noted in each trial using AFFEX and rated on the following scale:

0= No smiling at all.

1= Small smile, with lips slightly upturned, and no involvement of cheeks or eyes.

2= Medium smile, with lips upturned, perhaps mouth open, and slight bulging of cheeks.

3= Large smile, with lips stretched broadly and upturned, perhaps mouth open, definite bulging of cheeks and noticeable crinkling of eyes.

o) Positive Motive Intensity: Intensity of banging of hands on table, clapping, waving of arms in excitement, reaching toward the doors, etc. is noted in each trial.

0= Not present.

1= Low intensity positive motor activity.

2= High intensity positive motor activity.

p) Effectiveness of Experimenter: the experimenter's effectiveness in performing the task correctly. The experimenter gets an overall code from the entire episode.

0= Ineffective, veers away from standardized procedures, changes procedures

1= Mildly effective

2= Effective, episode performed according to standardized procedures

q) Toy error: when the toy either stops, or falls off of the table (any deviation that prevents trial from continuing)

0= not present

1= present

r) Total time of Trials: amount of time in seconds of each trial, noted by experimenter's "start" and "stop" commands

s) Total duration of attention: amount of time child is looking at stimulus, scored in seconds, cumulative duration time is noted.

# Unpredictable Toy Episode

## 9 Month Visit -- TOT Study

Subject # \_\_\_\_\_

Scorer \_\_\_\_\_

Date Scored \_\_\_\_\_

Latency To Fear Response or Escape Behavior: T1 \_\_\_\_\_sec. T2 \_\_\_\_\_sec. T3 \_\_\_\_\_sec.

Baseline State (1-5) \_\_\_\_\_ Child Location: Mother's Lap (0) or High Chair (1) \_\_\_\_\_

	Trial 1	Trial 2	Trial 3
Starting Time			
Ending Time			
<b>FEAR</b>			
Presence of Startle Response (0-1)			
Presence of Facial Fear (0-1)			
Presence of Bodily Fear (0-1)			
Intensity of Avoidance (0-3)			
<b>SADNESS</b>			
Presence of Facial Sadness (0-1)			
Intensity of Vocal Distress (0-3)			
<b>POSITIVE</b>			
Positive Facial Intensity (0-3)			
Positive Motor Intensity (0-2)			
Presence of Approach (0-1)			
<b>E. R.</b>			
Presence of Gaze Aversion (0-1)			
Presence of Self Stimulation (0-1)			

Toy Error (0-1) T1 \_\_\_\_\_ T2 \_\_\_\_\_ T3 \_\_\_\_\_ # of Observed Trials \_\_\_\_\_

Parent Behavior (0-2) \_\_\_\_\_ Effectiveness of Experimenter (0-2) \_\_\_\_\_

Total Time of Trials (seconds) \_\_\_\_\_ Total Duration of Attention (seconds) \_\_\_\_\_

## EC 1,4. Masks

### Rationale

Previous research has indicated that the incongruity inherent in viewing a mask elicits fear in some children. This episode provides such an opportunity for the expression of fear in a non-social context with relatively mild, non-intrusive stimulation.

### Physical setting



The child (C) is placed in a high chair in a gray enclosed booth. Her/his mother (M) stands behind and to C's right, about 1 m from C. M is outside C's visual field when C orients toward the curtain. C is secured in the high chair by a seat belt. Videotaping takes place through a camera opening in the enclosure. A curtain hangs in front of the main opening of the enclosure where the masks will be presented so that the masks are

hidden from C's view until their presentation. The masks are an evil queen (from Snow White), an old man, glow-in-the-dark vampire, and a gas mask.

### Procedure

M places C in the highchair, which is already in the gray enclosure. Once positioned, E draws C's attention to the curtained opening by knocking on the wall of the enclosure. The trial begins when C's attention is focused. E then lifts the curtain and displays a mask. After 10 s the mask is removed, and the curtain is left down for 5 s before the next mask is displayed. The sequence of display of the masks is as follows: evil queen, old-man, glow-in-the-dark vampire, and gas mask.

### Camera instructions

Because C is in the gray enclosure, it is only possible to videotape C's face and part of the upper torso. It is important to get a clear picture of the face and upper body at all times. The camera remains stationary.

### Scoring

This episode consists of four trials each divided into two epochs. Each trial begins with a knock and is followed by two five second epochs. The period between trials during which the experimenter is changing masks is not coded. Start coding once the child has made eye contact with the mask. Epochs where the child has not noticed the masks should be considered missing. The epochs are coded by indicating the occurrence of the specified behavior, or by rating the intensity of the behavior. When an intensity rating is requested, the highest intensity observed should be coded.

### **Variables to be coded:**

- t) Latency to fear response
- u) Presence of facial fear
- v) Intensity of distress vocalizations
- w) Presence of bodily fear
- x) Intensity of avoidance
- y) Presence of startle response
- z) Presence of gaze aversion
- aa) Presence of approach
- bb) Presence of self stimulation
- cc) Baseline state
- dd) Parent behavior
- ee) Child location
- ff) Presence of facial sadness
- gg) Positive facial intensity
- hh) Positive motor intensity
- ii) Effectiveness of experimenter
- jj) Total time of trials
- kk) Total duration of attention

### **Definitions of Variables**

a) Latency to Fear Response: Interval, in seconds, from the start of the trial or episode to the first definite fear response (facial, vocalic and postural, which includes bodily fear and escapes behavior, but does not include approach or vocal distress with a intensity of 1). A definite fear response is any response that would be coded as a '1' or higher on the coding sheet.

b) Presence of Facial Fear: Presence of facial fear should be noted in each epoch  
0= No facial fear shown in any region of the face  
1= fear displayed: drawing back of lips, straightening of brows, widening of eyes.

c) Intensity of Distress Vocalizations: Peak intensity of distress vocalizations is noted in each epoch and rated on the following scale.

0= No distress.

1= Mild vocalization that may be difficult to identify as hedonically negative

2= Low intensity protest. Definite whimpering, mild fussing, or whining, limited to short duration (1-2 seconds).

3= Definite non-muted crying usually lasting the entire epoch or trial

d) Presence of Bodily Fear: Presence of bodily fear is noted in each epoch and rated on the following scale:

0= No sign of bodily fear

1= Decreased activity: an apparent and sudden decrease in the activity level of the child, tensing: visible and sustained tensing of the muscles, associated with decreased activity, and/or freezing or trembling: tensing of the entire body with no motion, or trembling due to extreme muscular tension.

e) Intensity of Avoidance: Peak intensity of avoidance is noted in each epoch and rated on the following scale:

0= No escape behavior or social referencing

1= Mild or fleeting escape behavior (e.g. turning head away, sinking into chair).

2= Moderate escape behavior resulting in significant, but not extreme attempts to get away or resist. Full body movements such as arching back, twisting away, and leaning away are included as well as hitting, pushing and/or slapping.

3= Vigorous escape behavior, usually involving linked, intense full body movements like those found in '2'. These movements usually last the entire epoch.

f) Presence of Startle Response: Within each epoch the presence of absence is noted

0= No startle response

1= Startle response

g) Presence of Gaze Aversion: Child averts eyes and attention from masks for a short duration. Child's head does not have to move, but it may.

0= No gaze aversion present.

1= Gaze aversion present

h) Presence of Approach: Child approaches the stimuli. Approach can include leaning forward or reaching.

0= No approach

1= Approach present

i) Presence of Self-Stimulation: Child uses a body part to engage in repetitive manipulation (e.g. sucking thumb)

0= No self-stimulation

1= Self-stimulation present

j) Baseline:

1=Drowsy

2=Alert/calm (little body movement)

3=Alert/active (large amount of body movement)

4=Fussy

5=Crying

k) Parent Behavior

0= Interfering; emotionally loaded statements to C, soothing, reprimanding C, commanding, or generally disrupting

1= Mild interference; 1-2 comments directed at C or adjustments of C. These comments or adjustments are not emotionally loaded.

2= No interference, neutral

l) Child Location

0= Mother's lap

1= High chair

m) Presence of facial sadness: Presence of facial sadness is noted for each trial

0= No facial sadness present

1= Facial sadness displayed by lip corners drawn down; bottom lip may be pushed up and out by the chin which may be tense or wrinkled, and cheeks looking lower than usual or having a droopy appearance

n) Positive Facial Intensity: Peak intensity of facial joy is noted in each trial using AFFEX and rated on the following scale:

0= No smiling at all.

1= Small smile, with lips slightly upturned, and no involvement of cheeks or eyes.  
2= Medium smile, with lips upturned, perhaps mouth open, and slight bulging of cheeks.

3= Large smile, with lips stretched broadly and upturned, perhaps mouth open, definite bulging of cheeks and noticeable crinkling of eyes.

o) Positive Motive Intensity: Intensity of banging of hands on table, clapping, waving of arms in excitement, reaching toward the doors, etc. is noted in each trial.

0= Not present.

1= Low intensity positive motor activity.

2= High intensity positive motor activity.

p) Effectiveness of Experimenter: the experimenter's effectiveness in performing the task correctly. The experimenter gets an overall code from the entire episode.

0= Ineffective, veers away from standardized procedures, changes procedures

1= Mildly effective

2= Effective, episode performed according to standardized procedures

q) Total time of Trials: amount of time in seconds of each trial, noted by experimenter's "start" and "stop" commands

r) Total duration of attention: amount of time child is looking at stimulus, scored in seconds, cumulative duration time is noted.

# Masks Episode

9 Month Visit -- TOT Study

Subject # \_\_\_\_\_

Scorer \_\_\_\_\_

Date Scored \_\_\_\_\_

Latency To Fear Response or Escape Behavior: T1 \_\_\_\_\_ sec. T2 \_\_\_\_\_ sec.

Baseline State (1-5) \_\_\_\_\_ Child Location: Mother's Lap (0) or High Chair (1) \_\_\_\_\_

	<b>Trial 1</b>	<b>Trial 2</b>
Starting Time		
Ending Time		
<b>FEAR</b>		
Presence of Startle Response (0-1)		
Presence of Facial Fear (0-1)		
Presence of Bodily Fear (0-1)		
Intensity of Avoidance (0-3)		
<b>SADNESS</b>		
Presence of Facial Sadness (0-1)		
Intensity of Vocal Distress (0-3)		
<b>POSITIVE</b>		
Positive Facial Intensity (0-3)		
Positive Motor Intensity (0-2)		
Presence of Approach (0-1)		
<b>EMOTION REGULATION</b>		
Presence of Gaze Aversion (0-1)		
Presence of Self Stimulation (0-1)		

Parent Behavior (0-2) \_\_\_\_\_

Effectiveness of Experimenter (0-2) \_\_\_\_\_

Total Time of Trials (seconds) \_\_\_\_\_ Total Duration of Attention (seconds) \_\_\_\_\_

### EC 3,2. Puppet Game

#### Rationale

This episode measures enjoyment in response to social stimulation. The use of puppets allows a more standardized social interaction than is possible when the mother has a prominent role.

#### Physical Setting



A medium-sized table (80 cm X 140 cm) is placed with the short end facing the one-way mirror. The child (C) is in a highchair, pulled up to the end of the table, facing the one-way mirror. The mother (M) is seated at the table to C's left, approximately 1 m away. The familiar experimenter (E) is seated at the table to C's right, also 1 m away. The dialogue is printed on a sheet of paper placed on the table near E. The puppets remain on E's chair or E's lap, out of C's sight until

the game begins.

#### Procedure

E puts on both hand puppets under the table and brings them above the table to begin the episode. (If C is looking elsewhere (for example, at M) E should get C's attention before beginning the episode by saying C's name.) E plays the part of both puppets, using a standard dialogue that is printed on a sheet of paper that lies on the table for easy reference (see dialogue below). E's reading of the dialogue should be animated and proceed at a lively pace. Different "voices" are used for the two puppets. The entire dialogue should take 90 s. Each of the 3 "tickles" by the puppets should last approximately 3 s and should be at C's midsection rather than close to the neck or face to avoid upsetting C. If C becomes distressed by any of the "tickles," any remaining "tickles" should take place further away from C (for example, at the edge of the table rather than in actual contact with C's body). If C becomes extremely distressed after the first tickle, the puppets should then pretend to tickle each other rather than C (see substitute dialogue). After the dialogue, E brings the puppets back under the table, out of C's sight, where E silently removes them. Without comment, E then places the puppets, heads closest to C, on the table directly in front of C. E then withdraws his/her hands silently, and C is given 30 s to play with the puppets (make sure that M knows that C is to play with the puppets alone).



Dialogue for puppet game:

Puppet A: Hi there! My name is Chloe. What's your name?

**Puppet B:** My name is Zoe. How do you do?

A: Very well, I thank you. How do you do?

**B:** Very well, I thank you. Who do we have here today? (gesturing to child). S/he's awfully cute.

A: I think (His/Her) name is \_\_\_\_\_. (To child) Is your name \_\_\_\_\_? yes, (His/Her) name is \_\_\_\_\_.

**B:** Hi \_\_\_\_\_. It's very nice to see you here today. Are you having fun? Gee, Chloe, What do you think would happen if I tickled \_\_\_\_\_'s tummy?

A: I don't know, Zoe. Why don't you try it and find out?

**B:** Ok, Chloe, I think I will. Are you ready \_\_\_\_\_? Here I go. ready, set, go!! (tickles child's midsection)

A: Oh Zoe, that looked like grand fun! I think I'll try it too. Ready \_\_\_\_\_? Here I go. Ready, set, go!! (tickle)

**B:** Hey, Chloe, what would happen if we both tickled \_\_\_\_\_ together?

A: I don't know, but it sounds like fun. Let's try it!

**B:** Ok. Are you ready \_\_\_\_\_? Are you ready, Chloe? Ready, set, go!!! (both tickle)

A: That was fun, Zoe. Did you like that too \_\_\_\_\_? I certainly hope you did. Well, it was nice talking to you here today. Have a good time \_\_\_\_\_. Bye, bye, Zoe.

**B:** Bye, bye, Chloe.

A & **B:** Bye, bye, \_\_\_\_\_.

(If, after the first tickle, C becomes extremely upset, the following dialogue is substituted for the rest of the above dialogue, beginning after the first tickle):

A: Oh, Zoe, That looked like grand fun! Can I tickle you?

**B:** Okay!

A: Ok, Zoe, Here I come. ready, set, go! (pretends to tickle the other puppet)

**B:** Hee, hee, hee, that was fun! Now I'm going to tickle you, Chloe! Are you ready? Ready, set, go! (pretends to tickle the puppet).

A: That was fun, Zoe. Did you like that too \_\_\_\_\_? I certainly hope you did. Well, it was nice talking to you here today. Have a good time \_\_\_\_\_. Bye, bye, Zoe.

**B:** Bye, bye, Chloe.

A & **B:** Bye, bye, \_\_\_\_\_.

(Puppets disappear under the table where E removes them. Then E places them on the table about 10 cm in front of C.)

#### Camera Instructions

The camera's frame includes C's entire upper body with close-up frontal shots of C's face to facilitate scoring of smiling. The portion of the table directly in front of C is

also included so that C's approach to the puppets after the dialogue is captured. Remember to film for 30 s after the puppets are placed on the table in front of C.

#### Scoring

The episode begins with the appearance of the puppets from under the table and is divided into 5 trials for scoring. The first trial begins when the puppets appear from under the table, until the puppets make contact with C at the beginning of the first tickle. The second trial begins when the puppets make contact with C for the first tickle until the puppets touch C for the second tickle. The third trial begins when the puppets make contact with C for the second tickle until the puppets make contact for the third tickle. The fourth trial begins when the puppets make contact with C for the third tickle, and continues until E puts the puppets on the table in front of C. At this point the fifth epoch begins and continues for 30 s. The epochs are coded by indicating the occurrence of the specified behavior, or by rating the intensity of the behavior. When an intensity rating is requested, the highest intensity observed should be coded.

#### Variables to be coded:

- a) Latency to joy.
- b) Intensity of smiling.
- c) Laughter.
- d) Positive vocalizations.
- e) Positive motor acts.
- f) State
- g) Latency to Approach
- h) Engagement with Toy
- i) Duration of Attention
- j) Presence of Gaze Aversion
- k) Intensity of Avoidance
- l) Presence of Approach
- m) Looking at Mother (if present)
- n) Presence of Self-Stimulation
- o) Baseline State
- p) Effectiveness of Experimenter

#### Definitions of variables:

- a) Latency to joy: Interval, in seconds, from the start of the episode to the first sign of joy (facial, postural, or vocalic).

- b) Intensity of smiling: Peak intensity of facial joy is noted in each epoch using AFFEX (See Appendix A for definitions) and rated on the following scale:
- 0= No smiling at all.
  - 1= Small smile, with lips slightly upturned, and no involvement of cheeks or eyes.
  - 2= Medium smile, with lips upturned, perhaps mouth open, slight bulging of cheeks, and perhaps some crinkling about the eyes.
  - 3= Large smile, with lips stretched broadly and upturned, perhaps mouth open, definite bulging of cheeks and noticeable crinkling of eyes.
- c) Laughter: Presence of laughter in each of the epochs is noted; laughter should be more intense than positive vocalizations and usually has a rhythmic quality.
- 0= Not present.
  - 2= Present.
- d) Intensity of Positive vocalizations: Intensity of positively toned babbling, squealing, and similar behaviors in each epoch is noted. This does not include vocalization when the child is fussy or crying (0-3)
- 0=No Positive vocal
  - 1=Ambiguous vocal
  - 2=Definite positive vocal sound – babbling, squealing
  - 3=Intense positive vocalizations – definite laughing
- e) Positive motor activity: Positive motor acts include the following: banging of hands on table; clapping of hands; waving arms in excitement; attempts, reaches for and/or plays with puppets during dialogue; definite leaning forward towards the puppets.
- 0= Not positive motor activity.
  - 1= Low intensity positive motor activity.
  - 2= High intensity positive motor activity.
- f) State:
- 1= tired/drowsy
  - 2= alert/calm – little body movement
  - 3= alert/active – lots of body movement
  - 4= fussy
  - 5= crying
- g) Latency to approach: Interval, in seconds, from E's laying the puppets on the table in front of C to C's first contact with them (epoch 5).
- h) Engagement with toy: the child's level of engagement with the toy should be noted.
- 0= Indifferent to the toy.
  - 1= Neutral reaction to toy, looks at toy with mild interest.
  - 2= Fully engaged with toy; likes toy, engrossed in toy.

**\*Note:** When considering engagement with the toy, remember that staring, leaning and reaching are equally important, especially for infants who may not have the motor skills required to reach for a moving toy. Consider the intensity of the stare: Is it a blank stare or is the child mentally engaged? A child should not automatically lose engagement points just because s/he does not reach.

- i) Duration of Attention: amount of time child is looking at the stimulus, scored using real time. Cumulative duration time of attention is noted out of the total length of time the epoch. (Should be seen as a fraction).
- j) Gaze Aversion: child glances away from stimulus without focusing on any particular object (head not completely turned).  
0= Not present  
1= Present
- k) Intensity of Avoidance: Peak intensity of escape is noted for each epoch.  
0= No avoidance behavior  
1= Mild or fleeting avoidance behavior (e.g. turning head completely, sinking into chair)  
2= Moderate avoidance behavior resulting in significant, but not extreme attempts to get away or resist. Full body movements, such as arching back, twisting away, and leaning away are included as well as hitting, pushing, and/or slapping.  
3= Vigorous avoidance behavior, usually involving linked, intense full-body movements like those found in '2'. These movements usually last for the entire epoch.
- l) Presence of Approach: child approaches stimulus, leans forward, reaches, etc.  
0= Not present  
1= Present
- m) Looking at Mother ONLY IF she is present.  
0= Not Looking  
1= Looking
- n) Presence of Self-Stimulation: child uses a body part to engage in repetitive manipulation (e.g. sucking thumb)  
0= Not present  
1= Present

- o) Baseline State: the child's state prior to the beginning of an episode.
  - 1= tired/drowsy
  - 2= alert/calm – little body movement
  - 3= alert/active – lots of body movement
  - 4= fussy
  - 5= crying
  
- p) Effectiveness of Experimenter: the experimenter's effectiveness in performing the script correctly. The experimenter gets an overall code from the entire episode.
  - 0= Ineffective, veers away from standardized procedures, changes procedures
  - 1= Mildly effective; tone is either somewhat too positive or too flat/negative, procedures are slightly changed.
  - 2= Effective, episode performed according to standardized procedures

# 9 Month Puppet Game TOT Study

Subject # \_\_\_\_\_

Scorer \_\_\_\_\_

Date Scored \_\_\_\_\_

Baseline state: \_\_\_\_\_

Latency to joy response \_\_\_\_\_s

Latency to approach puppets in epoch 5 \_\_\_\_\_

Epochs	1	2	3	4
Intensity of Smiling (0-3)				
Intensity of Positive Vocal (0-3)				
Presence of Positive Motor Acts (0-2)				
State (1-5)				

Epochs	1	2	3	4
Duration of Attention (timed in seconds)				
Presence of Gaze Aversion (0-1)				
Intensity of Avoidance (0-3)				
Presence of Approaches (0-1)				
Looking at Mother if Present (0-1)				
Presence of Self-Stimulation (0-1)				

Engaged With Toy: \_\_\_\_\_

Effectiveness of Experimenter \_\_\_\_\_

# of observed epochs: \_\_\_\_\_

## APPENDIX B: Mother-Infant Interactive Affect

### **FAMILY STUDY** **PARENT/CHILD AFFECT CODING SYSTEM** **G. Kochanska**

#### TIME 1

Coders view videotapes of various paradigms and code parent and child affect. Facial expressions, body language, and tone of voice are all indicators of affect. The coding is done for each 30-second segment. Different paradigms will vary in their length, and have standard numbers of segments. If a paradigm runs over time, some segments will not get coded. If a paradigm is somewhat shorter than it should be, then some segments will remain blank. If the last segment is only partially completed (e.g., 19 seconds rather than 30), coders use whatever is available for that segment (unless under 15 seconds).

For each segment, the coder records each affect category that occurs. Thus, there may be several different affect categories in a segment (e.g., if child is smiling for 10 seconds and frowning sadly for 10 seconds, two codes would be used: pleasure/joy, and discrete negative). Each affect code, however, may be used only once in a segment.

During some paradigms, the parent or child may not be visible, however, their voice may be used to determine the coding category. If the parent or child cannot be seen (any part of their body) and cannot be heard, then the segment is marked as uncodable on the coding sheet.

Coding the neutral affects (neutral/positive and neutral/negative)

Convention: For one person (parent or child), the neutral codes may only stand alone in a segment, i.e., no discrete affect codes may be put in that segment. If a discrete affect code is used, that fact precludes, by convention, using either one of the neutral codes in that segment. Only one neutral code may be used (either N+ or N-), whichever is dominant.

#### Circled affect codes

Circling is used to mark an affect that is either particularly pervasive or particularly intense. It is not used for neutral/positive and neutral/negative because those are moods rather than discrete affect expressions, and thus, by definition are long lasting but not intense.

If any discrete affect persists for more than 15 seconds (cumulatively), or if that affect occurs several times in one segment (thus, most likely accumulates to more than 15 seconds), the code should be circled.

If any affect is particularly intense (e.g., child cries with tears, screams, or giggles loudly), the code should also be circled (discrete negative, joyful).

If an affect clearly escalates, e.g., child smiles for a while and then starts to giggle, code joyful circled only, because one affect code may only be used once in a segment.

Often an affect will be both pervasive and intense; it should only be circled once.

The following contexts (paradigms) of Time 1 are coded. Start time and end time for each paradigm must be coordinated with the start and end times of the Maternal Responsiveness coding system, as well as with the Discipline/Compliance coding system. Use either the beginning or the 30th second of each minute (:00 or :30) on the VCR timer to mark the starting time of coding. If the real time ends in 0 to 14 seconds, use the beginning of the minute as the start time. If the real time ends in 15 to 30 seconds, use the 30th second as the start time. **Be sure to write down the real start time for each paradigm to be able to coordinate with the other systems and for reliability purposes.**

MOM/DAD BUSY	(7 min)
SNACK	(6 min)
PLAY W/O TOY	(5 min)
PLAY W/ TOY	(5 min)
PROHIBITION	(5 min)
FREE PLAY	(3 min)
CARE GIVING	(12 min)
GIFT	(2 min)

**total = 45 minutes (90 segments)**

## AFFECT CATEGORIES

TENDER/AFFECTIONATE - Physically or verbally demonstrative, often accompanied by tender, caring tone of voice, kissing (either directly or through other means such as a puppet or through the air), stroking, hugging, tickling, positive comments or reinforcement accompanied by physical tenderness. **Does not include parent merely picking up child to move him/her or touching as part of routine care giving or touching used primarily used to get the child's attention. If parent is trying to be affectionate and child does not respond with snuggling into the**



**parent or other form of affection, only the parent is coded as tender/affectionate. Note: In infancy, just affectionate talk is not coded as affection if not accompanied by some form of physical closeness (or very immediate face-to-face interaction focused just on the exchange of terms of endearment). It may be enough, however, for affection to be coded for parents at older age.**

For child, include active snuggling to parent, full body pressed voluntarily to parent, face "sinking" into parent's neck, etc., not just being touched by parent. Also include child's spontaneous hugs and/or kisses to a doll or animal while directly playing with Parent. Parent may be coded as affectionate, but if child is not actively reciprocating, s/he will not be coded as affectionate.

JOYFUL - Smiling, laughing, giggling, high pitched voice, enthusiastic

NEUTRAL/POSITIVE - Neutral expression with no emotional tint or with a positive tint. For child, alert, "bright-eyed", comfortable, but not smiling

NEUTRAL/NEGATIVE - Neutral expression with a negative tint, a touch of impatience, creates an impression that she/he "would rather be elsewhere." For child, include subtle signs of fatigue, boredom, lack of alertness, "dull-eyed", but no clear sign of a well-defined negative affect.

Additional guidelines for coding neutral/positive and neutral/negative

These guidelines were developed after we discovered, doing the first reliability for parents' affect in the Parent Child Study, that neutral/negative practically never happened.

For neutral/positive, there has to be some degree of animation, generally positive affect expression (even if short of a full smile). Parent appears to be in a good mood; you feel like approaching her/him and beginning an interaction, and you think she/he would respond warmly and eagerly. She/he looks genuinely comfortable and enjoying the "here and now". In the snack situation, she/he keeps talking to the child, makes overtures that are "bright", cheerful, and positive in content and vocal quality, even if she/he is busy with getting food ready. She/he may watch the baby with a warm and perhaps half-amused expression, even if she/he is not interacting with him/her.

For neutral/negative, none of the above is present; you have a feeling that, if given a choice, the parent would much rather be somewhere else, or that she/he would be glad if the session were over. There may be subtle sign of fatigue, impatience, or worry. You have a feeling that she/he is participating out of the sense of duty and is not having a jolly

good time, although, of course, the experience is not clearly unpleasant, either. The situations when neutral/negative is most likely are those in the Living Room. In the snack situation, code neutral/negative if the parent does not make cheerful bids toward child (she/he may mutter something occasionally, but it lacks the "bright" quality), and in general, appears dutiful rather than genuinely enjoying the "here and now". You have a feeling she/he will be quite relieved when the session is over.

\*\*\*For Plant and Mom/Dad busy episodes, the parent only needs to be neutral positive for most of seven seconds (there must be seven seconds of interaction to consider neutral positive) to be coded as neutral positive. This alteration was made because the parents are instructed to be busy and are not expected to interact with their children the whole time.

CONVENTION: ONLY ONE NEUTRAL CODE (EITHER POSITIVE OR NEGATIVE) MAY BE GIVEN IN ONE SEGMENT. IF BOTH ARE CONSIDERED, THE DOMINANT ONE SHOULD BE CHOSEN.

DISCRETE NEGATIVE AFFECT - Code if any of the following affects are present. Negative affects are not distinguished further because of difficulties identifying and separating them in the Parent Child Study.

ANGER/IRRITATION - Irritation in tone or words, scowling, whining or crying due to anger or irritation, angry yelling, punishment, striking.

FUSSY - Generalized mild distress for unknown reasons; whining not clearly attributable to an anger-causing event

SAD - Crying due to sadness, frowning, pouting, minor injury.

ANXIOUS/FEARFUL - Muscle tension, apprehension, worried or panicked expression

DISTRESSED - Well-defined negative affect with unknown cause (if known, code as fear or anger); screaming, crying.

UNCODABLE - If the parent or child cannot be seen or heard through the entire segment

## FINAL TABULATION

First tabulate all separate categories for parent and for child.

Next tabulate the shared affects.

### Directions for tabulating shared affects

(1) Shared positive: Find all segments in which both M/F and C expressed positive affect(s) only and no negative affect was present for either person. Positive include tender/affectionate, joyful, and neutral/positive. Thus, both M/F and C are neutral/positive; or one is neutral/positive and the other has a discrete positive affect; or one or both have circled positive affect(s), etc. While finding them, mark each segment lightly with a red dot. Add them.

AF12SP =

(1.1) Shared positive intense: Go through all red-dotted segments (shared positive). Find all segments when both M/F and C have one or more circled positive affect codes. The circled affects do not have to be the same for M/F and C. Also, other non-circled positive affects may be present. Mark each segment lightly by circling in pencil. Add them.

AF12SPI =

(1.2) Shared positive moderate: Go through all segments marked with a red dot but not circled (shared positive but not shared intense). Find and add all those when C had joy (intense or regular) and M/F had joy and/or tender (intense or regular). In other words, ignore the red-dotted segments that contain neutral positive for either M/F or C.

AF12SPM =

(1.3) Shared positive other: Do not go back to the sheets.

Compute:  $AF12SPO = AF12SP - (AF12SPI + AF12SPM) =$

(Remember to add first, subtract next)

Check the computation:  $AF12SPI + AF12SPM + AF12SPO$  must equal  $AF12SP$

(2) Shared negative: Sum all segments in which both M/F and C had negative affect(s) only and no positive affect was present for either person. Negative include neutral/negative, and discrete negative. (circled or not).

AF12SN =

## AFFECT CODING SHEET: 9 MONTHS

MOM BUSY

Start Time \_\_\_\_\_

8 minutes

	1		2		3		4		5		6		7		8	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Tender/Affection																
Joy																
Discrete Negative																
Neutral Positive +																
Neutral Negative -																
Uncodeable																

MOM BUSY (cont.)

	10		11		12		13		14		15		16	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Tender/Affection														
Joy														
Discrete Negative														
Neutral Positive +														
Neutral Negative -														
Uncodeable														

SNACK

Start Time \_\_\_\_\_

6 minutes

	1		2		3		4		5		6		7		8	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Tender/Affection																
Joy																
Discrete Negative																
Neutral Positive +																
Neutral Negative -																
Uncodeable																

SNACK (cont.)

	11		12	
	M	C	M	C
Tender/Affection				
Joy				
Discrete Negative				
Neutral Positive +				
Neutral Negative -				
Uncodeable				

FREE PLAY

Start Time \_\_\_\_\_

10 minutes

	1		2		3		4		5		6		7		
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	
Tender/Affection															
Joy															
Discrete Negative															
Neutral Positive +															
Neutral Negative -															
Uncodeable															

FREE PLAY (Con't)

	11		12		13		14		15		16		17		
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	
Tender/Affection															
Joy															
Discrete Negative															
Neutral Positive +															
Neutral Negative -															
Uncodeable															

MODEL BUILDING

Start Time \_\_\_\_\_

3 minutes

	1		2		3		4		5		
	M	C	M	C	M	C	M	C	M	C	
Tender/Affection											
Joy											
Discrete Negative											
Neutral Positive +											
Neutral Negative -											
Uncodeable											

PROHIBITED PLANT Start Time \_\_\_\_\_ 3 Minutes

	1		2		3		4		5		6
	M	C	M	C	M	C	M	C	M	C	
Tender/Affection											
Joy											
Discrete Negative											
Neutral Positive +											
Neutral Negative -											
Uncodeable											

UNPREDICTABLE TOY Start Time \_\_\_\_\_ 3 minutes

	1		2		3		4		5		6
	M	C	M	C	M	C	M	C	M	C	
Tender/Affection											
Joy											
Discrete Negative											
Neutral Positive +											
Neutral Negative -											
Uncodeable											

CAREGIVING Start Time \_\_\_\_\_ 5 minutes

	1		2		3		4		5		6		7		
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	
Tender/Affection															
Joy															
Discrete Negative															
Neutral Positive +															
Neutral Negative -															
Uncodeable															

9 Month Mother-Child Affect Scoring Sheet

Episode	tender	joy	neutral pos	discrete neg	neutral neg	No Code
Mom Busy in Kitchen						
Snack						
Free Play						
Model Building						
Prohibited Plant						
Unpredictable Toy						
Caregiving/Changing						

Episode	Mutual Discrete Pos	Mutual Mood	Child Discrete Neg and Pos	Total Segments
Mom Busy in Kitchen				
Snack				
Free Play				
Model Building				
Prohibited Plant				
Unpredictable Toy				
Caregiving/Changing				

## Maternal Sensitivity QUICK Coding Sheet

### Episode 1. Mom Busy in the Kitchen

Acceptance vs. Rejection (Tolerance versus Frustration with B)

- 9- **Highly accepting**- M clearly values the B's own will as important--even if behavior irritating or hurtful (may exhibit brief irritation or frustration). Loves and respects B as individual. Fully accepts responsibility of caring for B. Is proud of B's willfulness (e.g., if M calls B over to her and he doesn't respond, M is not annoyed—instead she takes notice that B is particularly engaged in something interesting to him).
- 7- **Accepting**- very positive, irritation and resentment infrequent. Not as much respect for B as separate person but generally patient. Generally accepts limitations of her own autonomy. (This mom doesn't necessarily show special interest in baby's agenda, but tolerates it with no irritation).
- 5- **Ambivalent**- chiefly pos. toward B but resentment or hurt may break thru in inappropriate ways (taking B behavior such as anger as deep-seated mother directed hostility or rejection.) Sometimes impatient and irritable w/ B- rejecting him when ceases to be compliant. Interprets B behavior as rejection. Tenses (which aggravates difficulty) when B upset or angry. (accepting when all is fine but when B fusses or is negative, M shows frustration or annoyance).
- 3- **Substantially rejecting**- Neg. responses to B outweigh pos. Overtly ignores B, discusses B's bad points (e.g., "Oh, you are just such a fuss pot", or manifests clear irritation/impatience for the bulk of the episode).
- 1- **Highly rejecting**- clearly rejecting B, pos. feelings frequently overwhelmed by her angry, resentful feelings. M shows constant opposition to his wishes- irritation and scolding. Engages in power struggles that are unnecessary routinely. Rarely shows positive behaviors toward (or about) B.



Sensitivity vs. Insensitivity (prompt and appropriate responsiveness)

- 9- **Highly sensitive**- exquisitely attuned to B's signals and responds promptly and appropriately. Seems to anticipate
- 7- **Sensitive**- interprets B's communications accurately and responds promptly and appropriately but w/ less sensitivity perhaps b/c less skillful in dividing her attention btw B and competing demands- may miss some ambiguous/subtle cues. Responses not as consistently prompt or as finely appropriate but never seriously out of tune.
- 5- **Inconsistently sensitive**- periods of insensitivity for one reason or another. Awareness of B intermittent. Prompt and appropriate sometimes and inappropriate or slow at other times..
- 3- **Insensitive**- frequently fails to respond to B's communications appropriately and/or promptly but may at times show capacity for sensitivity but has an incapability to see things from B's point of view. May misperceive his signals or fail to give him what he wants b/c it is inconvenient or she doesn't want to spoil him. May respond appropriately but break off b/f B fully satisfied.
- 1- **Highly insensitive**- geared almost exclusively to her own wishes, moods, and activity. Responds to B's signal when very intense and prolonged or often enough repeated. When M responds, response is characteristically inappropriate or fragmented and incomplete.

Cooperation vs. Interference (support and guidance versus interruption on B's activities)

- 9- **Conspicuously cooperative**- views B as separate, active, autonomous person- sets up the environment in such a way that avoids the need for direct control. She avoids interrupting his activities but when desirable, engages in reciprocal activity- capitalizes on spontaneity.
- 7- **Cooperative**- On the whole M is cooperative and non-interfering. Less foresight in arranging physical environment that a 9- so there are more occasions where she needs to exert control. Less skillful at spontaneity and more frequently instructive. Does not intervene abruptly.
- 5- **Mildly interfering**- inconsiderate of B's wishes and activities- interrupts and interferes but gently or mildly. Uses verbal commands to control. More instructive modes of play and less spontaneous. In shifts of activity she plays much less attention to mood-setting and other techniques which aid smooth transitions. She is matter of fact- when something needed (change, nap, feeding) disregards the fact that her intervention may break B's activity in progress.
- 3- **Interfering**- displays direct, forceful, physical interference or frequent milder interferences or both- with some type of rationale, not arbitrary. Determined to shape B in her way of doing things. Interfering in a greater proportion of her transactions.
- 1- **Highly interfering**- M has no respect for her B as a separate, active and autonomous person. Imposes own will on B. Interference is arbitrary (own whims or mood). Direct, physical forcefulness of interruptions or restraints or v. frequent— instructing, training, eliciting, directing, controlling

*Effectiveness of Soothing (hard crying only—recognizing, interpreting the cause and responding to the cry)*

- 1- **Very low effectiveness of response**- does not respond to B's crying before B is in a state of high tension or she responds inappropriately (e.g., tickling a screaming baby)
- 3- **Low effectiveness of response**- sometimes intervenes effectively but often permits B to get into a state of high tension or lets him fuss for prolonged periods of time. Either delays attention, gives up after ineffective intervention, or tries series of inappropriate interventions.
- 5- **Moderate effectiveness of response**- more usually intervenes effectively. She does not delay her intervention unduly. She often postpones effective intervention by substitute a series of temporary measures. B rarely permitted to get into state of high tension but when he does she attempts to sooth him and persists for some time b/f giving up.
- 7- **High effectiveness of response**- M nearly always intervenes effectively- rarely allows B to get into state of high tension or prolonged fuss. Interpretations usually correct- tries variety of modes b/f giving up.
- 9- **Very high effectiveness of response**- M characteristically intervenes appropriately w/o sig. delay. So effective that soothing activities can rarely be distinguished from her regular mothering activities. When soothing needed she is flexible, sensitive, sympathetic, and persistent.

#### *Availability*

- 1- **Very low availability**- preoccupied, withdrawn, and unresponsive- little or no attention beyond routine care.
- 3- **Low availability**- fairly unavailable to B. Fairly alert to signals but still preoccupied, withdrawn, or unresponsive. Gives him more than routine care only for brief inconsistent periods.
- 5- **Moderate availability**- substantially more than routine care but often too preoccupied with other things. Periods in which she withholds response to his signals.
- 7- **High availability**- M available to B most of the episode- sometimes preoccupied but B can always get her attention.
- 9- **Very high availability**- she consistently has the ability to divide her attention so that she is always alert to B even when engaged in other activities. She pays much attention to B.

### *Intrusiveness*

- 1- **Not at all characteristic**- no signs of intrusive behavior.
- 2- **Minimally characteristic**. There is some evidence of intrusiveness, but is not typical. May initiate interaction with and offer suggestions to the child which are occasionally not welcomed- may continue activity but does not escalate it.
- 3- **Moderately characteristic**- often intrusive. Substantial proportion of their interactions are intrusive.
- 4- **Highly characteristic**- M's interactions consistently and typically intrusive. M controls interaction, allowing B little self-direction in his/her activities. Allows little autonomy and essentially negates B's experience.

### Episode 2. Snack

#### *Acceptance vs. Rejection*

#### *Sensitivity vs. Insensitivity*

#### *Cooperation vs. Interference*

#### *Effectiveness of Soothing*

### *Adaptation to baby's pace*

- 1- **M interferes w/ B's pacing**. M has no adequate appreciation of B's natural rate of feeding. M may force feed, opening B's mouth by force, or causing him pain till he cries and the food may be put in his mouth. Or, M may feed B so slowly or w/ so many interruptions that he becomes v. frustrated and upset or distracted that he loses interest in the situation.
- 3- **M tends to determine pacing**. M tends to interfere w/ B's rate. Force feeding or faster than B desires. Or, she made feed slowly and intensively (w/ interruptions) → B's pleasure goes away
- 5- **M alternates btw determining pacing and letting B determine it**- not forced, but not sensitively attuned to B's rate of digestion/swallowing.
- 7- **M is sensitive to B's pacing**. Gears herself pretty sensitively to B's rate of ingestion, although harmony of interaction is not as impressive as M w/ higher rating.
- 8- **M is very well adapted to B's pace**. Harmony. The way M presents spoon requires initiative from B to get it- sucking it off spoon. Overflow at a minimum. Playfulness between bites, no rushing.

### Episode 3. Free Play

#### *Acceptance vs. Rejection*

#### *Sensitivity vs. Insensitivity*

#### *Cooperation vs. Interference*

#### *Effectiveness of Soothing*

*Delight (delight—situation specific intense positive feelings—joy or pride (clapping for B))*

- 1- **Delight is absent**- detached or mild, bland, positive feeling w/o appropriate-to-situation quality of delight.
- 3- **Delight is rare**- bland or matter-of-fact.
- 5- **Occasional delight**. Positive feeling, occasionally manifests real delight. (delight = once)
- 7- **Fairly frequent delight**. In context of warm, relaxed atmosphere, highlight of interaction btw M and B (delight = 2-3 times).
- 9- **Markedly frequent delight**. Finds all kinds of expressions and notions of his delightful. Enormously interested in everything he does- even w/ a pout or gesture of rejection or cry or protest. Pleasant, uninhibited, relaxed and comfortable interaction (delight = 3 or more times).

#### *Appropriateness of Play*

- 1- **Very inappropriate play**- controlling, teasing, or even tormenting. Grossly over stimulated, badly geared to B's developmental level- mechanical, simple, and boring. For own gratification rather than B's.
- 3- **Inappropriate play**- mechanical and unspontaneous, in attempt to distract or instruct rather than for his enjoyment, some features of being over stimulating, controlling, teasing or over-extending.
- 5- **Moderately appropriate play**- fairly spontaneous, sometimes mechanical. Either lack capacity for delight or she intersperses inappropriate play or cuts play off abruptly).
- 6- **Appropriate play**- enjoyment as chief purpose, some spontaneity and flexibility. May over stimulate occasionally.
- 9- **Very appropriate play**- spontaneous and delightedly. Sensitively appropriate to his mood and lvl of dev't. Gears play actions to cues given by B's behavior.

#### *Intrusiveness*

#### Episode 4. Model Building

*Acceptance vs. Rejection*

*Sensitivity vs. Insensitivity*

*Cooperation vs. Interference*

*Effectiveness of Soothing*

*Encouragement (includes instructive involvement and praise)*

- 1- **Very little encouragement.** Routine care- Ignores B during the task. Provides no praise.
- 3- **Little encouragement.** M does no instructing and little praise--believes it is either unnecessary or undesirable to foster their dev't w/ any special stimulation.
- 4- **Moderate encouragement.** Not obviously underestimating but makes no special conscious effort to facilitate dev't. (Talks to B about the task, may offer verbal encouragement or praise, but doesn't show him how it works OR demonstrates physically but then doesn't help B to do it or praise B's efforts).
- 7- **Considerable encouragement.** M exerts some pressure on B towards sensorimotor achievement. (hands B the rings, shows B how they fit on tower). Praise is given but not to the same degree as for higher ratings.
- 9- **Much encouragement.** Stimulates toward dev't. Important to her that B achieve.  
(tells B the color of the rings as she coaches her through the task, uses verbal praise generously and appropriately)

*Intrusiveness*

#### Episode 5. Prohibited Plant

*Acceptance vs. Rejection*

*Sensitivity vs. Insensitivity*

*Cooperation vs. Interference*

*Effectiveness of Soothing*

*Intrusiveness*

#### Episode 6. Unpredictable Toy

*Acceptance vs. Rejection*

*Sensitivity vs. Insensitivity*

*Cooperation vs. Interference*

*Effectiveness of Soothing*

*Intrusiveness*

## Episode 7. Caregiving/Changing

Acceptance vs. Rejection

Sensitivity vs. Insensitivity

Cooperation vs. Interference

Effectiveness of Soothing

Intrusiveness

## Maternal Sensitivity Coding Sheet

Participant ID # \_\_\_\_\_

Coded by \_\_\_\_\_

Episode 1. Mom Busy in the Kitchen

### Rejection

1      2      3      4      5      6      7      8      9

### Acceptance

### Insensitivity

1      2      3      4      5      6      7      8      9

### Sensitivity

### Interference

1      2      3      4      5      6      7      8      9

### Cooperation

### Ineffective Soothing

1      2      3      4      5      6      7      8      9

### Effective Soothing

### Low Availability

1      2      3      4      5      6      7      8      9

### High Availability

### Intrusiveness:

High

Moderate

Low

None

Episode 2. Snack

**Rejection**

**Acceptance**

**1      2      3      4      5      6      7      8      9**

**Insensitivity**

**Sensitivity**

**1      2      3      4      5      6      7      8      9**

**Interference**

**Cooperation**

**1      2      3      4      5      6      7      8      9**

**Ineffective Soothing**

**Effective soothing**

**1      2      3      4      5      6      7      8      9**

**Interference in Feeding**

**Adaptation to baby's pace**

**1      2      3      4      5      6      7      8      9**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**



Episode 3. Free Play

**Rejection**

**Acceptance**

**1      2      3      4      5      6      7      8      9**

**Insensitivity**

**Sensitivity**

**1      2      3      4      5      6      7      8      9**

**Interference**

**Cooperation**

**1      2      3      4      5      6      7      8      9**

**Ineffective Soothing**

**Effective Soothing**

**1      2      3      4      5      6      7      8      9**

**Absence of Delight**

**Markedly Frequent Delight**

**1      2      3      4      5      6      7      8      9**

**Inappropriate Play**

**Very appropriate Play**

**1      2      3      4      5      6      7      8      9**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**

Episode 4. Model Building

**Rejection**

**1      2      3      4      5      6      7      8      9**

**Acceptance**

**Insensitivity**

**1      2      3      4      5      6      7      8      9**

**Sensitivity**

**Interference**

**1      2      3      4      5      6      7      8      9**

**Cooperation**

**Ineffective Soothing**

**1      2      3      4      5      6      7      8      9**

**Effective Soothing**

**Little Encouragement**

**1      2      3      4      5      6      7      8      9**

**Much encouragement**

**Absence of Delight**

**1      2      3      4      5      6      7      8      9**

**Markedly Frequent Delight**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**

Episode 5. Prohibited Plant

**Rejection**

**Acceptance**

**1      2      3      4      5      6      7      8      9**

**Insensitivity**

**Sensitivity**

**1      2      3      4      5      6      7      8      9**

**Interference**

**Cooperation**

**1      2      3      4      5      6      7      8      9**

**Ineffective Soothing**

**Effective Soothing**

**1      2      3      4      5      6      7      8      9**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**

Episode 6. Unpredictable Toy

**Rejection**

**1      2      3      4      5      6      7      8      9**

**Acceptance**

**Insensitivity**

**1      2      3      4      5      6      7      8      9**

**Sensitivity**

**Interference**

**1      2      3      4      5      6      7      8      9**

**Cooperation**

**Ineffective Soothing**

**1      2      3      4      5      6      7      8      9**

**Effective Soothing**

**Absence of Delight**

**1      2      3      4      5      6      7      8      9**

**Markedly Frequent Delight**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**

Episode 7. Caregiving/Changing

**Rejection**

**1      2      3      4      5      6      7      8      9**

**Acceptance**

**Insensitivity**

**1      2      3      4      5      6      7      8      9**

**Sensitivity**

**Interference**

**1      2      3      4      5      6      7      8      9**

**Cooperation**

**Ineffective Soothing**

**1      2      3      4      5      6      7      8      9**

**Effective Soothing**

**Intrusiveness:**

**High**

**Moderate**

**Low**

**None**

## APPENDIX D: Maternal Responsiveness

### Maternal Responsiveness Microscopic, 1<sup>st</sup> Pass Coding Guide

#### I. Criteria for a Child Related Event

The **child** is the agent (actor)

The event **originates** in the child (except for negativity or behaviors that get a “1”)

The behavior calls for (i.e., should elicit) a response on mom’s part

#### II. Discrete CRE Codes

**Redirection required** – B is distracted or wandering and requires a maternal redirection.

**Negativity** – B is distressed, as in fussing, whining, protesting, or crying.

**Neutral/Positive** – B makes bid for attention that is not negative (nor does it require redirection) nor is it a response to a maternal initiation or intervention, as in vocalizing, switching attention during play, pointing to objects, social referencing, need for help.

**Physical Event** – B manifesting internal state

(e.g., fatigue [itchy eyes, tugging at ear], hunger [sucking hand, opened mouth for food].

**OR**, baby makes a bid that requires only a physical intervention from mom (e.g., reaching for a forbidden toy, picking up a toy, moving an object closer, B needs re-positioned [due to awkward position or a fall].

#### III. Tricky Calls

1. To discriminate codes 2 vs. 3: Ask yourself whether or not the child needs physical help/intervention (3) or social attention (2)?
2. When 2 behaviors occur simultaneously and neither are coded “1”, make your judgments based on the most pressing concern—or the most salient need i.e., what does the baby need more, to play with a desired toy or to finish a BM and have a diaper changed? (3!) Versus The slightly tired baby who switches set to a new toy while at the same time yawns just once ?(2)
3. Give a child a CRE for an initiation (e.g., a vocalization or new toy interest), but if a reciprocal M-B exchanges begins, do not code continuously. To be a new CRE, a clear latency between the bout of reciprocity and a new initiation must be obvious (more than 1 second in duration).
4. A fall is coded as a 3, followed by the 1 in a new CRE that begins when the child cries (typically 2 or 3 secs after the fall itself).

5. Be aware of the context of the episode: an interest in a new toy during free-play is a CRE but may not be during the context of Mom busy in kitchen if the child does not ask for help (or need help) obtaining the object.

### **Global Codes**

4. No Interaction—M and B are clearly engaged in divergent activity
5. Mom Driven Interaction—Reciprocity began with mom or mom directed the exchange
6. Caregiving—M is feeding or changing for the full minute without any protest or other CRE from the child (e.g., if child is reaching for the lotion than that gets a CRE “3”, not a global code)
7. Infant Directed Interaction—B is engaged in an activity (with a referent) and mo is simply in the background, **supporting B’s efforts but not directing them.**

**This coding scheme is based on the rating of “3 pillars” of maternal behavior.**

- 1.) **Degree of attention:** This is the level to which a mother acknowledges a child’s bid for attention, distress, or behavior.
- 2.) **Promptness of response:** How quickly a mother responds to her child’s bid for attention, distress, or behavior.
- 3.) **Level of engagement:** How involved does mom become in activity with child (i.e., does mom just try to re-direct child’s activity or attention or does she become involved in the activity with the child?)

**Overall tone of each response is as follows:**

- 1.) **Poor (FAILURE; “F”):** Harsh/Irritated/Hostile, Misses bid, actively ignores child’s bid when response was appropriate, invalidating
- 2.) **Fair (MINIMAL; “C-”):** Indifferent to child’s actions, disinterested in child’s actions but not invalidating; actions occurs only after significant delay; negative words with positive or flat affect
- 3.) **Good (GOOD; “B”):** Shares comments on baby’s actions; warm, affectionate
- 4.) **Excellent (EXCELLENT; “A”):** Warm and affectionate (physically), empathetic. This mom would rather be with child and making them happy than doing anything else. “Over-the-top” in a good way.

### **Episode 1. Mother Busy in the Kitchen**

*“0” Redirection Required*

#### **1- Poor-**

**Degree of attention:** Parent is not aware of child’s distraction or wandering behavior of child, actively ignores behavior or is harsh in response.

**Promptness of response:** Mother does not respond at all or responds promptly, but tone is negative

**Level of engagement:** Mother is not engaged with child. Child is not redirected to task or experimenter redirects (Child crawls off out of original location, and/or experimenter retrieves child and brings back to original location, mom doesn’t even look towards child to see where they have gone or who is carrying them. Parent is totally focused on their own task). Mom may appear frustrated or invalidating of child’s distraction (e.g., child is attracted to noise experimenter is making in next room, and mom responds by saying “Mind your own business, don’t be so nosy”).

#### **2- Fair-**

**Degree of attention:** Parent directs limited attention towards child. Parent is aware of child’s distraction or wandering behavior, but lets behavior occur (with or without comment). Parent may look towards child crawling away, but does not go after and retrieve the child, experimenter may retrieve child instead, or does not try to regain child’s attention.



**Promptness of response:** Not very prompt, may be delay before acknowledging child's distraction. May retrieve child but only when no one else does, or does so without acknowledging interest in other object/task, etc. (i.e., child crawls off and mom retrieves without commenting to child on distraction; just brings child back).

**Level of engagement:** Not very engaged with child. Does not try to re-direct child's attention, rather just a physical move.

### 3- Good-

**Degree of attention:** Parent is aware of distraction or wandering behavior and takes note and/or comments and/or physically acts upon behavior. Verbal tone is soft and soothing, not loud or harsh. (Parent notices child crawling into other room and, after reacts verbally e.g., "Hey baby, where are you going?", possibly while going to physically retrieve the child). Shares comments on baby's distraction.

**Promptness of response:** Responds immediately either verbally and/or physically; Gentle re-direction *without* same level of mutual interest

**Level of engagement:** Mom briefly engages child after retrieval (e.g., mom picks up baby from room and says, "here baby, here are some pots for you to play with" while showing baby pots and pans. \*This is where "3" is differentiated from "4" (see below)

### 4- Exceptional-

**Degree of attention:** Parent is aware of wandering or distraction and reacts both physically and verbally almost immediately. Verbal tone is soft and soothing, and behavior not forceful or negative. Mom exhibits knowledge of what child is doing; positive invitation to re-orient to task is made *after* letting child explore.

**Promptness of response:** Responds immediately; Mom is flexible and proud of child's exploration. Mom shares child's interest in another (distracting/ off-task) object.

**Level of engagement:** Mom highly engaged in joint activity with child (e.g., mom picks up baby from room and says, "here baby, here are some pots for you to play with" mom then proceeds to sit on floor with child and bang pots and pans.) or (Parent sees child staring into space and attempts to get attention back to toys child was playing with by sitting on floor with them and investigating new toys.) Mom seems interested and amused by what child is interested in that made him/her crawl off. (e.g., She may go walk behind child and say "what do you see? Is that a container? (if child looking at container of toys)..maybe Miss Laura will let you see what's in there later on" ...before moving baby back to kitchen).

“1” Negativity

1- **Poor-**

**Degree of attention:** Parent is not aware of child’s distress, ignores completely, becomes angry/annoyed, dismissive (e.g., “Stop it!”, “What’s your problem?”). Her vocal tone is not soft or soothing.

**Promptness of response:** Not prompt, if she responds at all; response may be invalidating of child’s distress

**Level of engagement:** Mother does not engage child in activity or the parent may force the child to do something, ignoring negative affect (e.g., parent puts child down on floor and walks away even though child continues to scream or cry, or puts child down and says, “That’s enough! I have stuff to do!” If parent continues with activity but speaks in soothing manner, do not code “1” for this event.

2- **Fair-**

**Degree of attention:** Parent is aware and may acknowledge child’s distress, but responds without sincere concern and *continues on with her own agenda*. Parent’s reaction may be insensitive or dismissive (e.g., child screaming while mom is cleaning kitchen to told “It’s not that bad, go play with you toys.”) Parent may seem distracted, and not truly engaged in trying to comfort child (e.g, Mom continues to try to offer toys even though child is following mom around with outstretched arms, signaling to be picked up).

**Promptness of response:** Not very prompt, or prompt response but not warm

**Level of engagement:** Mom does not try to engage child in activity, but rather just offers toys, etc. regard to child’s wishes. *Code “2” if parent tries to redirect child’s attention without addressing child’s distress, physically or verbally (e.g., keeps taking out new toys and placing in front of child without commenting on the fact the child is crying or verbally reacts in insensitive manner, e.g., “Here, play with this.” Or “ I know you want Mommy right now, but I’m busy”).* Also, if the parent clearly misinterprets child’s reason for distress, (e.g, child wants to be held and mom thinks it’s because of the toy selection), and responds inappropriately. Mom may continue using same strategy (i.e. offering same toy to child even though child keeps dropping it from highchair and clearly doesn’t want it) without realizing child’s *real* need.

3- **Good-**

**Degree of attention:** Parent gives attention to child but may continue to perform her own activity, at least partially. Parent verbally cheers up the child, soothes, comforts (e.g., “It’s okay, come here, I’ll hold you”), offers verbal suggestions or explanations (e.g., “I’m sorry, I can’t hold you and carry these dishes”) or redirection, (e.g., “Can you play with this while mommy cleans the dishes?”). The parent typically stops or pauses her behavior to attend to the child and help decrease child’s level of arousal down to normal. Parent may try to finish task quickly and then give full attention to child, knowing child doesn’t like task parent is involved in (e.g, “Hold on one minute, just let me finish cleaning this up and I’ll pick you up.”). Tone must be sincere and warm.

**Promptness of response:** Responds immediately

**Level of engagement:** Engages child briefly, but does not join in activity. (e.g., “What’s the matter baby? Here, do you want to new toy?” while briefly shaking new toy in front of baby, long enough to get the baby interested.)

#### 4- **Exceptional-**

**Degree of attention:** Parent responds in contingent, empathetic manner, with full attention on the child’s needs, feelings, and wishes. Parent stops activity completely to attend to child and soothe them or involve them in task. (e.g., child starts crying when mom puts him on floor, so mom picks them right up again, gives a kiss, and asks, “Do you want to help mommy out away the dishes?”). Parent may validate the child’s feelings, (e.g., “I know you don’t like it when mom needs to clean.”). Parent’s behavior is prompt and sincere, showing genuine empathy to child’s distress. Parent actively listens and adjusts level of interaction to match child’s needs (e.g., mother is cleaning countertop and turns on disposal, baby starts crying at noise, so mom immediately turns off disposal and picks up baby, saying “I know you don’t like that noise, I’m sorry”, gives baby a kiss and says, “do you want to play with your cups?” This type of behavior should go “above and beyond” to help child feel better with an extreme awareness of child’s needs (e.g., child wimpers at sight of mom moving towards door, so mom says “it’s okay, I’m not going anywhere,” picks up child and gives a hug.)

**Promptness of response:** Responds immediately...stops what they are doing.

**Level of engagement:** Total joint attention/ involvement in activity with child. Mom may pick of crying child and pick up new toy saying, “What’s this? Is this your favorite toy? Let’s play!” and sits on floor, playing with child.

“2” *Neutral/positive:* this is an event in which the infant is looking for meaning or interaction with mom. Response is coded based on degree to which the parent engages the child in his/her interaction and meets the child’s needs for conversation, meaning, or attention, verbally or non-verbally.

#### 1- **Poor-**

**Degree of attention:** The parent *actively* ignores a child’s bid insofar as it is determined that mom did in fact hear or know that child made a bid, but chose not to acknowledge it *OR* if they missed a bid for attention that they should have witnessed (e.g., mom is on phone and child holds up toy to show mom but mom doesn’t realize child is doing so because she is totally engrossed in her phone conversation.) Additionally, if the parent refuses to be attentive to a child’s needs or responds irritably, impatiently, or in a dismissive manner. (e.g., Child holds up a toy to show mom while she is doing dishes; mom says, “I know, that’s you favorite toy..Mom needs to finish this.” *OR* Mom simply looks at child but says nothing.)

**Promptness of response:** Mom refuses to stop own activity to react to child; continues with own agenda

**Level of engagement:** Mom does not engage child in activity or show interest in what they are doing. Continues on own agenda, no acknowledgement of social engagement

## 2- Fair-

**Degree of attention:** Parent does give child attention, but is preoccupied with own activity. Parent does acknowledge child's bid, but tries to redirect child's activity (e.g., Child crawls to mom and pulls up on her leg, reaching to be picked up (mom is doing dishes); Mom looks down and, instead of picking child up, says, in a short, non-warm tone, "where is your pot? Go play because mom's busy...")

**Promptness of response:** Parent postpones attention and finishes activity prior to attending to child, but does acknowledge child's bid for attention. May be prompt, but may be flat in affect.

**Level of engagement:** May direct child to task or activity but does not play with child. (e.g., Child vocalizes to mom from highchair and mom says, "What are you saying?" but doesn't really talk back to child).

## 3- Good-

**Degree of attention:** Parent addresses the bid and directs attention to child. Verbal suggestions or comments are offered in verbally warm tone.

**Promptness of response:** Mom responds immediately.

**Level of engagement:** Mom may re-direct child and engage, but may be brief or at least not overly engaged. If parent simply reacts to child's needs, code as "3", as will be discussed, if parent goes above and beyond child's request, code as "4". (e.g., child points to water running in sink and mom says "water", this is coded as "3"..if mom were to start up conversation re: water like "yes, that's water; splash, splash. Do you splash in the tub?", this would be "4".) or (Child speaks to mom from highchair and mom says "My, don't you have a lot to say!" = "3"... "My don't you have a lot to say! Thank you so much for singing to mom..can we sing a Raffi song together?" = "4".

## 4- Exceptional-

**Degree of attention:** Parent goes beyond child's bid, initiating further interaction by making task enjoyable or expressing delight at child. Parent gives child full attention and sincerely answers child's directions/questions. Parent is affectively positive in both tone and mannerisms, enjoying interaction with child. Tone of interaction is what differentiates "3" from "4". (e.g., child points to running water in sink and mom says "yes, that's water (smiling), do you want to come touch it? It's like in your bath. Can you say "water"?").

**Promptness of response:** Mom immediately stops what she is doing and attends to child.

**Level of engagement:** Parent makes task enjoyable or fun for child (e.g., Mom is unloading dishwasher and child wants to help. Mom says "Do you want to help mommy unload the dishwasher? Can you hold this spoon?".banging spoon on ground to initiate child to do the same.)

## *"3" Physical event*

### 1- Poor –

**Degree of attention:** Parent ignores or does not acknowledge child's event (hiccups, sneeze, etc.) May seem dismissive or irritated by them or stresses negative

consequences of event. (e.g., child sneezes on clean dishes and mom says, “you’re going to get us all sick doing that, yuck!” or “Where are the tissues, you need one..Did you move them again?”)

**Promptness of response:** Non-responsive or responds only after long delay.

**Level of engagement:** No unnecessary engagement. (i.e., Child sneezes and mom hastily wipes nose but does not speak to child).

## 2- Fair –

**Degree of attention:** Attempts to ignore event or responds in perfunctory fashion. Affective tone is curt or irritable.

**Promptness of response:** There may be a delay in responding. (e.g., child drops toy from high chair and mom says “did you drop that?” without retrieving it for the child, or just picks it up without saying anything.)

**Level of engagement:** Directs attention to child but doesn’t engage child in activity. (e.g., child drops spoon and mom picks spoon off floor and simply gives back to baby without saying anything or commenting on baby’s actions) or (baby drops spoon and mom responds by saying, “why did you drop that again? If you do it again I’m not picking it up!”)

## 3- Good –

**Degree of attention:** Mother gives attention to child, may continue with task in half-hearted manner. Parent verbally cheers up, soothes, or comforts child, offers verbal suggestions or explanations. (e.g., “God bless you”, in reaction to a sneeze; “oh, do you have the hiccups? Are you okay?”)

**Promptness of response:** Responds immediately

**Level of engagement:** Devotes full attention to child and tries to comfort child or resolve problem (i.e., child drops spoon from highchair and mom goes to pick up spoon and says, “did you drop that spoon again?”, banging spoon briefly to get child to take it from her).

## 4- Exceptional –

**Degree of attention:** Mom stops what she is doing and gives child full attention, attending to needs completely. Responds to child in a contingent manner, comforting in empathetic fashion and shows genuine affection (pats, kisses, hugs).

**Promptness of response:** Mom stops what she is doing and immediately responds to child’s needs. Behavior is eager and prompt.

**Level of engagement:** Mom engages child in game-like fashion if need is in response to a dropped toy, etc. (e.g., child drops toy from highchair and mom quickly picks it up and says, “did you drop that? Are you getting tired of that one? Do you want a new one?”) or responds in empathetic, caring manner to sneeze, cough, or the like (e.g., Child sneezes and mom “funny sneezes back” saying “oh, goodness, God bless you! That was a big sneeze!” while gently wiping child’s nose with a tissue.)

# Maternal Responsiveness Microscopic Coding Sheet

ID #  
Coded By:

Episode 1. Mother Busy in Kitchen

Start Time:

M	E	Cd	Comment	Sec	MR Code
1	1				
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8	1				
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	G				

**Episode 2. Snack      Start Time:**

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**Episode 3. Free play**      **Start Time:**

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#### Episode 4. Model Building      Start Time:

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	G				

**Episode 5. Prohibited Plant****Start Time:**

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**Episode 6. Unpredictable Toy****Start Time:**

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### Episode 7. Caregiving/Changing

Start Time:

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## APPENDIX E: Child Compliance & Maternal Discipline

### **36 month Child Compliance & Parent Discipline Coding System Temperament Over Time 01.05**

\*Child behavior is described using categories of compliance/ noncompliance in response to parental control.

\*Parental control is described in terms of the degree of power; microscopic codes evaluate physical interventions.

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\*Coding is done in 30-second segments for the “do” (cleanup) context.

\*For the “don’t” contexts (prohibited toys), the coding combines event-triggered and time-sampled methods. For the “don’t” context, each episode begins when the child’s attention shifts to the toys, and continues every 30-seconds until the child re-orientes to another activity.

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**“Do” Segments: Cleanup (Duration: 5 minutes minimum. Code every 30 seconds)**

*Child Compliance: Global*

Code ‘0’: Off Task/ Parent Cleanup

There is no on-task behavior on the part of the child; child may be wandering or running about room. Parent may be aware of it, but makes no attempt to redirect child to task; she is does not attempt to engage child in task, rather she just cleans up herself.

Code ‘1’: Relational Play

There is no on-task behavior on the part of the child. Parent is aware of it and joins in play; no attempt at redirection. Cleanup is no longer focus of child or parent; play has become focus.

Code ‘2’: Committed Compliance

Internalized and wholehearted behavioral compliance to cleanup task. Parental agenda is followed as child’s own. Child fully embraces parental directive.

Child stays on task with very few parental directives/ prompts, and is actively involved in cleaning up toys (e.g., singing cleanup song with mom and putting toys away) . If child becomes distracted due to parent’s intervention or due to having questions about a toy (e.g., while putting bulldozer away, child asks, “Mom, what does this digger do?”) still code ‘2’.

Code '3': Situational Compliance

Responsive to parental agenda, but only due to parental control. Without continual parental intervention/guidance, child loses attention in toys and begins playing again. Half-hearted direction following. Child is compliant to directions and good-natured, but easily distracted and hasn't fully taken parental agenda as their own.

Code '4': Negotiation

Child is good-natured, but states they do not want to clean up. They bargain with mom to have more play time (e.g., "2 more minutes...")

Code '5': Passive Noncompliance

Passively reluctant to accept maternal agenda; "selective deafness". Ignores directives. Child does not comply unless continually prompted. May engage in conversations with self about toys, or ignore mother by lying on floor, rolling about.

Code '6': Overt Resistance

Rejecting parental agenda, but not in an aversive manner. Child may say "no" in response to parental request to cleanup, but it is not said in a harsh or forceful, may be whined. Child's expression of autonomy; E.g., "Mama do it, I don't want to."

Code '7': Defiance

Forceful rejection of parental directive. Defiant protest, accompanied by negative affect (anger, crying). Child does not comply, even with prompts. Temper tantrum, crying, or yelling in response to request to cleanup, or trying to pull toys out of cleanup bin after mom has put them away.

*Maternal Discipline: Global*

Notes: If child compliance code is either 1 (off task) or 2 (relational play), parent must get code of either '0' (no interaction) or '1' (social exchange), respectively. Parent can also get a '0' code if they are absorbed in questionnaires while child is cleaning up.

Code '0': No Interaction

Mother is not interacting with child. She is either involved in questionnaires or other activities; child and mother engaged in divergent activities with no attention to child.

Code '1': Social Exchange; Directive

Parent does not attempt to influence child to cleanup, verbally or physically. Parent may be involved in verbal directives regarding other situations (i.e., diaper change, potty break). Affect of parent may be negative, but could be light-hearted.

Code '2': Social Exchange; Playful.

Parent does not attempt to influence child to cleanup, verbally or physically.  
Parent interacts with child in playful manner. Parent may also be teaching.  
Affect should be positive for both child and parent.

Code '3': Gentle Guidance

Parent directs child (regarding cleanup) in a gentle or subtle, positive manner.  
No forceful verbal or physical control is present. She tries to get the child to cleanup using polite suggestions, hints, playful comments but keeps child's arousal level or reduced.

Code '4': Intense Positive Guidance

Parent directs child (regarding cleanup), but does so by getting excited about the task. She appears to 'cheerlead' for her child to clean up by turning cleanup into a game, singing songs or dancing around. She elicits positive affect and interest from child by giving positive directives, e.g., "Great Job!", "Good!", "Alright, now can you do this!" and does so in return. Mom tries to increase the child's arousal level.

Code '5': Control

Parent controls child in a non-forceful, matter of fact manner; yet assertive. Parent must issue commands and prohibitions, e.g., "put these here", "no, no, time to cleanup now", "No, it's time to clean up NOW". Parent uses strong tone, but is not negative or overly forceful. May display hint of irritation, impatience, or frustration. Control is not masked as play, but there are no negative, angry comments.

Code '6': Forceful, Negative Control

Parent directs child behavior regarding cleanup in a forceful, power assertive manner. She raises her voice, uses assertive tone, and may be threatening or negative. Parent may be angry or impatient; possibly "combative". Possible physical intervention such as removing toys, physically, from child's hand, stepping in from of child trying to move away from toys

Code '7': Forceful, Negative Control with Physical Punishment

Parent's verbal component of control is similar to Code '5', except may be even more harsh. She may raise her voice, yell, or threaten. To obtain this code though, parent MUST use some sort of harsh physical discipline such as spanking or grabbing child's arm.

*Physical Intervention Codes: Code either no, distal, or gentle as per which occurs for majority of segment; all others code all that occur.*

No Physical Control

Parent uses no kind of physical control/ intervention.



#### Distal Physical Signals

Parent points to toys, models throwing them into basket, holds basket in position that facilitates cleanup, or places toys in front of child in a manner that nonverbally suggests child put them away. But, there is no DIRECT physical contact. Also does not include mom cleaning up toys.

#### Gentle Physical Control/ Guidance

There is direct physical contact, though I may be mediated through a toy. Parent may gently turn child away from distractions or toward toys, directing child to cleanup. No indication of clash of wills though.

#### Assertive Physical Control

Parent firmly directs child toward cleanup. Physically removes toys from child's hand, or moves towards toys (physically).

#### Forceful, Negative Physical Punishment

Parent shakes, spansks, handles child roughly. Parent may also slap or yank toy abruptly from child's hand. There may also be threatening motions intended to hurt or frighten child.

**“Don’t” Episodes (Prohibited Toys; Duration of 36 month Home Visit until directed to play with toys. Event driven coding; every 30 seconds)**

\*Notes: Coding for this segment should begin when child orients attention toward toys. Child may look/orient, point, talk about, touch, or play with toys. Additionally, coding should be recorded when parent directs child’s attention toward toys to tell them about the “rules”. If child only glances at toys but doesn’t “miss a beat”, do not count as an epoch start. Try to take cues from mom as well. If she is directing child verbally while engaged in another task, evaluate child’s attention. If parent and child are discussing toys, also count as epoch because attention is directed at toys.

After start of coding segment, coding should be done for 30-second epochs until child redirects attention to other tasks. If multiple types of behaviors occur, score last half of segment or higher code.

For coding, consider both quality of child’s behavior (no touching, self-corrected action, etc.) and whether or not parent intervened.

*Child Compliance*

Code ‘0’: Maternal Permission to touch toys

Mother gives permission to touch toys and child toys, thus suspending prohibited nature of toys.

Code ‘1’: Looking/ No-touching, Self-corrected behavior (Committed Compliance)

Child looks at toys but does not touch. Child then redirects self to task. No parental intervention, either verbal or physical, allowed. Child may reach for toys, but stops short on own accord, without words or action from mom.

Code ‘2’: Looking/ No touching, Parental Intervention (Situational Compliance)

Child stops action towards toys, but only due to the fact that mom intervened, either verbally or physically.

Code ‘3’: Touching Toys, Self-corrected behavior (Committed, situational compliance)

Child touches toys, but parent does not intervene. Child gently plays with toys (for more than 2 seconds), but stops on their own and returns to task.

Code ‘4’: Touching Toys, Parental Intervention

Child touches toys and stops action due only to parental intervention, either verbally or physically.

Code ‘5’: Negotiation

Child is good-natured, but states they want to play with toys. They bargain with mom to have play time with toys (e.g., “after I do this, I would like to play...”)

Code '6': Passive Noncompliance

Child touches toys, parent intervenes verbally, and child continues to play with toys.; "selective deafness". Child does not overtly refuse to stop, but simply pretends not to hear/ see parental intervention.

Code '7': Overt Resistance

Child plays with toys, parent intervenes verbally or physically, and child responds with a "no", whine, simple refusal. Child response is not aversive, but an expression of autonomy, stating a different point of view/agenda than parent.

Code '8': Defiance

Forceful rejection of parental directive. Child whole-heartedly plays with toys. Parent intervenes and child responds with defiant protest, accompanied by negative affect (anger, crying). Child does not comply, even with prompts. Temper tantrum, crying, or yelling in response to request to not play with toys, or trying to pull toys out of bin after mom has put them away.

*Maternal Discipline*

Code '0': No Interaction

Mother is not interacting with child. She is either involved in questionnaires or other activities; child and mother engaged in divergent \ activities with no attention to child.

Code '1': Social Exchange; Directive

Parent does not attempt to influence child away from toys, verbally or physically. Parent may be involved in verbal directives regarding other situations (i.e., diaper change, potty break). Affect of parent may be negative, but could be light-hearted.

Code '2': Social Exchange; Playful.

Parent does not attempt to influence child away from toys, verbally or physically. Parent interacts with child in playful manner. Parent may also be teaching. Affect should be positive for both child and parent.

Code '3': Gentle Guidance

Parent directs child (regarding toys) in a gentle, subtle, or playful manner. No forceful verbal or physical control is present. She tries to get the child to move away from toys, back to task, using polite suggestions, hints, playful comments.

Code. '4': Intense Positive Guidance

Parent directs child away from toys by getting excited about the task at hand or another distraction. She may turn task into a game, singing songs or dancing around. She tries to elicit positive affect and interest from child by giving positive directives, e.g., "Great Job!", "Good!", "I know those toys are there, but this is SO cool, come take a look!"

Code '5': Control

Parent controls child in a non-forceful, matter of fact manner; yet assertive. Parent must issue commands and prohibitions, e.g., "put these here", "no, no, We'll play with those later, not now." Parent uses strong tone, but is not negative or overly forceful. May display hint of irritation, impatience, or frustration. Control is not masked as play, but there are no negative, angry comments.

Code '6': Forceful, Negative Control

Parent directs child behavior regarding toys in a forceful, power assertive manner. She raises her voice, uses assertive tone, and may be threatening or negative. Parent may be angry or impatient; possibly "combative". Possible physical intervention such as removing toys, physically, from child's hand, stepping in front of child trying to move away from toys

Code '7': Forceful, Negative Control with Physical Punishment

Parent's verbal component of control is similar to Code '5', except may be even more harsh. She may raise her voice, yell, or threaten. To obtain this code though, parent MUST use some sort of harsh physical discipline such as spanking or grabbing child's arm.

*Physical Intervention Codes*

No Physical Control

Parent uses no kind of physical control/ intervention.

Distal Physical Signals

Parent points to task, models activity, or facilitates involvement, or motions to child such that it nonverbally suggests child to move away from the toys. But, there is no DIRECT physical contact.

Gentle Physical Control/ Guidance

There is direct physical contact, though I may be mediated through a toy. Parent may gently turn child away from distractions or toward task, directing child to participate. No indication of clash of wills though.

Assertive Physical Control

Parent firmly directs child toward cleanup. Physically removes toys from child's hand, or moves towards toys (physically).

Forceful, Negative Physical Punishment

Parent shakes, spansks, handles child roughly. Parent may also slap or yank toy abruptly from child's hand. There may also be threatening motions intended to hurt or frighten child.

ID #: \_\_\_\_\_

Coder: \_\_\_\_\_

**PROHIBITED TOYS: Don't s**

Start Time: \_\_\_\_\_

Segment # & Time	Child Compliance Global Code	Maternal Discipline Global Code	Maternal Physical Discipline Check all that apply				
			None	Distal	Gentle	Assertive	Forceful
1							-
2							-
3							-
4							-
5							-
6							-
7							-
8							-
9							-
10							-
11							-
12							-
13							-
14							-
15							-
16							-
17							-
18							-
19							-
20							-
21							-
22							-
23							-
24							-
25							-
26							-
27							-
28							-
29							-
30							-

Summary/Tally of Codes

Child Compliance/Noncompliance: Global

Code 0. Maternal Permission	
Code 1. Look, No touch, self-correct	
Code 2. Look, No touch, parental	
Code 3. Touch toys, self-correct	
Code 4. Negotiation	
Code 5. Passive Noncompliance	
Code 6. Overt Resistance	
Code 7. Defiance	

Maternal Discipline:Global

Code 0. No interaction	
Code 1. Social exchange: Directive	
Code 2. Social exchange: Playful	
Code 3. Gentle guidance	
Code 4. Intense Positive guidance	
Code 5. Control	
Code 6. Forceful, negative control	
Code 7. Forceful, with physical	

Maternal Discipline: Physical Intervention

Code 0. No physical control	
Code 1. Distal signals	
Code 2. Gentle Guidance	
Code 3. Assertive Physical Control	
Code 4. Forceful, Negative with Physical	

ID #: \_\_\_\_\_

Coder: \_\_\_\_\_

**CLEAN-UP:  
Do's**

Start Time: \_\_\_\_\_

Segment # & Time	Child Compliance Global Code	Maternal Discipline Global Code
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

**Maternal Physical Discipline**  
Check all that apply

None	Distal	Gentle	Assertive	Forceful
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-
				-

Summary/Tally of Codes

Child Compliance/Noncompliance

Code 0. Off task	
Code 1. Relational Play	
Code 2. Committed Compliance	
Code 3. Situational Compliance	
Code 4. Negotiation	
Code 5. Passive Noncompliance	
Code 6. Overt Resistance	
Code 7. Defiance	

Maternal Discipline

Code 0. No interaction	
Code 1. Social exchange: Directive	
Code 2. Social exchange: Playful	
Code 3. Gentle guidance	
Code 4. Intense Positive guidance	
Code 5. Control	
Code 6. Forceful, negative control	
Code 7. Forceful, with physical	

Maternal Discipline: Physical Intervention

Code 0. No physical control  
Code 1. Distal signals  
Code 2. Gentle Guidance  
Code 3. Assertive Physical Control  
Code 4. Forceful, Negative with Physical


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