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To the Graduate Council:

I am submitting herewith a dissertation written by Vanessa Ann Vigilante entitled "Molar and Molecular Perspectives on Mothers' Responsiveness to Their Clinic-Referred and "Normal" Children." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Robert G. Wahler, Major Professor

We have read this dissertation and recommend its acceptance:

Jenny Macfie, Richard Saudargas, Lance Laurence, Vey Nordquist

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Accepted for the Council:

Vice Chancellor and
Dean of Graduate Studies

Thesis
2006b
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MOLAR AND MOLECULAR PERSPECTIVES ON MOTHERS' RESPONSIVENESS TO THEIR CLINIC-REFERRED AND "NORMAL" CHILDREN

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Vanessa Ann Vigilante

August 2006

DEDICATION

Thank you to all the families

who very generously agreed to participate in this study

by allowing us into their homes and their lives.

ACKNOWLEDGMENT

To all my committee members, Drs. Wahler, Saudargas, Nordquist, Laurence, and Macfie, and to Janet Carnes, secretary extraordinaire, I extend my heartfelt thanks for accompanying me patiently through, especially, the tail end of the dissertation process. Dr. Richard Saurdargas, thank you for understanding the matching law and especially for what I felt to be constant support and good faith in me during my graduate studentship. Dr. Vey Nordquist, the critical questions you have asked reflect your deep knowledge about behaviorism and parent-child relations and caused me to think more deeply about both. Dr. Jenny Macfie, thank you for supporting me at my most crucial times and for the constructive feedback that made my dissertation much more clear, organized, and interesting. Dr. Lance Laurence, talented teacher and clinician, I appreciate your taking the time to be on my committee and offering your clinical insights. It has been a pleasure being on your team over the years and I will always remember you for your kindness and generosity. Finally, dear Dr. Robert Wahler, my dissertation chair, you are truly an original thinker who has taught me a great deal about both the scientific and clinical aspects of the field and it has been an honor working with you.

ABSTRACT

An abundance of research has investigated the mother responsiveness construct as an aggregate measure of the degree to which mothers react sensitively to what their children say and do. While the aggregate measure has proven useful in accounting for the ways mothers and children join in dyadic harmony, there is a dearth of information regarding the aggregates' components. Twenty clinic-referred and thirty-two volunteer mother-child dyads were observed in their home settings for 1 hour per dyad. Observers monitored mother and child responsiveness during the dyadic interactions and childrens' neutral, positive, and negative responses were recorded. The mother's responsive social reactions were also recorded, as well as their unresponsive social reactions to their children's negative responses. Results showed that the aggregate measures of mother and child responsiveness differentiated the two groups in expected ways. The volunteer dyads were more responsive than their clinic-referred counterparts and the volunteer children were less negative and more neutral than were the clinic-referred children. The component measures, however, yielded unexpected similarities between groups that were obscured by the aggregate measures. Children in both groups displayed similar rates of positive behaviors and both groups of mothers reacted in synchronous ways with their children's positive, neutral, and negative responses. The present findings suggest that measuring the components of mother and child responsiveness may prove useful in

accounting for the specific ways in which children are embracing or resisting the socialization process.

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CHAPTER I

LITERATURE REVIEW

Introduction

Maccoby 's view of behaviorism and psychoanalysis as guidelines in our understanding of children's socialization in family settings has influenced the thinking of countless numbers of child oriented scientists and clinicians. A look back at these "grand theories" (Maccoby, 1999) over the past decades will reveal substantial change in their defining constructs, suggesting the resilient and robust nature of both viewpoints. Psychoanalysis has changed from a Freudian focus on biological drives to its current attachment ideas in which children are impacted by parents' sensitivity or responsiveness (Kochanska , 2002). Likewise, behaviorism has changed from Thorndike's and Skinner's mechanistic conceptions of reward and reinforcement to Herrnstein's (1970) holistic, or molar, interpretation of these concepts.

Child socialization is defined as an ongoing process whereby children internalize parental rules and norms and then actualize these by behaving in ways that please their parents. For socialization to occur, children must be willing to learn what it is their parents have to teach them. Additionally, socialization can only be maintained if the child is eager and willing to respond receptively and cooperatively to the parental enterprise (Kochanksa, Naskan, & Carlson, 2005). This then raises the question as to how parents generate willingness in their children. Kochanska (1997,

2002) calls a child's willingness to comply committed compliance. Committed compliance is a child's whole-hearted effort to cooperate with the parental enterprise. According to Kochanska, committed compliance belies a mutually responsive orientation (MRO) within the parent-child pair. MRO consists of observable parent-child behaviors that include positive emotions and an eagerness on the part of both participants to behave in ways that please the other. Kochanska's MRO model is holistic because it explains child socialization by identifying patterns of parent-child behaviors. Kochanska describes MRO as developing from a history of responsive treatment by mother to child. The history of responsiveness generates in the child a willingness to reciprocate with the parental enterprise. Thus, from a unidirectional parent-child interaction characterized by maternal responsiveness grows a bi-directionally influenced interaction where both participants work to satisfy and please the other. According to Kochanska, children's reciprocation is a "payback" for years of responsive treatment and works to maintain MRO. The years of responsive treatment, according to Kochanska, create in the child an internal working model or cognitive schema, of parents as helpful and who can be trusted to appropriately attend to the child's needs and bids for attention. The child's trust in and view of the parental unit as benign and helpful generates in them an eagerness to behave in ways that please their parents.

According to Kochanska (1997), responsive mothers have a holistic, or macro view, of their children's needs that enables them to orchestrate finely-tuned, or appropriate, reactions to the entire range of their children's behaviors. Responsive parents, according to Kochanska (1997) have a "predilection for perspective-taking."

Thus, their ability to separate their own needs from those of their children helps them to be acutely attuned to their children's bids for attention and maximizes the likelihood that they will respond appropriately to these. Thus, according to Kochanska, maternal responsiveness follows naturally from a mother's ability to see things from her child's point of view.

Although Herrnstein did not apply his molar view of reinforcement to child socialization, his laboratory work stimulated the thinking of researchers who found the traditional Skinnerian view to be inadequate in accounting for the socialization process (see Snyder & Patterson, 1995). Similar to Kochanska's mutually responsive orientation, Herrnstein's matching law (1974) has been used to conceptualize mother-child interactions as jointly orchestrated frequency distributions of each person's various social responses. The matching process occurs within a reciprocal system where relative rates of appropriate and inappropriate behavior tend to equal relative rates of appropriate and inappropriate attention, respectively. Like MRO, the matching process creates reciprocity and synchrony within the mother-child dyad when relative rates of appropriate attention to appropriate behavior characterize the majority of the mother-child interaction.

Figure B-1 provides an illustration of the MRO model. As seen from the figure, rather than selectively attending to specific child behaviors, a responsive mother reacts appropriately to the whole range of her child's behaviors. Since Kochanska's methodology is based on scale ratings of synchrony in the observed mother-child transactions, mutual responsiveness can only be assessed in a molar fashion. The behavior of the Kochanska mother is dependent upon her degree of

objectivity or capacity to see things from her child's point of view – what Kochanska refers to as perspective-taking. Thus, the greater the mother's perspective-taking capacity, the more appropriate will be her interactions with her child, thereby enabling MRO to develop. MRO, then, is a natural outgrowth of a mother's perspective-taking skills. Perspective-taking is a cognitive function that allows the mother to set aside her personal agenda and be objective when interacting with her child. Mothers who do not possess the prerequisite perspective-taking capacities that are the foundation of MRO, can be helped to develop these through cognitive-behavioral or insight-oriented therapeutic techniques. The respective therapeutic techniques would be specfically geared towards educating the mother about how her thinking patterns are impeding her ability to develop perspective-taking skills. The therapy would be aimed at guiding the mother towards an understanding of how she may be confusing her own needs with those of her child, work with her to separate her own and her child's needs, and ultimately develop in her the degree of objectivity that will enable her to develop the ability to take the perspective of her child.

A contrasting point of view regarding the pathway to child socialization is Herrnstein's (1970) matching law of behavioral choice. Figure 2 provides an illustration of the matching law model. In this model, the responsive mother reacts to specific patterns of child responses by consistently distributing her social attention (reinforcers) differentially across the behaviors that comprise the three response classes (positive, neutral, negative). The matching law states that the child's pattern of responses is dependent upon relative frequencies of mother social attention. The response that the child is most likely to perform is the one that tends to receive the

highest rates of relative social attention from the mother. Thus, in the matching law model, a child's behavioral choice is determined by the relative frequencies of specific reinforcers provided by mother with the child choosing the behavior that receives the largest proportion of these reinforcers. The matching law construct, then, describes how children's various responses function as patterns of behavior consisting of positive, neutral, and negative acts. By applying this model to parent-child interactions, we could examine how it works to create the signature behavioral patterns of the dyads.

Within a matching law framework, whether or not a parent-child pair is able to develop patterns of responsiveness, reciprocity, and cooperation is dependent upon which of the child's responses have, over time, received the highest proportion of attention from the parent. If prosocial responses by the child have consistently been the ones most likely to receive these reinforcers, patterns of prosocial behavior will develop. On the other hand, if neutral or antisocial responses by the child have consistently been those receiving the lion's share of attention from the parent, then these response patterns will become the norm for that youngster.

Kochanska's model is trust-based while Herrnstein's model is economy-based. Kochanska's MRO model is based on Bowlby's (1970) internal working model construct. Accordingly, John Bowlby (1970), the quality of attachment between mother and child is established over the infant's first year of life and infants who have mothers who are attuned and sensitive to their needs and bids for attention develop trust not only towards their caregiver but towards the broader environment as well. Bowlby's attachment model states that parents who are attuned and sensitive to

their infants create in the infant a cognitive framework – or internal working model – leading the child to expect responsive treatment from people, in general. The infant soon learns, however, that to maintain responsive treatment, it must also give responsiveness in return. It is this picture of parent-child interactions that characterizes the contemporary literature on parent-child attachment quality. Kochanska's MRO model, then, is derived from Bowlby's internal working model construct by her assertion that years of responsive parenting develop in the child an expectation that the present-day interaction with the parent will follow from what has been provided in the past. Thus, according to the MRO model, it is children's development of certainty - or trust - that they will be the recipients of responsive treatment that causes them to behave prosocially and cooperate whole-heartedly with the parental enterprise.

In contrast to Kochanska's trust-based model, Herrnstein's matching law model is economy-based. Within the economic model, the child's goal is to maximize desirable parental attention. In order for this to occur, and because there is a pool of reinforcers available through mother's attention, the child eventually aligns his or her response pattern to the pattern of available reinforcers – those orchestrated and controlled by mother. According to the economic model, children who choose to behave prosocially do so because prosocial behavior maximizes appropriate parental attention. At the same time that children are looking to maximize appropriate parental attention, parents are seeking to maximize child cooperation. To accomplish this, each participant must behave in ways that are economically viable. In the economy-based model, then, the child gaining appropriate attention from the mother

and the mother gaining willing cooperation from the child comprises a reciprocal give-and-take between the two partners.

While the Kochanksa model presumes a normally functioning mother-child dyad, that is, a dyad free of psychological disorder, the degree of success of both the Kochanska and Herrnstein models is dependent, in part, upon the level of psychological functioning of the participants. A mother who suffers from depression or anxiety or has a child who suffers from these or is temperamentally difficult (i.e., a colicky infant or irritable child) may have both less success developing the pesrpective-taking capacities that lead to the development of MRO and difficulty consistently applying the matching model to interactions with her child. By the same token, temperamentally easy-going children who have depressed mothers may overmatch rates of mother positive reinforcers simply because they are more inclined to behave prosocially, despite mother behaviors. Alternatively, temperamentally difficult children who have highly responsive mothers may undermatch rates of positive maternal reinforcers because they have a bent towards behavioral negativity. Thus, the degree to which a mother-child dyad is able to develop patterns of reciprocity is partly dependent upon variables that may be outside of the control of the dyad.

Similarities and Differences Between the MRO and Matching Models

Similarities between the MRO and matching models are found in their holistic nature and in their generation of children's sense of security. Both models are holistic because they each consider the entire range of mother-child behaviors. While

both models are holistic however, the matching model is informed by components of the whole (i.e., positive, compliant, neutral, and negative response classes), while the MRO model maintains its' molar focus by grouping all child behaviors together into a single class. Additionally, the economic viewpoint of the matching model and the trust viewpoint of the MRO model both generate a sense of security in the child. Both viewpoints are based on the mother developing the perspective-taking skills to respond objectively (i.e., sensitively) to her child's needs and bids for attention such that the child finds it worth his or her while to respond in parentally-preferred ways.

The third major difference between the two models pertains to applicability to parent training. Despite the matching model depicting children as accountants who "tally the ledger" to maximize social attention – a description with which sounds alien - it is actually a more familiar model for most parents because it is an extension of the differential reinforcement strategy that weakens "bad" behavior while strengthening "good" behavior. While this simple reinforcement model requires parents to react to specific behaviors, the matching model requires them to attend to the whole range of the child's behaviors in order to identify those response patterns judged adaptive and maladaptive. By attending to the entire range of behaviors, the parent can also indirectly, as well as directly, influence a particular category of child behavior (i.e., prosocial) by increasing its' relative rate of reinforcers. Thus, it is possible for a parent to strengthen or weaken a child response without actually increasing or decreasing the absolute rate of attention following the behavior. Since relative rate of attention by the parent is the instrumental factor in determining reinforcement value, this sort of "systemic" change in how the parent distributes

attention across the youngster's repertoire, should have predictable effects on children's behavior. For example, Timmy is resistant to doing his homework each evening and his response rates are highest for arguing, then constructive dialogue, and finally homework. Timmy's father allocates the highest proportion of his social attention to arguing followed by constructive dialogue, and then homework. As expected, Timmy's homework is the least frequent of his responses due to this response receiving the lesser proportion of his dad's attention. Now, according to the matching law, instructing father to increase his social attention to constructive dialogue will indirectly increase relative rates of social attention for homework, while at the same time indirectly decreasing relative rates of social attention for arguing. Let's assume that father allocates 50% of his social attention to arguing, 30% to constructive dialogue, and 20% to homework. According to the matching law, instructing father to increase social attention to constructive dialogue to 70%, while leaving rates of attention to homework at 20%, necessarily decreases relative rates of social attention to arguing down to 10%, thereby making social attention for homework relatively more powerful. If father does this consistently, then the child will increase his rate of homework and in the process he might even believe that father is now more attentive to homework.

The preceding example illustrates how the matching model can create a systemic shift in parent-child interactions that could lead to more durable changes in child behavior than would be true when child behaviors are looked at as isolated events (Snyder & Patterson, 1995). Referring to our previous example, the child's problematic behavior was opposition to doing homework (i.e., arguing), which

received the highest relative rate of reinforcement from the father. The traditional reinforcement model would lead the parent to target this behavior in isolation of other behaviors in the child's repertoire.. Thus, the father might target arguing with time out, without taking into consideration the relative rates at which he is attending to other behaviors in the child's antisocial response class. Thus, this father is continuously applying band-aids to child behavior problems without ever curbing these. While his is not a very durable method of child socialization, it persists because there is a tendency on the part of parents and teachers to think that the specific reinforcer following it linearly influences specific prosocial, neutral, and antisocial child behaviors. The matching law argues instead that child behaviors fall into prosocial, neutral, or antisocial response categories that are influenced by the caregivers' pattern of appropriate or inappropriate attention. Patterns of caregiver attention are hypothesized to generate more stability in the caregiver-child interaction than do singular contingencies. That is, there is more maintenance of a response class or category than of its' individual components (Epstein & O'Brian, 1985). The reason is because single behavioral acts tend to be inconsistent and therefore difficult to predict and control. When these same acts are aggregated according to classes of behavior (i.e., positive, neutral, negative, and compliant) consistent patterns emerge that make these classes predictable and controllable (Epstein & O'Brien, 1985).

Despite the applicability of Herrnstein's model, socialization researchers ignored matching while making ample use of Kochanska's MRO model. The highly appealing nature of this latter model has blind-sighted researchers to the applicability of matching as an alternative guideline in thinking about the socialization process.

Scientific openness to the matching model's applicability to parent training as well as its similarities to the MRO model are expected to lead to advancements in the parent training literature as it relates to child socialization.

The Matching Law: Matching in the Laboratory

A review of the literature providing empirical evidence for the matching law will inform the reader as to its' applicability in explaining human choice behavior. The matching law describes behavioral choice in animal studies (Baum, 1973, 1974; Catania, 1962, 1963, 1968; de Villers, 1977; Findley, 1958; Herrnstein, 1961, 1974; Miller, 1976) as well as in human studies both in the laboratory setting (Baum, 1975; Bradshaw, Szabadi & Bevan, 1976, 1977, 1978; Schroeder & Holland, 1969) and in applied settings (Deitz, Repp & Dietz, 1976; Gross & Drabman, 1981; Parish, Cataldo, Kolko, Neef & Egel, 1986; Poling & Ryan, 1982; Repp, Barton & Brulle, 1983; Simaon, Ayllon & Milan, 1982).

Matching law research began in the laboratory setting with animal, and then human, subjects, moving then into the applied setting where it was used to predict behavioral choice with humans. Some of these latter studies involved experimental analyses of relative reinforcement contingencies, while others involved observing naturally occurring response – reinforcer patterns. Results of matching in applied settings under controlled conditions are varied – but they generally support relationships between response rates and reinforcement rates (Bulow & Meller, 1998; Conger & Killeen, 1974; Mace, McCurdy & Quigley, 1990; Murray & Kollins, 2000). Other studies show less than perfect matching relationships as illustrated by

"undermatching" and "overmatching" (Mace, Shade & Mauro, 1994; Pierce & Epling, 1983; Pierce, Epling & Greer, 1981).

Undermatching occurs when relative response rate is lower than reinforcement rate, while overmatching occurs when response rate is higher than reinforcement rate. Undermatching and overmatching, are the result of the subject's lack of sensitivity to changes in relative reinforcement contingencies. Because humans (as well as animals) are not fully "responsive" to the complex patterns of reinforcers available to them, researchers have employed adjunct procedures (Baum, 1975; Lowe & Horne, 1993; Mace et al, 1994) to increase subject sensitivity to reinforcement contingencies and these include: providing additional instructions; withholding reinforcement for a set period of time whenever the subject chooses an alternate response (called a changeover delay); and providing other visual and auditory cues which alert the subject that relative reinforcement rate has changed across the pattern of responses. While these adjunctive procedures have effectively increased subject sensitivity to changes in relative reinforcement rates, the reason why matching relationships do not always hold in experimenter controlled settings are not clear and this has raised questions about the adequacy of the matching law to provide a comprehensive explanation of human choice behavior (Fuqua, 1984; Mace et al, 1994).

The Matching Law: Matching in Naturalistic Settings

The matching law literature pertaining to human subjects has revealed consistent findings across both experimental and naturalistic studies. The

methodological differences center on the use of child or adult subjects as well as correlational or experimental designs. Similarities include an average of two responses studied; a variety of two or more reinforcers assessed; causal or correlational effects depending upon the experimental or naturalistic design of the study; molecular coding systems that capture sequential processes; and matching relationships that reflect a wide range of variance depending upon the whether the design was experimental or correlational.

Matching theory applications to parent-child and teacher-student interactions are the topic of several naturalistic and experimental studies aimed at describing how direct and extraneous reinforcers influence behavior. Identifying the full repertoire of the child's behaviors, placing these into response categories, and then calculating the conditional probability of parent/teacher reinforcers establish matching relationships. The conditional probabilities are then converted into proportions. The proportions describe the relative degree to which each child response class is dependent upon the relative availability of the reinforcer that predicts its' occurrence. Perfect matching relationships, revealed by slopes that reach 1.0, are relatively rare in naturalistic studies and studies that use descriptive statistical measures, because these lack experimenter control of extraneous variables that could interfere with matching.

In their naturalistic study (1989), Martens and Houk applied Herrnstein's matching law to describe the behavior of a mentally challenged 18- year old female in her classroom setting. Two subject behaviors were targeted: on-task and disruptive. A variety of reinforcers were assessed: praise, reprimand, proximity, attend others, and nonassigned contact. The matching law accounted for 83% of the variance in

disruptive behavior and 44% of the variance in on-task behavior. The relatively lower rate of matching for the on-task behavior reflects an undermatching response rate indicating that the subject was relatively less sensitive to reinforcer patterns when engaging in on-task behavior. Undermatching indicates that either the subjects' behavior was being influenced by alternative reinforcer sources that were higher in attentional rate or had become rule-governed and thus made insensitive to actual rates of contingent reinforcers.

Martens, Halperin, Rummell, & Kilpatrick (1990) applied Herrnstein's matching law in their naturalistic study of the on-task and off-task behavior of a 6-year old boy. The student-behavior categories consisted of on-task and off-task, while the teacher reinforcers consisted of praise, reprimand, interact, attend to others, proximity, and teacher not interacting with anyone. The matching law accounted for an average of 49% of the variance in subject on-task and off-task behavior indicating that the subject undermatched teacher reinforcers 51% of the time. According to the authors, episodes of undermatching occurred when alternative sources of reinforcers were higher in rate than were contingent reinforcers.

Mace, McCurdy, & Quigley (1990) investigated matching in a classroom setting. They found that students, when offered two concurrently available reinforcement alternatives for successful completion of academic and vocational tasks, distributed their responses such that they matched relative rates of reinforcement for each response. The effects of relative reinforcers to the appropriate communicative and self-injurious scratching of a 36-years old autistic man in a residential treatment setting was the focus of a naturalistic study by Symons, Hoch,

Dahl, and McComas (2003). The subject's self-injurious responses consisted of head and leg hitting and his appropriate communicative responses consisted of vocalizations and initiations defined as audible sounds or single-word utterances or appropriately approaching and reaching for an individual. The staff's reinforcers included prompts, reprimands, praise statements, and physical contact. Relative proportions of self-injurious and appropriate communicative behavior and staff attention contingent on self-injurious behavior and appropriate communicative behavior were calculated. The results of the matching analysis revealed that when staff attention to appropriate communicative behavior was high, rates of self-injurious behavior decreased and when staff attention to appropriate communication was low, self-injurious behavior increased.

Matching theory applications to parent and child interactions have been the topic of a handful of studies. The matching law has been used to describe individual differences in social aggression. In their naturalistic study, Snyder & Patterson (1995) studied ten aggressive and ten nonaggressive mother-son dyads in their home settings. Each dyad member was coded for the following behaviors that functioned as both responses and reinforcers: positive, positive verbal, comply, positive nonverbal, negative verbal, command, noncomply, negative nonverbal, talk, and neutral nonverbal. Onset of a conflict was defined as an aversive behavior of one dyad member that was immediately followed in the behavioral stream by an aversive behavior of the other dyad member. After the mutually aversive exchange, mothers and sons engaged in any of the aforementioned behaviors as a tactic to terminate the conflict. The matching law model tested the hypothesis that the effectiveness of

response choices to terminate conflict was dependent upon their relative association with reinforcement contingencies. So, the use of aggressive or constructive tactics to terminate conflict was hypothesized to be dependent upon which of these categories received the highest relative rate of reinforcers. Accordingly, results revealed that for the majority of mothers and sons in aggressive and nonaggressive dyads, the rates at which aggressive or constructive tactics were used to terminate conflict was accounted for by the matching law (Snyder & Patterson, 1995).

The predictors of antisocial behavior in adolescent boys were the subject of a matching law study by Dishion, Spracklen, Andrews, & Patterson (1996). In this study, the boys were paired together to form delinquent, non-delinquent, and mixed dyads. The delinquent dyads consisted of adolescents who had been arrested, the non-delinquent dyads were made up of adolescents who had never been arrested, and the mixed dyads consisted of one delinquent and one non-delinquent teen. Each dyad's conversation was videotaped and coded to identify Normative vs. Rule-Breaking topics and the reactions of the listener that consisted of Laugh vs. Pause. Laughing, relative to Pausing, proved to be the more powerful reinforcer for Rule-Breaking talk and results revealed that 84% of the variance in Rule-Breaking talk was accounted for by the relative rate of Laughing following this response.

Matching theory has been used to describe which parent behaviors facilitate child cooperation and reciprocity. Wahler, Herring, & Edwards (2001), in their naturalistic study of 32 mother-child dyads, showed how the matching law accounted for the relationship between children's compliant and other prosocial behaviors and their mothers' social attention. Child responses consisted of compliant and prosocial

and mother reinforcers assessed consisted of appropriate social attention. The results revealed that 57% of the variance between mother social attention to childrens' compliance and prosocial approaches were accounted for by the relative rate of reinforcers for these responses. As mothers gave higher relative rates of attention to prosocial responses in general, compliance increased.

Further support for an economic model to explain reciprocal systems comes from a recently published article in Scientific American (de Waal, 2005). In that article, de Waal used experiments with chimpanzees to explain that reciprocal systems are part of evolutionary nature. According to de Waal, reciprocal systems exist because cooperation can yield desired social benefits such as pleasure and rewards. In order to reap these social benefits, the individual must monitor its efforts relative to the efforts of others and compare its rewards with the effort put in (de Waal, 2005). If the expired effort roughly equals the relative benefits received, the reciprocal system maintains itself. On the other hand, if the effort expended exceeds the relative benefits received, the reciprocal system will break down. Thus, cooperation is not a response to getting more than the next person; rather it is a response to getting "a fair share of the pie" based on relative effort put in.

In summary, the results of these studies indicate that parent-child and teacher-child behaviors operate according to the principles of the matching law model of behavioral choice. That is, an economic system based on a synchrony between relative rates of child responses and relative rates of parent/teacher reinforcers. Thus, children tend to behave prosocially when given relatively higher rates of positive attention for these behaviors and antisocially when this type of behavior garners the

most caregiver attention. Those parent-child dyads where child prosocial responses and mother appropriate attention characterize the majority of the dyad's social exchanges enjoy an interactional synchrony that is positive in nature. Additionally, children who tend to undermatch relative rates of caretaker inappropriate attention presumably enjoy greater interactional positivity with their partner because by doing so they are necessarily decreasing relative rates of negative interactional exchanges. Children who tend to undermatch caregiver inappropriate attention do so because they are, overall, receiving higher rates of attention for prosocial behaviors making them tend to act this way more often.

Attachment Theory and Mother-Child Interactional Patterns: Kochanska's MRO Construct

According to Bowlby's internal working model of relationships, children form a mental representation of a prior relationship quality that determines their expectations about the quality of future relationships. Attachment theorists who followed Bowlby's model, such as Maccoby (1992), postulate that a child's internal representation of the early attachment relationship as secure or insecure is revealed within the way the child approaches a new person. If the child is insecurely attached to his caregiver, he will warily approach new persons. Contrarily, if the child is securely attached, he will openly approach new persons and trust them enough to form an intimate relationship.

More recently the idea of bi-directionality has broadened to include inquiries into how the specific behaviors that shape a parent-child relationship create patterns

of interactional synchrony and reciprocity within the dyad (Sears, 1951: Hartup & Rubin, 1986; Hinde, 1987; Youniss, 1983; Maccoby, 1992). From this perspective, children are socialized through being active participants in intimate relationships and socialization is viewed as a gradual process that occurs over time through joint activity with others characterized by reciprocity and coordination (Maccoby, 1992).

Contemporary attachment theorists have used Bowlby's internal working model construct as a building block for new ideas about the parent-child relationship. Kochanska (2002) hypothesizes that a mutually responsive orientation (MRO) between parent and child facilitates willingness in the child to be cooperative towards parental rules and adopt parental values. According to Kochanska, the MRO model is derived from Bowlby's internal working model construct in that it is considered a by-product of a child's secure attachment to the caregiver and is defined as a "relationship that is close, mutually binding, cooperative, and affectively positive" and reflects a secure parent-child relationship that is based on a history of responsive caregiving. Kochanska has studied MRO by utilizing both micro- and macro assessment measures and then aggregating these into one overall mother responsiveness score. The major difference between Kochanska's micro- and macro measures pertains to duration of observed episodes. That is, while both measures rate the mother's behaviors according to a Likert-type scale, the micro measure rates behaviors according to 60-s intervals, while the macro measure rates behaviors during play, snack, and discipline episodes that are not time specified.

Kochanska wrote a commentary (2002) on her MRO construct maintaining that mother-child dyads characterized by responsiveness, shared cooperation, and

shared positive affect are considered to have a mutually responsive orientation. Shared cooperation and shared positive affect, while they seem like components of responsiveness, are actually components of mutual responsiveness because they are based on both members of the dyad behaving reciprocally towards the other. The term responsiveness, on the other hand, reflects the degree of sensitivity one partner has for the other and, thus, is not based on shared interactions. To clarify, responsiveness refers, respectively, to the parent's and the child's willing, sensitive, supportive, and developmentally appropriate response to one another's signals of distress, unhappiness, needs, bids for attention, or attempts to exert influence (Kochanska, 2002). Shared positive affect refers to the "good times" shared by the parent and the child – pleasurable, harmonious, smoothly flowing interactions infused with positive emotions experienced by both (Kochanska, 2002). Shared cooperation refers to reciprocity between the mother's and child's compliance. It is this mutually responsive orientation, according to Kochanska, that fosters the child's internalization of parental values and subsequent development of conscience that is the hallmark of socialization. Socialization is viewed by developmental researchers, such as Kochanska, as a process jointly constructed by parents and children over time (Collins & Laursen, 1999; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Maccoby, 1999; Reis et al., 2000; Kochanska, 2002). Kochanska and her colleagues (2002) propose that children who grow up in mutually responsive dyads are more likely than those who do not to wholeheartedly embrace the parental enterprise and be open to parental influence thereby enabling them to develop a strong conscience. According to Kochanksa (2002), the child's eagerness to respond

positively to parental influence develops from a "history of mutually gratifying and accommodating experiences" that makes the child expect support and responsiveness from the parent and give cooperation in return.

Kochanska first introduced her mutually responsive orientation construct in a 1997 data paper (Kochanska, 1997). In that paper Kochanksa explains that while Maccoby introduced parent-child responsiveness as a main component in the child socialization process, it remains a poorly understood construct. To further define the role of mutual responsiveness in the child socialization process, Kochanska demonstrated that mother-child responsiveness, mother-child shared positive affect, and mother-child shared cooperation are components of a mutually responsive orientation. The three components are measured in multiple contexts of daily interactions using a combination of micro- and macroscopic behavioral coding systems (Kochanska, 2002).

In her paper, Kochanska studied two components of mutual reciprocity - shared cooperation and shared positive affect – to determine if they are correlated with mothers' use of power in disciplinary interactions and children's degree of internalization of maternal rules. Subjects were 103 mother-child dyads when the children were 26-41 and 43-56 months of age. Shared cooperation and shared positive affect were assessed using both micro- and macroscopic observational measures. The macroscopic measures involved coding mother child interactions in 60-second increments, while the macroscopic measures involved rating mother responsiveness to child as poor, fair, good, or exceptional in 5-minute intervals (Kochanska, 1997). Mothers' use of power in disciplinary interactions and children's

degree of internalization of maternal rules was assessed using both observational and mother-reported measures. The two variables were then compared with aggregated scores for mother-child shared cooperation and shared positive affect. The shared cooperation aggregate was obtained by averaging the micro- and macroscopic scores of maternal responsiveness to child, and child committed compliance to mother. Alternatively, the shared positive affect aggregate was obtained by tallying the number of intervals where both mother and child displayed positive affect and neither displayed negative affect.

Results revealed that in the dyads high on mutually responsive orientation (as defined by high scores on shared cooperation and shared positive affect), mothers resorted to less power and children were more internalized regarding maternal values and rules. Thus, mothers and children who were sensitive to the other's needs created a system of reciprocity. The reciprocal system protects against interpersonal conflict because mothers who are less coercive when disciplining their children tend to have children who are relatively more eager to cooperate with the parental enterprise.

How the mother-child relationship in infancy affected the child's socialization in the second year was the topic of a naturalistic study by Kochanska and colleagues (Kochanska, Forman, & Coy, 1999). Subjects were 112 mother-child dyads assessed when the children were 9 and 14 months of age. The authors studied two components of the early mother-child relationship--maternal responsiveness and shared positivity--through naturalistic dyadic interactions using both micro- and macroscopic observational measures. At 9-months the interactions were coded for 60-minutes in the home environment and included: mother doing chores, snack preparation, snack;

play with no toys first, and with one toy next; care giving; multiple demands (mother filling out forms while keeping the child away from a plant; free play with toys, preparing and giving bath; and unwrapping gifts). At 14-months, the interactions were 40- minutes in duration and included: free time; snack; a teaching task; play with a basket of toys; toy cleanup; and unwrapping gifts (Kochanska, Forman, & Coy, 1999). Microscopic coding of these events consisted of 60-second segments where coders recorded all child-related events (the child's signals or states that called for maternal response); distress/negative affect, bid for attention/interaction, need of assistance, influence attempt, or physiological signal. The coders then assessed responsiveness by coding coding each maternal response to each child-related event. The responses were coded on a Likert-type scale as poor, fair, good, or exceptional according to degrees of maternal promptness, engagement, sincerity, sensitivity, acceptance, cooperation, availability, following child lead and/or focus of attention, and adjusting the level of stimulation to child state (Kochanska, Forman, & Coy, 1999).

Results of the study revealed that both maternal responsiveness and shared positivity at 9-months separately predicted positive socialization effects at 22-months. The effects included mothers being less coercive during discipline, children's higher empathy to maternal distress, children's more eager and successful performance in a mother-child imitation paradigm, and more distress when they believed they had violated a standard of conduct (Kochanska, Forman, & Coy, 1999).

Whether the positive effects of mother-child mutually responsive orientation assessed at toddler and preschool age extended longitudinally into early school age

was the topic of a naturalistic study by Kochanska & Murray (2000). Specifically, the authors investigated the long-term consequences of mutually responsive orientation for the development of conscience. Kochanska describes conscience as a reliable internal guidance system that regulates conduct without the need for external control. Subjects were mother-child pairs assessed when the children were 2 1/2 and then 41/2 years of age. Mothers and children were seen during home and laboratory sessions at toddler age, during a laboratory session at preschool age, and during a laboratory session at early school age. Measures of mother-child mutually responsive orientation and conscience were obtained at toddler and preschool age. Two components of the mother-child mutually responsive orientation were observed and these were shared cooperation with each other and shared mother-child positive affect. Shared cooperation with each other encompassed the mother's eager responsiveness to the child and the child's eager responsiveness to the mother. Shared positive affect reflected interactions infused with positive emotion on the part of both members of the dyad. Maternal responsiveness to the child was assessed using both microscopic and macroscopic coding systems. During the microscopic assessment, "child-related events" such as child distress/negative affect, bid for attention, influence attempt, and need for help/assistance were examined in 60-second segments of parent-child interaction. For each of these child-related events, maternal response was evaluated according to the following macroscopic coding system: poor (mother ignores, avoids, reprimands child), fair (mother responds in a perfunctory, half-hearted way), good (mother responds adequately, "well enough" to child), and exceptional (mother responds in a prompt, contingent, warm, supportive, genuinely

interested, empathic manner) (Kochanska & Murray, 2000). A rating on each scale was given for each 5-minute segment of observed interaction and these were then averaged across the 5-minute segments for each scale (Kochanska & Murray, 2000). The child's wholehearted, or eager, compliance with the mother was observed in naturalistic discipline contexts, toy cleanups, and prohibition contexts centering around preventing the child from touching attractive toys displayed on a low shelf. Child responses to maternal directives were coded according to 20 or 60-second intervals. The child was coded as wholeheartedly compliant when compliance was assessed to be self-regulated and not contingent on maternal sustained control (Kochanska & Murray, 2000).

The mother's and child's affect was coded a total of 145-minutes at toddler age and 75- minutes at preschool age during the child-related events described previously. The coding system applied to the discipline situations included neutral-positive, positive, neutral-negative, and negative affect codes. A second system was applied to daily routines and included the following codes: affectionate, joyful, neutral-positive, neutral-negative, sad, anxious, and angry. All intervals of affect in which both mother and child displayed positive affect and neither displayed negative affect were tallied, divided by the total number of coded segments, and averaged across both affect coding systems resulting in the mother-child shared positive affect scores for toddler and preschool age assessments (Kochanska & Murray, 2000). Results revealed that mother-child mutually responsive orientation – as assessed by the shared cooperation and shared positive affect scores - at toddler and preschool ages predicted children's future conscience while controlling for the developmental

continuity of conscience. Additionally, findings showed that mutually responsive orientation at toddler age had a direct effect on future conscience. According to the study, the results confirm those of earlier studies that mutually responsive orientation is vital to child socialization (Kochanska & Murray, 2000).

In her naturalistic study, Kochanska and colleagues hypothesized that the effects of maternal responsive, gentle parenting on child conscience are moderated by the child's security and trust in the caregiver (Kochanska, Aksan, Knaack, & Rhines, 2004). Subjects were mother-child dyads assessed for trust in the caregiver during the Strange Situation when the children were 14-months during a 90-minute session. The subjects were assessed again when the children were 56-months of age during one 210-minute session to determine if early security promoted the development of conscience (Kochanska et al., 2004). Then, mothers' responsiveness and power assertion were observed at 14, 22, 33, and 45 months, the former during naturalistic interactions encompassing daily situation such as free time, meal preparation, routine caregiving, and play time, etc. and the latter in discipline contexts consisting of toy cleanup and prohibition of action. Children's moral conduct, cognition, and moral self were assessed at 56 months. Results of the study revealed that mothers' style of childrearing that was responsive to the child and relatively free of the use of power, observed in naturalistic contexts from the 2nd to the 4th years, predicted children's internalized moral orientation, or conscience, at age 56 months (Kochanska, Aksan, Knaack, & Rhines).

The development of mutual responsiveness between parents and their young children was the focus of a naturalistic study by Kochanska and Aksan (2004).

Subjects were 102 mothers interacting with their children at 7 and 15 months of age. Responsiveness was assessed using macroscopic ratings and microscopic event coding. The macroscopic ratings were based on Ainsworth's (Ainsworth et at., 1971) coding of maternal responsiveness. The scales (sensitivity, insensitivity, acceptance-rejection, and cooperation-interference) were combined into one responsiveness rating ranging from 1 (highly unresponsive) to 7 (highly responsive). The microscopic coding of responsiveness consisted of coders deciding, for each 60-second interval, whether the child directed a bid or signal toward the parent that had the potential for parental response. Then, coders evaluated the parent's response to each child's bid using one of four mutually responsive codes: poor, fair, good, or exceptional. The judgment integrated multiple dimensions of responsive parenting (e.g., promptness, enagagement, sincerity, and other aspects of sensitivity, acceptance, cooperation; emotional availability; following child lead or focus of attention; adjusting stimulation to child state) (Kochanska, 2004). Coding conventions specified how to judge the degree of responsiveness given the type of the child's bid. For example, to be coded as "exceptionally responsive" to child distress, the parent needed to respond very empathically, eagerly, promptly, warmly, in a comforting, appropriate manner. To be coded in this same way to child positive social bids, the parent needed to respond enthusiastically, share the focuses of attention with the child, and demonstrate a clear desire for interaction (Kochanska, 2004).

Child responsiveness to the parent was coded in the same manner as parent responsiveness to the child. During the first step, coders observed each 60-second

segment and judged whether the parent directed any specific bid or signal to the child that had the potential for child response. Three types of bids were coded: social-interactive bids; influence attempts (attempts to regulate child behavior or secure his or her cooperation in areas other than social interaction and mood expression, e.g., in caregiving routines); and mood regulation attempts (comforting, distracting). During the second step, the child's response was coded as poor, fair, good, and exceptional. The criteria for coding reflected the promptness, sincerity, eagerness, and wholeheartedness of response, and how likely the child's reaction was to please the parent. An overall child responsiveness score across all types of parental bids was then computed (Kochanska, 2004). Results showed that children's development of self and resistance to parental demands, increased social repertoire and intersubjectivity, and improved mood regulation and the corresponding adaptations on the parents' side were all reflected in the developmental patterns of responsiveness (Kochanska, 2004).

In summation, Kochanska and her colleagues' investigations indicate that the development of MRO is vital to the child socialization process. More specifically, Kochanska's studies implicate mutual responsiveness between parent and child to be a parent-driven process that develops over time and is captured within macroscopic measurement instruments (i.e., rating scales) that capture holistic, and durable impressions of the quality of the parent-child interaction. According to Kochanska, child socialization begins as a parent-driven process because it depends, in part, on the attachment security that has developed in the child through sensitive parenting. The sensitive parenting is the starting point that leads to both the parent and child

behaving in mutually responsive or sensitive ways. Thus, patterns of mutual responsiveness are based on an early mother-child relationship where the mother was consistently sensitive and responsive to her infants' needs and bids for attention, thereby fostering the child's development of trust expressed through wholehearted and eager cooperation with the parental enterprise.

Purpose of the Study

The present study is designed to determine if the trust and economic models are interchangeable: that is, do observations of volunteer and clinic-referred mother-child dyads generate converging pictures of successful and unsuccessful socialization as seen from the two theoretical viewpoints. MRO is the prevailing model guiding our understanding of children's socialization. Generating MRO requires mothers to respond appropriately to what toddlers do and say. Research documents that mothers who are able to socially react in appropriate ways generate an aggregate of appropriate child responses (Kochanska, 1997). Little, however, is known about what are the components of the mothers' and child's ways of joining in dyadic harmony.

Matching yields a component model of the responsiveness aggregate. While the matching model provides a picture of the components of responsiveness, thus far, there exist no studies of this model in the socialization research. In order to apply the matching model to child socialization research, mothers' responsiveness as an aggregate must be measured, its' components must be quantified, and both sets of measures must be shown to covary with the child's responsiveness. To examine

reciprocity, the sequence is reversed to show how the child's responsiveness impacts the mother's responsiveness.

By studying volunteer and clinic-referred dyads we can compare poorly socialized children with those who are well socialized. In doing so, we expect to find less responsiveness in the aggregate and in its components in the clinic-referred dyads. Hopefully, the results will provide developmental researchers and clinicians with more specific knowledge about the socialization process as viewed from theoretical models derived by Kochanska and Herrnstein.

The specific hypotheses this study aims to test are that 1) both the mother and child responsiveness aggregate means will be lower in clinic-referred dyads; 2) the mother and child responsiveness aggregates and components will covary in both groups such that regardless of group status, dyadic partners will approximate each other's level of responsiveness; 3) when the responsiveness aggregate is separated into proportional components, these components will line up in rank order with the children's proportion scores.

CHAPTER II

METHOD

Naturalistic observation of mother-child pairs in their home environment were used to capture the antecedent and consequential mother- child behaviors for every 15-second time interval within one 60-minute session. Both mother and child behaviors were coded for elements related to mutual responsiveness. The responsiveness elements included approaches that were compliant or neutral or positive in behavior or affect. Approaches that were oppositional or negative were coded as elements of unresponsiveness and worked against the mother and child's responsiveness score. The responsive and unresponsive elements comprised a responsiveness aggregate that was converted into a percentage score for both the mother and child in each dyad. The responsiveness aggregate formed a picture of the mother and child's responsiveness from a holistic perspective.

Next, the components of the responsiveness aggregate were separated to inspect components of this macro picture of mother-child responsiveness. To accomplish this, the positive, neutral, and negative approaches by the child and the appropriate and inappropriate maternal reactions were converted into proportions. Once the aggregate and component scores were obtained, statistical procedures that specifically tested the hypotheses were conducted.

Participants

Thirty-two volunteer mother-child dyads were recruited through announcements sent home with children in 5 elementary schools. The participating children were Caucasian and predominantly boys (65%) with a mean age of 8 years (age range 6-11). Most of the mothers of these children were married (90%), of middle class status, with a mean age of 32 years (age range 30-30). The average number of siblings in these families was two, with a range from zero to three. Another twenty mother-child dyads were self-referred to a university mental health clinic and selectively recruited in order to obtain a group of chronically oppositional children. Referral concerns by these mothers centered on their children's disruptive behavior and all mothers specified child noncompliance as a particularly troubling aspect of parenting. Similar to the volunteer sample, these clinic-referred dyads were Caucasian, the children were largely boys (70%) whose mean age was 8 years (age range 6-11). Most of these mothers were married (80%), of middle class socioeconomic status, with a mean age of 31 years (range 29-39). The average number of siblings in these families was 2 with a range of 0-3. All participating mothers gave informed consent after reading about the proposed study and the investigators adhered to the ethical principles set forth in their description of the research protocol.

Additional analyses measuring how the groups differed on socio-economic status (SES) indicators such as income, education, age, gender, and race were intended to control statistically for any such differences found when testing hypotheses. SES variables may influence the quality of parenting and the degree to

which mother's react sensitively to their children. For example, mothers who are unduly stressed due to economic disadvantage may be poorly attuned to their children's needs and bids for attention. Due, however, to a problem with data acquisition, such analyses were unable to be conducted.

General Procedure

All others completed a questionnaire asking for the aforementioned demographic information on each participant. Next, a one-hour home observation was arranged with mothers and scheduled for a time of day in which mother believed that she and her child would have maximum opportunity to be together in their house or apartment. In line with the intended free-field nature (i.e., unmanipulated) of these observation settings, other family members were invited to be present but only a few siblings actually participated (i.e., 2 families in each group) and no fathers were present. Rules for the observation were as follows: stay within two rooms of the house, keep telephone calls brief, do not have friends or extended family present, and do not turn on television sets or radios. The sessions were then videotaped for later coding by observers.

Observers were undergraduate psychology majors who obtained course credit for their training as observers and their coding of the videotapes. Each observer read and signed a confidentiality pledge after reading a summary of ethical issues concerning this research project. One observer then coded each videotape and a second master observer also coded 20% of the videotapes to assess observer agreement. The observers were ignorant as to their purpose in this study and ignorant

to the group status of each dyad. All observers were trained to an 80% level of agreement on each of the following codes. After training, any observer whose agreement fell below 80% were re-trained or replaced by a newly trained pair.

The Standardized Observation Codes (SOC-R)

These codes, the procedures for their use, and the scoring template are contained in an unpublished manual available by contacting the author. The manual has been used in a number of studies with demonstrated reliability and validity (see the publication by Cerezo, 1988). In the use of SOC-R, all child and mother behaviors are segmented into 15-second time intervals within a 60-minute block and each behavior is assigned a code. Thus, codes can be counted across the 240 intervals and code sequences describing child-mother and mother-child interactions (15-second and longer) can be specified. Code sequences (e.g., child compliance followed by mother approval) are scored only once per time interval. For purposes of the present study, the following codes and code summaries were utilized:

Mother Responsiveness. This is a summary index comprising the percent of mothers' "appropriate" reactions occurring within 15-seconds after any coded child behavior. Definitions of "appropriate" and inappropriate mother reactions are as follows: Mother's appropriate reactions to a child's positive or neutral approach are defined by her positive or neutral actions or words; inappropriate reactions amount to her negative actions or words; mother's appropriate reactions to child compliance and her inappropriate reactions are defined in the same way as those reactions following child positive or neutral approaches; mother's appropriate reactions to all instances of

child negativity, including non-compliance, are defined by ignoring or time-out; inappropriate reactions amount to her negative actions or words or her positive or neutral actions or words. The resulting index of mother responsiveness is computed by dividing her total appropriate and inappropriate reactions into her total reactions.

Mother Positive. This is a summary of all positive intervals of mother verbal and nonverbal behaviors. Praise, compliments, appropriate laughter, hugs, pats, and kisses comprised this category.

Mother Negative. This is a summary of all aversive intervals of mother verbal and nonverbal behavior. Yelling, hitting, scolding, and rejecting (i.e., rolling eyes, sighing impatiently) comprised this category.

Mother Neutral. This is a summary of all mother verbal and nonverbal behaviors that were not coded positive or negative.

Child Responsiveness. This is a summary index comprising the percent of childrens' "appropriate" reactions occurring within 15-seconds after any coded mother behavior. Definitions of "appropriate" and inappropriate child reactions are as follows: Child's appropriate reactions to a mothers' positive or neutral approaches as well as compliance are defined by positive or neutral actions or words; inappropriate reactions amount to the child's negative actions or words; children's appropriate reactions to all instances of mother negativity, are defined by ignoring; inappropriate reactions to mother negativity amount to the child's negative actions or words or positive or neutral actions or words. The resulting index of child responsiveness is computed by dividing the child's total appropriate and inappropriate reactions into her or his total reactions.

Child Positive. This is a summary of all positive intervals of child verbal and nonverbal behavior. Appropriate laughter, hugging, kissing, display of good manners (i.e., please, thank you, your welcome), helping behaviors, and complying with a positive attitude comprised this category.

Child Neutral. This is a summary of all child verbal and nonverbal behaviors that were not coded positive or negative.

Child Negative. This is a summary of all intervals of child verbal and nonverbal behavior that was not coded as positive or negative.

Observer Agreement

The 20% subset of observations in which two observers independently coded the home videotapes was used to evaluate their scoring agreement. Following Hartmann's (1977) recommendations on assessing the reliability of direct observations, the observers' agreement on the nine summary variables was assessed and used in all of the substantive data analyses. To do so, intraclass coefficients comparing observer pairs were computed as follows: mother responsiveness = .86; mother positivity = .80; mother negativity = .81; mother neutrality = .79; child responsiveness = .88; child positivity = .81; child negativity = .98; and child neutrality = .81. Thus, it is evident that observers were in good agreement with respect to the various codes comprising the summary scores. The acceptable levels of agreement on both the aggregate responsiveness measures of mother and child behavior as well as the components of each partner's responsiveness allowed us to test the hypotheses through t-tests of mean comparisons and correlational analyses.

Data Analyses

Independent samples t-tests of the mean differences in the aggregate and component measures of mother and child responsiveness were conducted to document results as suggested by previous literature. That literature indicates that clinic-referred dyads interact with less harmony than do volunteer dyads. Our first hypothesis, geared to a molar picture of these interactions (following Kochanska's model), predicted that the mother and child responsiveness aggregates would differ between groups with the volunteers demonstrating greater responsiveness. Next, guided by our second hypothesis, we looked at a molecular picture of mother and child responsiveness. In this analysis, we separated child responsiveness into frequency measures of 3 categories: positive, neutral, and negative; mother responsiveness was separated into appropriate reactions to these 3 child response categories. According to hypothesis 2, the clinic-referred children ought to produce lower frequencies of positive and neutral responses than volunteers, and higher frequencies of negative responses. Likewise, the mothers of clinic-referred children were expected to offer fewer appropriate reactions to all three child response categories. Independent t-tests were used to compare these mean differences between the two groups of dyads. Finally, we converted the frequency measures into proportions to test our third hypothesis that the 3 mother responsiveness components would line up in rank order with the children's proportion scores in both groups. We followed this step by correlating the respective child-mother proportion scores (following Herrnstein's model). Thus, Pearson product-moment correlation coefficients were computed between the proportions of the three mother reactions and

the three child responses towards which they were targeted. Assuming that mothers' appropriate reactions were influencing the rank order of their children's proportions scores, we expected equally high correlations regardless of group status. Results of this analysis were presented as scatterplots to provide a more detailed picture of these correlations.

Hierarchical Regression Analyses

Despite finding most of the expected between group differences, our previous analyses revealed that the two groups of mothers were highly responsive to their children, both in the molar and molecular assessments of the dyads' interactions. This was surprising in view of the fact that the clinic-referred children were far more negative than the volunteer children. In hindsight, we turned to mothers' inappropriate reactions to child negativity as a potential explanation for the larger frequency of this behavior in the clinic-referred sample. In doing so we reasoned that mothers' inappropriate or unresponsive reactions might influence all of children's negativity. Thus, we combined the groups and utilized the three measures of mother unresponsiveness ranging from molar to a mid-level proportion to a molecular frequency. Based on the meta analysis by Bakermans-Kranenburg et al. (2003), we assumed that the more proximal (molecular) measures of mother unresponsiveness w powerful predictors of child negativity.

Multivariate Analysis of Variance Testing the Effects of Group Status on the Mother and Child Aggregate, Frequency, and Proportion Variables

The independent t-tests comparing mean differences between the two groups were intended to be followed-up with a multivariate analysis of variance (MANOVA) test. Due to lack of availability of the data set, however, this analysis was unable to be conducted. The purpose of the MANOVA would have been to test the effects of group status and gender on the mother and child variables. To conduct the MANOVA, we would have entered group status and gender as the independent variables and the mother and child variables as dependent variables. Wilks's lambda would have been used to evaluate whether the means of the mother and child variables are equal across group status and gender.

CHAPTER III

RESULTS

Independent t-tests of the Mean Differences in the Aggregate Measures of Mother and Child Responsiveness

Independent samples t-tests were conducted to evaluate the hypothesis that volunteer mothers and children would be more responsive than the clinic-referred dyads (the corresponding means and standard deviations are given in Table A-1). The tests were significant and the results consistent with the research hypothesis: volunteer mothers were markedly more responsive than were the clinic-referred mothers, $t(48) = 2.64$, $p < .01$ and their children were more responsive than their clinic-referred counterparts, $t(48) = 3.52$, $p < .001$.

Independent t-tests of the Mean Differences in the Frequency Component Measures of Mother and Child Responsiveness

The test results depicted in Table A-2 show the volunteer children produced more neutral, $t(48) = 3.61$, $p < .001$, and less negative, $t(48) = -3.36$, $p < .001$, responses than did the clinic referred children. Unexpectedly, however, children in both groups did not differ in their production of positive responses, $t(48) = 1.32$ ns. Consistent with our hypothesis, volunteer mothers reacted more appropriately to their children's neutral responses as compared to the clinic-referred mothers, $t(48) = 3.80$, $p < .001$. Yet, mothers in both groups did not differ in their appropriate reactions to

their children's positive responses, $t(48) = 1.51$ ns. Additionally, clinic-referred mothers reacted more appropriately (i.e., ignoring) to their children's negative responses than did the volunteer mothers $t(48) = -3.46$, $p < .001$., although this could have been due to so many zero productions of negative responses by the volunteer children.

Within Group Comparison of the Rank Order of Mother and Child Responsiveness Components

As shown in Table A-3, the rank ordering of the children's three response categories line up perfectly with their mothers' rank ordering of appropriate reactions. The results suggest high levels of synchrony within both groups of dyads.

Bivariate Correlations of the Mother and Child Proportions Scores

The results are presented as scatterplots (see Figures B-3, B-4, and B-5) and show that all the correlations were statistically significant and were greater than or equal to .75. These results suggest that the interactions of both the volunteer and clinic-referred dyads are highly synchronous.

Hierarchical Regression Analysis Comparing the Predictive Power of the Three Forms of Mother Inappropriate Reactions

The results of the analysis are shown in Table A-4 and indicate that the aggregate index of mother unresponsiveness accounted for the least amount of variability in child negativity, $R2 = .026$, $F(1, 46) = 1.2$ ns. Alternatively, the

proximal frequency measure was the strongest predictor of child negativity, R2 change = .62, $F(1, 46) = 14.5$, $p < .01$.

CHAPTER IV

DISCUSSION

As Table A-1 shows, the aggregate measures of mother and child responsiveness differed in expected directions for the clinic-referred and volunteer groups. Volunteer children were significantly more responsive to their mothers than were children in the clinic-referred group. When the child responsiveness aggregate was separated into three categories, two of the three proved to be distinctive markers for both groups of dyads.

Table A-2 shows the volunteers produced more neutral and less negative responding than did their clinic-referred counterparts. Surprisingly, the two groups were virtually identical in their production of positive responses. Table A-2 also shows that the mothers in both groups offered appropriate reactions that seemed to mirror frequencies of their children's 3 response categories. Thus, despite the significant mean differences in their aggregate responsiveness, the molecular measures of responsiveness suggest that both groups of mothers were tracking their children's responses and reacting appropriately to what they saw and heard. In fact, when we converted the Table A-2 measures to proportions (see Table A-3), the rank ordering of the children's three response categories line up perfectly with their mothers' rank ordering of appropriate reactions.

A clear look at the mutual responsiveness of these dyads is described in the scatterplots shown in Figures B-3, B-4, and B-5 (each figure shows both clinic-

referred and volunteer group performance). Notice in Figure B-3 that both the clinic-referred and volunteer children matched their neutral responses to their mother's offerings of appropriate social reactions. In fact, the correlations between mothers' proportional offerings and the children's proportions of neutral responses were similarly high and positive for the two groups. Thus, even though the volunteer children produced higher proportions of neutral activity than did the clinic-referred children, and volunteer mothers offered higher proportions of appropriate reactions following these responses (see Table A-3), the two groups of dyads were in similar patterns of synchrony.

In Figure B-4, the mothers' synchrony with their children's positive responses is even more striking. In both groups, the synchrony in dyads was virtually perfect. These synchrony orchestrations by mothers in both groups continued to be evident when the children produced negative responses. Despite the much larger proportion of child negativity in the clinic-referred group (26% vs 5%), Figure B-5 shows that all mothers allocated their ignoring tactics (i.e., appropriate reactions) in almost perfect accordance with their children's output of negative responses. The lesser correlations for volunteer dyads may well be due to so many children's zero production of negative responses.

Frankly, we were surprised to find such high levels of responsiveness in the clinic-referred mothers parenting (94%), particularly in reference to their skills in ignoring child negativity. This finding was especially surprising in view of the fact that the clinic-referred children were far more negative than the volunteer children. But, while these mothers were inappropriate in only 6% of their reactions, we

wondered if these "mistakes" might have impacted their children's negativity. Mothers in both groups made the majority of their mistakes following their children's negative behaviors pointing to the possibility that all mothers' inappropriate reactions provoked their children's negativity. To test this assumption, we combined the groups and, using proportion scores of child negativity as the dependent variable, we used molar to molecular indices of mothers' inappropriate reactions (i.e., unresponsiveness) as predictor variables. Based on the meta analysis by Bakermans-Kranenburg et al. (2003), we assumed that the more proximal (molecular) measures of mother unresponsiveness would be the most powerful predictors of child negativity.

Reference to the results of the hierarchical regression analyses shown in Table A-4 clearly indicates the differential predictive power of the three measures of mother inappropriate reactions. That is, the proximal frequency measure was the strongest predictor and the molar level aggregate index was the weakest. Thus, we found correlational evidence to argue that mother inappropriate reactions, particularly at the molecular frequency level, might have influenced child negativity.

The significant differences in aggregate measures of mother and child responsiveness between the volunteer and clinic-referred groups is consistent with the child developmental literature (Kochanska, 2004) showing that mother-child dyads characterized by high rates of child negativity tend to lack the mutual responsiveness that dyads with more prosocial children enjoy. Furthermore, given that the volunteer dyads were more responsive than were their clinic-referred counterparts, the significant differences between child neutral and negative responses were expected.

That is, children with more responsive mothers tended to behave more neutrally and less negatively than children whose mothers were relatively less responsive. In contrast, we were surprised to find that the children's frequencies of positive responses were identical across the two groups. This finding was obscured by the aggregate measures of the children's responsiveness, thereby demonstrating the utility of the component measures.

Finally, the correlational analysis of the mother and child responsiveness components (i.e., child responses and mother appropriate reactions) revealed surprising similarities in mother responsiveness between the two groups. The similarities show that mothers in both groups were equally responsive to their children's various responses, leading us to wonder why the clinic-referred children's negativity was so much higher than that produced by volunteer children.

Important Addition to the Mother-Child Responsiveness Literature

Our findings run contrary to Kochanska's (2004) socialization model that theorizes low levels of maternal responsiveness should promote children's negativity (e.g., lack of cooperation). As Table A-4 showed, the molar index of low responsiveness had no value in predicting child negativity. Only when this index was defined as response-contingent inappropriate reactions (Herrnstein, 1990) to the children's negativity did we find predictive value. Thus, while the molar indices of responsiveness have proven to be of value in accounting for the prosocial behavior of children, they may not prove so useful in accounting for the particular ways in which children embrace or resist the socialization process.

Limitations

This study has several limitations that are cause for consideration. First, our analyses are correlational, thus, caution should be exercised regarding causal inferences. For example, it is not clear whether the mothers' inappropriate reactions are provoking child negativity or vice versa. Another limitation of this study is the exclusion of child temperament as a predictor variable of child negativity. Perhaps the relatively high negativity displayed by the clinic-referred children, despite having highly responsive mothers, is due to a constitutional bent towards negative emotionality that is largely unaffected by maternal sensitivity. A recent study by Kochanska et al. (2005), however, that looks at the relationship between maternal responsiveness and child negative temperament showed that with highly responsive mothers, angry infants at 9 months became highly cooperative at 15 months, but with unresponsive mothers angry infants became increasingly uncooperative. Thus, children who are prone towards negative emotionality may be particularly sensitive to the socialization process (Belsky, 1997; Belsky et al., 1998).

The exclusion of fathers, and how their responsiveness impacts the child socialization process is another limitation of this study. In fact, there is a gap in the developmental literature regarding the effects of paternal responsiveness on child receptivity to the parental enterprise. A recent study by Kochanska et al. (2005), however, showed that the mother's early responsiveness and her ability to serve as a secure base for the child promoted the child's willing stance toward parental socialization. Moreover, those effects were not limited to the mother-child relationship but, rather, generalized to promote the child's receptivity in the

relationship with the father. However, no evidence was found of a similar effect for paternal responsiveness and the child's security with the father. These findings are consistent with the view that the child's relationship with the mother may be primary and may constitute a more powerful source of influence than that with the father in two-parent families (Kochanska et al., 2005).

The exclusion of measures of child compliance is also a limitation that demands explanation. Child compliance is the barometer of successful socialization, while chronic noncompliance indicates that the socialization process has failed. Thus, while it is a limitation that we did not have the barometer index in our study, Kochanska (1997) has made a strong argument that a better index of a child's wholehearted commitment to the parental enterprise is child responsiveness – a measure that was included. That is, children who are compliant are not necessarily responsive whereas children who are responsive are more likely to be cooperative as well.

Future Directions

This study raises questions as to what factors are promoting and maintaining child negativity in the clinic-referred children despite the high degree of maternal responsiveness and synchrony within the dyads. Thus, the ways in which mother's react to child negativity demands further inquiry. Ignoring and time-out are the two most widely espoused methods to suppress child antisocial behavior yet none of the mothers in our study used the time out procedure. Thus, future research is need to reevaluate the effectiveness of ignoring as a way to extinguish child negative

behavior and to test the effectiveness of other techniques such as redirection (i.e., redirecting a child towards a more parentally-preferred behavior), reflecting (i.e., labeling the child's emotional state, for example, "I understand you feel angry because you cannot have an ice cream before dinner."), and giving the child choices ("I don't want to set the table." "You can set the table or walk the dog."). Additionally, our results suggest parent training may be more effective by teaching mothers how to respond to child negativity using methods other than ignoring, such as time out and loss of privileges.

Implications for Parent Training Interventions

Some of the most widely used parent training interventions, for example, Parent-Child Interaction Therapy (PCIT), (Eyberg & Robinson, 1982) focus on teaching mothers strategies and techniques to use when their children are behaving prosocially as when they are behaving in negative ways. The results of our study suggest, however, that mothers seem to already know how to react appropriately to their children's prosocial (e.g., neutral and positive responses) as well as antisocial (e.g., negative responses) behaviors. All of the mothers in our study used ignoring to extinguish child negativity and the clinic-referred mothers did so even more than the volunteers. However, the clinic-referred children were much more negative than the volunteer children and their mothers made more mistakes (e.g., inappropriate reactions to child negativity) than did their volunteer counterparts. Due to the correlational design of our study, it is unknown whether the clinic-referred mothers made more mistakes because they were exhausted from dealing with their highly

negative children, whether they were, despite their children's negativity, just more prone to making mistakes, or whether they were using an ineffective parenting strategy (i.e., ignoring).

Since none of the mothers in our study had ever received responsiveness training this suggests that children may be receptive to a broad and varied array of responsive reactions from their mothers. In contrast, our study shows that mothers appear to make the majority of their "mistakes" when their children are behaving negatively. As mother inappropriate reactions were shown to predict child negativity, this finding suggests that children may be highly sensitive to their mothers' inappropriate reactions. Our study indicates, then, that children may be quite flexible regarding their receptivity to maternal responsiveness but much less flexible when it comes to maternal unresponsiveness. Thus, parent-training interventions may be more effective and efficient by placing considerably more emphasis on teaching mothers how to react appropriately to child negativity, and more specifically, by using time out instead of ignoring. Alternatively, less emphasis may be placed on teaching them how to react appropriately to their children's prosocial behaviors because, given the possibility that their children are receptive to a broad range of responsive reactions, they may already be doing so satisfactorily.

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APPENDICES

APPENDIX A: TABLES

Table A-1

Means, Standard Deviations, and t-Tests Between Mother and Child Responsiveness Means for Volunteer and Clinic-Referred Mother-Child Dyads

	Volunteer n = 32		Clinic-Referred n = 20		t-Test in Mean Comparison
	M	SD	M	SD	(df = 48)
Mother Responsiveness Index	.99	.03	.94	.08	2.64**
Child Responsiveness Index	.95	.07	.81	.19	3.52***

**p < .01, ***p < .001

Table A-2

Frequency Means, Standard Deviations, and t-Tests Between Mother and Child Responsiveness Component Means for Volunteer and Clinic-Referred Groups.

	Volunteer		Clinic-Referred		T-Test In Mean Comparison
	X	SD	X	SD	(df = 48)
Child Neutral Response	97.88	46.59	49.77	45.36	3.608 ***
Mother Positive and Neutral Reactions	97.30	46.94	47.54	43.09	3.798 ***
Child Positive Response	10.46	14.0	25.95	7.91	1.336 ns
Mother Positive and Neutral Reactions	10.46	14.0	25.40	7.56	1.512 ns
Child Negative Response	3.07	5.18	19.68	24.59	-3.361***
Mother Ignoring	2.6	14.32	16.18	19.44-	3.464***

***p < .001

Table A-3

A Between Group Description of the Rank Order Differences in the Child Response Proportion Scores and Mother Reaction Proportion Scores

	Volunteer n = 32 Rank	Clinic-referred n = 20 Rank
Child Neutral Responses	1	1
Mother Appropriate Reactions	1	1
Child Positive Responses	2	3
Mother Appropriate Reactions	2	3
Child Negative Responses	3	2
Mother Appropriate Reactions	3	2

Table A-4

Hierarchicial Regression Analysis Comparing the Predictive Power of the Three Forms of Mother Inappropriate Reactions

Predictor	Proportion of Child Negativity				
	R^2	R^2 Change	Adjusted R^2	F	Significance
Aggregate inappropriate reactions (molar Level)	.026		.005	(1,46) = 1.2	.27 ns
Proportion of inappropriate reactions (mid-Level)		.24	.23	(1,45) = 14.7	.001**
Frequency of inappropriate reactions (molecular level)		.62	.60	(1,44) = 14.5	.000**

** $p < .01$

APPENDIX B: FIGURES

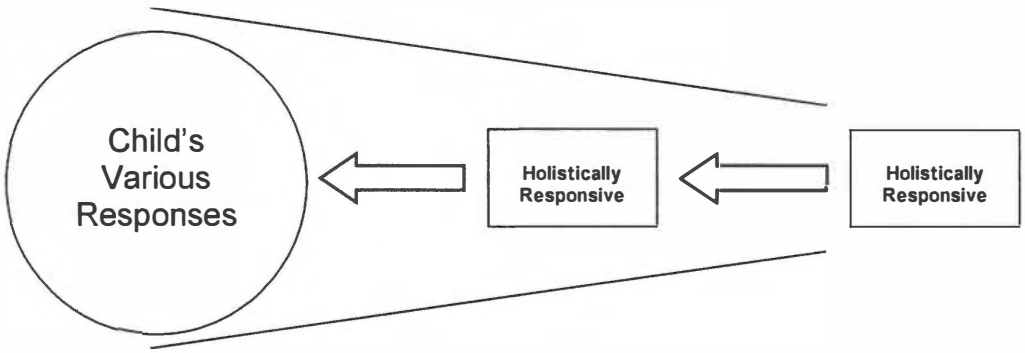


Figure B-1

A Schematic Illustration of Kochanska's MRO Model

of Mother Responsiveness

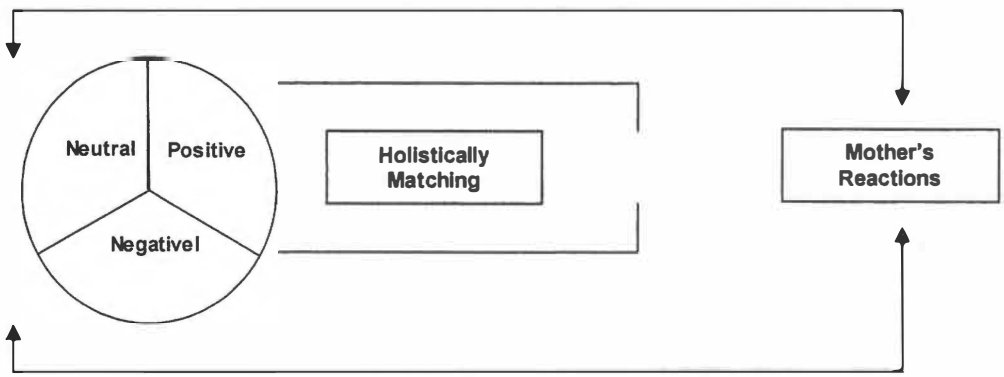
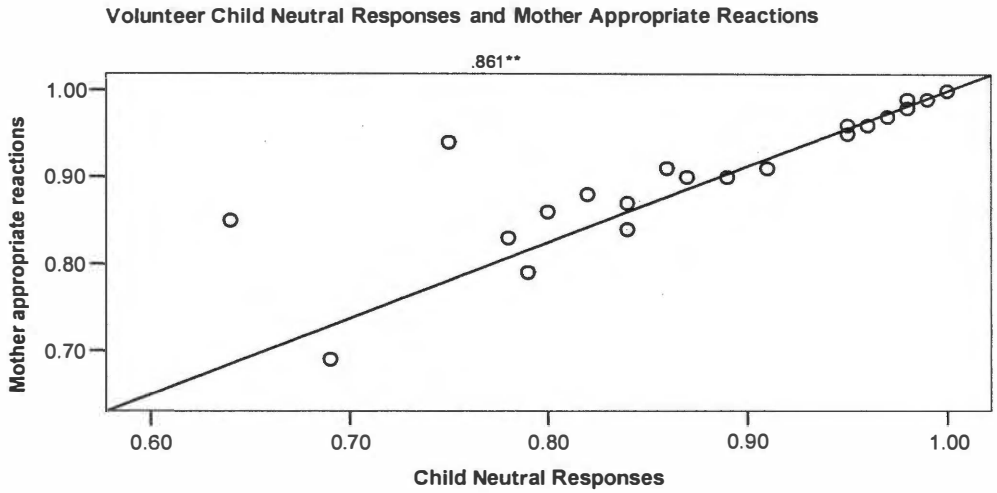


Figure B-2

A Schematic Illustration of Herrnstein's Matching Model

of Mother Responsiveness



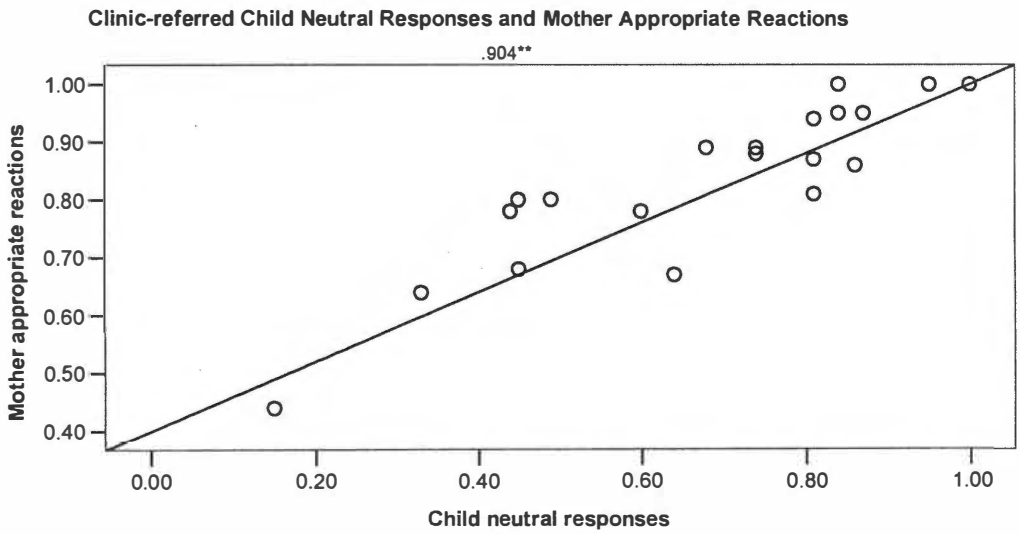
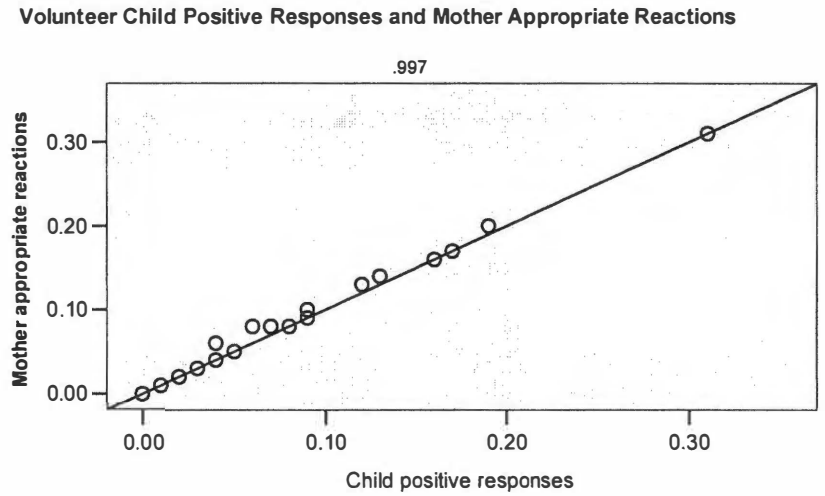


Figure B-3

Scatterplot Descriptions of Child Neutral Responses and

Mother Appropriate Reactions for Volunteer and Clinic-Referred Groups



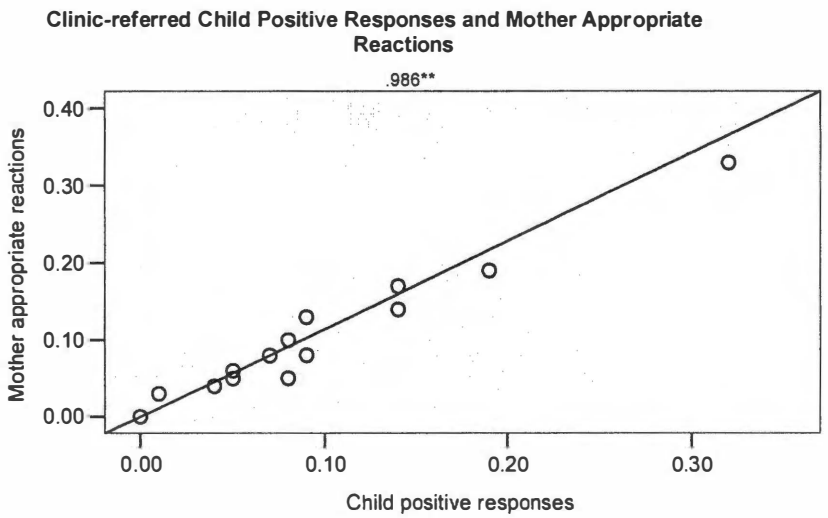
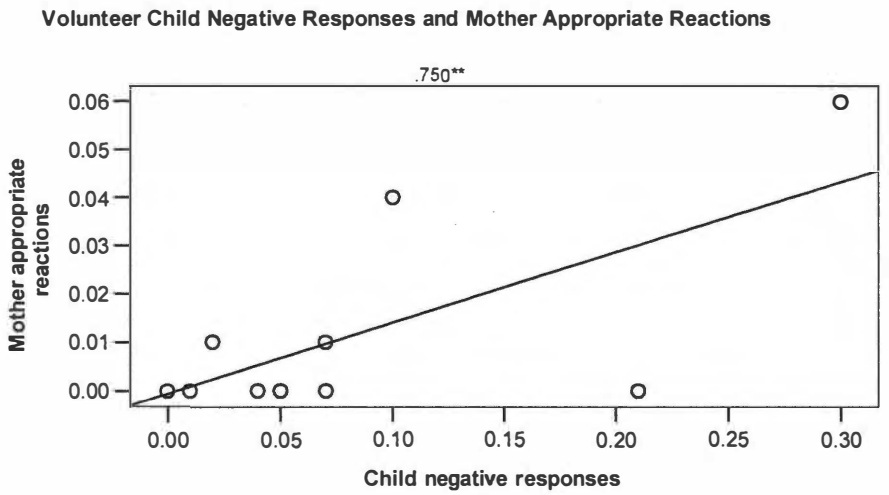


Figure B-4

Scatterplot Descriptions of Child Positive Responses and

Mother Appropriate Reactions for Volunteer and Clinic-Referred Groups



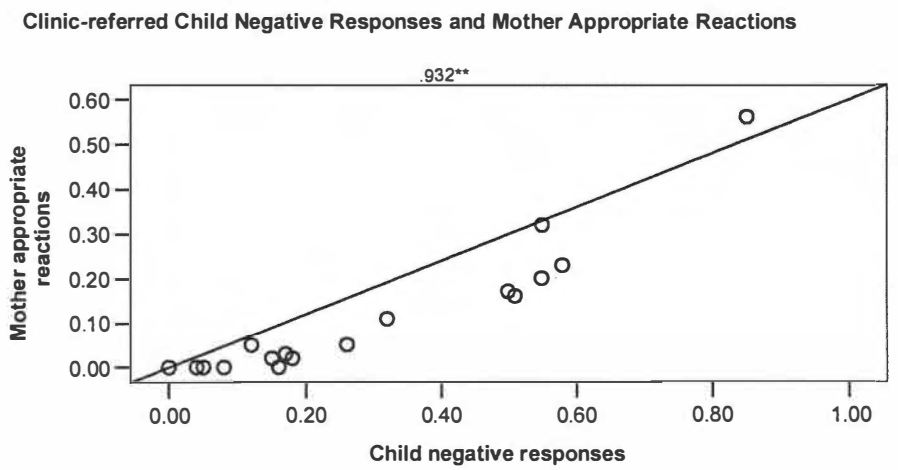


Figure B-5

Scatterplot Descriptions of Child Negative Responses and

Mother Appropriate Reactions for Volunteer and Clinic-Referred Groups

VITA

Vanessa Ann Vigilante was born on June 27, 1966 in Brooklyn, New York. Her parents are Anthony and Olga Vigilante, who, through example, taught her to have a strong work ethic and deep compassion for others. Vanessa earned an Associate of Science degree from Union County Community College, a Bachelor's degree in psychology from Rutgers, The State University of New Jersey, and both Master's and Doctorate degrees in Clinical Psychology from The University of Tennessee, Knoxville. She is currently a predoctoral intern at William S. Hall Psychiatric Institute/University of South Carolina Medical School and will begin her postdoctoral fellowship in Leadership Education and Adolescent Health at the University of Rochester Medical Center in September of 2006.

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