

DYADIC RECIPROCITY IN THE EMERGING RELATIONSHIP BETWEEN LOW
INCOME AFRICAN AMERICAN MOTHERS AND THEIR TODDLERS

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by
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

DYADIC RECIPROCITY IN THE EMERGING RELATIONSHIP BETWEEN LOW
INCOME AFRICAN AMERICAN MOTHERS AND THEIR TODDLERS

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CHAPTER ONE

INTRODUCTION

Recent theory and research on parent-child relations emphasizes the concept of reciprocity, the bidirectional mutually responsive quality of interaction that describes well-functioning parent-child relationships (Deater-Deckard & O'Connor, 2000; Kochanska, 1997; Maccoby, 1999). Due to its theoretical importance, knowledge about the structure and correlates of dyadic reciprocity is burgeoning. However, research is lacking in describing and explaining the development of dyadic reciprocity among African American families. Several related fields of inquiry have also informed the growing understanding of the relevance and nature of reciprocity in the parent-child relationship, including cognition, language, biophysiology, socialization, and attachment, though this research has focused on families of the majority culture. The critical nature of parent-child relations as bidirectional requires researchers to consider a number of conceptual frameworks for understanding reciprocity, especially Bronfenbrenner's bioecological model. A systemic perspective will aid in the description of developing reciprocal interactions among low-income African American mother-child dyads.

CHAPTER TWO

DYADIC RECIPROCITY IN THE PARENT-CHILD RELATIONSHIP

Dyadic Reciprocity

Dyadic reciprocity, as it is used here, reflects the conceptualization and perception of a more comprehensive form of social interaction than has been previously used in describing parent-child relations (Kuczynski, Lollis, & Koguchi, 2003). Rather than thinking of interaction as a series of discrete turns, exchanges, reactions, or strategies, dyadic reciprocity attempts to show how the thoughts and actions of one partner are intertwined with the thoughts and actions of the other. Actions of the parent and of the child may be mutually anticipated, interpreted, and adjusted to in a continuous fashion so that it is difficult to think of an individual behavior except in the abstract. Dyadic reciprocity emphasizes that the products of parent-child relations, whether they be meanings, behavior, or social relationships, cannot be understood as individual achievements but instead are meshed products of a continuously coordinated system of joint action and shared meaning.

Dyadic mutuality, as defined by Kochanska (1997), has emerged as a parent-child relational construct recently used (i.e., Deater-Deckard & O'Connor, 2000) to describe the developing system of mutually responsive relationships within families. Kochanska (1997) operationalized mutuality as consisting of parent-child cooperation and shared positive emotion, as well as parent responsiveness to the child and child responsiveness to the parent. Accordingly, mutuality is a property of the dyad and cannot be defined by the behavior of either individual alone. In her longitudinal study of preschoolers and their mothers, Kochanska found that these components of mutuality were substantially

interrelated and could be combined into a quantitative dimensional score representing differences between dyads in mutuality that are distinct from the behaviors of either individual. Kochanska reported that mutuality was moderately stable in early childhood and was associated with maternal discipline that was less power assertive and with children's greater internalization of maternal values. Thus, the establishment and maintenance of mutuality appear to be an integral part of the socialization process between parent and child in early childhood. Less well understood are the parental, child, and contextual characteristics that may influence the development of dyadic reciprocity.

Maternal Personality and Depression

Parents are assumed to have their major influence on children's development through their patterns of interaction, as exemplified by child-rearing practices and personal characteristics. Research over the past two decades demonstrated that the parent-child relationship needs to be embedded in the life course of parents and considered in terms of their psychological attributes. Beyond this more general research on parenting, interest in how parents' personality may influence their emerging relationship with their young child has been growing. Kochanska and her colleagues have examined multiple questions regarding parental characteristics and the development of the parent-child relationship in early childhood. Mothers high in conscientiousness were more responsive to their infants, with responsiveness measured as a multidimensional construct capturing maternal ability to respond sensitively and promptly to child signals, provide appropriate support and comfort, follow the child's lead, respect his or her autonomy, and adjust her own behavior to the child's current state or needs (Clark, Kochanska, & Ready, 2000). Consistent with Dix's (1992) prediction that parental empathy is a natural candidate for a

trait that would facilitate the ability to “read” children’s signals and respond sensitively and supportively to the child’s needs, Kochanska (1997) found that highly empathic mothers developed a more mutually positive relationship with their young children. Parents’ personality, as measured by the Big Five traits as well as empathy, mistrust, manipulativeness, aggression, dependency, entitlement, and workaholism, explained a significant proportion of variance in the shared positive affective ambience permeating their interactions with their children, and in their responsiveness to their young children’s cues (Kochanska, Friesenborg, Lange, & Martel, 2004).

Maternal personality has yet to be examined in relation to dyadic reciprocity, though its relation to other parent-child relationship constructs suggests it may play a role. The attachment literature, for instance, has shown that mothers scoring high on the constraint dimension (rigidity, traditionalism, and low risk-taking) moderated the influence of difficult infant temperament on the development of an insecure attachment (Mangelsdorf, Gunnar, Kestenbaum, & Lang, 1991). Similarly, in their study of low-income families, maternal stress reactivity and alienation moderated the link between infant fearfulness and attachment (Ispa, Fine, & Thornburg, 2002). Ispa et al, 2002 also found that this relationship held only for mothers scoring low to moderate in these negative personality dimensions. This may suggest that, in the face of difficult life circumstances, mothers who were more calm and trusting were more affected by their infants’ demanding temperaments and less able to establish secure attachment relationships. This work to date looking at the impact of maternal personality supports its use in the present study looking at its association with dyadic reciprocity.

Among the broad range of variables found to relate to differences in the ability of the dyad to engage in fulfilling interactions, maternal depressive symptomology is one. Depressed mothers, as a group, have been described in the literature as having particular traits that are hypothesized to be indicators of poor parenting strategies in general. These traits include withdrawal, intrusiveness, hostility, coerciveness, and insensitivity (Downey & Coyne, 1990; Gelfand & Teti, 1990). Maternal depression has also been found to be associated with increased expression of negative affect (e.g., Cohn, Campbell, Matias, & Hopkins, 1990), insensitivity and poor responsiveness to the child (e.g., Stein, Gath, Bucher, Bond, Day, & Cooper, 1991), and use of passive response strategies (Leadbeater & Raver, 1996). All of these are interactive and parenting skills that may hinder the mother's ability to facilitate dyadic reciprocity and that may be negatively affected by depression. While some overlap may be inferred in the use of both maternal personality and depression in the prediction of dyadic reciprocity, the partial independence of the constructs can be expected based on their unique contributions in the prediction of parenting behavior (Duggan, Sham, Minne, & Murray, 1998).

Child Temperament

A current view of both the parent and the child actively shaping their relationship is articulated in the ecological approach to development (Belsky, 1984). Earlier top-down models that assigned the major role in development to the parent and more recent views that assigned it to the child have become integrated. In the current perspective, the parent and the child are active agents, who, by continuous transactions, co-create their emerging relationship (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Maccoby, 1992).

Research on the links between child temperament and the parent-child relationship has been complicated by the causal processes operating in both directions. Easy, positive babies are thought to evoke different reactions from caregivers than difficult, negative babies (Scarr & McCartney, 1983). Empirical evidence, however, has been complex (Putnam, Sanson, & Rothbart, 2002). Proneness to anger, a typical core quality of “difficultness,” often covaries with less responsive, negative parenting. Difficult babies pose more challenges than easy babies and may elicit more adversarial and less responsive parenting (e.g., van den Boom & Hoeksma, 1994). Affectively positive and well-focused infants may elicit more responsive, positive parenting (Adamson & Russell, 1999; Kyrios & Prior, 1990).

A recent example of the complexity of the empirical evidence with regard to the implications of infant temperament on the parent-child relationship is seen in Kochanska’s work. In their report of two studies, Kochanska and her colleagues (2004) noted that joyful infants enjoyed a relationship with their mothers that was affectively positive, responsive, and attuned to the child. Affective ambience in mother-infant dyads with fearful babies was also more positive, but ambience in dyads with anger-prone infants was less positive. A more positive ambience emerged in father-infant dyads with more joyful, less angry, and better focused babies. In contrast to the first study, in which infant and relationship characteristics were assessed concurrently, the second study found no effect for infant temperament (assessed at 9 months) and the mother-child relationship (assessed from 9 to 45 months). The authors suggest that the concurrent effects of infant characteristics on the relationship might be most salient. Over time, however, due to unfolding bidirectional transactions in which mother and child influence each other, the

effect of temperament assessed in infancy may no longer be detected after several years. This work on the impact of temperamental characteristics on the unfolding dyadic reciprocity between parent and child will be extended in the present model to examine low-income African American dyads.

Attachment

Ainsworth, Blehar, Waters, and Wall (1978) described infants' experiences with attachment figures (usually parents) during the first year that should be precursors of secure, or insecure, attachment. These authors' summary construct of parenting sensitivity includes alertness to infant signals, appropriate interpretation of response, promptness of response, flexibility of attention and behavior, appropriate level of control, and negotiation of conflicting goals. There appears to be a technical aspect to being sensitive in that parents must be able to read accurately the signals of their infant. Also, the construct of sensitivity emphasizes flexible adaptation on the part of caregivers so that responses to signals are well attuned to the current time and place. Again, skillful understanding and action is involved as the timing and pacing of behavior must be well suited to the individual baby at each general developmental stage and specific state of arousal (Hinde, 1982).

Despite Watson's (2001) emphasis on the infant's role in determining attachment security, there has been a tendency for researchers to focus on maternal antecedents of infant-mother attachment. This is presumably due to general acceptance of this highly plausible belief that adults shape interactions more than infants, even though theorists view attachment classifications derived from the Strange Situation as a measure of the relationship between the infant and the caregiver (Sroufe & Sampson, 2000). Fish and

Stifter (1995) examined the influence of first year interaction on attachment relationships by considering behavior at the level of the dyad through cluster analysis. Of the three clusters of dyads identified, the most optimal dyads showed patterns of interaction in which mothers were sensitive and not overcontrolling, and in which infants were positive and responsive. For females, being in the most optimal cluster at 5 months related to subsequent attachment security, regardless of the 10-month pattern of interaction. For males, who were significantly less likely to be secure than females, insecure attachment was predicted by negative cluster change from 5 to 10 months (moving from a more optimal to a less optimal cluster).

The attachment relationship may thus serve as a context for developing reciprocity in parent-child interactions, wherein the infant has come to adopt an internal working model of expectations for social encounters based on previous experience with the caregiver. Security of attachment may also be a predictor of a mutually responsive orientation in early childhood, though this prospect has not yet been explored. The bidirectionality of influence between parent and child is especially highlighted in this consideration of the attachment relationship and synchronous parent-child interactions. The inclusion of attachment security in the present model of the development and maintenance of dyadic reciprocity will serve as another necessary measure of relational function between parent and child.

Goodness of Fit in the Parent-Child Relationship

Goodness of fit is a relationship construct whose formal properties can be described in terms similar to those used for the construct of attachment (Seifer & Schiller, 1995). The dyadic partners behave with each other according to set goals for a variety of

infant temperament behaviors that are determined in part by prior expectations, in part by cultural background, and in part by immediate context. When the dyadic system operates close to these set goals, there is a high degree of fit; when their interactions consistently violate these goals, the fit is poor.

Dyads that either fit well together in smoothly maintaining set goals and/or that adapt well to perturbations during interactions will presumably work out a system of sensitive parenting, an appropriate proximity/exploration balance, and a secure attachment (Seifer & Schiller, 1995). Dyads that achieve a high degree of fit for temperaments associated with arousal of affect may appear the most sensitively mutually regulated pairs; this achievement is likely to result from some combination of the infant's level of arousability or control of arousal and the responsiveness of the parent's interventions. In contrast, dyads that do not routinely achieve an adequate degree of fit are likely to be characterized by insensitive parenting and a greater likelihood of disturbances in the secure-base balance as well as in insecure quality of attachment (Belsky, 1999). Another goal of the present study was to determine if a model of goodness of fit, between mothers' personality and toddlers' temperament, can be used to account for the development of dyadic reciprocity between mothers and toddlers.

The Socioeconomic and Cultural Context

The impact of socioeconomic stress on children's functioning and on the parent-child relationship has been the subject of much research. Drawn from the process-person-context-time model espoused by Bronfenbrenner (2001), McLoyd (1990) suggested that that the impact of economic hardship on the child is mediated by its impact on parents, the marital relationship, and the parent-child relationship. The presence of social support

and the characteristics of the child were considered moderators of the effects of poverty. This model, or portions of it, has been used considerably in research examining contextual effects on the parent-child relationship. Poverty is associated with lower levels of warmth and maternal responsiveness, as predicted by McLoyd's model (e.g., Brooks-Gunn, Klebanov, & Liaw, 1995). Other family characteristics related to economic hardship, such as maternal education and teenage motherhood, have been shown to be related to less synchronous mother-infant interactions (Fish, Stifter, & Belsky, 1993; Raver & Leadbeater, 1995). Kim-Cohen, Moffitt, Caspi, and Taylor (2004) have suggested that the quality of the parent-child relationship could promote children's resilience to impoverished life conditions. The context of poverty may exert a powerful influence on the ability of mother-child dyads to engage in mutually satisfying interactions, and this study will examine dyadic reciprocity within that context.

Parents' cultural belief systems, or ethnotheories, play a compelling role in shaping parental behavior and the parent-child relationship (Harkness & Super, 2002). Variability within the U.S. exists such that the mother-child relationship may be differentially determined among ethnic groups. For instance, Ispa et al. (2004) found that maternal intrusiveness was related to decreased dyadic mutuality for European American and more acculturated Mexican American dyads, but not for African American or less acculturated Mexican American dyads. The authors point to the potential parental belief systems underlying intrusive behavior, noting that a more directive interactive style may be normative in some cultural contexts, and linked to broader values about children and the parent-child relationship that cannot be detected with current measurement strategies.

Due to the dearth of research on the nature and development of dyadic reciprocity among African American families, such a population serves as the cultural context for this study.

The present study will adopt a dual focus: on the description of dyadic reciprocity among mother-child dyads and on the antecedents proposed to influence its development. As research on the nature of dyadic reciprocity as the means of parent-child interaction among African American families is lacking, the first set of goals will be to provide descriptive data on reciprocity in a comprehensive framework for this sample. While the cultural mechanisms underlying any differences between previously reported dyadic reciprocity in samples of the majority culture and dyadic reciprocity found in this sample of African American families is not the focus of this study, a descriptive strategy was employed. In this study, reciprocity between parent and child was viewed as a bidirectional process, and the parent's responsiveness to and positive affect with the child, as well as the child's responsiveness to and positive affect with the parent was coded in an analogous manner (Kochanska & Aksan, 2004). The study included mother-child dyads observed in naturalistic interactions in three situational contexts at 24 months. Two approaches were used to assess responsiveness, based on research comparing ratings with event frequency counts (e.g., Kochanska & Aksan, 2004; Rothbaum & Crockenberg, 1995). It has been argued that ratings may capture person-oriented, enduring, traitlike features of individuals, whereas coding microscopic events is situation specific and may vary from context to context for the same person. Thus, global ratings and microscopic codes may provide complementary windows into the parent-child relationship, especially for the description of dyadic reciprocity in an unstudied population.

Consequently, two independent coding systems were used. The first one involved macroscopic, global ratings of sensitivity, acceptance, and cooperation (Kochanska, 1998), based on the coder's overall impression. The second approach focused on microscopic coding of discrete bids. Several modalities of individual bids by both partners will be captured. For mothers, social-interactive bids (verbal or nonverbal attempts to engage the child), mood regulation attempts (soothing, comforting, distracting from distress), and influence attempts (asking child to start or stop an activity, to cooperate with caregiving), and children's responsiveness to those bids.

For children, emotionally negative cues and bids (distress, upset, crying), emotionally neutral or positive bids (social overtures, vocalizations, smiles, influence attempts), and physical events or signals (coughing, sneezing, choking, other physiological cues) were assessed, and maternal responsiveness to those bids (Kochanska, 1998). The levels of positive affectivity displayed by both mothers and children during the observed session were also event coded.

Based on these data, a number of questions were posed regarding the ecology of early mother-child reciprocity. Do mothers direct different bids to their infants? Do young children direct different bids to mothers? Do mothers and children respond differently to each other's bids varying in modality? Mothers and children were anticipated to direct a variety of bids to one another, and the frequencies of such bids were anticipated to reflect differences in the responses of mothers to children and children to mothers. Do mothers and children share affectively in their interactions, and does shared affect occur different among contexts? Positive affective sharing was

anticipated to occur, reflecting differences in the contextual situation in which the dyads were interacting.

The second set of goals examined questions regarding individual differences in the development of early reciprocity. Do mother and child characteristics differentiate patterns of dyadic reciprocity both independently and based on a goodness of fit model? All study predictors were expected to contribute to the emergence of dyadic reciprocity. A goodness of fit model based on the interaction of infant temperament and maternal personality was also expected to aid in the explanation of the emergence of dyadic reciprocity. How does the attachment relationship influence the development of dyadic reciprocity? The addition of attachment was expected to improve the predictive model of dyadic reciprocity over and above maternal and child characteristics. How does reciprocity emerge based on multilevel modeling? Both group (dyad) level and individual level effects were expected to emerge from multilevel analysis.

CHAPTER THREE

METHOD

Participants

The current sample included 89 African American mothers and their children who were participants in longitudinal research evaluating Early Head Start (EHS) programs. All of the mothers had applied to an Early Head Start program in the inner core of a large, Midwestern city. Half of the participants had been randomly assigned to receive EHS services and the other half had been assigned to a comparison group. The comparison group received no EHS interventions, but were tracked and assessed on all measures used in the study.

The EHS staff had used a variety of methods to recruit applicants. These included flyers distributed at local health department and social services offices, public service announcements in the local media, and informational events at local high schools.

Participating mothers were all African American, young, and with an average educational level of 10th grade. The vast majority of the mothers were single, and most were receiving some type of public assistance, such as food stamps, Medicaid, or Aid to Families with Dependent Children. At the time of application approximately half of the mothers were pregnant. The others had infants aged 10 days to one year in age. None of the infants had been diagnosed with developmental disabilities.

Overview

Data were collected from consenting parents and their toddlers during interviews and a 3-hour home session during which mothers and children participated in videotaped interactions (see Raikes & Love, 2001, for a more in-depth description of the study

design and measures used). Mother-child interactions during three situational contexts were coded using the macroscopic and microscopic coding schemes. The three contexts included a 3-minute teaching task, a 2-minute forbidden toy task, and a 10-minute play task. In the teaching task, mothers were instructed to teach their child a skill (either color matching or clothing identification) that their toddler had not mastered yet. In the forbidden toy task, mothers and children were shown an enticing toy that was then placed out of reach of the child. Mothers were then told to prevent their child from getting the toy by whatever means they generally use. At the end of the task, the child was allowed to play with the toy. This context was meant to replicate a situation often encountered by toddlers, one in which they must wait for what they want. The play task involved three bags of toys that mothers were instructed to use in play with their toddlers. Although the contexts were naturalistic and the mother was asked to behave as she normally would, the observational session followed a structured script that specified the same order of the paradigms for each dyad. The measures of parent-child responsiveness and positive affect were based on observations of their interactions in these semistructured activities.

Assessment of Mothers' Personality and Depression

Maternal personality was assessed using Tellegen's (1982) Multidimensional Personality Questionnaire (MPQ), which was administered when the children were between 6 and 12 months of age. The higher-order factor of Negative Affectivity derived from the MPQ was used in analyses. The Negative Affectivity factor has been described as an anxiety or neuroticism factor (Tellegen et al., 1988). Items comprising the Negative Affectivity factor tapped a common quality; kappa was .79.

Maternal depression was assessed with the CED-D-SF (Ross, Mirowsky, & Huber, 1983), and included 12 items measuring appetite loss, sleeplessness, loneliness, sadness, and lethargy. Higher scores indicated more depressive symptoms. Reliability for the depression inventory was measured at $\kappa = .82$.

Assessment of Child Temperament

Child temperament was also assessed when the children were between 6 and 12 months of age using Rothbart's (1981) Infant Behavior Questionnaire (IBQ). This mother-report instrument assessed infant temperamental reactivity and self-regulation. IBQ items are designed to refer to specific concrete behaviors of infants and reflect six temperamental dimensions: activity level, smiling and laughter, fear, distress to limitations, soothability, and duration of orienting. Due to the volume of data collected by the evaluation study, the duration of orienting scale was not assessed. A Negative Temperament factor was obtained using the items from the fear and distress to limitations subscales, with kappa of .86.

Assessment of Attachment

The Attachment Behavior Q-set, Revision 3.0 (AQS; Waters, 1987) was also completed by mothers when their children were 12 months of age. Mothers sorted 90 cards into piles depending on how like their child the card descriptions were. Each description obtains a score between 1 and 9 based on the pile in which it was placed, and these scores are correlated with criterion sort scores based on a hypothetical very secure child. Thus, AQS scores closer to 1 indicate greater security. Reliability was measured at $\kappa = .81$.

Assessment of Responsiveness Between Parents and Children

Responsiveness was assessed during 15 minutes of mother-child interactions at 24-months, which encompasses three typical daily contexts during the home sessions: teaching a skill, restricting behavior, and playing with toys. The measures of responsiveness of mothers to children and children to mothers came from the same interactions. Two coding systems were used: macroscopic (global ratings) and microscopic (where all discrete maternal and child bids and the partner's responses are coded).

The macroscopic coding of responsiveness is based on Kochanska's (1998) coding of maternal responsiveness. Each situational context for both mothers and toddlers were coded with a global rating for each of three scales. Based on Kochanska's (1998) research, the scales – sensitivity/insensitivity, acceptance/rejection, cooperation/interference – were anticipated to be highly correlated, and so they were combined into one responsiveness rating ranging from 1 (highly unresponsive) to 7 (highly responsive). Each anchor was carefully described. Child responsiveness to the parent was similarly rated, though adapted to capture child response (Kochanska and Aksan, 2004). Reliability, kappas, were .92 for maternal responsiveness to the child, and .93 for child responsiveness to the mother. The scores were then aggregated across all the contexts into the mother's overall macroscopic responsiveness and the child's overall macroscopic responsiveness. To establish reliability of coding between the two coders, the entire observational material (mothers and toddlers) from 15% of cases was used. Kappas (generalizability, Bakeman & Gottman, 1997) were: for sensitivity, .98; for acceptance, .97; and for cooperation, .98.

The microscopic coding of responsiveness entailed two passes through each videotape for both mother and child, using 60-second intervals. During the first pass, the coder decided, for each 60-second interval, whether the child directed a bid or signal toward the parent that had the potential for parental response. If the child directed one or more signals to the parent, they were coded as (a) negative/distress signal or bid (crying, whimpering), (b) neutral or positive social bid (asks question, makes request, needs help), or (c) physical bid (sneezing, coughing).

During the second pass, for maternal responsiveness, the coder evaluated the mother's response to each of the child's bids using one of four mutually exclusive codes: poor, fair, good, or exceptional. The judgment integrated multiple dimensions of responsive parenting (e.g., promptness, engagement, sincerity, and other aspects of sensitivity, acceptance, and cooperation; emotional availability; following child's lead or focus of attention; adjusting stimulation to child state). Coding conventions (Kochanska, 1998) 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 mother needed to respond very empathetically, eagerly, promptly, warmly, in a comforting, appropriate manner. To be so coded to child positive bids, the parent needed to respond enthusiastically, share the focus of attention with the child, and demonstrate a clear desire for interaction.

For child responsiveness to the mother, the approach to coding was fundamentally the same. During the first pass, the coder observed each 60-second segment and judged whether the mother had directed any specific bid or signal to the child that had the potential for child response. Obviously, maternal bids to the child were not the same as

the child's bids to the mother. Three types of bids were coded: (a) social-interactive bids (asks question, describes object or action), (b) influence attempts (attempts to regulate child behavior or secure his or her cooperation in areas other than social interaction and mood expression), (c) mood regulation attempts (comforting, distracting), and (d) physiological signals.

During the second pass, the child's response was coded as poor, fair, good, or exceptional. The criteria for coding are similar to those in the maternal system but designed with developmental considerations in mind. They captured the promptness, sincerity, eagerness, and wholeheartedness of response, and how likely the child's reaction was to please the mother. As in the case of maternal responsiveness, conventions described how to code child response given the specific type of maternal bid.

For both mothers and children, the proportions of each type of response to each type of bid was computed and a responsiveness score to each type of bid was created by weighing the composite of poor, fair, good, and exceptional responses. Finally, an overall mother and child responsiveness score was computed across all types of bids for the situational context. To establish reliability of coding between the two coders for the first pass, approximately 15% of cases (mothers and toddlers) were used, sampling from all the contexts (692 coded segments). The average kappa, across multiple checks, for pinpointing all instances of child-related events, was .76, and for identifying specific event categories, .84. For identifying all instances of mother-related events, the average kappa was .81, and for identifying specific event categories, .86. For the second pass, approximately 10% of cases were used, and the kappas were .73 for maternal responsiveness and .75 for child responsiveness.

Assessment of Positive Affect Between Mothers and Children

The coding of mothers' and children's affect was done for every 30 second interval, using a set of seven codes (tender/affectionate, joyful, neutral positive, neutral negative, sad, anxious/fearful, and anger/irritation, distressed). Positive and negative affect scores were tallied individually for both mother and child, as well as for intervals in which both mother and child displayed positive affect and neither displayed negative affect. The tallied scores were then divided by the total number of coded segments resulting in a mother-child shared positive affect score for the situational context.

Final Data Aggregation of Dyadic Reciprocity

For each dyad, a shared responsiveness score was created by averaging the micro- and macroscopic responsiveness scores of mother to child and child to mother. Then, this score was aggregated with the shared positive affect score to create a dyadic reciprocity score for each dyad in the situational context. All variables were standardized prior to the aggregation. The two components were related, $r(89) = .51, p < .001$.

CHAPTER FOUR

RESULTS

In order to determine the relative importance of the dyadic reciprocity construct, the dual focus of this study was followed: a descriptive perspective (mean levels and differences among contexts and bids) and an individual differences perspective. The macroscopic ratings and the microscopic scores were used to begin with a set of descriptive analyses of mothers' and children's responsiveness and shared positive affect. Both sets of codes allowed for the examination of differential responsiveness of parents and children to contexts and bids. The microscopic scores, in addition, produced extensive descriptive information regarding several dependent measures, which the macroscopic ratings could not provide: the frequency of mothers' bids to their children and children's bids to their mothers, mothers' responsiveness to children and children's responsiveness to mothers for different types of bids, and the instances of shared positive affect for different types of bids. Each set of measures was submitted to a three-way within-subjects analysis of variance (ANOVA) to examine systematic mean differences as a function of the type of bid and child gender. All of the means are in Table 1.

Then, an individual differences perspective was employed, utilizing the dyadic reciprocity aggregate scores. These analyses used a number of individual and relationship variables to uncover the emergence of dyadic reciprocity among these mother-toddler dyads in a multilevel design. As both mothers and their children are nested within the dyad, this model attempts to explain how mother-toddler dyadic reciprocity may be a result of both individual-level attributes and relationship quality.

Effects of Child Sex

First, boys and girls were compared on their overall scores on mother-toddler dyadic reciprocity. Girls tended to have higher scores, $t(88) = 2.58, p < .05$ (mother-daughter dyads, $M = .09, SD = .49$; mother-son dyads, $M = .03, SD = .78$). Second, to clarify these data further, the aggregated dyadic reciprocity scores were decomposed to the raw scores on the separate specific component variables (the macroscopic responsiveness scores for mothers and toddlers, and the mother-child shared positive affect scores, all before standardization). In this ANOVA, the sex * component effect was significant, $F(5, 84) = 5.55, p < .001$. Subsequent ANOVAs conducted on the separate variables indicated that, regarding the sex effect, the dyads with girls tended to have higher scores on the shared positive affect during the teaching task, $F(1, 88) = 3.73, p < .05$, and girls were often more responsive to their mothers as measured by macroscopic ratings (forbidden toy task), $F(1, 88) = 21.33, p < .05$. Interestingly, mothers were more responsive to their sons as measured by macroscopic ratings (play task), $F(1, 88) = 16.71, p < .01$.

Rates of Children's Bids to Their Mothers

Overall, children directed more bids to their mothers during the play task than the teaching task, $F(1, 88) = 86.21, p < .01$, and more bids during the teaching task than the forbidden toy task, $F(1, 88) = 12.63, p < .001$. The differences in the rates of bids of each type that children directed to their mothers in the microscopic measurement were examined with ANOVA using child sex and type of bid as the within-subjects factors for each situational context. The measures were the tallies of each type of bid, divided by the number of coded segments. For the teaching task, no interaction effect was significant,

but the main effects for bid type was significant, $F(2, 87) = 42.52, p < .01$. Follow-up analyses revealed that children directed more affectively positive or neutral bids than negative bids, $F(1, 88) = 79.48, p < .01$, and more negative bids than physiological bids, $F(1, 88) = 19.28, p < .001$. Similar results were found for the play task, with no interaction effects and positive/neutral bids being most frequent, followed by negative bids, followed by physiological bids. For the forbidden toy task, however, a different pattern emerged. While no interaction effect again surfaced, negative bids were more frequent than positive/neutral bids, $F(1, 88) = 82.38, p < .01$, and positive/neutral bids were more frequent than physiological bids, $F(1, 88) = 15.62, p < .001$.

Rates of Mothers' Bids to Their Children

Similar to the findings for children's bids to their mothers, mothers directed more bids to their children during the play task than the teaching task, $F(1, 88) = 97.35, p < .01$, and more bids during the teaching task than the forbidden toy task, $F(1, 88) = 62.18, p < .001$. Indeed, mothers made very few bids to their children of any type during the forbidden toy task. The differences in the rates of bids of each type that mothers directed to their children in the microscopic measurement were examined with ANOVA using child sex and type of bid as the within-subjects factors for each situational context. The measures were the tallies of each type of bid, divided by the number of coded segments. For the teaching task, no interaction effect was significant, but the main effects for bid type was significant, $F(2, 87) = 69.21, p < .01$. Follow-up analyses revealed that mothers directed more influence or control attempt bids than social bids, $F(1, 88) = 46.82, p < .01$, and more social bids than physiological bids, $F(1, 88) = 25.46, p < .001$. Mood regulating bids were almost nonexistent in any situational context. Similar results were found for the

play task and the forbidden toy task, with no interaction effects and influence/control attempt bids being most frequent, followed by social bids, followed by physiological bids.

Mothers' Responsiveness to Their Children

Using ANOVA with child sex, bid type, and situational context as the within-subject factors, mothers' responsiveness to their children's bids was examined. With listwise deletion, 79 dyads remained in which children, both boys and girls, had directed all three types of bids in all three situational contexts. No interaction effect surfaced. All three main effects were significant: child sex, $F(1, 78) = 17.14, p < .01$; bid type, $F(2, 77) = 10.78, p < .01$; and situational context, $F(2, 77) = 23.02, p < .001$.

Children's Responsiveness to Their Parents

Using ANOVA with child sex, bid type, and situational context as the within-subject factors, children's responsiveness to their mothers' bids was examined. Since only two mothers in the sample directed any mood regulating bids to their children, this type of bid was eliminated for this analysis. With listwise deletion, 72 dyads remained in which mothers of children, both boys and girls, had directed all four types of bids in all three situational contexts. No interaction effect surfaced. All three main effects were significant: child sex, $F(1, 71) = 32.52, p < .05$; bid type, $F(3, 69) = 49.85, p < .01$; and situational context, $F(2, 71) = 42.23, p < .01$.

Emergence of Dyadic Reciprocity

Before testing for the contributions of explanatory variables to the prediction of dyadic reciprocity, an intercept-only model with no explanatory variables was conducted. This model partitions the total variance in a within-group and a between-groups variance

in order to determine if there were differences between individuals as well as between dyads. The results of this preliminary analysis are shown in Table 2.

The results in Table 2 indicate a significant between-groups variance for dyadic reciprocity. Hence, dyadic reciprocity is determined not only by individual factors of mothers and children but also by characteristics of the class context, in this case the dyad. However, in the model the within-group variance is larger than the between-groups variance, suggesting that individual factors explain more variance in dyadic reciprocity than dyadic features. Because of the significant between-class variance, multilevel analysis was performed for the prediction of dyadic reciprocity (Raudenbush & Bryk, 2002).

In predicting dyadic reciprocity, variables at the individual level were entered in the model (Table 3). First, the results show that mother-daughter dyads are marginally more reciprocal in their interactions. Second, a confirmed negative relationship was shown for maternal negative personality and depression. A similar and expected negative relationship was also seen for negative temperament. The hypothesis that a goodness-of-fit measure, taken by the interaction of children's negative temperament and mothers' negative personality, would be important for the development of dyadic reciprocity was also supported. These personality and well-being variables all seem to have an impact on the development of a mutually responsive mother-child relationship. The individual level variables explain 7.6% of the within-group variance.

To examine the contributions of the characteristics of the dyad, a class-level variable was entered in the model. The results demonstrate a significant contribution of the security of the attachment relationship between mothers and their children in the

formation of later systems of reciprocity. There are greater degrees of dyadic reciprocity for mother and children who enjoy a more secure attachment relationship (Table 4). The model explained 40.8% of the between-groups variance. No cross-level interaction effects among individual-level and dyad-level variables were significant, suggesting that the relative importance of the individual-level variables is not context-specific on the quality of the attachment relationship.

CHAPTER FOUR

DISCUSSION

With the upswing in relationship-based approaches to child socialization and well-being outcomes (Collins & Laursen, 1999; Kochanska, 1997, 1998; Kochanska & Aksan, 2004; Maccoby, 1999), interactions between parents and children are increasingly seen as bidirectional. This study represents a next step in the attempt toward a satisfactory conceptualization and measurement of systems of reciprocity. Following Kochanska's (1997, 1998, 2004) eclectic strategy, the attempt here was to capitalize on the existing approaches in different areas of developmental research. Two components of such a system studied in this work were the mother's and child's responsiveness to each other, as measured with macroscopic scales and microscopic bids, and the enjoyable interaction, in which both mother and child experienced shared positive affect. Future work will better describe different components of dyadic reciprocity, such as, for example, communication styles or synchronous play routines, and consequently, it will allow for the development of more comprehensive and better differentiated measures. The current study benefited from the assessment of responsiveness and positive affect in the different socialization contexts of relaxed play and discipline/demands.

The pattern of findings here clearly reflects parental adaptation to their children's increased autonomy and to the advent of the self in the second year (Kagan, 1991), and partially replicates Kochanska's (2004) findings. Mothers were willing to allow the child to lead a proportion of the interactions, particularly social exchanges. Mothers also recognized the child's increasing abilities to regulate distress (Kopp, 1989), which may account for the conspicuous absence of mood regulation attempts. Furthermore, the large

proportion of mothers' bids as influence attempts directed at their children indicates that they recognize and adapt to a set of challenges posed by the onset of proficient upright locomotion at the beginning of the second year, greater exploration, and the potential for safety and norm violations (Biringen, Emde, Campos, & Applebaum, 1995).

The findings for children's bids to mothers present a complementary picture. The majority of children's bids to mothers were positive in two of the three situational contexts. This trend corresponds to maturational changes in the child: rapid development of intersubjectivity, joint attention, and communicative skills (Gauvain, 2001), all of which enhance the child's active role as a social partner. The obvious exception is the high proportion of negative bids in the forbidden toy task, a task designed to simulate a common, albeit challenging, situation for mother and child. In this situation, where the child's increasing autonomy is confronted with his increasing ability to self-regulate, a certain amount of frustration is expected. Given that negative and physiological bids largely reflect attempts to seek comfort, and are a central part of the established attachment system, it is not surprising that these bids represented lower proportions of the children's overall bids.

Developmental processes were also reflected in mothers' and children's responsiveness to each other. Interesting, despite the lack of sex differences in Kochanska's work, this study found that mothers were more responsive to their sons. McAdoo (1997) suggests that a history of racism and a socially unequal society may influence African American mothers to differentially parent their sons and daughters. For families in socioeconomically stressed conditions, as were the families in this sample, child outcomes are particularly perilous for boys, which may stimulate mothers to be

especially attentive to their sons (Hill, 1999). In general, however, mothers were more responsive to their children's positive or neutral bids than to their negative or physiological bids.

By contrast, girls were more responsive to their mothers, which replicates other sex-based differences found in interactions between children and their mothers (Deater-Decker & O'Connor, 2000). In addition, children were most responsive to their mothers' social overtures, and less responsive to influence attempts, which may reflect their rising communicative and joint attention skills (Gauvain, 2001). As mothers were also more responsive to their children's positive than negative bids, such a complementary finding across children's bids and parent's responsiveness highlights how reinforcement contingencies may shape social exchanges. Future studies should focus on the assessment of responsiveness and shared positive affect over time, which would provide a clearer picture of the developmental consequences of such a system of reciprocity.

As reported by Kochanska (1997, 1998), the components of the aggregated dyadic reciprocity concept in this study were also highly correlated, suggesting that the construct may be considered in combination. As such, the prediction of dyadic reciprocity between mothers and their toddlers was initiated using a multilevel structure. As predicted, individual as well as class-level variability existed in this construct. The individual-level variables were chosen for their substantially determined affiliation with the parent-child relationship and child outcomes in general, and applied here to the construct of dyadic reciprocity. Indeed, such biologically influenced concepts as personality, depression, and temperament appeared to be likely suspects for relation to the system of reciprocity within the parent-child relationship. Similarly, the established attachment relationship

proved to be an essential component for the development of dyadic reciprocity. The usefulness of the multilevel model is heretofore seen in its ability to describe variability at the dyad level that may have otherwise been falsely apportioned to the individual level (Raudenbush & Bryk, 2002). It also supports the need to examine the parent-child relationship at the dyadic level, wherein the dyad represents a unique entity to be considered separately from the contribution of the individuals that comprise it.

Nevertheless, the rich descriptive nature of the data, particularly the microscopic data, allow for a developmental perspective on these findings. Despite the clear influence that mother and child characteristics have on the mutual responsiveness of their interactions, a pattern emerged that suggests that mothers and children adjust and respond to one another as their relationship emerges and according to well-described developmental changes in the child. In this socioeconomically disadvantaged African American sample, levels of dyadic reciprocity were quite similar to those reports by Kochanska (1997, 1998) in her sample of advantaged European American families. At face value, such similarities intimate that mothers and children form patterns of interaction that supercede the sway of individual characteristics and, perhaps, social and environmental conditions. A truer test of this apparent development of a system of reciprocity will be long-term relationship and child outcomes in these families, though the current findings are encouraging.

Although due to the highly asymmetrical quality of the early mother-child relationship (Maccoby, 1992) mothers have been shown to be the more potent agents in the establishment of dyadic reciprocity with their children (Kochanska & Aksan, 2004), the complimentary question of the child's input into that relationship has been shown in

this study. Despite this evidence that both mother and child shape the emergence of dyadic reciprocity, it appears that mothers bear the responsibility of adjusting their interactive style to match the child's developmental stage, abilities, individual nature, and contemporaneous state.

Finally, a word of caution is in order about the over-reliance on mother-reported predictive measures in this study. A well-recognized problem in developmental research and one that should inspire caution is the use of maternal reported data without accompanying behavioral data. In this study, however, multiple, robust observational measures were used for the dyadic reciprocity construct, substantially aggregated across settings, contexts, and coded intervals as a means to alleviate that problem. The pattern of findings provides yet another argument for the judicious interpretation of studies that use only one source of data, and it supports an empirical strategy that utilizes data coming from multiple sources.

This study, though relatively preliminary and limited in many ways, makes a contribution to our understanding of some of the fundamental processes in the development of the parent-child relationship. It extends previous research by examining relational dynamics for African American mother-child dyads in disadvantaged circumstances. Continuing research may elucidate the parental belief systems at work in the interactional patterns of these mothers with their children, and the outcomes of such a system of reciprocity for child outcomes and the parent-child relationship as the child matures. In light of the resurgence of interest in early relationships, the insights into the fundamental role of individual and dyadic factors in the emergence of the parent-child relationship are particularly timely.

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APPENDIX A

Table 1. *Overview of the Measures: Descriptive Data.*

	<i>N</i> = 89		
	<i>M</i>	<i>SD</i>	Range
Dyadic reciprocity			
Mother: microscopic responsiveness score:			
Teaching task:			
Total sample	1.07	1.10	-2.00-1.52
Girls	.86	1.29	-2.00-1.29
Boys	1.48	1.11	-1.20-1.52
Forbidden toy task:			
Total sample	.09	1.07	-2.00-.29
Girls	.04	1.09	-2.00-.29
Boys	.68	1.01	-2.00-.65
Play task			
Total sample	1.29	1.20	-1.08-1.45
Girls	1.04	1.19	-1.20-1.27
Boys	1.68	1.33	-1.08-1.45
Mother: macroscopic responsiveness score:			
Teaching task:			
Total sample	4.46	1.31	1.00-7.00
Girls	3.89	1.12	2.00-6.00
Boys	4.95	1.52	1.00-7.00
Forbidden toy task:			
Total sample	2.97	1.36	1.00-5.00
Girls	2.89	1.92	2.00-4.00
Boys	3.05	1.12	1.00-5.00
Play task:			
Total sample	4.94	1.36	1.00-7.00
Girls	4.89	1.22	2.00-6.00
Boys	5.05	1.28	1.00-7.00
Child: microscopic responsiveness score:			
Teaching task:			
Total sample	1.17	1.13	-2.00-1.54
Girls	1.86	1.39	-1.80-1.68
Boys	.68	1.16	-2.00-1.54
Forbidden toy task:			
Total sample	-.19	1.02	-2.00-.29
Girls	-.31	1.15	-2.00-.29
Boys	-.02	1.23	-2.00-.65
Play task			
Total sample	1.21	1.00	-1.17-1.87
Girls	1.42	1.29	-1.02-1.87
Boys	1.01	1.36	-1.17-1.49

Child: macroscopic responsiveness score:			
Teaching task:			
Total sample	4.16	1.31	1.00-7.00
Girls	4.29	1.12	2.00-7.00
Boys	3.92	1.52	1.00-6.00
Forbidden toy task:			
Total sample	2.54	1.21	1.00-5.00
Girls	3.02	1.48	2.00-5.00
Boys	2.19	1.18	1.00-4.00
Play task			
Total sample	4.99	1.16	1.00-7.00
Girls	5.62	1.27	2.00-7.00
Boys	4.31	1.38	1.00-6.00
Mother-child shared positive affect:			
Teaching task:			
Total sample	.65	.14	.17-.73
Girls	.69	.21	.17-.72
Boys	.62	.19	.19-.73
Forbidden toy task:			
Total sample	.42	.19	.12-.63
Girls	.51	.20	.18-.63
Boys	.48	.20	.12-.54
Play task			
Total sample	.75	.21	.11-.83
Girls	.79	.28	.19-.78
Boys	.71	.20	.11-.83
Mother-child: overall dyadic reciprocity:			
Total sample	.06	.66	-2.49-1.45
Girls	.09	.49	-.85-1.10
Boys	.04	.78	-2.49-1.45
Dyadic reciprocity predictors:			
Mothers' negative personality:	.39	.20	.06-.89
Mothers' depressive symptoms	4.11	1.32	1.00-7.00
Children's negative temperament	3.56	.77	2.80-8.04
Attachment	.68	.28	.26-.93

Table 2. Results for the ‘Intercept-Only Model’ of Dyadic Reciprocity.

		$DR_{ij} = \gamma_{00} + \varepsilon_{ij} + r_{0j} + u_{00}$		
Random Effect		Variance Component	Percent of Variance	<i>P</i> -value
Individuals	ε	0.187	70.5%	0.001
Dyads	r_0	0.115	37.2%	0.05

Table 3. Results of Multilevel Regression Model for Dyadic Reciprocity – Fixed Effects

Fixed Effects	Coefficient	Standard Error	<i>P</i> -value
Individual variables			
Child sex, γ_{100}	-0.362	0.187	0.05
Mothers’ negative personality, γ_{200}	-0.464	0.133	0.01
Mothers’ depressive symptoms, γ_{300}	-0.235	0.201	0.05
Children’s negative temperament, γ_{400}	-0.358	0.155	0.01
Goodness-of-fit, γ_{500}	0.286	0.259	0.05
Dyad variable			
Attachment, γ_{010}	0.092	0.502	0.05

Table 4. Results of Multilevel Regression Model for Dyadic Reciprocity – Random Effects

Random Effects	Standard Deviation	Variance Component	<i>P</i> -value
Between dyads			
Dyadic reciprocity slope, u_{50}	0.472	0.215	0.05

APPENDIX B

Dyadic Reciprocity in the Parent-Child Relationship: An Integrative Literature Review

Introduction

Recent theory and research on parent-child relations emphasizes the concept of reciprocity, the bidirectional mutually responsive quality of interaction that describes well-functioning parent-child relationships (Deater-Deckard & O'Connor, 2000; Kochanska, 1997; Maccoby, 1999). Due to its theoretical importance, knowledge about the structure and correlates of dyadic reciprocity is burgeoning. Several related fields of inquiry have also informed the growing understanding of the relevance and nature of reciprocity in the parent-child relationship, including cognition, language, biophysiology, socialization, and attachment. The critical nature of parent-child relations as bidirectional requires researchers to consider a number of conceptual frameworks for understanding reciprocity, especially Bronfenbrenner's bioecological model. This review will highlight theoretical, conceptual, and process literature that adds to the understanding of dyadic reciprocity, and will suggest a framework for extending present research such that the ecological significance of dyadic reciprocity is broadened.

Dyadic Reciprocity and Related Constructs

Dyadic reciprocity, as it is used here, reflects the conceptualization and perception of a more comprehensive form of social interaction than has been previously used in describing parent-child relations (Kuczynski, Lollis, & Koguchi, 2003). Rather than thinking of interaction as a series of discrete turns, exchanges, reactions, or strategies, dyadic reciprocity attempts to show how the thoughts and actions of one partner are intertwined with the thoughts and actions of the other. Actions of the parent and of the

child may be mutually anticipated, interpreted, and adjusted to in a continuous fashion so that it is difficult to think of an individual behavior except in the abstract. Dyadic reciprocity emphasizes that the products of parent-child relations, whether they be meanings, behavior, or social relationships, cannot be understood as individual achievements but instead are meshed products of a continuously coordinated system of joint action and shared meaning. In this sense, dyadic reciprocity can be considered a molar concept. Several related parent-child interactional constructs have been operationalized for study and can inform an understanding of dyadic reciprocity – joint attention, social contingency, and dyadic mutuality.

Joint Attention

Joint attention research, beginning with the seminal work of Bruner and his colleagues (e.g., Scaife & Bruner, 1975), explores parent-child interaction from the perspective of an increasing tendency of infants to “follow the gaze” of adult caregivers during early and middle infancy periods. Episodes of joint attention observed during infant-caregiver interactions may influence many different dimensions of early development. Evidence for the functional significance of early joint attention episodes is perhaps most persuasive and ecologically valid when it demonstrates that naturally occurring individual differences in children’s joint attentional behaviors are associated with different developmental outcomes across time and context (Dunham & Moore, 1995). An informative variation of the individual differences approach has been the exploration of the developmental consequences of deficits in the joint attentional behaviors suspected to exist in special populations of young children, such as with children with autism, high-risk preterm infants, and infants of socioeconomically

disadvantaged adolescent mothers. Data appear to support the view that early deficits in joint attentional skills can have serious consequences across several domains of early development, including theory of mind, language, and social cognition (e.g., Charman, Baron-Cohen, Swettenham, Baird, Cox, & Drew, 2000; Sigman & Kasari, 1995; Smith & Ulvund, 2003).

Social Contingency

As research concerned with early social stimulation has shifted from a focus on the effects of social deprivation to questions concerned with the influence of qualitative differences in our early social experiences, the social contingency hypothesis has emerged. Developed by Dunham and Dunham (1995) the social contingency hypothesis attempts to address the pervasive assumption that various qualitative properties of social stimulation are optimal for adaptive development above and beyond the quantity of stimulation experienced. The social contingency hypothesis essentially identifies a measurable social behavior emitted by an infant (e.g., a vocalization that occurs while gazing at the adult) and a social behavior emitted by the adult partner (e.g., a vocalization that occurs while gazing at the child). If each of these behaviors is viewed as an individual element in a potential interactional structure, a number of different relations can exist between these elements as they occur across time. In the social contingency hypothesis, the terms contingent and reciprocating are the critical concepts describing the generic social relationships that various researchers have identified as optimal (Dunham & Dunham, 1995).

The term contingent describes an interaction in which a sequentially dependent, close temporal relationship exists between the infant's social behavior and the adult's

reply (Dunham & Dunham, 1995). For example, in a perfect contingency structure, the designated adult response would occur after each instance of the designated infant behavior, but at no other time during the interaction. The term reciprocating, in the context of the social contingency hypothesis, describes the assumption that an adult's social response is optimal when, in addition to being contingent, it acknowledges (i.e., reciprocates) certain theoretically specified properties of the infant's preceding behavior. Essentially, the reciprocity assumption operationalizes the generally accepted notion that not all adult social responses are created equal. Some contingent behaviors are assumed to be more influential than others, and they are presumed to exert this influence above and beyond the effects of the contingency structure, per se. An interactional structure is generally considered to be optimal for adaptive development when it is both contingent and reciprocating as these terms have been elaborated across different theoretical positions. The term optimal is used in the sense of exerting a maximal influence on the particular developmental process under consideration (e.g., Tomasello, 1995; Wellman, 1990).

It is important to emphasize that Dunham and Dunham's (1995) use of the term reciprocity in the social contingency hypothesis does not imply the existence of a theoretical dyadic state in which both child and caregiver have a shared understanding of the other's intentions during the interaction. This inferred state of social understanding differentiates both joint attention and social contingency from the proposed concept of dyadic reciprocity. In addition, whereas joint attention and social contingency research procedures are designed to study primarily the influence of adult social behaviors on the child, dyadic reciprocity attempts to capture the dyad operating as a single unit of study.

Dyadic Mutuality

Dyadic mutuality, as defined by Kochanska (1997), has emerged as a parent-child relational construct recently used (i.e., Deater-Deckard & O'Connor, 2000) to describe the developing system of mutually responsive relationships within families. Kochanska (1997) operationalized mutuality as consisting of parent-child cooperation and shared positive emotion, as well as parent responsiveness to the child and child responsiveness to the parent. Accordingly, mutuality is a property of the dyad and cannot be defined by the behavior of either individual alone. In her longitudinal study of preschoolers and their mothers, Kochanska found that these components of mutuality were substantially interrelated and could be combined into a quantitative dimensional score representing differences between dyads in mutuality that are distinct from the behaviors of either individual. Kochanska reported that mutuality was moderately stable in early childhood and was associated with maternal discipline that was less power assertive and with children's greater internalization of maternal values. Thus, the establishment and maintenance of mutuality appear to be an integral part of the socialization process between parent and child in early childhood.

An Illustration of Dyadic Reciprocity

A famous literary quotation from Lewis Carroll's (1895/1966) *Alice in Wonderland* and John Tenniel's accompanying drawing is useful for mediating thinking about parents and children, represented by Alice and the flamingo respectively, interacting not as independent individuals but as partners in an interdependent relationship. Also pertinent are the concepts of behavior control and co-regulation in a context of interdependent agents who are unequal in power. This quotation concerns Alice's game of

croquet, in which all inanimate objects in the game were replaced by live organisms – hedgehogs, flamingos, and soldiers – and in a social structure represented by the Red Queen.

The chief difficulty Alice found at first was in managing her flamingo: she succeeded in getting its body tucked away, comfortably enough, under her arm, with its legs hanging down, but generally, just as she had got its neck nicely straightened out and was going to give the hedgehog a blow with its head it would twist itself round and look up in her face, with such a puzzled expression that she could not help bursting out laughing; and, when she had got its head down, and was going to begin again, it was very provoking to find that the hedgehog had unrolled itself, and was in the process of crawling away; besides all this, there was generally a ridge or a furrow in the way wherever she wanted to send the hedgehog to, and as the doubled-up soldiers were always getting up and walking off to other parts of the ground, Alice soon came to the conclusion that it was a very difficult game indeed. (Carroll, 1865/1966, pp. 111-112)

Bateson (1972) used this metaphor to illustrate the difficulty of applying traditional notions of unilateral causality when referring to interactions among biological organisms. The poor mechanical coupling of Alice to the flamingo made it difficult for her to “cause” the hedgehog to go through the wickets in any definite way. Alice’s predicament, as well as that of the flamingo, is a metaphor for parenting in an agent-agent interaction. There is an asymmetry in power between Alice and the flamingo; however, the flamingo is not powerless. Its capacities and nature may be different from those of Alice, but it is, nevertheless, an agent with its own goals and ways of understanding. Alice has two options if she is to be at all effective as a causal agent: She could put the flamingo

in a straightjacket and change the rules back to a unilateral game, or she could act in a way that takes the active nature of the flamingo into account. From the outset, the genotype and nature of the flamingo limit Alice's influence in both amount and kind, and it would be best if Alice accepted that fact. In her immediate interactions, Alice would have to adjust her behavior in a way that reacts to, anticipates, and coordinates with the moves and goals of her partner in the interaction (Bateson, 1972).

A limitation of the metaphor is that Alice and the flamingo are not involved in an intimate, long-term relationship (Kuczinski, 2003). The kinds of strategies available to Alice, therefore, are of the generic sort that one would use with an unfamiliar person with whom there is no past history from which one could predict responses. However, as a long-term strategy, Alice might wish to earn the receptivity and cooperation of the flamingo. Lastly, the metaphor of Alice portrays a rich perspective of the dynamic context of interactions. Successful parenting and an optimal parent-child relationship require flexible adaptation not only to the child but also to a constantly changing ecological context.

Theories of Parent-Child Interaction

Most contemporary accounts of parent-child relations assume a bidirectional model of causality. There is a disparity, however, between theory and empirical research in the way the concept is used. Unidirectional causal models persist in the way research questions are asked, analyzed, interpreted, and disseminated (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Many different ideas about the nature of bidirectional causality have emerged in recent decades. These include such models as circular causality, fit, and systems. In practice, however, most empirical investigations use these concepts

interchangeably to connote any process or outcome to which parents and children have contributed (Kuczinski, 2003). The purpose of the following review is to identify distinct ideas associated with each of these bidirectional models and to present a systems approach as ideal for examining parent-child interactional reciprocity.

Circular Causality

The concept of circular causality (Bevcar & Bevcar, 1988; Kuczinski, 2003), found in the family systems literature, implies that causes and outcomes are recursive and indeterminate. In the case of socialization, parents and children are involved in a recursive interactional loop in which there is no distinct beginning or end. Cause and effect cannot be isolated from each other except by arbitrary punctuation of a circle of interaction by the observer. Furthermore, prediction of outcomes is difficult because of the complexity of recursive social and biological systems within which the family is embedded.

In parent-child relations, circular causality is most commonly considered in terms of “vicious cycles” of cause and effect. Gerald Patterson and his colleagues have described circular processes at micro and macro levels of analyses in their accounts of the development of coercive processes in clinic-referred families and in the role that coercion plays in the life course of children in these families (Patterson, Reid, & Dishion, 1992). Within the family circular processes occur in the interplay between an inherited difficult temperament on the part of the child and preexisting risk factors in the parent, such as social and economic disadvantage, depression, and substance abuse, that leave the parent unskilled in managing children’s behavior. In one circular process, mothers’ unskillful handling of children’s noncompliance leads to escalation in noncompliance; which leads to stress, depression, and low self-esteem in mothers; which leads to further debilitations

in mothers' management of noncompliance; and so on (Patterson, Reid, & Dishion, 1992). Circular causality does not necessarily capture the differences between dyads in mutuality that are distinct from the behaviors of either individual. Nor does circular causality aid in the interpretability of dyadic reciprocity as emphasizing that the products of parent-child relations, whether they be meanings, behavior, or social relationships, cannot be understood as individual achievements but instead are meshed products of a continuously coordinated system of joint action and shared meaning.

Fit

Fit emphasizes the enduring contextual repercussions of long-term living arrangements. Parents and children not only influence each other during interaction but also are mutually embedded, fitting together to form an interdependent causal structure. Maturana (1978) developed an idea of fit called "structural coupling" that has been influential in family systems theory. Whenever two or more living systems interact they will automatically co-evolve a closed pattern of interaction. "In such a case the structurally plastic changes of state of one system become perturbations for the other and vice versa in a manner that establishes an interlocked, mutually selecting, mutually triggering domain of state trajectories" (Maturana, 1978, p. 36). Causality is inherent in the structure of interacting organisms rather than in any of the participants in the interaction. The idea that parents and children fit together to form an interdependent causal structure can be found in the concept of "goodness of fit" (Lerner, 1993). Research on children of difficult temperament suggests that their successful social functioning derives from how well their personality is complemented or supported by the context in which they live. Causality, therefore, is located not in the absolute characteristics of the parent or the child but in the

causal structure represented by the goodness of fit between the two (Lerner, 1993; Thomas, Chess, & Birch, 1977).

Systemic Causality

Different systems models combine elements of circularity and fit in their accounts of causal processes. What is common to all models is that they place the bidirectionality of the parent-child dyad within a complex system of reciprocal influences between persons and other elements of the environment inside and outside the family. In family systems, the child is considered to be involved in bidirectional causal interactions not just with each parent but also with siblings, grandparents, and other family members. Children have an impact on the marital relationship of the parents, and they are drawn into, and negatively affected by, marital conflict. Relationship theory also implies a model of systemic causality in which each parent-child dyad is simultaneously part of a multitude of individual relationships within the family and outside the family, each of which may be distinctive in structure and dynamics and each of which may have an impact on other relationships in which an individual is involved (Reiss, Collins, & Berscheid, 2000).

In ecological theories, the causal forces affecting the parent and the child are traced within still more complex systems of multilevel, multidirectional influences (Belsky, 1984; Bronfenbrenner, 2001; Ford & Lerner, 1992). Here, the bidirectional arrow between parent and child is considered within a multitude of bidirectional arrows involving the family network, the social network, the school network, the local community, and the encompassing culture.

In summary, there has been great progress in the conceptualization of bidirectional causality; however, this has not been reflected in empirical research, with

few researchers taking up the challenge of specific causal models. A direction for future research on dyadic reciprocal processes is for researchers to take seriously the core implications of the particular model of bidirectional causality that underlies their thinking. Bronfenbrenner's bioecological model in particular appears to hold untapped promise for the examination of dyadic reciprocity within the powerfully influential systems in which children and parents must develop and maintain mutual interactions.

Antecedents of Dyadic Reciprocity

Theories of socialization and child development now emphasize the contribution of both the child and parent via bidirectional processes (Kuczinski, 2003). This bidirectional system develops over time within the context of an enduring relationship between a parent and each one of his or her children (Dunn, 1993). More precisely, Maccoby (1992) and Kochanska (1997) have hypothesized that socialization occurs as part of a developing system of mutually responsive relationships within families. Drawing from the research base in joint attention, social contingency, and dyadic mutuality, where the overall assumptions of Maccoby (1992) and Kochanska (1997) have held primacy, the individual differences present in both parent and child that shape this developing mutually responsive relationship are outlined. Some of these studies use an explicit theoretical framework, such as those described above, while others demonstrate implicit allegiance to a theory. In addition, this research base shows the explication of a number of broader ecological influences on the reciprocity of parent-child interaction.

Parent Characteristics

Parents are assumed to have their major influence on children's development through their patterns of interaction, as exemplified by child-rearing practices and

personal characteristics. Research over the past two decades demonstrated that the parent-child relationship needs to be embedded in the life course of parents and considered in terms of their psychological attributes. Repeatedly it has been found that adults who are psychologically healthy and mature are more likely to provide the very kind of care that promotes healthy psychological development in their offspring (Belsky, 1990). Parents who score high on measures of ego development and ego strength, for example, behave sensitively and responsively toward their infants (e.g., Cox, Owen, Lewis, & Henderson) and develop feelings of confidence and control in their role as parents (Bugental & Happaney, 2002). General feelings of self-efficacy and control are themselves positively associated with a warm, accepting, and helpful style of teaching preschoolers (Hustedt & Raver, 2002); and mothers and fathers alike who feel positively about themselves tend to communicate more effectively with their young children and manage disciplinary situations well (Teti & Candelaria, 2002). Not surprisingly, mothers who are depressed tend to be less affectionate, responsive, and spontaneous with their infant (e.g., Henderson & Jennings, 2003) and to be irritable and punitive with their older children (e.g., Kochanska, Kuczinski, Radke-Yarrow, & Welsh, 1987).

Personality. Beyond this more general research on parenting, interest in how parents' personality may influence their emerging relationship with their young child has been growing. Kochanska and her colleagues have examined multiple questions regarding the development of the parent-child relationship in early childhood. Mothers high in conscientiousness were more responsive to their infants, with responsiveness measured as a multidimensional construct capturing maternal ability to respond sensitively and promptly to child signals, provide appropriate support and comfort, follow the child's

lead, respect his or her autonomy, and adjust one's own behavior to the child's current state or needs (Clark, Kochanska, & Ready, 2000). Consistent with Dix's (1992) prediction that parental empathy is a natural candidate for a trait that would facilitate the ability to "read" children's signals and respond sensitively and supportively to the child's needs, Kochanska (1997) found that highly empathic mothers developed a more mutually positive relationship with their young children. Parents' personality, as measured by the Big Five traits as well as empathy, mistrust, manipulateness, aggression, dependency, entitlement, and workaholism, explained a significant proportion of variance in the shared positive affective ambience permeating their interactions with their children, and in their responsiveness to their young children's cues (Kochanska, Friesenborg, Lange, & Martel, 2004). The investigation of personality on the dyadic reciprocity, in particular, of the parent-child relationship and its integration with developmental and systemic frameworks may be an avenue for future research.

Depression. A broad range of variables, such as maternal depressive symptoms, has been found to be related to differences in the ability of the dyad to engage in fulfilling interactions. Depressed mothers, as a group, have been described in the literature as having particular traits that are hypothesized to be indicators of poor parenting strategies in general. These traits include withdrawal, intrusiveness, hostility, coerciveness, and insensitivity (Downey & Coyne, 1990; Gelfand & Teti, 1990). Maternal depression has also been found to be associated with increased expression of negative affect (e.g., Cohn, Campbell, Matias, & Hopkins, 1990), insensitivity and poor responsiveness to the child (e.g., Stein, Gath, Bucher, Bond, Day, & Cooper, 1991), and use of passive response strategies

(Leadbeater & Raver, 1996). All of these are interactive and parenting skills that may hinder the mother's ability to facilitate dyadic reciprocity.

Goldsmith and Rogoff (1997) found that mother-toddler dyads in which the mother had dysphoric symptoms spent smaller proportions of time engaged in a common activity while playing with a toy than did the nondysphoric control dyads. Similarly, Jameson and her colleagues (1997) reported that clinically depressed mothers and their 13- to 29-month-old toddlers were less likely to engage in joint attention and to repair interrupted interactions while playing with a toy than nondepressed-mother dyads. Finally, Henderson and Jennings (2003) found that, while depressed- and nondepressed-mother dyads were relatively similar in their ability to maintain joint attention, joint attention among the depressed-mother dyads was related to a comorbid diagnosis. Surprisingly, dyads with mothers who met criteria for a comorbid diagnosis were better at joint attention than those with major depressive disorder alone, despite the fact that these mothers were likely to have longer and more severe depressive histories. The relationship between comorbid status and joint attention was mediated by the mother's affect, such that the mothers with a comorbid diagnosis displayed a higher level of positive affectivity. While this evidence points to the importance of depressive symptomology in shaping the mother's role in dyadic interactions, it does not capture the role of the child or the broader ecological context in parent-child interactions.

Responsiveness. Responsiveness has been most often seen as the quality of the parent's (mostly mother's) style of reacting to the child's signals and bids directed to the parent. Pappalardo and Maccoby (1985) found that even situationally induced maternal responsiveness to child resulted in the child's enhanced cooperation with the mother.

Bryant and Crockenberg (1980) reported that mothers' responsiveness was associated with their daughters' prosocial development. Lytton (1977) described a reciprocity system between the parent's and child's compliance. Rocissano, Slade, and Lynch (1987) found that mothers who often followed their children's leads during play had children who were most compliant and who, in turn, remained most engaged in a mutual exchange. Westerman (1990) found that mothers of children with compliance problems were not proficient in coordinating their influence with the child's ongoing activity, whereas mothers of problem-free children were responsive or well attuned to it. Martin (1981) established that mothers' responsiveness to their infants (in the sense of matching the intensity of maternal behavior to that of the child) predicted the child's compliance at 22 and 42 months, although the relations were mostly for boys. Attachment researchers point out the associations between maternal responsiveness and child compliance, suggesting that the child's secure attachment is a mediator of that link (Matas, Arend, & Sroufe, 1978).

Furthermore, responsiveness has been most often studied with respect to the emotionally negative cues, perhaps because of the importance of child fear, distress, and pain, and of parental comfort and reassurance in attachment theory (Kochanska & Aksan, 2004). Although parental responsiveness to children's distress is admittedly significant, early social interactions encompass children's and parents' bids of many modalities. Most of children's overtures toward their parents may be affectively neutral or positive, rather than negative. Parental responsiveness to different types of child bids may have varying consequences for their child. Responsiveness to distress cues may lead to the emerging confidence in protection, whereas responsiveness to other bids – to the emerging sense of

control or agency (Goldberg, Grusec, & Jenkins, 1999). Kochanska and Aksan (2004), for instance, found that mothers were generally more responsive than fathers, and that both mothers and fathers were more responsive to children's positive bids than to their negative bids or to bids suggesting physical vulnerability. While responsiveness is undoubtedly one aspect of mutuality in relationships, it has yet to be examined from a systemic perspective.

Child Characteristics

A current view of both the parent and the child actively shaping their relationship is articulated in the ecological approach to development (Belsky, 1984). Earlier top-down models that assigned the major role in development to the parent and more recent views that assigned it to the child have become integrated. In the current perspective, the parent and the child are active agents, who, by continuous transactions, co-create their emerging relationship (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Maccoby, 1992).

Temperament. Research on the links between child temperament and the parent-child relationship has been complicated by the causal processes operating in both directions. Easy, positive babies are thought to evoke different reactions from caregivers than difficult, negative babies (Scarr & McCartney, 1983). Empirical evidence, however, has been complex (Putnam, Sanson, & Rothbart, 2002). Proneness to anger, a typical core quality of "difficultness," often covaries with less responsive, negative parenting. Difficult babies pose more challenges than easy babies and may elicit more adversarial and less responsive parenting (e.g., van den Boom & Hoeksma, 1994). Affectively positive and well-focused infants may elicit more responsive, positive parenting (Adamson & Russell, 1999; Kyrios & Prior, 1990).

A recent example of the complexity of the empirical evidence with regard to the implications of infant temperament on the parent-child relationship is seen in Kochanska's work. In their report of two studies, Kochanska and her colleagues (2004) noted that joyful infants enjoyed a relationship with their mothers that was affectively positive, responsive, and attuned to the child. Affective ambience in mother-infant dyads with fearful babies was also more positive, but ambience in dyads with anger-prone infants was less positive. A more positive ambience emerged in father-infant dyads with more joyful, less angry, and better focused babies. In contrast to the first study, in which infant and relationship characteristics were assessed concurrently, the second study found no effect for infant temperament (assessed at 9 months) and the mother-child relationship (assessed from 9 to 45 months). The authors suggest that the concurrent effects of infant characteristics on the relationship might be most salient. Over time, however, due to unfolding bidirectional transactions in which mother and child influence each other, the effect of temperament assessed in infancy may no longer be detected after several years.

It is important to note that the extensive temperament literature points to the necessity of interpreting temperament as neither a purely behavioral nor a purely physiological phenomenon. Recent studies indicate that early physiological reactivity, as measured by heart rate, brain electrical activity, and adrenocortical activity, plays an important role in the development of systems of behavioral regulation (e.g., Schmidt, Fox, Rubin, & Sternberg, 1997). Observed differences in physiological responses to particular types of elicitors suggest that what we are in fact observing is a complex interactional system involving emotions, physiology, and interactions with caretakers and others (Fox & Calkins, 1993). Thus, the measurement of temperament utilizing multiple behavioral

and physiological methods appears to most accurately represent the construct of temperament as it relates to parent-child dyadic reciprocity.

Responsiveness. Developmental processes in both parents and children may be reflected in their responsiveness to each other. Kochanska and Aksan (2004) found that at both 7 and 15 months, children were equally responsive to both parents. During this time span, children displayed a three-fold increase in responsiveness to parents, with a simultaneous decrease in negative affectivity. These trends may correspond to maturational changes in the child: rapid development of intersubjectivity, joint attention, and communicative skills, all of which enhance the child's active role as a social partner. The developmental increases found in children's responsiveness may thus be reflecting their increased social engagement and the emerging self. Likewise, decreases in negative affectivity may reflect an increased capacity to regulate distress, and this decrease in comfort-seeking behavior may also be linked to the emerging attachment system (Kochanska & Aksan, 2004).

The infant's ability to regulate behavior and emotion, to sustain face-to-face interaction, and to attend jointly to objects can be construed as resulting from communicative and affective mutually regulated dyadic processes (Tronick, 1989). These processes are affected by exposure to toxic substances like cocaine. Beeghly & Tronick (1994) found that both caregiver and infant factors associated with cocaine exposure disrupt the regulatory capacity of the dyad, and that this resulting dyadic dysregulation may prevent the infant's successful development of later cognitive and social tasks.

This finding is reflected in the emergence of infant joint attention, as well. Consistent with the hypotheses espoused by Dunham and Dunham (1992), receptive

language skills at 12 months predicted time spent within mother-child interactive episodes of joint attentional focus (Markus, Mundy, Morales, Delgado, & Yale, 2000). More attention to child characteristics and their overall and contextual influences on dyadic reciprocity is needed to fully understand its development.

The Role of Attachment

Ainsworth, Blehar, Waters, and Wall (1978) described infants' experiences with attachment figures (usually parents) during the first year that should be precursors of secure, or insecure, attachment. These authors' summary construct of parenting sensitivity includes alertness to infant signals, appropriate interpretation of response, promptness of response, flexibility of attention and behavior, appropriate level of control, and negotiation of conflicting goals. There appears to be a technical aspect to being sensitive in that parents must be able to read accurately the signals of their infant. Also, the construct of sensitivity emphasizes flexible adaptation on the part of caregivers so that responses to signals are well attuned to the current time and place. Again, skillful understanding and action is involved as the timing and pacing of behavior must be well suited to the individual baby at each general developmental stage and specific state of arousal (Hinde, 1982).

An approach related conceptually to sensitivity is the development of mutual regulation of affect (Tronick, 1989). In this conceptualization, infant-parent interaction between the ages of three and nine months represents a working out by dyads of their joint mechanisms for regulating affect. The infant is characterized as having internal set goals of maintaining homeostasis, establishing security, experiencing positive emotions, and controlling for negative emotions. During dyadic interaction, all these control states are

likely to be violated, and the repair of these “interactive errors,” repeated over the course of continuing interaction, provides the basis for the development of interactive patterns that begin to transcend time and setting, that is, become part of a relationship representation. The more optimal states of infant arousal are viewed as a set goal of the dyad that motivates their interactive behavior. Infants who experience more successful interactive repair (either by self-regulation or regulation by the caregiver) are more likely to engage in behavior that solicits high-quality interactive behavior from their partner (Gianino & Tronick, 1988). Those attachment figures who consistently provide sensitive affect-regulating experiences lead infants to develop representations of their partners as likely to respond to interactive bids (Tomasello, 1995).

In a related perspective on sensitivity, Völker, Keller, Lohaus, Cappenberg, and Chasiotis (1999) suggested that maternal affective warmth and behavioral contingency displayed during face-to-face encounters predict different aspects of later attachment behavior. They assumed that a global rating of early face-to-face sensitivity addresses a social reward system (the warmth dimension) responsible for later contact behavior but not for security of attachment. Results indicated that security related to early maternal face-to-face contingency towards discrete infant signals. Although the infants’ contact-seeking, maintaining, and avoiding behavior after the first separation episode of the Strange Situation, and the contact-maintaining behavior after the second episode, were related to early maternal face-to-face sensitivity (warmth), early maternal contingency to infant signals was related to the organizational aspect of attachment security. Similar results with regard to the relationship between early social contingency between infant and mother and later attachment security were found by Nichols, Gergely, and Fonagy (2001).

Watson (2001) proposed a theoretical analysis in which the four major attachment patterns (A, B, C, and D) were viewed as adaptations to particular forms of early social contingency experience. In this proposition, human infants are thought to analyze contingency experience on the basis of two computations of conditional probability, one prospective and one retrospective. Ideally, when these computations do not agree, the direction of disagreement provides information as to how the infant should adjust effective behavior and/or how potential contingent consequences should be redefined. Watson (2001) also proposed that the specific patterns of insecure attachment (A, C, and D) are a result of parental responsiveness that is by nature inconsistent or out of balance and that the infant interprets this imbalance as his or her misperception of a balanced contingency. The observed indicators of attachment security are seen as consistent with specific attempts by infants to adjust behavior and/or discrimination according to the direction of imbalance in conditional probabilities they have experienced in interactions with their caretakers.

Despite Watson's (2001) emphasis on the infant's role in determining attachment security, there has been a tendency for researchers to focus on maternal antecedents of infant-mother attachment. This is presumably due to general acceptance of this highly plausible belief that adults shape interactions more than infants, even though theorists view attachment classifications derived from the Strange Situation as a measure of the relationship between the infant and the caregiver (Sroufe & Sampson, 2000). Fish and Stifter (1995) examined the influence of first year interaction on attachment relationships by considering behavior at the level of the dyad through cluster analysis. Of the three clusters of dyads identified, the most optimal dyads showed patterns of interaction in

which mothers were sensitive and not overcontrolling, and in which infants were positive and responsive. For females, being in the most optimal cluster at 5 months related to subsequent attachment security, regardless of the 10-month pattern of interaction. For males, who were significantly less likely to be secure than females, insecure attachment was predicted by negative cluster change from 5 to 10 months (moving from a more optimal to a less optimal cluster).

The attachment relationship may thus serve as a context for developing reciprocity in parent-child interactions, wherein the infant has come to adopt an internal working model of expectations for social encounters based on previous experience with the caregiver. Security of attachment may also be a predictor of a mutually responsive orientation in early childhood, though this prospect has not yet been explored. The bidirectionality of influence between parent and child is especially highlighted in this consideration of the attachment relationship and synchronous parent-child interactions. The inclusion of attachment security in future models of the development and maintenance of dyadic reciprocity would serve as another necessary measure of relational function between parent and child.

Goodness of Fit

Goodness of fit is a relationship construct whose formal properties can be described in terms similar to those used for the construct of attachment (Seifer & Schiller, 1995). The dyadic partners behave with each other according to set goals for a variety of infant temperament behaviors that are determined in part by prior expectations, in part by cultural background, and in part by immediate context. When the dyadic system operates close to these set goals, there is a high degree of fit; when their interactions consistently

violate these goals, the fit is poor. Hinde (1982) has discussed how the match between characteristics of the dyad and the larger social context must be considered in attachment research.

It is important to note that goodness of fit should not be construed as a static construct. Rather, the partners in the relationship must be viewed as dynamic and changing on the basis of their accumulated interactive histories and as capable of influencing each other in fundamental ways (Lerner, Rothbaum, Boulos, & Castellino, 2002). Further, the degree of fit is not established at some point to remain fixed thereafter but may repeatedly change over time as perturbations and repairs of the interaction take place. The concept of goodness of fit typically is used to describe parents adapting to difficulties presented by their infants; however, it can be applied equally to the resilient child who adapts to less than optimal caregiving circumstances and hence promotes healthier development of the relationship. In sum, goodness of fit characterizes the “personality” of caregiver-infant relationships in ways that may be enduring over time as well as ways that are sensitive to the interactive history at a particular point in time (Seifer & Schiller, 1995).

Dyads that either fit well together in smoothly maintaining set goals and/or that adapt well to perturbations during interactions will presumably work out a system of sensitive parenting, an appropriate proximity/exploration balance, and a secure attachment (Seifer & Schiller, 1995). Dyads that achieve a high degree of fit for temperaments associated with arousal of affect may appear the most sensitively mutually regulated pairs; this achievement is likely to result from some combination of the infant’s level of arousability or control of arousal and the responsiveness of the parent’s interventions. In

contrast, dyads that do not routinely achieve an adequate degree of fit are likely to be characterized by insensitive parenting and a greater likelihood of disturbances in the secure-base balance as well as in insecure quality of attachment (Belsky, 1999).

Environmental Influences

The past two decades has witnessed an increased attempt to better specify an array of factors and processes that have an impact on parent-child relations. The social context in which the parent-child relationship is embedded - including socioeconomic status, social support factors, child care, and the cultural context – have all been the source of inquiry, albeit disparately. Still, the antecedents of parent-child relations, and more specifically dyadic reciprocity, have received far less attention than have the outcomes, especially from a systems perspective.

Poverty

The impact of socioeconomic stress on children's functioning and on the parent-child relationship has been the subject of much research. Drawn from the process-person-context-time model espoused by Bronfenbrenner (2001), McLoyd (1990) suggested that that the impact of economic hardship on the child is mediated by its impact on parents, the marital relationship, and the parent-child relationship. The presence of social support and the characteristics of the child were considered moderators of the effects of poverty. This model, or portions of it, has been used considerably in research examining contextual effects on the parent-child relationship. Poverty is associated with lower levels of warmth and maternal responsiveness, as predicted by McLoyd's model (e.g., Brooks-Gunn, Klebanov, & Liaw, 1995). Other family characteristics related to economic hardship, such as maternal education and teenage motherhood, have been shown to be related to less

synchronous mother-infant interactions (Fish, Stifter, & Belsky, 1993; Raver & Leadbeater, 1995). Kim-Cohen, Moffitt, Caspi, and Taylor (2004) have suggested that the quality of the parent-child relationship could promote children's resilience to impoverished life conditions.

Social Support

Investigators have repeatedly found that spousal support of both the emotional (e.g., love, intimacy) and instrumental (e.g., caretaking tasks) variety is associated with enhanced parental functioning – of mothers and fathers alike. This is true of studies of parents of infants, toddlers, and preschoolers (Belsky, 1990). Support from intimate relationships has been found to relate to more synchronous, reciprocal mother-infant interaction (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983), and higher marital quality to infant-mother attachment security (e.g., Belsky, 1999).

Research on families with preschool-age children has also documented the association between social networks and mother-child relationships. In observations of mother-child interactive play, maternal responsiveness during play was related to satisfaction with support, and support in the maternal role related to greater maternal engagement in play. These mothers also praised their children more and were less intrusively controlling (Jennings, Stagg, & Connors, 1991).

Child Care

Despite theory suggesting that extensive time away from the infant may undermine the employed mother's ability to get to know her infant well and thus to behave in a sensitive, development-facilitating manner when with the child (e.g., Sroufe, 1988), most research fails to confirm this hypothesis. Much recent research on mother-infant

interaction does not detect any differences between employed and non-employed mothers, or mothers working full-time or part-time, or mothers of children spending much or little time in routine nonmaternal care arrangements (e.g., Burchinal, Bryant, Lee, & Ramey, 1992). Among the few studies documenting negative effects of amount of care in infancy on mother-infant interaction is Belsky's (1999) recent research showing more time in care across the first 3 years of life to be associated with more negative mother-child interaction during the second and third years of life. In contrast to such work, some research on 12- to 18-month-olds indicates that employed mothers, relative to mothers not in the labor force (or working fewer hours), may be more sensitive (Caruso, 1996), while manifesting less power assertion and more positive guidance when interacting with their toddlers (Crockenberg & Littman, 1991).

When pre-existing differences between families that vary in child care utilization or maternal employment are controlled, and with larger sample sizes, however, a different picture emerges. The NICHD-Study of Early Child Care found that at 15 and 36 months of age more than 10 hours per week of nonmaternal care initiated in the first year of life increased the risk of insecure infant-mother attachment relationships under certain conditions (i.e., when mothers were insensitive), and indicated that low quality of care in the first year of life also plays a role in the development of insecure attachments (NICHD Early Child Care Research Network, 1999). Data from this study indicate, in the first 3 years of life, that more time in care forecasts less sensitive patterns of mother-child interaction, and lower quality of care does so as well (NICHD Early Child Care Research Network, 1999).

Cultural Context

Parents' cultural belief systems, or ethnotheories, play a powerful role in shaping parental behavior and the parent-child relationship (Harkness & Super, 2002). Variability within the U.S. exists such that the mother-child relationship may be differentially determined among ethnic groups. For instance, Ispa et al. (2004) found that maternal intrusiveness was related to decreased dyadic mutuality for European American and more acculturated Mexican American dyads, but not for African American or less acculturated Mexican American dyads. The authors point to the potential parental belief systems underlying intrusive behavior, noting that a more directive interactive style may be normative in some cultural contexts, and linked to broader values about children and the parent-child relationship that cannot be detected with current measurement strategies. Of particular interest, and as yet unexplored, is how parents' responses to individual differences among children, thus shaping their interactions and relationships, are culturally shaped.

In understanding how the broader environmental context influences the development of dyadic reciprocity in parent-child interactions, the bioecological model may be essential. An emphasis on process and the dynamic association among different levels of organization can help account for change in the parent-child relationship. Just as the multiple dimensions of personal diversity must be considered, a similar consideration of the context must occur. In turn, all these assessments are embedded in time, which has a different meaning at the various levels of developmental organization.

Outcomes of Dyadic Reciprocity and Related Constructs

Although parent-child interaction is thought to contribute to children becoming skilled participants in the intellectual and social lives of their communities (Rogoff, 1990; Vygotsky, 1978), further consideration must be given to the features of parent-child interaction that explicitly influence children's learning. These features may include children's level of involvement, the structuring of children's efforts, adjustment of parental support, and the goal of the activity (de la Ossa & Gauvain, 2001). Likewise, transactional theories would hold that, over time, aspects of parenting may be affected by the parent-child relationship. Based on the literature evolving from joint attention, social contingency, and dyadic mutuality research, outcomes of the parent-child relationship can be seen for both children and parents.

Child Outcomes

Joint attention is considered to be a fundamental aspect of early social development that may be related to later cognitive competence (Mundy & Gomes, 1998). It has been shown that the amount of time infants spend in joint attention episodes with their mothers at 14 months, and the tendency of mothers to use language that follows their infant's focus of attention, predict children's expressed vocabulary size at 18 and 24 months (Carpenter, Nagell, & Tomasello, 1998). Preterm infants who initiated joint attention episodes were also found to have higher nonverbal IQ scores, beyond the effects of biomedical risk status and infant development (Smith & Ulvund, 2003). By using cluster analysis to differentiate dyadic interaction styles, Saxon, Colombo, Robinson, and Frick (2000) showed that dyads characterized by high levels of joint attention and decreasing levels of maternal initiation and maintenance of joint attention included

toddlers who would later display greater language and cognitive skills. In a study of 4- to 7-year -old children and mothers using plans, de la Ossa and Gauvain (2001) reported that mothers tailored their guidance on joint planning tasks in relation to the developmental needs of children, and that an important aspect of these efforts is the establishment and maintenance of joint attention.

Social contingency theories of infant development suggest that exposure to response contingent and noncontingent stimulation during infancy can have important implications for a child's cognitive, emotional, and social development (e.g., Dunham & Dunham, 1995). Based on three experiments with 3-month-old infants, Dunham, Dunham, Hurshman, and Alexander (1989) compared the effects of contingent and noncontingent parent-child social interactions on subsequent infant-controlled choice tasks. Infants who experienced a prior noncontingent social interaction tended to respond to a nonsocial stimulus by turning away. Infants seemed to be less motivated to respond in an engaging way to the stimulus if they had a history of noncontingent interactions.

Affect regulation and synchrony in mother-infant play has also been used to assess symbolic competence in young children. Feldman and Greenbaum (1997) found that infants' ability to regulate affect at 3 months predicted three domains of symbolic competence at 2 years. In addition, measures of maternal affective sensitivity were related to the child's symbolic play and the use of internal talk. The authors see these findings as representing a step in specifying relations between self and mutual regulation of affect in infancy and subsequent cognitive development.

Numerous investigators have suggested that social contingency in mother-child interaction during infancy serves as a foundation for success in their later relationships

with peers. For example, the dyad's ability to maintain long periods of social interchange, and parents' responsiveness to their children's cues during those interchanges, are related to children's social competence (Parke, Cassidy, Burks, Carson, & Boyum, 1992). Raver (1996) reported that social contingency, measured by time spent in joint attention and dyadic turn-taking, was related to children's use of self-regulatory strategies, but not to empathic responsiveness, both measures of social competence.

The content of parent-child interaction is often used to predict problem behaviors in young children. There is general agreement that interactions characterized as mutually hostile, harsh, permissive, or overcontrolling contribute to a wide spectrum of child psychopathologies (e.g., Patterson, Reid, & Dishion, 1992). For instance, rigidity, as opposed to flexibility, in parent-child interactions has been related to externalizing and internalizing behavior in early childhood (Hollenstein, Granic, Stoolmiller, & Snyder, 2004). Such mutually harsh or coercive patterns of interaction, or those quite negatively reciprocal, have also been related to child maltreatment through the moderating influence of parental attributions (Bugental & Happaney, 2002). While determining the direction of effects is difficult in these studies, to the extent that these findings reveal causality, parents who attribute defiant intentions to children or who see themselves as lacking power are more likely to be harsh or abusive (e.g., Smith & O'Leary, 1995).

Kochanska (1997) found that children in mutually responsive dyads indeed developed feelings of internal obligation regarding maternal goals and values, presumably due in part to the absence of salient parental pressure, which, in turn, fostered children's internal attributions and their experience of genuine freedom of choice (Maccoby, 1992). Of particular interest is that the associations between the essentially dyadic mutually

responsive mother-child orientations and socialization outcomes remained significant even after the characteristics of the individual mother and child (positive affect expression regardless of the other's affect) were covaried.

The research thus far yields substantial evidence that aspects of parent-child interaction are indeed salient in shaping child outcomes. What is lacking in the literature is the measurement of the reciprocity of the dyad as a single unit of study. Also missing is consideration of a variety of features of the environment or context in which parent-child interaction is embedded. Consideration of the dyadic reciprocity of parent-child interaction within a systemic framework will allow for more ecologically useful conclusions and applications to be drawn from data.

Parent Outcomes

Less is known about parent or parenting outcomes related to parent-child interaction than about child outcomes. Kochanska (1997) has found that mothers and children who established a system of reciprocity in their relationship may embark on a smoother and more successful developmental trajectory. The greater smoothness was reflected in the manner those dyads negotiated discipline encounters, significantly less coercive than in dyads who were less able to create a mutually responsive orientation. The history of responsiveness to the child, according to Kochanska (1997), places the parent in a position to withdraw from that accumulated investment and to be able to execute disciplinary goals with a minimum of pressure (Maccoby, 1992).

Teti and Gelfand (1991) have suggested that maternal self-efficacy may mediate the relationship between perceptions of the infant and in the emerging relationship, and parenting competence. As in most studies of parenting, the parent-child relationship is not

assessed as the means of influencing parenting behavior. In their review of the literature on parenting competence, Teti and Candelaria (2002) stated that the child her- or himself presents a context through which parental competence reveals itself. This contention supports the notion that the competent parent is not only one who is sensitive, responsive and successfully socializes their children with the correct balance of induction, love withdrawal and power assertion, but is aware of who their child is and adapts their specific behavior accordingly to create a match, or mutual orientation, that ensures successful socialization (Teti & Candelaria, 2002). Future studies of the effects of dyadic reciprocity on parenting should attempt to measure the parent-child relationship as a single unit of study, and to capture the context of the developing relationship.

Future Directions for Theory-Building and Research on Dyadic Reciprocity

Much remains to be learned about the actual complex developmental dynamics behind the emergence of dyadic reciprocity. For example, does mother-child mutually responsive orientation provide a direct or an indirect path to future socialization outcomes, or perhaps both? Inclusion of such parent characteristics as personality, mental health, responsiveness, and attributions, and such child characteristics as temperament, cognitive and social skills, and compromised health may also elucidate the pathways to dyadic reciprocity. Also, as the parent-child relationship develops within many contexts, the consideration of environmental influences on the development and maintenance of reciprocity is essential. The little-explored nature of parenting and parent well-being consequences of a mutually responsive parent-child relationship should be investigated, as well. Bronfenbrenner's process-person-context-time model appears ideal for understanding this complex relational phenomenon, though rigorously designed research

has as its challenge the effective measurement and analysis of such variables. Long-term measurement and analysis of dyadic reciprocity, its antecedents, and its consequences would allow for a more ecologically reflective understanding of the concept, which is, by definition, a representation of systemically embedded development.

APPENDIX C

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