Order Number 9000732

Maternal drug abuse and mother-child interaction at age eighteen months

Schile, Teresa Christine, Ph.D.

City University of New York, 1989

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

A

MATERNAL DRUG ABUSE AND MOTHER-CHILD INTERACTION AT AGE EIGHTEEN MONTHS

by

Teresa C. Schile

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1989

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

4/12/89
Date

Arietta Slade
Chair of Examining Committee

April 13, 1989
Date

Herbert D. Schlossberg
Executive Officer

Dr. Arietta Slade
Dr. Helen Johnson
Dr. Vera Paster
Supervisory Committee

City University of New York

Abstract

MATERNAL DRUG ABUSE AND MOTHER-CHILD INTERACTION AT AGE EIGHTEEN MONTHS

by

Teresa C. Schile

Advisor: Dr. Arietta Slade

This study examined the relationship between maternal drug abuse and patterns of interactional synchrony in an inner-city, minority, low income population. Dyads consisting of mothers who abused drugs and their eighteen month old children were compared with dyads of non-drug-abusing mothers and children. Dyads were matched for income level and ethnicity. Mother-child interaction in a free play situation was videotaped, segmented into turns, and coded for synchrony, using a slightly modified version of Rocissano and Yatchmink's (1984) scale. Synchrony measured the management of joint attention in the dyad. Synchronous turns were those which maintained the topic of the partner's previous turn, while asynchronous turns changed topic. Turns were also defined as directing or nondirecting.

Post-hoc comparisons were also done between the non-drug-abusing group and a group of middle-income, non-drug-abusing dyads to assess the effect of income level on

mother-child interaction.

Results showed that drug abusing dyads had an elevated rate of interacting, but no difference in terms of proportions of synchronous responses. Both mothers and children in the drug and non-drug groups responded to partner asynchrony with increased asynchrony. Drug group mothers also responded with increased synchrony to child synchrony. Drug group children were more directing than non-drug group children.

Comparisons of non-drug middle- and low-income groups showed that low-income dyads were less synchronous than middle-income dyads. Low-income mothers were also more directing than middle-income mothers. In addition, middle-income mothers were less asynchronous in response to child asynchrony than low-income mothers.

These results were interpreted within the context of a model of maternal functioning based on psychological, social and material resources. Results were interpreted as consistent with literature describing drug abusers as immature and egocentric, with difficulties in caring for others. The findings also supported the idea that several aspects of maternal resources are important in determining interactional style. Finally, implications of different patterns of mother-child interaction for child development were discussed.

Acknowledgements

The knowledge, support and assistance of many people have been crucial to the development and completion of this dissertation. I would like to thank those who have been involved for their invaluable contributions.

Dr. Helen Johnson and Dr. Tove Rosen gave me the privilege of working with them, and of meeting the families who participated in this study. I am most grateful to the families who participated, and to the staff of the Follow-up Clinic, for helping me learn about the difficult lives of these families.

I am particularly grateful to Dr. Helen Johnson for her insights into the clinical and methodological aspects of this work, and for her thoughts about the meaning of research findings.

Dr. Arietta Slade provided unfailing support and guidance throughout my graduate study, and has been a strong influence on my thinking about child development and mother-child interaction. Her own personal example as a committed clinician with a wide understanding of child development and theoretical issues has not been the least of her contributions. I am most grateful for her time, thoughtful assessment of my work, and insightful suggestions.

Dr. Vera Paster's work and thinking has been

influential in the development of the ideas in this dissertation, particularly her thinking about primary prevention and family systems. Her creative approach to the problems of the families in this study has been invaluable in shaping my own understanding.

I am thankful for the dedication, energy and support of Dr. David Ertel and Dr. Victoria Pinderhughes, and for their careful and thoughtful reading of this dissertation. Dr. Ertel has taught me a great deal about integrity, development as a clinician, and the integration of clinical and theoretical understanding. Dr. Pinderhughes has set an example of dedication in working with high-risk families, and of an open-minded, flexible approach to developing the most effective and respectful ways of working with these families.

There is insufficient space to do justice to others who contributed, directly or indirectly, to this study. Dr. Elizabeth Anisfeld, Dr. Lorraine Rocissano, and Ms. Denise Green have all given their support and the benefit of their experience. I am grateful to Mark Garcia for his critique of the statistical analysis, and to David Bateman and Barry Allen for assistance with computer software.

Finally, I would like to thank Peter Shenkin, whose presence and understanding has made the writing of this dissertation much easier than it would otherwise have been.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

CHAPTER I

REVIEW OF THE LITERATURE

Introduction

Drug abuse has become increasingly prevalent, and the possible effects of maternal drug use on child development have become a topic of concern. Work has been done particularly on physiological effects on the infant of in utero drug exposure. More recently, investigators have been turning to more complex models of the ways in which drug abuse could affect development, with the psychological and environmental aspects receiving more attention. To date, however, very little has been done in the way of in-depth investigation of mother-child interaction in this population.

This study is an investigation of mother-child interaction, in a sample of drug-abusing, inner-city mothers and their children, as compared with a group of non-drug-abusing mothers and children from the same inner-city environment.

The problem of drug abuse in an inner-city

population has become increasingly urgent. In this population, drug abuse is usually associated with a host of other problems, economic, social and psychological. This study is a beginning attempt to assess the effect of maternal drug abuse itself, apart from the difficulties of an inner-city population, on mother-child interaction at the age of 18 months. This age was chosen in order to examine the mother-child relationship at a time when the patterns of interaction have become more firmly established for the dyad. This is also a period of important developmental changes, the negotiation of which may have great impact on the direction and quality of development.

The issue of how maternal drug abuse could affect child development involves a number of areas in which research and clinical work has been done. Maternal drug abuse itself is a complex issue with biological, socioeconomic and psychological aspects. Areas of concern relevant to child development include ways of conceptualizing and characterizing mother-child interaction, physiological effects of fetal drug exposure, and effects of parental interaction style and socioeconomic status on child development. Mother-child interaction is a complex subject in its own right, and there are many factors which can affect maternal responses

to the child. Previously conceptualized factors include maternal personality and intrapsychic issues, social support and resources available to the mother.

Most recent studies involving at-risk populations agree that it is the operation of multiple factors that is associated with problematic outcomes, rather than the effect of a single factor in isolation. Maternal drug abuse in an inner-city population involves biological, environmental and psychological factors which may interact with each other in complex ways. For the sake of organization and clarity, the various factors to be considered will be discussed singly, and then integrated into the model used in this study.

Influences on Early Child Development

Models of child development used to operate more or less on the premise of a passive infant molded by environmental forces. In current thinking, this is not the case. The child is seen as contributing much to the course of development, although many environmental factors remain quite important.

Sameroff (1975) addressed these issues in an important paper delineating a transactional model of forces affecting development, with arrays of constitu-

tional and environmental factors. At any particular time, the actions and tendencies of the child will influence the way the environment responds, and vice versa, in a cyclical manner. While such a model might seem to allow for an infinite number of possible outcomes, it is Sameroff's contention that the actual number of developmental outcomes is relatively small. In fact, the vast majority of developmental outcomes can be described as "normal", and reflects self-righting and self-organizing tendencies, which can cope with all but the most negative influences. Such influences fall into two main categories: "reproductive casualty" (p. 269) or "caretaking casualty" (p. 274). The child will be able to attain a normal developmental outcome unless the balance of factors is too far on the negative side. Thus the effect of a single variable is usually small, unless it is of exceptional severity. Furthermore, constitutional difficulties may be counteracted by exceptionally positive caretaking, and negative caretaking may be absorbed without lasting injury by a child with an exceptionally strong constitution. Maternal drug abuse during pregnancy may be associated with both biological and caretaking problems, which greatly increases the risk to the child.

The effects of both biological and caretaking influences were seen in a longitudinal study of a large

number of children from a variety of ethnic backgrounds and income levels (Werner and Smith, 1979). This study showed the importance of perinatal stress, quality of the family environment and socioeconomic status in predicting mental health and learning problems in children. Most importantly, the effect of the caretaking environment was more powerful than the effect of perinatal stress, except for a few children who were very stressed biologically. Also, it was the combination of both factors that was associated with a high risk of developing behavior and learning problems. Children who had the most persistent and severe problems had apparently difficult temperaments in infancy, and the caretaker-child interactions were noted to be particularly unrewarding for both parent and child.

The authors speculate that the mothers in these dyads, who were poorly educated and without family support or stability, were unable to cope with infants they perceived as difficult. Mutually frustrating patterns were observed by age one, and appeared to be entrenched by age two. It should be noted that the question of whether these infants were actually more difficult to care for was left unresolved. Regardless of causation, these mutually frustrating interactions were associated with long-term developmental problems (up to age 18), and therefore are

deserving of in-depth investigation.

Mother-Child Interaction

Studies of mother-child interaction grew out of the literature on child development, and the question of how the mother's actions may affect the child. Because researchers now acknowledge that the child's actions also affect the mother, the interaction between them has become a focus of attention.

Interactions between mother and child are expected to be very different at different ages of the child, because of the changes that the child's maturation and development bring to the interaction. Stages in the development of the interaction and in the contribution of both partners can be viewed from many different perspectives: cognitive, affective, drive-related, social, and so forth. The child's capabilities at any age will strongly affect what kind of relationship can be established. How the demands of the actual interaction conform to or depart from the child's capacity for interaction will influence how and in what direction development proceeds.

Bishop (1951) demonstrated that mother-child interaction patterns are carried over into the child's relationships with other adults and peers. She found that

children carried over behavior in two ways: they responded to other adults in the same way they responded to their mothers, and they also used their mothers' way of interacting, seeming to incorporate some aspects of the mothers' behavior. Thus, on the social level, mother-child interaction can affect the way the child responds to many others in the world and contribute significantly to the child's style of social interaction.

Sander (1969) studied mother-child interaction over the first eighteen months of life and related it to many aspects of the child's development and personality. He conceived of the early relationship as consisting of a number of issues that need to be resolved, a series of different situations requiring adaptation on the part of both mother and infant. He delineated five stages with associated issues. The issue most relevant to the 18 month old infant and his or her mother is that of self assertion. The other important changes he noted at this age are more related to the child's developing cognitive abilities, particularly the development of language and representation.

He focused on three features of the interaction: initiation, reciprocation and regulation; and he stressed the importance of "harmonious coordination" (p. 132) and interactional synchrony in the interaction at each stage.

He also related these aspects of the mother-child interaction to the cognitive and social development of the children during their first year of school. While this study was a qualitative, in-depth investigation of a small number of children, and Sander did not come to conclusions about the matching of mother-child interactional patterns with specific developmental outcomes, the results did demonstrate striking differences among the children studied. There were differences in the management of attention in these children, in their responsiveness and flexibility, in the kind and amount of affect they displayed, and in the quality of their relationships with teachers and peers. Sander discussed these differences as related to the outcome of the various "issues" negotiated by the mother and child at the different stages of development. He concluded that the influence of the mother-child relationship extended even beyond the sphere of social relationships, into the development of the entire personality. The child's ability to relate to and take in the world, to be active and take the initiative, to expect success or failure, all of which strongly color the child's style of behaving in the world, all partly derive from the child's first relationship, in which he or she determines what consequences his or her actions have and is building up an image of the self in the world.

Goldberg (1977) focused on similar aspects of the child's early relationships. She emphasized the importance of "mutual contingency experiences" (p. 174), in which both parent and child can successfully interpret the other's actions, and bring about desired responses with their own actions. Difficulties may arise because the infant is relatively unpredictable, unresponsive or unreadable; or because the parent has problems in either interpreting or responding to the infant's needs. When one member of the dyad has difficulties, there is the possibility of either a positive or negative outcome, depending on the other's response. For instance, a predictable, easy to interpret infant may entice an unresponsive parent into a satisfying interaction; or a difficult infant may begin a cycle of mutual frustration by lack of responsiveness to an initially responsive parent.

In the development of a mutually satisfying relationship, she stressed the importance of contingencies of responding. Both partners of the dyad need to know what to expect and how to influence the other's behavior. This is especially important from the child's point of view and can have wide-ranging consequences for cognitive and social development.

The work of Spitz (1965) further elucidated this

point. Early relations with the mother were seen by him as extremely important, because of the dominance of the mother in the infant's world. Severe unpredictability on the part of the mother was seen by him as leading to similarly severely disturbed behavior in the child. Furthermore, predictability and responsiveness contribute a great deal to the emotional tone of the interaction. Spitz saw the earliest mother-child communications as consisting of little else than such emotional responses as pleasure and unpleasure. The range of communicated emotions grows broader with increasing age of the child, and the onset of language brings a wide diversity in the content of mother-child communications. Nevertheless, the influence of the emotions of mother and child, and their mutual pleasure and ease in interaction remain important at all ages.

Clarke-Stewart and Hevey (1981) studied changes in interaction from 12 to 30 months of age. They found that the mother initially was the predominant initiator of interaction, but that her predominance declined over time. Physical contact and proximity also declined, but the child's communication increased, with children becoming more verbal, responsive and active in the relationship. These findings are in accord with Sander's idea of the development of initiative, and also with the theory of

development put forth by Mahler, Pine and Bergman (1975).

Their model of separation-individuation delineated stages in the development of the young child as a separate and autonomous individual. The stage relevant to the 18 month old child is that of "rapprochement". With the onset of language and increasing cognitive abilities, the rapprochement phase begins, with alternate avoidance and seeking out of the mother, ambivalence and aggression. They see these behaviors as related to the child's more complete realization of separateness and autonomy, which awareness causes strong and mixed emotional reactions in the child.

Mahler, Pine and Bergman (1970) also studied the ways mothers responded to these different behaviors of their children, and related these maternal differences to the direction and quality of the child's development. They studied individual dyads longitudinally and in detail, and presented qualitative analyses of the mother-child interaction and personality development of the child. They described an optimal maternal response to the child's changing behavior, as well as two possible reactions which would have a negative impact on the child. Some of the mother studied appeared to prefer the symbiotic type of relationship with their child, and hindered the child's increasing autonomy. Other mothers presented the opposite

picture, prematurely pushing the child to independent functioning. The mothers they felt showed the optimal pattern of responding grew gradually in their maternal role, achieving greater emotional distance from their child as the child became more autonomous.

While the above work conceptualizes the development of the 18 month old infant from different points of view, all theories of development agree that this is a time of upheaval in the mother-child relationship. The child is asserting his or her wishes and becoming more separate and autonomous from the mother, a process which is often tumultuous and difficult for both. Successful negotiation of this period results in increasing autonomy of the child while retaining the positive quality of the mother-child relationship. Aspects of the mother-child interaction relevant to this outcome include mutual reciprocation, contingent responding, maternal tolerance of child self-assertion and successful repairing of the many expected interruptions in the flow of the interaction.

Interactional Synchrony

The studies thus far described have differed in their theoretical orientation and assumptions, with some

authors using a psychoanalytic model and others focusing more on cognitive factors. In spite of these differences in orientation, there are striking similarities in the descriptions of mother-child interaction, and in hypothesized effects on child development. Descriptions of optimal patterns of mother-child interaction make use of different but similar terms, e.g., "harmonious coordination", "synchrony", "pleasure and ease of interaction", "mutual contingency experiences". While these terms are not always very precisely defined, common dimensions include concepts of sensitivity, responsiveness, and positive affect. Exactly how the harmoniousness and positive quality of the interaction are defined and measured varies from study to study. The difficulty of capturing such qualities may perhaps be reflected in the descriptive and anecdotal nature of many of these studies.

One method of looking at the quality of mother-child interaction was developed by Rocissano and Yatchmink (1983). This method focuses on interactional synchrony, which is defined as the maintenance of joint attention in a dyad. Joint attention refers to the extent to which both partners of a dyad focus their attention on the same object or topic, e.g., the extent to which they share a common focus. Joint attention is a central aspect of interaction because the shared, common basis of attention

is crucial to communication. The emphasis in this method of assessment is on how communication itself is managed by the dyad, rather than on the content of the communication.

Rocissano and Yatchmink developed a category system to describe patterns in initiating, maintaining, breaking and repairing joint attention in mother-child dyads. Sander and others have focused on these aspects of interaction and considered them crucial parameters. According to Sanders' and Rocissano's observations, joint attention is accomplished in infancy by the mothers observing the infant's focus of attention and conforming to it. Infants gradually become more able to follow the mother's attentional focus towards the end of the first year. However, interactions still tend to be structured around the child's focus of attention. Mothers tend to sustain topics introduced by the child or allow the child to choose the new focus.

Rocissano and Yatchmink studied middle-income two year olds and their mothers in order to assess the ways in which the mother and child structured the interaction. They used a turn by turn analysis of interaction, and categorized turns according to degree of synchrony and use of social cues. They found that both mothers and children were predominantly synchronous (75 %) in their responses. This was achieved in either of two ways: symmetrical

interaction, in which both partners played equal roles; and reciprocal interaction, in which one partner (the mother) was more active. Mothers tended to initiate joint attention more frequently, and children to terminate it, with the mother assuming the more active role in topic maintenance. A reciprocal relationship was seen in the pattern of asynchronous turns, with one member of the dyad using social cues more and being more directing; however, the mothers were not always the more active partner.

The authors proposed that this system be used not only to describe mother-child interaction at this age in general, but to differentiate individual dyads in terms of interactional style. They suggested using the system to investigate populations of clinical interest, such as high-risk infants. Their work with prematurely born children, some with language delay, and their mothers (1983) found high levels of asynchrony, consonant with the idea that poor communication and lack of mutuality is associated with developmental difficulties.

Lynch and Rocissano (1984) adhered to a model of development as moving from other- to self-regulation. Psychological functions begin on the social, interpersonal level and gradually become internal or intrapersonal. Thus in the beginning stages of communication it is the mother who must take on the burden of maintaining joint

attention, and gradually the child becomes able to sustain attention internally and in interactions.They suggested that a synchronous maternal style was the most effective in promoting child development, because by assuming the primary responsibility for maintaining joint attention, the mother "frees up" the child's cognitive capacities for such tasks as language learning, rather than forcing the child to use his or her capabilities to maintain the communication with the mother. In this model the mother's asynchrony puts excessive demands on the child, leading to poor cognitive outcome.

They also noted that the direction of causality in terms of poor child development might be the reverse. Mothers of premature or otherwise difficult to interpret or care for infants face may find it excessively difficult to assess the child's attentional focus. In this case, the child's poor language or unclear communications lead to maternal asynchrony, with a lack of communication and further developmental delays.

The mother's task of interpreting and following the child's focus of attention certainly becomes easier as the child's linguistic skills increase. However, given a particular level of child communicative competence, the mother's ability to repair child-initiated breaks in joint attention becomes the more crucial variable.

Wulbert et. al. (1975) investigated mother-child relationship, language delay and income level. They found a striking relationship between certain parameters of the relationship and language delay: degree of maternal positive or negative feelings about the child, disciplinary methods and degree of maternal involvement. The mothers and language-delayed children behaved in a "parallel" (p. 67) manner when together, each engaged in their own activity with little interaction. Mothers and non-delayed children spent time playing together. The authors debated the direction of causality for these results, without being able to resolve the question. By the time these dyads were observed, the interactions of the dyads with language-delayed children were mutually frustrating and difficult, with neither member responding positively to the other. The most the authors could conclude is that relative lack of mutuality and poor interaction is associated with language delay. In Rocissano's system, these dyads would be described as highly asynchronous.

Rocissano, Slade and Lynch (1987), in a study of the relationship of interaction and child compliance, looked at children with similar linguistic skills. They found that child compliance was highly related to maternal synchrony, with the probability of a child complying with

an asynchronous instruction being zero in 9 of 10 dyads studied. However, child compliance was not related to competence in the play situation. Thus, whether children attempted an action was influenced primarily by their mother's interactional style, rather than by their ability to carry out the action.

They also found, as in their previous studies, that children more frequently broke joint attention and mothers more frequently repaired it, by maintaining the child's new focus. Children stayed engaged in the interaction more frequently if their mothers followed the children's topics. In dyads which failed to achieve joint attention, children tended to break attention and mother failed to repair it.

The authors considered this situation in the light of developmental theory about toddlers. Specifically, they considered this age from the point of view of separation-individuation, as the period of rapprochement. At this time the child makes more demands on the mother and is also more oppositional. The mother's attempts to keep the child's behavior within certain limits while maintaining a positive relationship with the child requires considerable effort and resourcefulness on the mother's part. Rocissano et. al. found that mothers were best able to ensure both child compliance and harmonious interaction by following

the child's focus of attention. The mothers' synchronous turns appeared to induce similar behavior in their children. Disrupting the child's focus was not an effective way to ensure child compliance (e.g., synchrony with mother). The authors interpret these results as illustrating an important aspect of maternal sensitivity during this period of development. Some of these mothers appeared to be sensitive to their child's movement towards autonomy. The mother's willingness to follow the child's lead is an important way of allowing the child autonomy, while still remaining in the interaction.

An important associated conclusion from these results is that during the toddler period much of the responsibility for maintaining a positive relationship that satisfies the child's needs for autonomy rests with the mother. It is particularly easy at this difficult stage for the mother to either become engaged in a battle over child compliance or allow child autonomy but not attempt to follow the child's many shifts of attention, thereby losing the interaction. Mothers who for intrapsychic or social reasons have fewer resources will be less able to meet this demand on their energy and attention. Such mothers would be expected to show a higher incidence of interactional difficulties with their children.

Low Income: Associations with Development and Mother-Child Interaction

This study will be investigating mother-child interaction in a group of drug-abusing mothers and a comparison group, who share many of the stressors that the drug-abusing mothers must cope with. Low income is one of these additional factors, which the literature has shown to be itself a risk factor in child development. Extensive literature on this topic has noted many factors in the low income population which contribute to developmental risk, including poor physical and mental health, low educational attainment, broken and disorganized families and the poverty environment. In describing interventions to enhance child development in this population, the quality of the relationship between the child and the family is often mentioned.

Golden and Birns (1968) investigated social class and early cognitive development. Correlations of socioeconomic status (SES) with intellectual performance are high, but not generally found until age three, when language becomes very important in learning. They investigated one and two year olds from middle, lower and disorganized lower class homes. They found that while there were no differences in test scores, the children

from the disorganized homes were more difficult to test, and often retreated into apathetic withdrawal. The authors report other findings (Malone, 1963) that such children, even if of superior intelligence, show serious learning problems. They attribute such problems to disturbances of personality and motivation. While very low income is often associated with disorganization in the home and family which may lead to such problems, they conclude that low income per se is not the most important factor in intellectual performance, at least during the preverbal period.

Wulbert et. al. (1975) found the mother-child relationship to be much more strongly related to language delay than SES. They noted that within any social class there is great variation in home environment, verbal stimulation and mother-child relationship. In terms of suggested intervention programs, they stressed improvement of mother-child interaction, rather than improvement of the physical home environment, as the factor most likely to induce developmental improvement in the child.

Ramey, Farran and Campbell (1979) stated that much of the literature on mixed-SES samples has found associations between SES and intelligence, parental behavior and attitudes and the home environment. They investigated lower SES families only, in an effort to establish which

familial characteristics were associated with IQ. High-risk infants, half of whom were in a daycare intervention program, were compared with non-risk infants from the community. They found a strong relationship between the child's later IQ and the mother's attitudes, behaviors and interaction with their toddlers. While the low SES mothers as a whole were less verbal, interactive, warm and involved, and more authoritarian than middle SES mothers, there was considerable variation. Ramey et. al. interpreted the results as indicating that low SES does not in itself explain the poor test performance of many of these children. It was the relationship between mother-child interaction variables and child IQ that they found to be most salient in this particular group. These results agree with those of Wulbert et. al., in finding mother-child interaction and relationship to be the most important variables associated with developmental outcome, whether assessed in cognitive, social or emotional terms.

Lewis and Wilson (1972) compared interaction in mother-child dyads from middle- and lower-class groups, which included equal number of black and white dyads. They found differences in the contingencies of maternal responses to their children which they felt could help to account for differences in learning. Middle-class mothers tended to vocalize in response to their infants'

vocalizations, to touch or hold them when they cried, and to watch when they played. Lower-class mothers tended to touch their infants when they vocalized, and vocalize to them when they cried or played. They also noted that the lower-class infants generally received more stimulation than the middle-class infants, but that the stimulation was less directed. They speculate that the middle-class pattern of maternal vocalization in response to child vocalization may be related to increased language in these children.

The different style of responding to infant distress was also noted by Kogan and Wimberger (1969), who concluded that interaction in lower-class dyads was more highly related to status qualities than affection, e.g., that obedience and control were more valued than affectionate exchange. The middle-class mothers tended to base their responses more on personal relatedness rather than status, and their were fewer instances of battles over control and strong negative affect in this group.

Farrar and Haskins (1980) compared the interactions of middle and low income mothers and their 3 year old children. Ethnicity was not controlled for, and all of the low-income dyads were black, while 4 of 28 middle-class dyads were black. They used four categories of activity in characterizing the interaction: 1) mutual play or

activity, 2) independent activity (directed or nondirected), 3) passive participation, and 4) no clear activity.

They found that middle income dyads spent twice as much time in mutual play as did low income dyads. The children from low income families were twice as likely to engage in nondirected independent play and in no clear activity than middle income children. Overall middle income children spent half their time in mutual play and the bulk of the remaining time in directed independent play. Low income children spent one quarter of their time in mutual play, and their mothers were more likely to be engaged in their own activity or no clear activity than the middle income mothers.

For both groups, the majority of the mutual play episodes were initiated by the mothers. In the low income group, the majority were terminated by mothers as well, leaving the children to continue the activity alone. As a consequence, mutual play episodes were half as long as for the middle income group.

The authors discussed earlier literature which suggested that low income mothers are more controlling. They did find that these mothers made more suggestions of activity change. However, both groups had equal probabilities of making suggestions when the child was in each type of activity, with no clear activity eliciting the

most suggestions. They consider the finding that the low income children were in this state relatively frequently to account for the higher incidence of suggestions from these mothers. This leaves unanswered the question of why low income children were in this state so often, however.

Farrar and Haskins interpreted these findings as indicating less difference between middle and low income mothers than previously thought. They did speculate that mutual play is a less valued activity for low income mothers, and this may have an effect on children's development. While their interpretation of the findings differed from the literature, the findings themselves supported previous evidence that low income mothers are more controlling, and that less time is devoted to interaction than in middle class dyads.

In one of the very few studies to systematically examine ethnicity, social class and sex of the child in relation to mother-child interaction, Zegiob and Forehand (1975) found the most significant effects to be associated with social class. They found that middle-class mothers were more cooperative and less critical with their children. They also found that lower-class mothers were more directive, controlling and detached, particularly with their daughters. The only difference associated with ethnicity was that white mothers were more cooperative

with their children than black mothers.

Kami and Radin (1967) looked at social class differences in a sample of black dyads. They found that the middle-class children sought and received attention and affection much more than lower-class children, and that middle-class mothers also initiated affectionate interaction with their children more. In terms of discipline techniques, middle-class mothers tended to use "bilateral" (p. 307) techniques which involved the child in the decision, while lower-class mothers tended to use "unilateral" (p. 306) techniques such as commands. Middle-class mothers also tended to emphasize the personal relationship when eliciting cooperation, while lower-class mothers stressed status or authority. The authors speculate that these differences may be related to the development of internal controls in the children, and that the lower-class style of parental may result in dependence on child external controls and associated conduct disorders.

Many of the above studies on low income families and children show an association with less maternal warmth, involvement and interaction, as well as poorer cognitive development than middle income children . Work in this area, while not entirely consistent, seems to indicate that parental behavior, rather than physical surroundings,

may be a more important mediating factor in both the cognitive and social development of these children.

To extend these conclusions further, along the lines of child development models: low SES may be considered a risk factor in development, but is actually a cluster of variables, the most salient of which are parental attitudes and behaviors. Low SES alone is less of a risk factor than if it is associated with maternal detachment and control based on external authority. The addition of family disorganization and/or biological risk factors greatly increases the risks of poor developmental outcome for the child. Finally, much of the literature indicates that the mother-child interaction is the best place to look for signs of developmental deviance and patterns in the relationship that may lead to poor developmental outcome.

Maternal Drug Abuse: Characteristics and Associated Personality Variables

The purpose of this study is to investigate the ways that low-income drug abusing mothers and their children interact with each other. There has been little research on this issue, or on the personality characteristics of drug abusing mothers, but there is a considerable amount

of literature on drug abuse. Prominent is work on the demographics of the incidence of drug abuse, social and environmental factors associated with this, and treatment approaches. Less work has been done on the psychological aspects of drug abuse. However, those who have studied the personalities and functioning of drug abusers through research and treatment have reported quite similar conclusions.

Nyswander (1956) examined addiction to many different drugs, but focused on narcotics addiction. Overall, she tended to emphasize the immaturity of the drug abuser. Addicts tend to have extreme emotional reactions and are intolerant of frustration, reacting with passive withdrawal or drug use. They are vulnerable to feelings of inadequacy and use drugs to combat this. The drug abuser is seen by Nyswander as unable to tolerate anxiety, which may be generated by experiences involving sexuality, aggression or evaluation of competence. Self-esteem tends to be very low, as is tolerance of frustration. The drug abuser is markedly immature, and unable to relate to others except in terms of dependency. The addicts she worked with could not care for others, but only be cared for.

Cohen (1969) discussed abusers of many different drugs, while Nyswander concentrated on narcotics abusers.

Cohen found many of the same factors to be operative in all drug abuse. He found drug abusers to be emotionally immature, intolerant of anxiety and frustration, and passive and dependent in relationships. For him, the drug, regardless of whether it is a sedative, stimulant, narcotic or psychedelic, provides the user with a sense of adequacy and freedom from disturbance by anxiety or drives.

Krystal and Raskin (1980, 1981) also discuss drug dependency as a general phenomenon, related more closely to the psychological functioning of the abuser than to the specific effects of the drug used. They consider drug dependency to be a serious emotional disorder, or rather, a manifestation of such disorder. Among the myriad difficulties drug dependent people manifest are anxiety, guilt, aggression, feelings of inadequacy, difficulties with sexuality, and intolerance of physical pain.

Krystal and Raskin contend that drug dependence is a type of ego function, an attempt at adaptation or adjustment to intrapsychic stress or conflict. They particularly stress the ego's relationship to affects, especially painful affects. They also propose a model of self and object representation in the drug dependent person.

Drug dependency is a way to seek relief from

painful, unbearable feelings. The drug dependent person has ego impairments which prevent him or her from being able to effectively cope with pain and tension without the help of drugs. The authors stress the role of anxiety in sensitizing people to pain and in making pain unbearable. They see drug dependent individuals as highly sensitive to negative experiences or feelings, due to the intervening effects of anxiety.

Their model of psychological functioning in drug dependency involves a regression with respect to affects: de-differentiation, resomatization and deverbalization. Affects are experienced in a more somatic and overwhelming way, without the ability to label and express them verbally which would assist with management of the affects. Anxiety and depression are often not seen clinically, but there are generally a number of somatic symptoms in their place. The drug dependent person is not well aware of his or her affects, and lives fearful of being overwhelmed by the undifferentiated anxiety-depression. Denial and drug use serve to keep these primitive overwhelming affects at bay.

In brief, in their view of the object relationships of the drug abuser, the drug serves as a transference object; specifically as a substitute for a love object which is related to primitively, via the mode of incor-

poration. The internal self and object representations are impoverished and depend upon external supplies for their maintenance. Because of extreme ambivalence towards the love object, the relationship with the drug shows the same pattern of experience: states of bliss and union alternating with states of separation (withdrawal) and intolerable pain. Most importantly, the relationship with the drug replaces relationships with people. Because of the drug abuser's ego deficits and behavior, satisfying relationships with people are rare, and each frustration and disappointment leads the abuser back to the drug for solace, which must inevitably fail. Drug dependency represents an extreme form of transference, the acting out of a primitive and extremely ambivalent relationship with the early love object.

Drug abusers have a continual need for external supplies, tending to be unable to adjust to the real or fantasied loss of the love object. This occurs because of a disturbance in the individuation process, in which the ego and self representation become impoverished, and the individual is unable to maintain a sense of self without external support. Krystal and Raskin contend that drug dependent people simultaneously strive for fusion with the object and maintain rigid externalization of the object. In other words, they never internalized the love object

and developed a unified object representation, because the original love object was experienced as too frustrating, seductive, or both. They note that histories of early frustration and rejection are common among drug dependent people. The aggression mobilized by these experiences is so massive that it is experienced as threatening annihilation of the self or object and must be repressed. The drug dependent person is continually caught between trying to keep the object away and outside of the self, and trying to incorporate the object, both in an effort to feel whole and cared for. Neither attempt can be successful, and the primitive cycle is perpetuated.

The authors also note that the drug abuser lacks the internal, auxiliary ago, aspects of the object, e.g., the supporting and sustaining aspects of the mother who does those things for the child that the child cannot yet do. The drug dependent person cannot be such a 'good mother' either internally or to others.

With respect to the functioning of drug abusing mothers, personality variables suggestive of those discussed above have been found to be associated with disturbances in child care (Brunquell et. al., 1981). They found that the variable of "level of personality integration" (p. 689) best predicted whether care would be good or inadequate, and compared this finding with other

work in the area of child abuse and neglect. The broad factor of ego development has been found useful in studies relating maternal psychological functioning to child care practices. "Personality integration" in Brunquell's study referred to the degree to which the mother could recognize her own needs and processes, perceive those in her child, and integrate the two. According to the above work on drug abusers, this is an ability which drug abusing mothers would not be expected to have.

Coppollilo (1975) described narcotics-addicted mothers in similar terms. He noted a high incidence of abuse in the history of these mothers, extremely low-self esteem, infantile egocentrism, and depression. He felt that the best predictor of the ability of these mothers to successfully raise their children was the mother's early relationship with her own parent figure.

Descriptions of the negative effects of the mother's interference with separation and aggression on the child's development, the early object relations of drug dependent people, and of the factors operative in inadequate care of children all mesh together, which should not be surprising. Mothers whose own childhoods were marked by excessive conflict will show the results in their functioning as adults and will be prone to re-enacting these situations with their own children.

Developmental Effects of Maternal Drug Abuse on Infants

Many studies have found neurobehavioral effects of maternal drug use in children whose mothers used heroin, methadone, cocaine and other drugs. Changes in the sensitivity and responsiveness of children due to drug exposure may have important consequences for mother-child interaction, both from the point of view of the child's contribution to the interaction and the mother's interpretation of and response to the child's behaviors.

Strauss, Starr, Ostrea, Chavez and Stryker (1976) compared infants of methadone-maintained and non-addicted mothers. They found the addicted infants to be significantly more irritable and tremulous for the first month of life, which they related to drug withdrawal (neonatal narcotic abstinence syndrome). While motor development was within normal limits throughout the first year, the scores of the addicted infants declined progressively.

Rosen and Johnson (1982) followed infants of methadone-maintained and drug-free mothers to 18 months of age. 56% of the methadone-maintained mothers used other drugs as well, and 15% had moderate to heavy alcohol

intake. Initially, 75% of the methadone infants had moderate to severe withdrawal symptoms. More of these infants also had very small head circumferences than the non-drug infants. This persisted at age 18 months, along with an increase in neurological findings of hyper- or hypotonia, delays in motor development, and strabismus or nystagmus. In addition, these infants had significantly lower scores on both the mental and motor indices of the Bayley scales.

In their discussion of these findings, they note that many infants born at risk overcome early problems and develop normally. They speculate that in this population of drug-exposed children, risk factors associated with low income, family instability and a poor environment may interfere with the recovery of these children from drug-related risk factors.

Householder, Hatcher, Burns and Chasnoff (1982) reviewed the literature on infants of narcotic-addicted mothers, including users of heroin and methadone. Studies have reported findings in areas of labor and delivery complications, neonatal withdrawal, sudden infant death syndrome, newborn alertness, cognitive and motor development at various follow-up ages, and disturbances of state and feeding. Most relevant to the present study are the last two categories.

They reported that studies of cognitive and motor development have found mixed results, with some studies showing normal development at a range of ages, from 6 months to 5 years. Other studies have found language or motor deficits from 1 to 6 years of age. Findings in the area of state and feeding disturbances have been much more consistent. Increased irritability, restlessness, tremulousness, sleep disturbance, and sucking and feeding problems have been found in a number of studies of infants.

Householder et al. stress the importance of findings based on the Brazelton Neonatal Behavioral Assessment Scale, and connect these findings to problems in mother-child attachment. They suggest that narcotic-addicted infants have impairments in their abilities to organize their responses to the environment: to attend, react to and habituate to disturbing stimuli. Visual orientation and following responses are also impaired, as is reaction to sound, to a lesser degree. These infants are in an alert state less often, although they behave similarly to non-addicted infants when alert. Increased tremulousness and irritability are also well-established findings for addicted neonates.

The authors note that these findings coincide with the pattern of problems reported by caretakers of these

infants, which essentially is the pattern of a 'difficult' baby: easily irritated, difficult to soothe. These babies may require care by someone who is particularly sensitive and empathic, and less prone to feeling angry or rejected because of the infant's behavior. Drug-abusing mothers may be among those who are less likely to be able to cope adequately with the stresses of caring for such an infant. They may misinterpret the infant's signals, under- or overstimulate the infant, and enter into a vicious cycle of mutually frustrating interaction.

They conclude that infants of narcotic-addicted mothers are exposed to a "double risk": that of the physiological effects of addiction, and also of the long-term effects due to the caregiver's reactions.

Chasnoff, Hatcher and Burns (1981) compared three groups of infants: methadone-maintained, polydrug and non-drug-exposed infants. This is one of the very few studies that explicitly addresses the issue of polydrug abuse; most studies are concerned with the effects of a single drug and attempt to eliminate the complications of multiple drugs. As single drug use is relatively rare, however, studies that look at abuse of multiple drugs will be increasingly helpful in work with these children and families.

Polydrug use, in this study, consisted of the use of

two to five of the following drugs: phenobarbital, diazepam, marijuana, phencyclidine ("angel dust"), codeine, pentazocine and Pyribenzamine ("Ts and blues"). The authors compare the three groups of infants on measures of growth and neonatal behavior, using the Brazelton scale. All groups were matched on maternal factors such as age, ethnicity, education, prenatal care and nutrition. There were no differences between the groups of infants on gestational age, Apgar scores or perinatal complications. One third of the methadone infants required treatment for withdrawal, but none of the polydrug infants did. Methadone infants were smaller, had lower birthweights and smaller head circumferences than non-drug infants, while none of these differences were found for polydrug infants. Polydrug infants did show poorer state organization than nondrug infants, with greater lability and poorer consolability. Methadone-addicted infants had these same difficulties as well as poorer orienting responses and motor control.

The authors conclude that polydrug-addicted infants are at risk for behavioral deficits, and that there might be a continuum of risk, with the polydrug infants intermediate between methadone and non-drug infants.

Sowder and Burt (1980) completed a comprehensive long-term study of the children of heroin addicts,

compared to children of parents who did not use drugs. The 3-4 year old children of addicted parents did less well on most tests of cognitive abilities. "Risk" scores were computed for all children by combining the scores of all tests. The high risk category indicated that the child scored below the 10th percentile on 3 of 4 tests. Moderate risk indicated below average scores on at least 2 tests. On this summary score, the children of addicts did less well than children of drug- free parents. 42% were at high risk and 15% at moderate risk, compared to 20% and 9% of the drug-free children, respectively.

Overall, there is considerable literature to suggest that children of drug abusers have a variety of neurobehavioral and cognitive difficulties. It is not yet clear, however, how such difficulties affect the mother-child relationship, although there is work in closely related areas that indicates mothers have increased problems establishing good communication and relatedness with such infants.

Drug Abusing Mothers and Their Children: Interaction

Studies which have investigated mother-child interaction and drug abuse generally assume that

development is complex, and that a plethora of factors combine to determine developmental outcome. Concern about mother-child interaction in this particular population is heightened by consideration of the multiple risk factors such children must contend with, and the role of the parent-child relationship in either intensifying or ameliorating the effects of these risk factors.

Lawson and Wilson (1979) did extensive clinical work with drug-addicted mothers and their children, and confirmed many of Nyswander's (1956) findings. They noted that many of these mothers tend to withdraw from the demands placed on them by dependent children. Because infants undergoing withdrawal are highly sensitive to stimulation and cannot be easily soothed, the drug-addicted mothers withdraw even further to avoid feelings of guilt. These mothers generally have low self-esteem, often hidden behind manipulative and defensive behavior. They feel powerless and worthless, and often have difficulty in caring for themselves. The authors contend that drug-addicted mothers have difficulties in object relations, and tend to be egocentric because of the deprivation experienced in their own childhood. These mothers are very ready to feel defensive, frightened and rejected by the reality of a dependent baby, particularly if the baby is not easily cared for and is not a source of

gratification for the mother.

Marcus, Hans, Patterson and Morris (1984), Bernstein, Jeremy, Hans and Marcus (1984) and Jeremy and Bernstein (1984) described a longitudinal study of methadone-addicted dyads. They compared these dyads with a control group on measures of maternal resources for functioning, and also assessed mother-child interaction at age 4 months. Resources for functioning included cognitive ability and education, social supports, mental health status and financial supports.

They found that the methadone-maintained mothers were more likely to receive public assistance, be less educated and show signs of psychiatric disorder than comparison mothers. Both groups were quite heterogeneous, however. A small subgroup of women showed poor social and cognitive resources in all assessments, and these were all methadone-maintained women. Another small subgroup showed uniformly good resources, and these were all comparison women. Most methadone-maintained women had an intermediate level of resources.

Communicative functioning of mothers and infants were assessed from videotapes of feeding, diapering and play situations. For infants, raters assessed the infant's ability to control awareness and upset, express feelings and moods differentially, and demonstrate intentionality

by continuing reciprocal exchanges or activities with objects. For mothers, raters looked at differential responsiveness to infant cues, regulation of infant state and upset, and responses to infant interactive behavior.

In terms of mother-child interaction, methadone infants tended to communicate slightly better than comparison infants, although the difference was not significant. Infants who did poorly on interaction tended to show greater motor tension than activity level, while the reverse was true for those who interacted well.

Maternal interaction scores were related to a constellation of variables, including methadone use, psychopathology, IQ, education, socioeconomic status and relationship with the baby's father. They consider this constellation of variables as constituting the mothers' "psychological and psychosocial resources for functioning" (Bernstein, Jeremy, Hans and Marcus, 1984, p. 185). Mothers with better resources overall did better in interaction. Among the poorer-functioning group on interaction were found a majority of methadone-maintained mothers with poor resources. Among the group who did well in interaction were primarily comparison mothers with good resources.

They also looked at the relationship between the mothers' and infants' interaction scores. Comparison

mothers showed better interaction performance than their infants, while methadone-maintained infants did better than their mothers in interaction.

The authors conclude that methadone-maintained mothers do less well in interaction with their infants than comparison mothers, reacting less often to their infants and failing to encourage their infants' social behaviors. The authors also concluded that poor overall resources was the critical factor in determining interactive performance, rather than maternal drug abuse per se. Maternal drug abuse was only one aspect of maternal resources, and it was the presence of several aspects of poor resources that was highly related to poorer interaction.

In explaining the lack of correlation between mothers' and infants' interactive behavior, they rely on the idea of it being too early for the mothers' behavior to have affected the infants' social communicativeness. They suggest that caretaking up to the age of 4 months involves responding to infant communications of biological rather than social needs, and therefore the mother's ability to respond to social cues has not yet affected the infant's social behavior.

However, an alternative explanation of the infant's greater communicative ability is possible, based on the

mother's inability to assume the larger share of responsibility for maintaining interaction, and the frequent clinical observation of children of inadequate parents directing parenting behavior towards their own parents (in whom a lack of such behavior is conspicuous). It is possible that these infants may be showing the first signs of assuming a more active role in the interaction.

Jeremy and Bernstein (1984) discussed the relationship between drug use and maternal resources further. Drug use and maternal resources are confounded as variables. If they had not assessed other aspects of maternal resources, drug use alone would have predicted interaction ability. Similarly, maternal resources alone, without the variable of drug use, also predicts interaction ability. It is only in analyzing the effects of the two together that drug use drops out as a predictive variable. In essence, the other variables that drug abuse is associated with are those which affect maternal interaction. Drug abuse alone, in a theoretically well-functioning mother, would not be expected to be related to poor interaction.

Sowder and Burt (1980) also noted an association between drug use and several other risk variables. Significantly more children of addicts were from one-parent families. More of the addicted parents were

unemployed, had an unemployed spouse and very low incomes, had less education and were more likely to belong to ethnic minorities. Multiple discriminant analyses were done to see which variables differentiated the children's cognitive status. Significant variables included parental drug use, ethnic background, employment status, and parental level of education. Because of the association between income and drug use, covariance analysis was done to see if this accounted for the differences between children. Income was related to child cognitive ability, but not to emotional difficulties. Also, the test scores for the two groups were still significantly different after the effect of income was accounted for. The authors concluded that parental drug abuse and other risk factors similar to Jeremy and Bernstein's "resources for functioning" have significant effects on child development.

Johnson, Glassman, Fiks and Rosen (1985) investigated developmental outcome of children born to methadone-maintained mothers, and the relationship of familial and environmental factors to developmental outcome. Children of methadone-maintained mothers were compared with non-drug-addicted children. Mothers of both groups were primarily black and receiving public assistance. Groups were also matched for infant's sex,

birthweight and gestational age. It is interesting to note that while the groups were matched initially, by age 3 years significantly more of the comparison mothers were working and no longer receiving public assistance, suggesting that they had better resources.

Children were clustered into 3 groups according to developmental status at age 3 years, using measures of head circumference, neurological findings, Merrill-Palmer score and number of special service referrals. The clusters were then compared on a number of maternal variables, including medical and job history, schooling, perinatal history, history of mental illness and drug use. Drug use was the only variable that differentiated the groups.

Distribution of the methadone and comparison children in the clusters was as follows: Cluster 1 (most positive status): 9 methadone, 4 comparison; Cluster 2: 10 methadone, 11 comparison; Cluster 3: 17 methadone, 3 comparison. The comparison children approximate a normal distribution, with most in the middle and a few at the positive and negative extremes of development. The distribution of methadone children is, in contrast, highly skewed, with nearly half of them showing poor development.

While a large proportion of the methadone children did poorly, some did quite well developmentally. The

mother-child interaction was examined for variables which might help account for this difference in functioning. Videotapes of free play at ages of 12, 18 and 24 months were coded for behaviors related to the maintenance of joint attention: initiating topic, continuing topic and continuing with own topic oblivious to the partner. The one difference found, which was consistent across all ages, was for maternal "continuing oblivious"; methadone mothers were absorbed in their own topics and oblivious to their children much more than comparison mothers. This variable also differentiated the clusters, with cluster 3 mothers more oblivious than cluster 1 and 2 mothers.

The authors interpret these results as indicating that it is possible both to identify patterns of development among at-risk children, and to differentiate the effects of maternal drug abuse within a uniformly low SES population (e.g., to separate drug abuse from other aspects of maternal resources). Presence of maternal drug abuse was a clear risk factor and differentiated children's development. However, there were maternal interaction factors which were somewhat independent of drug abuse. Results indicated that maternal availability and more positive caretaking enabled drug-exposed children to do well developmentally.

Summary and Hypotheses

Overall, the literature on maternal drug abuse and mother-child interaction suggests that drug-abusing mothers tend to have few resources and to be less communicative and interactive with their children. However, this is not a uniform characteristic, and some drug abusers are relatively intact and able to be available to their children. Availability of drug abusing mothers to their children can be seen as a function of both intrapsychic and external resources. Intrapsychic functioning may be at least partially determined by the drug abusing mother's own early relationships, particularly her own experience of being parented. The mother's ego functioning, and ability to separate her child's needs from her own, will be particularly important in how she interacts with her child. As a group, these mothers have been characterized as egocentric, passive, dependent and immature. Most studies have also found that these mothers have difficulty caring for their children.

The group of drug abusing mothers in this study is also a low-income, inner-city group of minority women who live in an extremely stressful environment and have few social and concrete resources to draw upon. This aspect of "resources for functioning" has also been related to the

ability of drug abusing mothers to interact well with their children.

Maternal drug abuse is expected to affect the relationship between mothers and their children in a number of ways. Previous literature on drug abusers and their children have suggested several pathways through which maternal drug abuse could affect the mother's relationship with the child. These include maternal personality variables associated with drug abuse, neurobehavioral deficits in children exposed to drugs which affect their behavior in interaction, maternal responses to children with such deficits, and maternal unavailability due to lack of supports and resources. While this study is not designed to test the possible contribution of child neurobehavioral deficits on mother-child interaction, it will assess the interaction itself and determine if there are differences between drug-abusing and non-drug-abusing dyads in this regard. The scale of interactional synchrony developed by Rocissano and Yatchmink (1983, 1984) will be used to assess the management of communication and interaction in the mother-child dyads.

In addition, this study will address the issue of low income and its effects on mother-child interaction. The population of interest consists of inner-city, low-

income drug abusers and their children. This study attempts to separate the effects of maternal drug abuse from those of low income. To this end, post-hoc comparisons will be made with a group of middle-class, non-drug-abusing dyads.

1. Interactional synchrony of drug-abusing mothers and their children is expected to be lower than that of low-income non-drug-abusing dyads. A comparison of the proportions of synchronous and asynchronous types of responses for the above groups will be used to test this relationship.

2. In addition, the expected decrease in sensitivity and responsiveness for the drug-abusing mothers will be tested by an examination of contingent responses, as well as the proportions of response types. In particular, it is expected that drug abusing mothers will respond differently to their child's asynchronous turns than non-drug-abusers, with a higher probability of asynchronous responses (relative to their unconditional probability of asynchrony).

3. It is tentatively hypothesized that children in the drug group will show evidence of taking greater responsibility for maintenance of the interaction than their non-drug-exposed peers. This may take the form of

either greater synchrony or increased directing.

Inclusion of a middle-income sample in the study produces the following hypotheses:

4. Income level is expected to be related to maternal and child synchrony, such that middle-income dyads are predicted to be more synchronous than low-income dyads.

5. Income level is also expected to be related to the amount of maternal directing. Low-income mothers are expected to be more directing than middle-income mothers.

6. While the categories of behavior used in previous studies of low and middle income dyads are not the same as those used in this study, previous research suggests that middle income children spend less time uninvolved in interaction. A difference is therefore predicted for the asynchronous uninvolved category of behavior, with low income children engaging in this to a higher degree than middle-income children.

With respect to all three samples, the following hypothesis was generated:

7. Overall patterns of normative interaction found in previous studies are expected to hold true for the middle and low income groups, and to a lesser degree for the drug group. These predictions include generally high

levels of synchrony for mothers and children, higher maternal synchrony relative to child synchrony, and a positive correlation between maternal and child synchrony.

The following section will present the methods used in this study, and discuss the assessment of the mother-child interaction in more detail.

CHAPTER II

METHOD

Overview

The issues of maternal drug abuse and mother-child interaction are complex, and cannot be sorted out on the basis of a single study. In the target population of low-income, inner-city mothers and children, there are a number of variables which the literature has shown are important in predicting characteristics of interaction. This study focuses on an in-depth examination of the mother-child interaction at 18 months of age, and examines the variables of maternal drug abuse and low income with respect to the interaction.

Subjects

All data in this study were obtained as part of a longitudinal follow-up study of maternal prenatal drug abuse and child development. This study was conducted at

Babies' Hospital of Columbia-Presbyterian Medical Center in New York City. The principal investigators were Dr. Tove Rosen and Dr. Helen Johnson. The study was begun in 1983, and terminated in 1985.

Mothers who used multiple drugs during their pregnancy and drug-free comparison mothers were recruited from the prenatal care clinic during pregnancy. All mothers were informed about the purpose of the study and enrolled before giving birth. Drug abusing mothers were identified on the basis of urine toxicology and self-report. Some background information about the mothers was also obtained, including information about education level and income.

The mothers selected for enrollment in the comparison group were matched to those in the drug-abusing group on the basis of income and ethnicity.

Only those infants who were at least 35 weeks gestational age at birth, had Apgar scores >3 at 1 minute and >5 at 5 minutes, and had no gross anomalies were included for follow-up in the study.

While there was a total of 111 mother-infant dyads enrolled in the study at the time of the child's birth, only 26 dyads were available for inclusion in this analysis at 18 months. Of the 26 mothers included in the study, 15 were black, 10 hispanic and 1 white. The

majority (18 of 26) were supported by welfare. Five were working, one was supported by her husband, one was supported by her mother, and one was on disability leave. The average age of the mothers was 28.3, with a range from 21 to 39 years. The majority of mothers had more than one child, with the mean being 2.3 and the range from 1 to 6 children. A total of five were married, and 11 characterized their relationship with the man in their life as good. Two said they were abused by their male companion, and the remaining 13 had either no relationship with a man or else a problematic one.

Maternal drug use was on a continuum from no drug use through moderate use of alcohol or marijuana through heavy multi-drug use including methadone or cocaine. Heavy alcohol users (more than 4 oz. of alcohol per day) were not included in the study. Maternal drug use was classified into 5 categories of increasing severity: 1) no drug use, 2) social drinking, 3) moderate multi-drug use, 4) heavy drug use, no methadone, and 5) methadone with or without other drugs. Table 1 shows the 5 classifications in greater detail.

TABLE 1

Drug Use Categories

1. No drug use. No drugs whatsoever used during pregnancy.
2. Social drinker. Alcohol only, ranging from 1 drink during pregnancy to maximum of 1 ounce per day.
3. Moderate drug use. Either: moderate use of alcohol/marijuana, with less than daily use of marijuana; or moderate multi-drug use; or regular daily marijuana use.
4. Heavy drug use. No methadone; cocaine at least once weekly; may include alcohol, marijuana and other drugs.
5. Methadone use. May include other drugs also.

While there were 111 mothers initially enrolled in the study, there were only 26 mother-child dyads suitable for inclusion in this study when the children had reached 18 months of age. This was due to several factors: mothers no longer being involved in the care of their children, erratic participation in the study, and termination of funding for follow-up. Only dyads in which the mother was the primary caregiver were included in this study of mother-child interaction.

Out of these 26 dyads, there were three whose drug use classification changed from the prenatal assessment, due to information obtained after birth. All of these changes involved admission or discovery of a greater degree of drug use than had been previously known. One was initially classified as a non-drug user, and later found to have been engaged in moderate marijuana use, which she did not consider to be really a drug. The other two were removed from the social drinker category due to cocaine use or methadone use early in pregnancy, prior to detoxification. None of the other category 1 or 2 mothers gave any indication up to age 18 months of having used drugs. Table 2 shows the 26 mothers included in the study and the drug use classification. For the purposes of this study, group 1 and 2 mothers were grouped together as non-drug abusers, and groups 3, 4 and 5 mothers were

considered to be drug abusers. This was done primarily because of the small numbers within each of the 5 original categories.

TABLE 2

Drug Use of Study Mothers

Subject	Drug or Non-drug	Drug Use Type
1	Drug	Methadone
2	Drug	Moderate
3	Drug	Methadone
4	Drug	Moderate
5	Drug	Moderate
6	Drug	Moderate
7	Drug	Methadone
8	Drug	Methadone
9	Drug	Heavy
10	Drug	Moderate
11	Drug	Methadone
12	Drug	Moderate
13	Drug	Heavy
14	Non-drug	Social Drinker
15	Non-drug	Social Drinker
16	Non-drug	Social Drinker
17	Non-drug	No drugs
18	Non-drug	No drugs
19	Non-drug	No drugs
20	Non-drug	Social Drinker
21	Non-drug	Social Drinker
22	Non-drug	No drugs
23	Non-drug	Social Drinker
24	Non-drug	No drugs
25	Non-drug	Social Drinker
26	Non-drug	No drugs

Of the 13 drug group mothers, 8 were black, 4 were hispanic and one was white; of the nondrug mothers, 7 were black and 6 were hispanic.

In addition to the two groups of mothers described above, a group of middle-class, non-drug abusing mothers and their children was used for post-hoc comparison on the basis of socioeconomic status. These dyads were recruited by A. Slade in a study done at the Einstein College of Medicine concerning mother-child interaction and symbolic play. These mothers were recruited from the community. This group consisted of 12 dyads. In terms of ethnicity, all but one of these mothers was white, with one black mother. All were married and were supported by husbands who worked. All were the primary caregiver for the child. This was a longitudinal study of attachment, mother-child interaction and the development of symbolic play, and videotaping of dyads was done at 16, 20 and 24 months. The videotapes of 16 month old children were selected for comparison in this study, as these were considered to be the most comparable in terms of developmental level to the 18 month old children in the drug and nondrug groups.

Videotaping

Videotapes of mothers and children in a free play situation were done when the child was 18 months of age. Mothers were asked to play with their children as they ordinarily would at home. Videotaping was done in the laboratory at Babies' Hospital, by one of three trained infant testers, one of whom was the author. Videotaping was done after testing with the Bayley Scales of Infant Development, after both mother and child had become accustomed to both the room and the examiner. Videotaping was not attempted if the child was tired, distressed or ill, or if the mother was pressed for time, but was re-scheduled. Every attempt was made to ensure that both mother and child were comfortable and that the child was rested and alert.

The videotaped play sessions were 30 minutes long. Due to constraints of space, videotaping was done by the examiner in the room with the mother and child. The examiner was silent and unobtrusive, and did not interact with either the mother or child unless necessary. This was not taken to an unnatural extreme however, and if either the mother or child directly approached the examiner, the examiner would respond, but would not initiate further interaction. Many children showed brief interest in the

camera and were allowed to examine it if they chose. No child appeared distracted or excessively interested in the camera for more than a brief period.

Videotaping was done with a consistent set of toys. For the initial 10 minutes, very simple objects were set out, including such items as assorted plastic containers, miscellaneous small objects and cardboard tubes. These objects were then removed, and a set of toys was then set out for the remaining 20 minutes. This set of toys included: a large truck with attachable trailer, 2 plastic cows, a 2-car train, a telephone with wheels and a face painted on it, and a play stove with assorted cooking utensils.

The portion of the videotapes selected for coding and analysis was 10 minutes long, during the second portion of the tape. After the second set of toys was set out, 2 minutes was allowed for "settling down", and the next 10 minutes were transcribed and coded. The middle portion of the videotape was used for this study in order to obtain a sample of interaction when both members of the dyad had adjusted to the videotaping situation, and to minimize the effects of fatigue, e.g., when the conditions for interaction were optimal.

The middle-income dyads were also videotaped in a free-play situation. The free-play portion of the videotape occurred after a period in which the child was allowed to freely play and explore the room while the mother and examiner talked together. The toys available in the free-play situation included cars, dolls, a telephone, blocks and containers, toy pots, pans, household items and tools. This free-play period was 8 minutes long.

Transcription and Coding

The assessment of interaction in this study is based on the coding system developed by Rocissano and Yatchmink (1984). This method of coding categorizes the management of joint attention in the dyad, and is based on turn-taking behavior. In order to describe the interaction, the stream of behavior is first segmented into "turns", e.g., alternating behaviors of the mother and child which are relevant to the interaction between them.

In this study, transcription of the videotapes and segmentation of turns was done by the author. Turns were defined by the opportunity for one member of the dyad to respond or contribute to the interaction; that is, by a pause in the interactive behavior of one partner during which the other might respond. Kaye and Charney's criteria

of turn demarcation as "a pronounced pause in which the partner might or might not take the floor" (1980, p. 214) was easily applied in those cases in which the partner did, in fact, take the floor. In those cases in which the partner did not respond, turn demarcation depended on whether there was evidence to indicate that a response could be reasonably expected. The presence of a social cue in the original partner's behavior was used to decide if a response was expected or sought.

The definition of social cues includes 1) the presence of a vocal or nonvocal communicative gesture, which is defined as all conventional signals, such as words, pointing, nodding or head shaking; 2) vocalizations which are not conventional communicative gestures, such as laughing or whining; and 3) gaze toward the partner. Appendix A contains a more complete description of the social cue definitions used in this study.

Social cues, in general, depend upon the assumption of communicative intent or relatedness. What indicates their "social" nature is their employment in relationship. However, communicative intentionality cannot be assumed for many of the behaviors, even the vocal behaviors, of young children. The question of communicative intentionality can also be debated for many of the verbal and nonverbal behaviors of adults. For infants, in

particular, vocalizations may be expressions of feeling rather than communications of such. However, what is most important about social behaviors is their indication of accessibility and relatedness to the partner. It is the contention of the author that communicative competence and intentionality develops throughout childhood. Observation of toddlers indicates that while their communicative ability and participation does not approach that of their caregivers, they have a fairly good mastery of communicative conventions. Accordingly, vocalizations were considered as social cues (e.g., as other-related in nature) unless there was clear evidence of unrelatedness to the partner.

The method of looking at the quality of mother-child interaction used in this study was developed by Rocissano and Yatchmink (1983). This method focuses on interactional synchrony, which is defined as the maintenance of joint attention in a dyad. Joint attention refers to the extent to which both partners of a dyad focus their attention on the same object or topic, e.g., the extent to which they share a common focus. Joint attention is a central aspect of interaction because the shared, common basis of attention is crucial to communication. The emphasis in this method of assessment is on how communication itself is managed by the dyad, rather than on the content of the

communication itself.

Rocissano and Yatchmink developed a category system to describe patterns in initiating, maintaining, breaking and repairing joint attention in mother-child dyads. The coding system developed by Rocissano and Yatchmink was slightly altered for use in this study. Appendix B contains a copy of the coding manual, including all turn category definitions used in this study.

The original coding system categorized turns as synchronous or asynchronous, referring to whether or not the partner maintained the focus of the previous partner's turn. This maintenance of focus (or lack thereof) depends on the simultaneity of attention by both members of the dyad to the same aspects of the environment.

The original coding system also then subdivided asynchronous turns into directing and uninvolved types. Directing asynchronous turns are those in which a social cue is used to direct the partner's attention to a different topic. Uninvolved turns consist of a change of topic without signaling the partner.

The modification of this coding system used in this study involved a similar subdivision of synchronous turns into directing and joining categories. Directing synchronous turns involve a partial shift of attention, in which the partner's previous focus of attention is

maintained with some alteration, which is signaled by a social cue. Synchronous joining turns involve no alteration in the focus of attention at all, and continue the partner's previous focus.

The actual coding of the videotapes was done using subdivisions of these four main categories. Table 3 shows the main coding categories and the turn types coded within each category. Appendix B also contains examples of all turn categories.

Coding of the videotapes was done by a trained coder who was unaware of the drug use status of the mothers and the hypotheses of the study. Coding was done using both the transcripts and the videotape itself simultaneously. While the coder did not do any transcribing of the videotapes, any disagreement of the coder with the transcriber concerning segmentation of turns was resolved in favor of the coder. Such disagreement was quite rare. The coder was trained by the author, who also coded a subset of the videotapes to establish reliability. Videotapes of caregivers and 18 month old children which could not be used in the study (because someone other than the mother was the primary caregiver) were used for training, in order to familiarize the coder with characteristics of this sample. Coding of the study videotapes was not begun until 85% agreement for the four

TABLE 3

Turn Type Categories

Synchronous	Directing	Directing Uninvited
		Directing Elaboration
	Joining	Joining Uninvited
		Maintain
		Joining Elaboration
		Parallel
		Attention
Asynchronous	Directing	Redirect
		Persist
	Uninvolved	Ignore
		Shift
		Continuing Response
		Gaze/No Response
		Touch

main coding categories was established for the training tapes.

Transcription and coding of the middle-income dyad videotapes was done by trained coders using the identical system described above. Again, coding was done after 85% agreement was established. Due to the difference in the length of the free-play session for this group, the turn frequencies were pro-rated for a 10-minute period to make them directly comparable to those in the drug and nondrug groups.

The following section will present the results of the data analysis.

CHAPTER III

RESULTS

Reliability

Work with this coding system on another sample and review of the literature using this system indicated that the agreement between trained coders was between 80% and 90%. During the training period, 100% of all videotapes were coded by both the coder and the author. Once coding of the study videotapes began, 6 of the 26 videotapes, or approximately 23%, were coded by both. Percent agreement for the four main turn categories was 84.7. Cohen's kappa, which is a statistic that corrects for chance agreement, was computed according to Fleiss, Cohen and Everitt (1969). Overall kappa was .787.

Distribution of Subject Characteristics

An analysis of the distribution of characteristics of the dyads which might be relevant to interactional style was done, in order to assess the possibility of confounding of variables in the analysis of synchrony.

TABLE 4

Distribution of Ethnicity by Drug Group, Low Income

	drug	nondrug	total	%
black	8	7	15	57.7
hispanic	4	6	10	38.5
white	1		1	3.8
Total	13	13	26	

Chi-Square	D.F.	Significance
1.46667	2	.4803

TABLE 5

Distribution of Ethnicity by Drug and Income Groups

	Drug	Nondrug	Middle income	Total
Black	8	7	1	16
Hispanic	4	6	0	10
White	1	0	11	12
Total	13	13	12	

Chi-Square:30.217, df=4, p<.001.

As can be seen from Tables 4 and 5, there is no significant difference in the distribution of ethnicity over the two low income groups, but when the middle-income group is included, there is a significant difference. This is due to the middle-income sample being primarily white, while the low-income groups are primarily black and hispanic.

A similar comparison was done for the sex of the child, as shown in Table 6. When only the two low income

groups are considered, the chi-square for independence of the two variables is .195 and is non-significant. In contrast, when the middle-income group is included, there is a significant difference in the distribution of child sex over the three groups. In the two low-income groups, the ratio of male to female children is approximately 1:2, while this is reversed for the middle-income group.

TABLE 6

Distribution of Child Sex by Drug and Income Group

	Drug	Nondrug	Middle-income	Total
Female	10	9	4	23
Male	3	4	8	15
Total	13	13	12	38

Chi-Square= 5.598, df=2, p=.06.

While the focus of this study is on the relationship of maternal drug abuse to patterns of mother-child interaction, an analysis of the data for the drug and nondrug groups was done according to ethnicity and child sex to see if there were any relationships attributable to these variables. Because there was only one white mother,

statistical testing could not be done including her as a "group" and she was excluded from these analyses. Only the black and hispanic dyads were considered. Because of the difference in income level, the middle-class dyads were not included in this analysis of ethnicity.

There was no relationship whatsoever of ethnicity to any of a number of variables, including the frequency or proportion of any of the turn types for either mothers or children.

There was also no relationship between the sex of the child and any of the measures of turn types, for either mothers or children.

Finally, there was no significant interaction found between ethnicity and child sex, for either mothers or children.

This lack of significant effects for ethnicity or child sex is interesting, in that many researchers have found cultural differences in the way mothers respond to male and female children. However, no such effects were seen in this study. The relationship of maternal drug abuse to measures of interactional synchrony will now be considered, and in the context of this study, can be considered to be relatively independent of ethnicity and child sex.

Presentation of the results of the main data

analyses will be as follows: comparison of the drug and non-drug low-income groups will be done first, followed by comparison of the low- and middle-income groups. The low-income non-drug group will thus serve as the "comparison" group against both the drug and middle-income groups.

Drug and Nondrug Groups: Overall Characteristics

Before looking at differences between the groups, the first data analysis performed was a summary of the characteristics of both groups together.

Both mothers and children in this sample were predominantly synchronous, with the bulk of turns in the synchronous joining category. Table 7 shows the mean proportions of turn types averaged for drug and nondrug subjects.

TABLE 7

Average Proportions of Turn Types

	Mothers	Children
Synchronous Directing	.211	.115
Synchronous Joining	.590	.596
Asynchronous Directing	.132	.069
Asynchronous Uninvolved	.068	.216

Overall proportion of maternal synchrony was .801, and overall child synchrony was .716. A paired t-test for the difference between maternal and child synchrony was highly significant, $T = 5.09$, $p<.001$, with mothers more synchronous than children.

Maternal and child synchrony was also highly correlated; Pearson's $r = .652$, $p<.001$. Higher maternal synchrony was associated with higher child synchrony.

Mothers were also more directing than children. Directing turns were summed over synchronous and asynchronous categories, with overall proportion of maternal directing = .343 and proportion of child directing turns = .184. A paired t-test for the difference

was highly significant; $T = 6.18$, $p<.001$. There was no correlation between maternal and child directing.

Thus, both mothers and children tended to be predominantly synchronous, with children engaging in synchronous behaviors 70% of the time, and mothers 80% of the time, on average. Mothers were more synchronous than their children, and also more directing than their children. However, while higher maternal synchrony was paired with higher child synchrony, higher maternal directing did not have any relationship to child directing.

Drug and Nondrug Comparisons: Turn Frequencies

In the literature, analyses of synchrony data using Rocissano's coding system have utilized the proportions of the various turn categories. In this study, both the frequencies and proportions of the turn types were analyzed. The analysis of frequencies was done in order to see if there were any differences in the amount of interaction, as well as in the pattern of interaction, between the groups. ("Amount" in this context refers to the volume of turns, not the amount of time spent in interaction, which was not measured.) There was no formal

hypothesis concerning differences on this measure, and no significant differences were expected. This analysis was done more as an exploration of the data, and as a check on the comparability of the turn proportions. Two mothers, for instance, may have the same proportion of synchronous responses, but one mother may have double the number of synchronous responses. This needs to be taken into account in understanding and characterizing the interactional style of each. The two mothers are equally synchronous in one sense, but quite different in another sense.

The turn categories used for analysis were: Synchronous Directing, Synchronous Joining, Asynchronous Directing and Asynchronous Uninvolved. Frequencies and proportions were computed for both children and mothers. Tables 8 and 9 show the mean frequencies of turn types for mothers and children.

TABLE 8

Mean Frequencies of Maternal Turn Types

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Drug	27.31	69.15	14.85	6.46
Nondrug	16.92	49.77	11.23	6.00

TABLE 9

Mean Frequencies of Child Turn Types

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Drug	16.31	68.31	9.69	21.92
Nondrug	8.08	51.00	4.54	20.46

T-tests for differences between means of the drug and nondrug groups showed significant differences for both types of synchronous turns for mothers, and for all turn types except asynchronous uninvolved for children, as seen in Table 10.

TABLE 10

T-Values for Frequencies Comparisons
Drug and Nondrug Groups

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Mothers	2.66	2.64	1.50	.26
p=	.014*	.015*	.147	.798
Children	3.34	2.44	2.68	.33
p=	.003*	.023*	.015*	.742

* p<.05.

A comparison of the total number of turns per dyad was done as well as the above comparisons of individual turn types, and is shown in Table 11.

TABLE 11

Mean Total Turns Per Dyad

Drug Group	234.00
Nondrug Group	168.00

$T = 3.61$, $p = .001$.

While it had been anticipated that an analysis of turn frequencies would yield nothing more interesting than a finding of no differences between groups, which would permit direct comparison of turn proportions without any adjustment, the actual findings were quite different and unexpected. There was a highly significant difference in total number of turns, with the drug group showing a higher frequency of turns. Because interaction was assessed for a fixed amount of time, the higher frequency of turns for the drug group means both a greater rate of

interaction and shorter duration of turns. Due to the nature of the coding system, it is not possible to determine where in the dyad such an increased rate originates; that is, whether the mother, child, or both are initiating shorter and more numerous turns. This phenomenon may be related to recent observations of cocaine-using mothers and infants, in which the mothers were found to interact in a choppy, interruptive manner (Anisfeld, personal communication, 1989). However, one might expect such a maternal style to also be associated with increased maternal asynchrony, which was not seen in this sample.

Instead, there was a significantly higher frequency of maternal synchronous turns for the drug group, and of all turn types except asynchronous uninvolved for the children in the drug group. In order to make sense of these findings, we will now consider the turn proportions, and then discuss the findings for both analyses together. However, at this point in the analysis it is clear that the comparison of the two groups is not as simple or straightforward as was originally assumed.

Drug and Nondrug Comparisons: Turn Proportions

These results for the analysis of turn frequencies are in marked contrast to those in which proportions of turns are compared. Table 12 displays the mean proportions of maternal and child synchrony for both groups.

TABLE 12

Mean Proportions of Maternal and Child Synchrony

	Maternal Synchrony	Child Synchrony
Drug Group	.809	.731
Nondrug Group	.792	.701

T-tests comparing the means of the drug and nondrug groups revealed no differences in either maternal or child synchrony.

A breakdown of the synchronous and asynchronous categories was then done to see if there were differences

among individual categories which were not revealed in the overall synchrony comparisons. These results are shown in Tables 13 and 14, for mothers and children, respectively.

TABLE 13

Mean Proportions of Maternal Turns, By Group

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Drug	.226	.583	.129	.062
Nondrug	.196	.596	.135	.073

TABLE 14

Mean Proportions of Child Turns, by Group

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Drug	.135	.586	.085	.184
Nondrug	.095	.606	.052	.247

T-tests for differences between the drug and nondrug proportions of turns again revealed no differences for mothers. For children, the t-tests showed that children in the drug group were more synchronous directing (T=2.19, p=.039) and slightly more asynchronous directing (T=1.8, p=.08).

Turn categories were also collapsed into Directing and Non-directing categories to examine the relative degree of active focusing of the partner's attention. These results are shown in Table 15.

Table 15

Mean Proportions of Directing Turns by Group

	Maternal Directing	Child Directing
Drug	.35	.22
Nondrug	.33	.15

T-tests performed on the means for the drug and nondrug groups showed no difference for the mothers, and a significantly higher proportion of directing turns for drug group children (T=2.72, p=.013).

Summary of Findings for Frequencies and Proportions of Turn Types: Drug and Nondrug Groups

Analysis of frequencies of turns revealed significantly higher frequencies of total turns for the drug group, as well as a higher frequency of synchronous maternal turns, and higher frequencies of all child turn categories except for asynchronous uninvolved. In spite of these higher frequencies for the drug mothers, there was no corresponding increase in the proportion of synchronous responding. There was also no difference between the two groups of mothers in terms of proportion of directing responses. The sole differences between the drug and nondrug mothers, on these measures, was in terms of greater frequencies of synchronous turns for the drug mothers.

It is interesting and perplexing that the drug group mothers showed a higher number, but not a higher proportion, of synchronous turns. For maternal asynchronous turns, there were no significant differences for either frequency or proportion.

Because of this disparity between the results for the frequency and proportion analyses, these data were examined in greater detail, to determine if statistically

insignificant differences were causing this apparent disparity.

A possible explanation of the disparity in the findings on frequencies and proportions may lie in the small overall number of asynchronous turns, which hampers detection of differences. It can be seen in Table 10 that the drug group mothers had more asynchronous directing turns than the nondrug mothers, although this difference was not statistically significant. The drug group mothers had 1.45 times the number of synchronous turns, and 1.23 times the number of asynchronous turns, than the nondrug mothers, but the asynchronous comparison was not significant. This may well be due to the low frequencies of asynchronous turns, as well as proportionately larger standard deviations for the asynchronous than the synchronous turns. It thus is probable that the disparity in findings between frequencies and proportions is due to a statistically insignificant increase in asynchronous directing turns for the drug group mothers. This would explain the lack of significant differences for proportions.

If this is in fact the case, then both the mothers and children in the drug group show the same pattern of increased frequency for every turn type except asynchronous uninvolved. This would indicate an increased level of active involvement in the interaction for both

mothers and children in the drug group.

Children of the two groups showed more differences. Along with the higher turn frequencies for three of the four turn categories for the drug children, there was also a higher proportion of directing turns.

One possible explanation of this pattern of results is that the children of drug-abusing mothers are taking a more active role than their non-drug-exposed peers in terms of maintaining and regulating the interaction with their mothers. In this sample, such increased child directiveness could be seen as quite effective in eliciting maternal participation and synchrony. However, such causal explanations must be made quite cautiously, as the nature of these data does not easily lend itself to directional interpretations.

Analysis of Response Contingencies

The above analysis of response proportions is one way of assessing responsiveness of one partner in a dyad to the other; that is, the overall degree to which one partner attends to the other and responds within the context of the other's focus. Another way to look at the sensitivity and differential responsiveness of members of

a dyad is to examine contingencies associated with response types. Does a partner respond uniformly to the other, or does his or her response vary according to what type of turn the other person just produced?

A comparison of the unconditional and conditional probabilities of response types yields a measure of the degree to which the partner's previous turn makes a difference as to the response. If the unconditional and conditional probabilities are the same, then the previous partner's turn type does not affect the response.

Unconditional probabilities of synchronous and asynchronous turns for the sample are equivalent to the computed proportions. Conditional probabilities were then computed for mothers and children, in the following possible situations: mother synchrony follows child synchrony, mother synchrony follows child asynchrony, mother asynchrony follows child synchrony, and mother asynchrony follows child asynchrony (plus the corresponding situations for child turns following mother turns).

Tables 16 and 17 present the contingent probabilities for mother and children separately, for the drug and nondrug groups.

TABLE 16

Maternal Contingent Probabilities, by Group

	Child Synchronous		Child Asynchronous	
	Mother Syn.	Mother Asyn.	Mother Syn.	Mother Asyn.
Drug	.908	.092	.569	.431
Nondrug	.889	.111	.532	.468

TABLE 17

Child Contingent Probabilities, by Group

	Mother Synchronous		Mother Asynchronous	
	Child Syn.	Child Asyn.	Child Syn.	Child Asyn.
Drug	.776	.225	.494	.506
Nondrug	.759	.241	.462	.537

Examining the two preceding tables, it can be seen that a preceding synchronous turn is predominantly followed by partner synchrony, for both mothers and children. However, if the preceding turn is asynchronous, the partner's response is almost equally likely to be synchronous or asynchrono

Following the procedure of Sackett (1980), chi-square

analyses for contingency were done prior to computing z-scores for comparison of unconditional and conditional probabilities. This is analogous to doing an analysis of variance prior to performing individual t-tests. In the chi-square table, the expected values for each cell are derived from the unconditional probabilities, and are then compared to the observed frequencies for possible discrepancies. Tables 18 and 19 present the chi-square analyses for the drug and nondrug groups, for mothers and children separately.

TABLE 18

Chi-Square Analysis of Contingency

Mothers, Drug Group

Turn #1

	Child Syn.	Child Asyn.	Total
Mother Syn.	1003 exp=896	245 exp=352	1248
Mother Asyn.	90 exp=197	184 exp=77	274
Total	1093	429	1522

Chi-square=255.1, p<.001.
(exp = expected frequency)

Children, Drug Group

Turn #1

	Mother Syn.	Mother Asyn.	Total
Child Syn.	969 exp=902	131 exp=198	1100
Child Asyn.	286 exp=353	145 exp=78	431
Total	1255	276	1531

Chi-square=97.97, p<.001

TABLE 19

Chi-Square Analysis of Contingency

Mothers, Nondrug Group

	Turn #1 Child Syn.	Child Asyn.	Total
Mother Syn.	679 exp=564	180 exp=296	859
Mother Asyn.	80 exp=196	216 exp=102	296
Total	759	396	1155

Chi-square=264.9, p<.001.

Children, Nondrug Group

	Turn #1 Mother Syn.	Mother Asyn.	Total
Child Syn.	669 exp=612	99 exp=156	768
Child Asyn.	201 exp=258	123 exp=66	324
Total	870	222	1092

Chi-square=87.96, p<.001.

An examination of the observed and expected frequencies in the above tables shows that, for the synchronous/synchronous category, the observed and expected values tend to be quite close. The asynchronous/asynchronous category, on the other hand, tends to have observed frequencies that are much larger than predicted. This holds true for mothers and children across both groups.

Given the highly significant chi-squares, individual z-scores were then calculated. These scores compare the unconditional and conditional probabilities of turn types for a particular individual or group. For example, the (unconditional) probability of a mother being synchronous can be compared with her (conditional) probability of being synchronous given prior child synchrony or asynchrony. Table 20 gives the group z-scores for mothers and children for the drug and nondrug groups.

TABLE 20

Z-Score Index of Unconditional/Conditional Probability Differences, Drug and Nondrug Groups

	Drug	Nondrug
Mother Syn/ Child Syn	.91	1.26
Mother Syn/ Child Asyn	-.89	-1.20
Mother Asyn/ Child Syn	-2.69*	-2.34*
Mother Asyn/ Child Asyn	2.65*	2.27*
Child Syn/ Mother Syn	2.41*	1.74
Child Syn/ Mother Asyn	-2.56*	-1.96
Child Asyn/ Mother Syn	-3.04*	-4.60*
Child Asyn/ Mother Asyn	3.66*	4.59*

* $p<.05$.

A similar pattern of responding is evident for both groups of dyads. Children's responses to maternal synchrony are not different from their unconditional probabilities of response types, and preserve their overall high level of synchronous responding. Responses to maternal asynchrony are significantly different. Children of both groups respond with increased asynchrony to maternal asynchrony. Child asynchrony increases in this situation to the point at which synchronous and asynchronous responses are about equally likely.

The same type of pattern described above for child responses to maternal asynchrony is also seen for both groups of mothers when responding to child asynchrony. An even more dramatic difference from the maternal unconditional probabilities is seen for both groups, again with maternal synchrony decreasing and asynchrony increasing to a point at which both are about equally likely.

However, maternal responses to child synchrony are different for the two groups. The drug group mothers show a pattern of responding to child synchrony which is different from their unconditional probabilities, with increased synchrony in response to child synchrony. The conditional responses of the nondrug mothers to child synchrony are not different from their unconditional

responses.

Drug and Nondrug Group Comparisons: Summary

The drug group dyads show a significantly higher rate of interaction, with more and shorter turns than the nondrug dyads. This higher rate/frequency is accounted for primarily by an increase in synchronous turns for the mothers, and in all but asynchronous uninvolved turns for the children. Nevertheless, this greater rate of interaction did not result in any differences in the proportions of turns for the mothers; rather, the higher rate appeared to affect all turn types equally. This kind of pattern is suggestive of increased arousal or an agitated, restless manner of interacting. However, because of the reciprocal nature of the turns, it is not possible to ascertain whether it is the mother, child, or both who are the source of this higher rate.

The finding that the drug group children were more directing with their mothers may indicate a greater degree of active involvement in the interaction, and a taking on of greater responsibility in the maintenance of the interaction. It may also indicate the beginnings of a "parentified" style of interacting, e.g. the taking of an

active role in guiding and maintaining the interaction with the mother.

Finally, the finding of increased maternal synchrony to child synchrony in the drug group suggests that these mothers respond best to their children when their children conform to the mothers' interests. Usually it is the mother who monitors the child's focus and conforms to it, but in these dyads it may be the child who bears the responsibility of monitoring and following the mother's focus of attention. This finding may be indicative of the egocentricity and immaturity often noted in drug abusers, and their greater comfort with a dependent rather than a caretaking role.

Middle- and Low-Income Groups: Comparisons

This next section will compare the middle- and low-income groups on the above measures of frequency and proportion, as well as conditional probabilities. The low-income group, which was called the "nondrug" group in the previous section, was chosen as the comparison group for the middle-income sample, and the drug group was excluded from this analysis. This was done in order to compare the two normative samples and to study the effects of income

level with as few complicating variables as possible.

Presentation of the results of analyses for these groups will follow the same order as for the drug and nondrug comparisons. There will be some unavoidable duplication of information in the tables, as the low-income group data is presented in comparisons with both the drug and middle-income groups. The reader should remember that the "low-income" and "nondrug" groups are different names for the same group.

Middle-Income Group Findings: Within-Group Summary

The middle-income group showed very high levels of synchrony for both mothers and children. As was seen with the low income and drug groups, the bulk of turns were in the synchronous joining category. Mean proportion of maternal synchrony was .916, and child synchrony was .863. A paired t-test revealed no difference between maternal and child synchrony.

Mothers had a relatively low proportion of directing turns compared to the low income groups. This difference was significant ($T= 3.0$, $p= .006$). There was no significant difference between maternal and child directing in this group.

It should be noted at this point that this group shows a distinctly different pattern of interaction that is characterized by very high levels of maternal and child synchrony, and by child interaction characteristics which match the mother's quite closely (e.g., no differences in terms of synchrony or directing responses).

Middle- and Low-Income Group Comparisons: Turn Frequencies

The first analysis done was a comparison of turn frequencies. Table 21 shows the mean number of total turns for both income groups. A t-test for the difference between the middle- and low-income non-drug groups was nonsignificant. This finding is in contrast to the increased total turns for the drug group, and further suggests that the drug group pattern is a deviation from the norm.

TABLE 21

Mean Total Turns Per Dyad

By Income Group

Low-income Group	168.00
Middle-income Group	157.58

$T = .62$, $p = .541$.

Frequencies of the main turn categories for mothers and children are shown in Tables 22 and 23.

T-tests of the differences between frequencies of turn types revealed significantly fewer maternal asynchronous turns and child asynchronous uninvolved turns for the middle-income group as compared with the low-income group. The middle-income group showed the lowest frequencies of asynchronous turns of all the groups. For several of these dyads, the frequency of asynchronous turns was zero.

TABLE 22

Mean Frequencies of Maternal Turn Types

Middle- and Low-Income Groups

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Low-income	16.92	49.77	11.23	6.00
Middle-income	11.75	61.08	3.50	2.25
T value	1.63	-1.37	3.97*	2.40*
p =	.12	.19	.001	.025

* $p<.05$.

TABLE 23

Mean Frequencies of Child Turn Types

Middle- and Low-Income Groups

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Low-income	8.08	51.00	4.54	20.46
Middle-income	8.08	61.08	6.25	3.58
T value	.00	-1.21	-1.14	5.25*
P =	.99	.24	.27	.001

* p<.05.

Middle- and Low-Income Group Comparisons: Turn Proportions

Table 24 shows the mean proportions of maternal and child synchrony for the middle- and low-income groups. It can be seen that the middle-income group has higher levels of both maternal and child synchrony. T-tests for differences with the low-income group revealed significantly higher synchrony for the middle-income group. For maternal synchrony, $T = -3.53$, $p = .002$; for child synchrony, $T = -3.69$, $p = .001$.

TABLE 24

Mean Proportions of Maternal and Child Synchrony by Income Group

	Maternal Synchrony	Child Synchrony
Low-income	.792	.701
Middle-income	.916	.863
T Value	-3.53*	3.69*
p =	.002	.001

* $p<.05$.

The breakdown of maternal and child synchrony according to turn category is shown in Tables 25 and 26.

TABLE 25

Mean Proportions of Maternal Turns, By Income Group

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Low-income	.196	.596	.135	.073
Middle-income	.156	.760	.046	.041
T value	1.10	-3.40*	3.75*	1.32
p =	.28	.002	.001	.20

* p<.05.

TABLE 26
Mean Proportions of Child Turns, by Income Group

	Synchronous Directing	Synchronous Joining	Asynchronous Directing	Asynchronous Uninvolved
Low-income	.095	.606	.052	.247
Middle-income	.107	.756	.087	.049
T value	-.54	-2.89*	-1.77	5.19*
p =	.59	.008	.09	.001

* p<.05.

As can be seen in Table 25, middle income mothers are significantly more synchronous joining and less asynchronous directing than low income mothers. Middle income children are more synchronous joining and less asynchronous uninvolved than low income children.

A comparison of proportions of directing turns is shown in Table 27. Middle-income mothers are significantly less directing than low-income mothers (T = 3.0, p = .006). There was no difference for middle versus low income children.

Table 27

Mean Proportions of Directing Turns by Income Group

	Maternal Directing	Child Directing
Low-income	.33	.15
Middle-income	.20	.19
T value	3.00*	-1.57
p =	.006	.13

* p<.05.

Summary of Findings for Frequencies and Proportions of Turn Types: Middle- and Low-Income Groups

These two groups are similar in having a relatively lower frequency of turns than the drug group. While there is no difference between these two groups in terms of total number of turns, a breakdown by turn categories shows decreased maternal asynchronous turns and child asynchronous uninvolved turns for the middle income group.

The middle-income group shows the highest levels of

overall synchrony. The pattern of mother-child interaction in this group is one of high levels of joining responses by both mothers and children, a relative lack of maternal directiveness, and a higher level of child responsiveness in the interaction.

Analysis of Response Contingencies: Middle- and Low-Income Groups

Tables 28 and 29 show maternal and child contingent probabilities for all groups. The middle-income mothers show a different pattern of responding to child asynchrony than the low-income mothers; while maternal synchrony is lowered following child asynchrony, middle-class mothers are still predominantly synchronous. This is in contrast to the equal probabilities of synchronous and asynchronous responses for low-income mothers after child asynchrony. It is also notable that middle-income mothers are almost always synchronous following child synchrony. Frequencies of maternal and child asynchrony were so low in this group that for many dyads individual z-scores could not be computed, because the frequencies of asynchronous turns were zero.

TABLE 28

Maternal Contingent Probabilities, by Income Group

	Child Synchronous		Child Asynchronous	
	Mother Syn.	Mother Asyn.	Mother Syn.	Mother Asyn.
Low-income	.889	.111	.532	.468
Middle-income	.949	.051	.776	.224

TABLE 29

Child Contingent Probabilities, by Income Group

	Mother Synchronous		Mother Asynchronous	
	Child Syn.	Child Asyn.	Child Syn.	Child Asyn.
Low-income	.759	.241	.462	.537
Middle-income	.909	.090	.390	.610

Table 30 shows the chi-square analysis of contingency for the middle-income group. As the chi-squares for mothers and children were both highly significant, the individual z-scores for maternal and child turn categories were then computed. These results are shown in Table 31, along with the low-income groups z-scores for comparison. The chi-square analysis for the low-income group can be found in Table 19 (labeled "Nondrug Group").

TABLE 30

Chi-Square Analysis of Contingency

Mothers, Middle-Income Group

Turn #1

	Child Syn.	Child Asyn.	Total
Mother Syn.	791 exp=769	81 exp=105	872
Mother Asyn.	33 exp=58	35 exp=8	68
Total	824	116	940

Chi-square=107.72, p<.001.

Children, Middle-Income Group

Turn #1

	Mother Syn.	Mother Asyn.	Total
Child Syn.	805 exp=776	25 exp=58	830
Child Asyn.	75 exp=106	43 exp=8	118
Total	880	68	948

Chi-square=182.05, p<.001.

TABLE 31

Z-Score Index of Unconditional/Conditional Probability Differences, by Income Group

	Middle-income	Low-income
Mother Syn/ Child Syn	1.42	1.26
Mother Syn/ Child Asyn	-1.26	-1.20
Mother Asyn/ Child Syn	-3.50*	-2.34*
Mother Asyn/ Child Asyn	3.39*	2.27*
Child Syn/ Mother Syn	1.12	1.74
Child Syn/ Mother Asyn	-1.33	-1.96
Child Asyn/ Mother Syn	-2.59*	-4.60*
Child Asyn/ Mother Asyn	2.40*	4.59*

* $p<.05$.

A comparison of the z-scores of the middle and low income groups reveals essentially the same pattern. For both groups, mothers and children's contingent responses to partner synchrony are not significantly different from their unconditional responses. However, when the preceding turn is asynchronous, both mothers and children respond with increased asynchrony. Nevertheless, in the middle income group, the level of maternal asynchrony in response to child asynchrony remains lower than that for the low income groups.

Middle- and Low-Income Group Comparisons: Summary

There was no difference between the two income groups in terms of the overall rate of interaction, but a breakdown by turn categories revealed decreased maternal asynchronous turns and decreased child asynchronous uninvolved turns for the middle-income group. This pattern of lower asynchrony was also found in the findings on turn proportions, with lower proportions of maternal asynchronous directing and child asynchronous uninvolved responses for the middle-income group. Overall, this group was characterized by very high synchrony and involvement in the interaction, with both mother and child following each other's lead. Both mothers and children in this group

showed increased synchronous joining responses, and mothers were less directing than the low-income group mothers. These interactions were thus quite smooth, with few intrusions or interruptions.

The middle-class mothers also appeared more flexible and tolerant of child asynchrony, and continued to respond synchronously even when their children changed topics. It is notable that these children were also much more likely to let their mothers know that they were changing the subject, instead of simply "doing their own thing".

Summary: Hypotheses and Data Analysis

1. The main hypothesis of this study proposed reduced maternal and child synchrony for drug group dyads. This hypothesis was not supported by the data. There were no differences between mothers of the drug and nondrug groups on measures of synchrony, with the exception of the unexpected finding of increased turn frequencies for the drug group. There were also no differences for the children of the drug and nondrug groups on synchrony measures.

2. While there was no difference between drug and nondrug mothers on overall synchrony, the mothers of these two groups did respond differently in terms of

contingencies associated with response types. Drug group mothers responded with increased synchrony to child synchronous turns, and with increased asynchrony to child asynchronous turns. Mothers in the nondrug group showed increased asynchrony to child asynchronous turns only.

The expected increase in maternal asynchrony to child asynchrony was actually found for all groups, and did not differentiate either mothers or children. Mothers were differentiated by their responses to child synchrony, as described above. Thus there was a difference found in terms of contingencies of responding, but it was not the difference that was predicted.

3. It was tentatively hypothesized that children in the drug group would show some evidence of taking greater responsibility for the maintenance of the mother-child interaction than nondrug children. Children in the drug group were found to be more directing than children in the nondrug group. This may be indicative of these children assuming a parentified role in the interaction, in terms of guiding the focus of the interaction more than would be expected.

4. Income level was also expected to be related to synchrony, with middle-income dyads expected to show higher levels of synchrony than low-income dyads. This hypothesis was supported by the data. Both mothers and

children in the middle-income group were highly synchronous.

5. Middle-income mothers were expected to be less directing than low-income mothers. This hypothesis was supported by the data. In addition, both mothers and children in this group had higher proportions of synchronous joining turns.

6. As predicted, middle-income children showed lower proportions of asynchronous uninvolved turns than the low-income groups, consistent with previous findings of increased involvement in interaction and more mutual play in this population.

7. Finally, the overall patterns of interaction predicted by the literature using this measure of interactional synchrony were found to generally hold true for all groups in this study. These findings included generally high levels of interactional synchrony for both mothers and children, higher maternal synchrony relative to child synchrony, and a positive correlation between maternal and child synchrony.

CHAPTER IV

DISCUSSION

The previous chapter described the results of this study and examined these with respect to the study hypotheses. This chapter will be devoted to discussing these results in more detail and considering factors which could help account for the pattern of findings. This will include more informal, qualitative observations of the study dyads as well as methodological considerations.

Drug Versus Nondrug Group Comparisons

The primary hypothesis of decreased maternal synchrony for the drug group was not supported by the data. The differences that were found included a different pattern of contingent responding for the drug group mothers, and increased directing on the part of drug group children. In addition, there was the unexpected and puzzling finding of increased frequency of turns for the drug group.

In considering possible reasons for the lack of differences in terms of maternal synchrony, it may be useful to consider the characteristics of these two groups more closely. There are a number of factors operative in this sample which may have helped to obscure actual differences in the populations considered.

The first of these factors is participation in a longitudinal research study. Unfortunately, it is difficult to practically compare mothers who choose to participate in a research study concerning the effects of maternal drug abuse on child development with those who choose not to participate. Although there is no way to test this idea in this sample, it makes sense to think that mothers who participate in such a study may well have characteristics that differentiate them from those who do not. Such characteristics may be conceptualized in many ways; as greater maternal interest or investment in their child, an increased ability to tolerate self-examination, generally increased energy and higher functioning. Participation in a study such as this one requires a substantial commitment of time and energy, and is not feasible for any mother who is truly low-functioning. It is thus possible, that by the very act of studying such a population in a laboratory setting, the more low-functioning mothers are eliminated from consideration.

While this would be true for low-functioning mothers of both groups, sampling of the drug group could be more severely affected due to the expected lower level of overall functioning of the drug group.

Another related problem concerns dropout from the study, and the question of whether this could skew the sample. Unfortunately, in this study maternal dropout is not measurable due to the study having been terminated early because of lack of funding. This is therefore an unresolved question.

Mothers ending their caregiving relationship with their children is also an issue in this population. It is a relatively common observation in clinical work with such a high-risk low-income population, that mothers may temporarily or permanently entrust their children to the care of a relative, often the maternal grandmother. This usually happens during periods of high stress and/or increased drug abuse, and is generally thought of as relieving the mother of responsibility for her children while she "gets her life together". Some indication of the relative frequency of this phenomenon may be given by an examination of the 18 month data which could not be included in this study. There were 11 videotapes made at this age with a caregiver other than the mother. 2 of these were done with drug group fathers because the

mothers were unable or unwilling to come; 3 were done with nondrug group fathers because the mothers worked; and 6 were done with drug group grandmothers because the mothers were no longer caring for their child.

While this cannot be considered a conclusive indication of the relative frequency of mothers giving up their children to another's care, it does suggest that more of the drug mothers did this than nondrug mothers. It is thus possible that the lower-functioning drug group mothers were eliminated differentially from the study because of this.

Because of the small size of this sample, it was not feasible to separately consider mothers with different degrees of drug abuse. While most work in the area of personality variables associated with maternal drug abuse has characterized drug abuse as a fairly unitary phenomenon, it is not known if there are measurable personality differences according to severity of drug abuse. There is certainly a difference in terms of overall day to day functioning, the most obvious aspect of which might be the amount of time a mother spends under the influence of drugs and the degree of impairment she shows in that state. However, it is not clear if there are measurable differences in the interactive behavior of mothers when not under the influence of drugs which can be

related to the severity of her drug use.

Most of the literature on maternal drug abuse has focused on the more severe end of the spectrum, e.g., narcotics use. It is possible that the moderate levels of polydrug use which characterized many of the drug abusing mothers in this study are associated with less severe disturbance in the interactive behavior of the mother. This is a question which needs to be followed up in further research with a larger sample, in which the severity of drug use can be more systematically related to interactive behavior.

In terms of child characteristics which may have affected how representative this sample is, birthweight and gestational age are two factors which should be considered. These two variables were controlled in this study, because of the well-documented association between these variables and developmental risk. The data on the numbers of children of either group excluded from consideration for this study because of prematurity or low birthweight are not available. However, there is a higher incidence of low birthweight and prematurity in infants of drug abusing mothers (Householder, Hatcher, Burns and Chasnoff, (1982), and Chasnoff, Burns, Burns and Schnoll, (1986)). In this study, premature infants were not considered for inclusion in an effort to separate the

effects of prematurity from those of drug abuse. However, how representative the sample is with respect to the entire population of drug-exposed infants may be questionable due to this. It is probable, given the documented higher incidence of prematurity in drug-exposed infants, that drug group infants were differentially excluded from the study according to this variable.

The cumulative effect of the factors listed above, some or all of which may have been operative in this sample, is to make this a sample of drug abusing mothers and children which is most likely higher functioning than the population it is ostensibly drawn from.

Of course, the lack of differences between the drug and nondrug groups on the synchrony measure may mean that there is actually no difference in the target populations in this regard. However, in the author's opinion, the differences which were found, along with consideration of the above factors which contribute to differential sampling of the higher-functioning portion of the drug abusing population, make it highly likely that there are true differences between the populations which are partially obscured by the sampling problems.

Aside from the question of whether the drug group sample is truly representative of the population of drug abusing mothers and their children, one also needs to

consider the nature of the comparison population in interpreting the results of this study. The dyads in the nondrug group experienced many of the same stresses that the drug group did. The majority of mothers of both groups did not work, were supported by public assistance, and did not have a supportive relationship with the baby's father or another man. Conceptualizing this cluster of characteristics as an important aspect of "maternal resources" (Marcus, Hans, Patterson and Morris, 1984), there was no difference between the drug and nondrug groups in terms of available external resources (as differentiated from purely intrapsychic aspects of resources for functioning). As far as can be ascertained, the one variable which differentiated these groups was maternal drug use. In this respect, the nondrug group was a valid comparison sample.

However, given the relatively high functioning of the drug group sample, and the lack of differences between the drug and nondrug groups in terms of external resources, the lack of dramatic differences between these groups in terms of interactive behavior is not surprising.

Problems of sampling and generalization will also be discussed later in this chapter, in the section on future research.

Keeping the caveats about sampling bias and generalization of these results in mind, we will now turn to a discussion of the pattern of the findings themselves, and interpretation of these results which might be relevant to clinical work with drug-abusing mothers and children.

In brief, the pattern which characterized the groups in this study was one of increased directing by the drug group children, and increased maternal synchrony in response to child synchrony for drug group mothers. Mothers and children of both groups responded to partner asynchrony with increased asynchrony. There was also a finding of a greater total number of turns for the drug group dyads. This included significantly higher frequencies of both types of synchronous turns for mothers, and of all turn types except asynchronous uninvolved for children. Closer analysis of the results suggested higher frequencies of all turn types except asynchronous uninvolved for both mothers and children in the drug group, e.g., a uniformly elevated rate of interaction across turn categories.

These results suggest the following interaction patterns. Drug children appear to be more involved and active in maintaining the mother-child interaction than their comparison peers. They are more active in focusing

the attention of their mothers, usually remaining synchronous while doing so. The drug abusing mothers are about as synchronous as the comparison mothers in this study, but the drug group children have to work harder (e.g., be more directing) to elicit this level of synchrony in their mothers. It is notable that nondrug mothers respond with equal probability of synchrony to child directing regardless of whether the child is synchronous or not. However, drug mothers responded with the highest level of synchrony to child synchronous directing, followed by child synchronous joining. In other words, the drug mothers' responses were more highly predicted by the preceding child behaviors. Nondrug mothers tended to respond more evenly to all child behaviors except asynchronous uninvolved, while synchrony of the drug mothers was higher if the child was synchronous and/or directing.

Given the reciprocal nature of a turn-by-turn analysis of interaction, directional interpretations of causality must be made with extreme caution. However, the hypothesis that the drug group children work harder than their peers to engage their mothers and elicit maternal synchrony is consistent with the obtained results. This pattern was initially suggested by informal observation of some of the study dyads, and also of drug abusing mothers

with older children. It was a common observation of staff working with these families that the children often organized their mothers' behavior, and seemed more mature than other children their age. These children appeared vigilant and highly attentive to their mothers, and were often inserting helpful comments and reminders into the conversation, without ever being really intrusive. In short, these children acted like mothers to their own mothers; and the mothers often responded to this unobtrusive guiding of their behavior by doing what the child suggested.

Other families, on the other hand, seemed much more overtly disorganized, with little communication between the mother and child and each of them engaging in their own separate, and often unfocused, activity. These families seemed to be ones in which the children had more cognitive problems.

An additional hypothesis suggested by these informal observations, and consistent with the results obtained, is that those drug-exposed children who are cognitively able may assume a precocious role in terms of interaction. This hypothesis could be tested by following a larger sample of drug-exposed infants, including those who show more serious biological problems, and comparing the cognitive functioning of the children with their interactive

behavior.

The pattern of maternal behavior in the drug group is consistent with the literature on associated personality characteristics and on mother-child interaction in this population, with the exception of the severity of difficulties associated with drug abuse itself which is suggested by work in the two areas. Clinical assessments of drug abusing mothers (Nyswander (1951), Cohen (1969), Krystal and Raskin (1970), Lawson and Wilson (1979)) generally indicate that these mothers are egocentric, immature and intolerant of frustration or demands upon them. They also note passivity and dependence in relationships, and an inability to care for others. Drug dependent mothers are described as needing their child to be a source of gratification and a means of bolstering their low self-esteem. Predictions from this area of the literature, while qualitative in nature, tend to emphasize more serious disturbances in mother-child interaction.

The small amount of work done in terms of more quantitative analysis of mother-child interaction in this population found less effects associated with drug abuse per se, and more of an association with maternal resources (Marcus, Hans, Patterson and Morris (1984), Bernstein, Jeremy, Hans and Marcus (1984), and Jeremy and Bernstein

(1984)). They found that the methadone mothers tended to do poorly in interaction, but that these mothers also tended to have few resources, which was the variable that best predicted maternal interaction skill. They also found that methadone-exposed infants had better communication skills than their mothers, while for the comparison group this relationship was reversed. The methadone-exposed infants also did slightly better in interaction than comparison infants.

These findings from the two areas of the literature can be integrated in the following way. Drug abusers do tend to have lower resources (both intrapsychic and external), and it was only through research which separated out this variable that the effects of drug abuse and resources could be assessed on their own. The pattern of interaction found in this study is generally consistent with descriptions of drug abusing mothers as egocentric, dependent and relatively unable to meet the needs of others. The findings of this study are also consistent with previous findings of increased interactional ability of drug-exposed infants as compared with their peers. This was seen in the relatively greater degree of active guiding of the mother's attention on the part of the drug group children.The behavior of the drug group mothers was more highly predicted by prior child behavior, in a way

that suggests that these mothers need the partner to be synchronous with them in order for them to be synchronous themselves. They were also relatively passive in following the child's lead, given that the child was synchronous. This is not a picture of the drug abusing mother as able to monitor and follow her child's focus of attention, unless the focus is on a topic she is already interested in. In this regard, the drug group mothers have more difficulties than the comparison group.

The findings of this study are also in agreement with previous findings in suggesting that the variable of maternal resources is an important aspect of the poor interactional functioning of drug abusing mothers. When this variable is controlled for, some of the differences become less marked or are no longer seen.

The finding of an increased rate of interaction is also interesting. The results of this study suggest that drug abusing mothers and their children have few "open spaces" (Sander, 1985) in their interaction, and may have a greater need to maintain continuous contact. This kind of agitated interaction may not be at all what they are actually seeking, however. In this respect, it is helpful to contrast the pattern of interaction in this group with that of both the low- and middle-income groups. In these groups, there was a relatively low number of turns. In the

middle-income group there was also a very high proportion of synchronous joining turns by both partners, and an absence of asynchronous uninvolved turns. There was also a high tolerance for child asynchrony on the part of the mothers. The overall pattern that emerges from these findings is that of a high degree of mutual involvement that is nevertheless relaxed and flexible. Both partners have ample time to respond, and are not pressured or rushed into resuming mutual contact. There is also an apparent lack of distress on the part of the mother when her child does not conform to her focus, such that she can then follow her child's lead. A mother who is highly invested in her child being obedient, or who feels rejected and insulted when her child does not respond to her, will be much less likely to so gracefully tolerate the child's shifts in attention.

The mothers in the drug group do not appear to have that kind of tolerance, or to be relaxed and calm in the interaction. They do not respond well to child asynchrony, and are just as likely to either insist that the child conform to their topic or to withdraw from the child as to follow the child's shift in focus. Furthermore, the high rate of responding in these dyads suggests an intolerance of separation and a need to be continuously engaged. The pattern of maternal responses also suggests that the

mother needs the child to be continuously engaged in a positive and attentive way, focused on the mother's interests and needs.

The child's separation and increasing autonomy may be quite threatening to the mother who has strong dependent needs of her own, and wants her child to pay attention to her and gratify her. The drug abusing mothers in this study thus appear most like the mothers that Mahler, Pine and Bergman (1975) characterized as intolerant of their children's independence. Interestingly enough, the children in this study appeared to show an increased development of interactional abilities, and could be said to be more autonomous than their non-drug-exposed peers, in that they appear to take more of an active role in managing the interaction with their mothers. The paradox is that they are not really more autonomous, since their somewhat precocious abilities are devoted to fulfilling their mothers' needs.

This pattern of interaction and its relevance to the development of the child will be discussed further, after consideration of the findings for comparison of the two income groups.

Middle- Versus Low-Income Comparisons

Comparison of the middle- and low-income groups yielded some of the most dramatic and consistent differences in this study. Relating the differences between these groups to the single factor of income level is complicated, however, by other differences between these groups, the most salient of which may best be captured by the concept of maternal resources.

Variables that co-varied with income level in this study included ethnicity, child sex, and quality of the mother's relationship with her child's father or another man. The drug and nondrug low-income groups were primarily black and hispanic, while the middle-income group was primarily white. While most previous studies have found that income level is a more important factor in maternal interactional style than ethnicity (Zegiob and Forehand, (1975), Farran and Haskins, (1980)), the possible contribution of ethnicity cannot be overlooked. In this study, the effect of this variable cannot be assessed, as it was not controlled for in the selection of the middle-income dyads.

Another variable which could affect differences between groups is sex of the child. A variety of studies

have shown that mothers often respond differently to children depending on their sex. Also, studies have frequently found that female children tend to be more resilient in the face of many stressors, and that there is a higher incidence of male children having a variety of cognitive and emotional problems. The two lower income groups contained twice as many female as male children, while for the middle income group, this proportion was reversed. If the male children are more vulnerable to effects of a psychosocially stressful environment, the higher proportion of female children in the low-income group might tend to mask the overall differences between middle- and low-income groups. The fact that large differences were nevertheless found between the groups suggests that this was not a problem in this study. Also, previous studies have not found differences in maternal or child synchrony according to the sex of the child (Rocissano and Yatchmink, (1984) and Rocissano, Slade and Lynch (1987)). A comparison on the basis of child sex for the low-income groups in this study yielded no differences on synchrony measures for mothers or children. Thus, even though child sex covaries with income level, it is unlikely to have contributed to the differences between the income groups.

Another characteristic which covaries with income

level in this study is the degree to which the mother receives support (financial and emotional) from a male partner. Virtually all of the middle-income mothers had stable relationships with a spouse who supported them financially, while this was true for a minority of the low-income mothers.

While the concept of income level was used in differentiating the groups, the concept of maternal resources might be more useful in understanding the array of differences between these groups of mothers, only some of which were assessed in this study. These maternal resources include both aspects of intrapsychic functioning and external sources of support or stress (Belsky, (1984)). Keeping this concept of overall maternal resources in mind, we will now examine the findings of this study with respect to the literature.

The middle-income group showed increased maternal and child synchrony as compared to the low-income group, particularly an increase in synchronous joining. Middle-income children were almost as synchronous as their mothers, in contrast to the significantly greater mother synchrony in the low-income group. Middle-income children were also less asynchronous uninvolved than low-income children. The low-income mothers were more directing than middle-income mothers, and were usually asynchronous when

directing.

In terms of contingencies of responding, middle-class mothers showed more synchrony in response to child asynchrony than the low-income mothers.

These findings are consistent with previous findings of different patterns of interaction according to income level. In particular, the findings of Farrar and Haskins (1980) of increased mutual activity, decreased maternal termination of mutual play and decreased maternal controlling behaviors for middle-income dyads were confirmed in this study.

Overall, the middle-income dyads in this study tended to spend the bulk of their time interacting in a highly synchronous way. Incidents of children breaking the mutual focus without cuing the mother were extremely rare, and both mothers and children followed the other's lead the vast majority of the time.

The children of the low-income dyads tended to break mutual focus without cuing the mothers, and the mothers more often failed to repair this break. If the child "wandered off" or became involved in solitary activity, the mother tended to direct the child to another activity of the mother's choice or engage in her own separate activity, rather than follow the child's lead.

What does it take for a mother to be synchronous

with her child? Anyone who has spent time with a active, exploring toddler knows that it requires a considerable amount of energy and investment in the relationship with the child. It can be quite draining to follow the child's shifts of attention and actively engage in mutual play for any significant amount of time. Mothers whose energy level is low, who are beset by multiple worries about practical concerns, whose own needs are not met, will be less likely to have the amount of energy that active interaction with a toddler demands.

The concept of maternal resources encompasses these aspects contributing to availability of the mother to the child. The low income mothers in this study do not have easy lives, and are continually called upon to mobilize their energy to make the most of scant finances, cope with a lack of amenities such as heat and hot water, and frequently to manage emotionally and financially without the support of their child's father. Single parenthood in an inner-city environment can only be considered stressful and taxing. Mothers in this situation often feel that management of their child's behavior so as to reduce the child's demands upon them is their highest priority. In this regard, time spent in mutual play can be seen as a luxury available to those who have sufficient energy and support.

Implications for Development

What are the consequences for the child's development of these patterns of mother-child interaction? This is a particularly important question to consider, as work with drug abusers and high-risk populations tends to emphasize the abuser's own early relationships with parental figures. What are the mechanisms by which difficulties in interaction and relatedness are "inherited" from generation to generation? What will the outcomes be for the children of the mothers in this study? Consideration of the way the interaction is managed in these dyads may begin to provide some indications about how these difficulties are perpetuated.

Beebe and Lachman (1983, 1986) discuss several aspects of the mother-infant interaction which are relevant to the development of psychic structure. They stress three areas: expectable patterning of mutual regulation, attempts at repairing ruptures in this patterning, and supercharged affective moments. The first area is most relevant to this study. Expectable patterning refers to the degree of predictability or contingency in the responses of mother and infant to each other. The

extreme of disturbance in this area is represented by an absence of contingency, e.g., random responding to the infant by the mother, which does not permit the infant to develop a sense of efficacy or causality. (The same holds true for the mother's need to be able to predict the infant's behavior and develop her own sense of effectiveness as a mother.) Given that there is contingency in the interaction, the questions to be addressed involve the type of contingency and what comes to be the characteristic pattern of interaction. It may be positive or negative in tone, but given that it is predictable, the child's representations of self, other, and interaction-with-another will crystallize around these expectancies. This is particularly relevant for the 18 month old children in this study, who are developing the language and symbolic representation that is crucial for psychic structure and enduring representations of the self and other.

In this study, there was definitely a contingent pattern of responding revealed for all groups, but the pattern of responding was different for each group. The mothers in the drug group respond to their children in a way that communicates their intolerance of separation and child autonomy. For these children, their connection with their mothers depends on their own ability to join the

mother. When they pursue what catches their own attention, the mother does not usually follow. They therefore will not be able to develop a sense of being able to engage the other in an activity that originates from themselves; engagement is only possible if they engage the mother "on her terms". Some loss in the child's sense of efficacy in engaging the other in his or her own interests would be expected as a consequence. The representation of the self in interaction will therefore be composed largely of experiences of relatedness that is associated with increased effort on the part of the child to join with the mother. While Beebe and Lachman stress the importance of both "matching" and "being matched" by the other, these children are likely to experience more success in matching or joining with the mother than in being joined.

Consideration of ruptures in mutual regulation or management of joint attention leads to similar conclusions. It is interesting to consider the apparent precocity of some of these children with respect to management of interaction in the light of Kohut's (1984) ideas about the development of psychic structure. As summarized by Beebe and Lachman (1985), his model is of psychic structure developing in the infant at moments of "optimal frustration", when the infant is able to take over the regulating functions of the mother. At what level

of frustration does this break down? Presumably the child's abilities stretch only so far. It would be useful to determine if, for instance, the increased child directing seen in this study develops at the expense of other functions, and if this ability is maintained at older ages. However, it is likely that the frustration of being unable to engage the mother on the child's own terms spurs the child to learn how to engage the mother within the context of the mother's needs. In this sample, synchronous directing was an effective strategy for eliciting maternal synchrony, and is a way of interacting that partially answers the interests of both partners.

The high rate of interaction may have implications in terms of "open spaces' in the interaction that serve for development of the sense of self, separate from the self-with-other. This is an issue that relates to the development of self-regulation, which is an ability that drug dependent people are considered to be notably lacking in. Krystal and Raskin (1980), in particular, stress the inability of the drug abuser to manage his or her affects, and the function of the drug as an auxiliary ego. The lack of space in the mother-child interactions of the drug group suggests an inability for either the mother or child to be alone. If this is so, then certain crucial abilities will not develop in the child, and the child will then

continue to be dependent on someone or something external to perform ego functions.

Together, the mother's intolerance of separation and the lack of open space in the interaction contribute to the child's developing representations of the self as inextricably entwined with the other, but with that relatedness nevertheless not fully satisfying the child's need for recognition of his or her own interests, characteristics, and needs. This is a representation of self and other that may well lead to perpetuation of the inter-generational difficulties so often seen in drug abuse.

Individual Variation, Maternal Resources, and Child Invulnerability

The concept of maternal resources has been helpful in conceptualizing aspects of the mother's ability to care for her child. It is important to remember that this is a very broad concept that has both external and intrapsychic components. So far, primarily the external aspects have been considered: the financial, social and interpersonal resources the mother may draw upon. However, the intrapsychic aspects may prove to be the more important.

Bernstein, Jeremy, Hans and Marcus (1984) use the

concept of maternal resources without attempting to separate out the different aspects of this variable. While they observed that some drug-abusing mothers did relatively well with their infants, and that this was related to "maternal resources" as a whole, it is not clear what aspects were most important. A study by Musick, Stott, Spencer, Goldman and Cohler (1987) of psychiatrically disturbed mothers and their children suggested that mothers with quite similar external resources could differ dramatically in their parenting ability.

In this study, informal qualitative observation of the drug and nondrug group dyads showed wide variation in maternal sensitivity. There were two or three drug group mothers who were highly sensitive to their children's needs. One of these mothers was a heavy drug user, on methadone, who was being abused by the child's father, and was nevertheless able, at times, to be empathic and available to her child. On the other hand, there were two or three nondrug group mothers who appeared either depressed and unavailable, or else quite intrusive and insensitive to their child's needs.

The findings of Musick et. al. indicated that some aspects of the mothers' intrapsychic functioning enabled certain mothers to make use of the external resources that

were available, while others could not. The more crucial variables may thus lie in the personality of the mother, rather than in the mere existence of external resources for her to draw upon. This is not to say that the external resources are unimportant, but that enabling a mother to effectively use them is more complicated a task than simply providing access.

Musick et. al. also found that this aspect of maternal functioning was related to child resilience or invulnerability. Considering that children of psychiatrically disturbed mothers are "at risk", they were interested in factors that might differentiate those children who were "invulnerable" to such risk. They felt that it was this aspect of the maternal functioning that accounted for the resilience of some of these children.

Informal observation of the dyads in this study showed wide variation in maternal sensitivity and availability, and in the developmental level and interactive sophistication of the children. It appeared, from the author's informal clinical assessment of these dyads, that the more sensitive mothers had children who were verbal, responsive and doing well developmentally. It also appeared that this maternal sensitivity was at least partially independent of drug use.

The lack of dramatic differences between the drug

and nondrug groups may well be related both to the small number of subjects and variation in maternal intrapsychic functioning. The lack of obviously poor functioning in the drug group children may also be related to such variation in maternal intrapsychic functioning, and to the ability of some of the drug group mothers to provide sensitive care. However, it remains an open question at this point, because of this variability in maternal functioning, whether the good interactional abilities of some of these children is related systematically to either strengths or weaknesses in the mothers. That is, whether these children are more active and directing due to maternal strengths that promote adaptation in the children, or whether the children are managing to marshall their inner resources in the face of poor maternal responsiveness.

While the pattern of egocentricity, passivity and immaturity may hold true for drug abusing mothers as a group, some of these mothers are able to interact positively with their children and facilitate their development. Why this is so is an important question for future research, particularly with regard to maximizing the "invulnerability" of these children.

Directions for Future Research and Intervention

Further research investigating mother-child interaction and variables of maternal drug abuse and maternal resources for functioning would help to confirm the findings of this study and address some of the difficulties and unanswered questions. Careful consideration of the potential sampling and methodological problems is necessary in order to best address questions about this population.

Subject selection and recruitment is a potentially difficult issue. There has been little discussion in the literature about the practical problems associated with studying populations that are "deviant" (Gurdin and Patterson, 1987, pg.459). The above authors and Gurdin and Jeremy (1987) discuss the sampling problems encountered in a study of methadone-maintained women and their children. Classical research design, with variables controlled for or systematically varied, is extremely difficult if not impossible to accomplish with such a population. They noted, for instance, that the multiple drugs used by their sample varied according to what was available on the streets and changed quite a bit over the course of the

study, making it impossible to control for this. Even locating a sample of drug-abusing mothers may be quite difficult, and enrolling them in a research project is far from a trivial task. Loss of subjects due to dropout from the study is another problem. All of these difficulties can affect the representativeness of the sample and the researcher's ability to separate out variables and generalize about results. This does not mean that such research should not be done, but that stringent adherence to classical research design, with random sampling and carefully controlled variables, is unlikely to be an achievable goal.

With ever-increasing drug use, the importance of understanding this population will continue to grow. It is therefore important to consider the best ways of making and maintaining contact with drug-abusing mothers and their children. This is a highly mobile population which tends to adhere very little, if at all, to the standards of compliance with societal expectations that institutions such as hospitals, child welfare agencies, etc. expect. It is therefore not very likely that they would conform to the demands and structure of a research study, or that this would be very high on their list of important things to do. Relating such a research project to ongoing programs that involve the more important obligations of

these mothers may be most successful in maintaining contact. Services such as preventive programs that have sufficient staff for outreach, home visits, and considerable individual contact with the mother are in a better position to maintain the mother's involvement.

This raises the interesting issue of intervention and treatment with this population. There are both ethical and practical questions involved in the idea of research on drug abusing mothers that does not involve intervention. Leaving the ethical questions aside, it is the author's opinion that research in the context of an intervention program, which can address the many overwhelming needs of these dyads, is in the best position to do an in-depth assessment and maintain longitudinal involvement.

An associated issue, concerning both research design and intervention, is that of "blind" assessment. In this study, both the drug and nondrug group families often had urgent problems, and withholding services from such families cannot, ethically, be done. Unless there is sufficient funding to support the luxury of entirely separate assessment and intervention staff, "blind" assessment cannot be maintained for long. In such a situation, continuous monitoring of inter-rater reliability, perhaps with an outside consultant, may be

the best way to satisfy the need for objective evaluation as well as provision of services.

Intervention strategies could be devised based on the results of this study, particularly the findings of an increased rate of interaction in drug group dyads and the different pattern of maternal contingent responding in that group. An approach that features a non-judgmental way of working with the dyad, sensitivity to intrapsychic issues and some education and modeling of interactive strategies, is suggested as a potentially effective way of working with the mother-child interaction.

Specifically, focusing very concretely on the higher rate of interaction could be quite fruitful. Beginning such work in infancy, when the mother may be confronted with an unusually sensitive or unresponsive baby, will help prevent the mother from feeling frustrated, angry and rejected by her baby. Education about ways to tone down the intensity of stimulation, by slowing the pace, or interacting in only one sensory modality at a time, might help the mother to achieve those interactive successes with her infant that will keep both mother and baby interested in and enjoying each other. Helping the mother to wait for her baby to respond, instead of frantically accelerating stimulation in an effort to get the desired response, is another part of this approach.

Attention to the mother's interpretation of her baby's actions is also important. The very high level of maternal asynchrony in response to child asynchrony is consonant with the mother feeling rejected or angry when her child does not respond to her. Helping the mother to understand that her child's explorations are not necessarily rejection, and encouraging the mother in participating in her child's explorations, could lead to more satisfying interactions for both of them.

In terms of the assessment of mother-child interaction, the differences found with the synchrony coding system used in this study have shown that it can be used to differentiate groups in a way that is clinically meaningful. For future work, it is recommended that this scale be used in conjunction with an assessment of affect in the dyad, as the style of management of joint attention does not necessarily indicate the affective tone of the interaction. Informal clinical assessment of the interaction of dyads in this study that were quite synchronous suggested that synchrony alone did not mean that the interaction was positive. On the other hand, interactions that were more asynchronous usually appeared more negative in quality, but not always. For instance, prohibitions were sometimes delivered in an angry tone of voice, and sometimes affectionately, with long

explanations. The mother who says, "Get away from there!" and the mother who says, "Honey, you can't touch that, you could get hurt." cannot be considered to be equivalent, but the synchrony measure does not provide a way to differentiate them. Investigating the connection between synchrony and affect, and particularly situations in which there is a discrepancy between the two, could be quite fruitful in more fully characterizing the mother-child interaction.

Both Beebe and Lachman (1986) and Sander (1985) have stressed the importance of affect in the mother-child interaction. Sander considered the affect of joy in the interaction to be the best measure of whether the interaction was really going well for both mother and child. Beebe noted the importance of affect in one study which looked at infants interacting with their mother and with a stranger. She found that infants showed the same degree of temporal matching in both situations, but that their affect with the mother was much more positive. The synchrony measure, in assessing joint attention, is analogous to Beebe's temporal matching, in that both look at the management of attention and the engagement in the interaction. However, both measures do not really capture the affective tone of an interaction.

The measure of interactional synchrony can be

considered to reveal a great deal about the structure of the interaction: how much interaction there is, who initiates and terminates it, who repairs it, how active both partners are in maintaining it. However, it is possible to miss aspects of the content of the interaction with this system, of which affect is one of the most salient. Integration of affect with synchrony scoring would provide a much more complete characterization of the mother-child interaction.

It could also be quite interesting to look at interaction in situations other than free play, particularly situations that are associated with frustration or need gratification. Situations which are structured around child compliance, as in the mother teaching a task to her child, or getting her child to comply with instructions or prohibitions, might be particularly fruitful. For the low-income mothers in particular, who may not value play as highly as middle-income mothers, the use of a more structured task may be much more representative of behavior in real life. Zegiob and Forehand (1975) also found that a task-teaching situation revealed the most significant relationships between interaction and income level, ethnicity and child sex. In future research, efforts to study interaction in way that is as relevant to real life as possible may find

that studying such "teaching" situations is more informative.

Finally, in-depth evaluation of the intrapsychic functioning of both mothers and children is indicated. There is considerable variation in the ability of both drug and nondrug mothers to sensitively care for their children, and the synchrony scale does not capture this fully. The primary purpose of this kind of research is to provide the understanding that is needed to maximize the functioning and development of these families. To this end, a more in-depth examination of those factors that appear to be related to child invulnerability and resilience will be most useful.

APPENDIX A
Social Cue Definitions

In general, social cues are those behaviors which are directed at the partner and are communicative in nature. Particularly with young children, there can be some question concerning the intentionality to communicate. For instance, if a child cries, it may not be clear to what extent this is a communication to the parent or simply an expression of distress with no intention of engaging the parent. In scoring social cues, always err on the side of assuming a communicative function, particularly for such behaviors as vocalizations or gaze toward the partner, unless there is clear evidence of unrelatedness.

1. All vocalizations are considered social cues, regardless of intentionality to communicate. Even if the vocalizations are not necessarily directed at the partner, they are social cues. In rare cases, if the partner is clearly unrelated to the other partner, then a non-social cue turn may be scored, with a social cue exception noted.

2. Gaze at the other person is sometimes a social cue and sometimes not, depending on how tuned in the person is. Direct eye contact is a social cue.

3. Touching the other person is a social cue.

4. Offering an object to the other person is a social cue. Putting an object in the direct line of sight of the other person with the intention of engaging their attention is a social cue.

5. Receiving or taking an object from the partner is not a social cue per se.

6. Gaze at the object of focus is not a social cue.

7. All conventional social gestures are social cues. This includes gesturing, pointing, nodding, etc..

8. Communicative facial expressions are social cues, but there has to be mutual gaze or the intention to communicate. This includes smiling, frowning, expressions of surprise or disgust, etc.. If the facial expression is clearly a private reaction and the person is unrelated to the partner, then such expressions are not social cues.

9. Carrying out commands or suggestions of the partner are not social cues per se.

APPENDIX B

Revised Rocissano-Yatchmink Synchrony Scoring Manual

I. Synchronous Turns

General Remarks: Synchronous turns refer to the maintenance of joint attention and are divided into two general categories, synchronous joining and synchronous directing. Broadly speaking, synchronous joining refers to those turns in which the activity and object of focus are maintained by the respondent. In the synchronous directing turns, the respondent alters the nature of the action or the object of focus, using social cues to inform the partner of this change. This does not imply a complete change of topic; rather, the action or object of focus remains the same.

A. Synchronous joining turns

1. Joining Uninvited

Unsolicited behaviors accompanied by social cues which occurred subsequent to a turn that did not include social cues. Such turns share both the object of focus of the previous turn and the activity performed upon it.

Example: C: Closes bus door without social cues

M: "Oh! You closed the bus door."

2. Maintain

Shares both the object of focus and the activity of the preceding turn. Such turns are preceded by turns involving social cues, and themselves include such cues.

Rules:

1. "wh" questions (who, what, where...) about the same object or activity as the partner's previous turn are scored Maintain (not elaborations).
2. Inaudible responses that are clearly synchronous are scored Maintain.
3. "Help" questions, comments or offers are scored Maintain.

4. Evaluative comments (pretty, nice) are scored Maintain (not
elaborations).
5. Answers to "wh" questions that are labels for objects are scored Maintain.
6. Comments on unscored aspects of the prior turn are scored Maintain ("Your hat fell off", "Oh, you sneezed", "Watch your step").
7. If partners alternate doing the same activity with an object but their roles do not change, then the turn is scored Maintain (taking turns talking on the phone).
8. Verbal interpretation of the other's verbal or nonverbal cues is scored Maintain.
9. Asking the partner what s/he wants to do is scored Maintain.

3. Joining Elaboration

Expanding or elaborating on either the activity or object being used without changing either. The expansion or elaboration is always of a purely conceptual nature, and the activity itself is not changed. These turns always include social cues, and the previous turn may or may not include such cues.

Rules:
1. The play is expanded or elaborated upon by adding properties of objects, roles or a fantasy aspect to the play. The properties or new knowledge about the object/activity are different from simple naming of an object or activity (see Maintain).
2. Answers to "wh" questions which describe the function of an object are scored JE.
3. Fantasy sound effects are scored JE.
4. If partners alternate doing the same activity and their roles change from agent to recipient, then the turns are scored JE. An example of this is taking turns calling each other on the telephone (see Maintain, Rule 7).
5. Adjectives which describe properties or characteristics which are not readily observable are scored JE ("the propeller makes the helicopter go round and round", "cows give us milk to drink").

4. Parallel

Follow turns that may or may not include social cues, and maintain both the activity and the object being used, but without social cues. (Looking at the object that is being used does not constitute a social cue.)

Rules:
1. Parallel indicates involvement in activity alone, without social cues. Parallel is essentially a Maintain without social cues.
2. Parallel expressly follows the partner's activity, without changing either the activity or the objects being used.
Examples:
M: Stirring in frying pan:"Want to cook some eggs?"
C: Takes frying pan and stirs in it. (Parallel)

M: as above
C: Puts frying pan down, stirs in cup. (Shift)

M: as above
C: Watches M intently (Attention)

5. Attention

No behavior other than attention directed toward partner or partner's activity. This is an active, involved watching, as distinguished from Gaze, which is an uninvolved staring into space or at partner in an unrelated way.

B. Synchronous Directing Turns

1. Directing Uninvited

These turns share either the activity or object being used in the previous turn, but not both. These turns always include social cues and are always preceded by turns without scoial cues (hence "uninvited"). These turns involve some alteration of the previous turn, but are not a complete change of subject.
Examples:
C: Examines cup.
M: "Give me a drink". (Uninvited Directing)

C: as above
M:" What is that?" (Uninvited Joining)

2. Directing Elaboration

These turns are the same as Directing Uninvited, but follow turns with social cues. The alteration of the previous turn can take the form of expanding or elaborating on the activity with an utterance, adding or deleting objects,or changing the activity.
Rules:
1. Differentiate from Shift, which is a change of activity

or object without social cues.
2. "Wh" questions about a new object within the same general ongoing topic are scored DE (or Uninvited Directing).
Examples:
C: Stirring in pan on stove, "Cook".
M: Points to cup on stove, "Stir in the cup". (DE)

C:as above
M: Rings bell on stove. (Shift)

C: Offers cup to M, "Juice".
M: "No, give the cow some juice". (DE)

II. Asynchronous Turns

General Remarks: Asynchronous turns refer to the absence of joint attention between partners, and are divided into two general categories: asynchronous directing and asynchronous uninvolved. Asynchronous directing turns use social cues to direct the partner's attention to a completely new topic. Asynchronous uninvolved turns consist of a complete change of topic without using social cues to inform the partner of the change.

A. Asynchronous Directing Turns

1. Redirect

Change of activity and object; change to an entirely new topic from the previous turn, using social cues. A social cue may or may not have been present in the prior turn.

Examples:
C; dials phone, "Phone".
M: "Let's play with the cows". (Redirect)

C: as above
M: "Call grandma on the phone". (DE)

M: Dials phone.
C: Holds cow up to M, "Mommy". (Redirect)

2. Persist

Always follows an asynchronous turn, which may or may not include a social cue. Persist involves continuing one's own prior turn, with social cue, after

the partner has been asynchronous. Persist is usually a continuing Redirect, but not always. While partners may "persist" in partially changing the topic, as in DE, such turns are not scored as Persist. The intervening turn has to be completely asynchronous in order to score a Persist, but it does not necessarily have to include a social cue.Persist and Continuing Response are similar in that they both involve continuation of the person's own activity following an asynchronous turn by the partner. The difference is that Persist contains a social cue and Continuing Response does not.

Examples:
C: examining truck, "Rmmm,rmmm".
M: "Call Daddy on the phone." (Redirect)
C: "Rmmm,rmmm". (Persist)
M: "Come on, let's call Daddy". (Persist)

M: Rolls truck, "Roll it, rmmm, rmmm".
C: Turns around and reaches for block. (Ignore)
M: "Want to roll the truck?" (Persist)

B. Asynchronous Uninvolved Turns

1. Ignore

Change to a completely new topic or focus of attention without giving partner any social cues about the change. Ignore usually follows turns with social cues, but not always.

Examples:
M: Holds container, "Put it in".
C: Puts block in container, "Ma". (Maintain)
M: Turns around and examines cow. (Ignore)

M: Holds container, "Put it in".
C: Put block in. (Parallel)
M: Turns around and examines cow. (Ignore)

2. Shift

Changes the activity or object being used without cueing the partner. A Shift is a Directing Elaboration without social cues, and is considered asynchronous. Shift usually follows turns with social cues, but not always.

Examples:
M: Rolls truck, "Roll it".
C: Puts cow in back of truck. (Shift)

M: Holds container, "Put it in".
C: Puts block in. (Parallel)
M: Shakes container vigorously, not looking at C. (Shift)

3. Continuing Response

The individual continues his/her own previous turn, without cueing the partner. The intervening turn is always asynchronous, and includes a social cue. Continuing Response thus always follows a Redirect or Persist, and involves the person "persisting" in his/her previous topic, but without cueing the partner.

Examples:
C: Rolls truck, "Truck".
M: "Call Daddy on the phone". (Redirect)
C: Rolls truck. (Continuing Response)

4. Gaze/ No Response

No behavior other than gaze toward partner or object, or staring off at nothing in particular. This is differentiated from Attention in that here the gaze does not indicate relatedness or involvement in the partner's activity, even if the direction of the gaze is toward the partner.

Examples:
C: Dials phone, "Phone".
M: Looking at C vacantly. (Gaze/NR)

C: as above
M: Watching C intently. (Attention)

5. Touch

Unsolicited physical contact,which is not related to the ongoing topic. Social cues may or may not have occurred in the previous turn. Touch may occur as a double scored turn, if it occurrs along with synchronous verbalizations.

Examples:
C: Examines block, "Ma".
M: Checks C's diaper. (Touch)

C: as above.
M: "Yes, block", checking C's diaper. (Maintain/Touch)

III. Additional Notes

1. Inaudible vocalizations should be scored as Equivocal unless they are clearly interpretable as synchronous by the behavioral context (tone of voice, gesture, facial expression, etc.), in which case they are Maintains.
2. Deciphering of inaudible verbalizations should be filled in on the transcript.

3. Social Cue Exceptions are for those rare cases in which a turn clearly belongs to a certain category, but does not fit the social cue criteria for that catergory. In such cases, mark the Exceptions column on the transcript.
4. In the vast majority of cases, the social cue criteria for classification of turns is to be strictly followed. This includes noting the presence or absence of social cues in the turn to be scored, as well as in the turn which immediately precedes it. Turns should be classified primarily according to the guidelines established in the manual, rather than by "feel" or "intuition".

5. In certain cases, a turn will contain behaviors which can be classified into more than one category. Double scoring may be done occasionally if the different aspects of the turn fall into both synchronous and asynchronous categories. If the different aspects would be both synchronous or both asynchronous, do not double score, but score the category with the "louder" behavior. For instance, a double scoring of Maintain/Touch is permissible, but a double scoring of Uninvited Directing/Parallel is not allowed, since both are synchronous. Directing categories are considered "louder" behaviors than joining or uninvolved behaviors.

REFERENCES

Bakeman, R. (1978). Untangling streams of behavior: Sequential analyses of observation data. In G.P.Sackett (Ed.), Observing Behavior, Vol. II: Data Collection and Analysis Methods, (pp. 63-78). Baltimore, MD: University Park Press.

Bakeman, R. and Gottman, J.M. (1987). Applying observational methods: A systematic view. In J.D. Osofsky (Ed.), Handbook of Infant Development (pp. 818-854). New York: Wiley and Sons.

Beebe, B. and Lachman, F.M. (1983). Mother-infant mutual influence and precursors of psychic structure. In A. Goldberg (Ed.), Progress in Self Psychology (pp. 3-25). Hillsdale, NJ: Analytic Press.

Beebe, B. and Lachman, F.M. (1986). The organization of infant experience: The contribution of mother-infant mutual influence. Paper presented at the American Psychological Association, Washington, D.C..

Belsky, J. (1984). The determinants of parenting: A process model. Child Development, 55, 83-96.

Bernstein, V., Jeremy, R.J., Hans, S.L., and Marcus, J. (1984). A longitudinal study of offspring born to methadone-maintained women. II. Dyadic interaction and infant behavior at 4 months. American Journal of Drug and Alcohol Abuse, 10(2), 161-193.

Bernstein, V., Jeremy, R.J. and Marcus, J. (1985). Mother-infant interaction in multiproblem families: Finding those at risk. Journal of the American Academy of Child Psychiatry, 25(5), 631-640.

Bishop, B.M. (1951). Mother-child interaction and the social behavior of children. Psychological Monographs,65(11, Whole No. 328).

Brown, J.V., Bakeman, R., Snyder, P.A., Fredrickson, W.T., Morgan, S.T., and Hepler, R. (1975). Interactions of black inner-city mothers with their newborn infants. Child Development, 46, 677-686.

Brunquell, D., Crichton, L., and Egeland, B. (1981). Maternal personality in disturbances of child

rearing. American Journal of Orthopsychiatry, 51(4), 680-691.

Burns, W. J. and Burns, K.A. (1988). Parenting dysfunction in chemically dependent women. In I.J. Chasnoff (Ed.), Drugs, Alcohol, Pregnancy and Parenting (pp. 159-172). Boston: Kluwer Academic Publishers.

Chasnoff, I.J. (1986). Drug Use in Pregnancy: Mother and Child. Boston, MTP Press Limited.

Chasnoff, I.J., Burns, K.A., Burns, W.J. and Schnoll, S.H. (1986). Prenatal drug exposure: Effects on neonatal and infant growth and development. Neurobehavioral Toxicology and Teratology, 8, 357-362.

Chasnoff, I.J., Burns, W.J., Schnoll, S.H. and Burns, K.A. (1985). Cocaine use in pregnancy. New England Journal of Medicine, 313, 666-669.

Chasnoff, I.J., Bussey, M.E., Savich, R. and Stack, C.M. (1986). Perinatal cerebral infaction and maternal cocaine use. The Journal of Pediatrics, 108(3), 456-459.

Chasnoff, I.J., Hatcher, R. and Burns, W.J. (1982). Polydrug- and methadone-addicted newborns: A continuum of impairment? Pediatrics, 70,(2), 210-214.

Clarke-Stewart, K.A. and Hevey, C.M. (1981). Longitudinal relations in repeated observations of mother-child interactions from 1 to 2 1/2 years. Developmental Psychology, 17,(2), 127-145.

Cohen, S. (1969). The Drug Dilemma. New York: McGraw-Hill.

Coppollilo, H.P. (1975). Teaching ex-addicts to become adequate parents is a tough job. Journal of the American Medical Association, 232, 585-590.

Crittendon, P.M. (1981). Abusing, neglecting, problematic, and adequate dyads: Differentiating by patterns of interaction. Merrill-Palmer Quarterly, 27(3), 201-218.

Farrar, D.C. and Haskins, R. (1980). Reciprocal influence in the social interactions of mothers and three year old children from different socioeconomic

backgrounds. Child Behavior, 51, 780-791.

Fleiss, J.L., Cohen, J. and Everitt, B.S. (1969). Large sample standard errors of kappa and weighted kappa. Psychological Bulletin, 72(5), 323-327.

Forfar, J.O. (1968). "At risk registers". Development and Medical Child Neurology, 10, 384-395.

Goldberg, S. (1977). Social competence in infancy: A model of parent-infant interaction. Merrill-Palmer Quarterly. 23(3), 163-177.

Golden, M. and Birns, B. (1968). Social class and cognitive development in infancy. Merrill-Palmer Quarterly, 14, 139-149.

Gordon, B.N. (1983). Maternal perception of child temperament and observed mother-child interaction. Child Psychology and Human Development, 13(3), 153-167.

Gurdin, J.B. and Jeremy, R.J. (1987). Problems of generalizing from a sample of a population called deviant: The case of methadone-maintained women and their infants. Journal of Community Psychology, 15, 471-480.

Gurdin, J.B. and Patterson, C.B. (1987). The problem of sample frame in populations called deviant: The case of methadone-maintained women and their infants. Journal of Community Psychology, 15, 459-470.

Householder, J., Hatcher, R., Burns, W., and Chasnoff, I. (1982). Infants born to narcotic-addicted mothers. Psychological Bulletin, 92(2), 453-468.

Jeremy, R.J. and Bernstein, V.J. (1984). Dyads at risk: methadone-maintained women and their four month old infants. Child Development, 55, 1141-1154.

Johnson, H.L., Diano, A. and Rosen, T. (1984). 24-month neurobehavioral follow-up of children of methadone-maintained mothers. Infant Behavior and Development, 7, 115-123.

Johnson, H.L., Glassman, M.B., Fiks, K.B., and Rosen, T.S. (1985). Resilient children:Individual differences in developmental outcome of children born to drug

abusers. Manuscript submitted for publication.

Kami, C.K. and Radin, N.L. (1967). Class differences in the socialization practices of negro mothers. Journal of Marriage and the Family, 29, 302-310.

Kaye, K. and Charney, R. (1980). How mothers maintain "dialogue" with two-year-olds. In. D. Olsen (Ed.), The Social Foundations of Language, (pp. 211-230). New York: Norton.

Kogan, K.L. and Wimberger, H.C. (1969). Interaction patterns in disadvantaged families. Journal of Clinical Psychology, 25, 347-352.

Kohut, H. (1984). How Does Analysis Cure? Chicago: University of Chicago Press.

Krystal, H. and Raskin, H.A. (1980). Drug Dependence: Aspects of Ego Function. Detroit, MI: Wayne State University Press.

Krystal, H. and Raskin, H.A. (1981). Drug dependence: Aspects of ego function. In H. Shaffer and M.E. Burglass (Eds.), Classic Contributions in the Addictions, (pp. 161-172). New York: Brunner/Mazel.

Lamb, M.E. and Easterbrooks, M.A. (1981). Individual differences in parental sensitivity: Origins, components and consequences. In M.E. Lamb and L.R. Sherrod (Eds.), Infant Social Cognition: Empirical and Theoretical Considerations, (pp. 127-153). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lawson, M.S. and Wilson, G.S. (1979) Addictions and pregnancy: Two lives in crisis. Social Work in Health Care, 4(4), 445-457.

Lewis, M. and Wilson, C.D. (1972). Infant development in lower-class American families. Human Development, 15, 112-127.

Mahler, M., Pine, F. and Bergman, A. (1970) The mother's reaction to her toddler's drive for individuation. In A. J. Anthony and T. Benedek, (Eds.). Parenthood: Its Psychology and Psychopathology. Boston: Little, Brown and Co..

Mahler, M., Pine, F. and Bergman, A. (1975). The

Psychological Birth of the Human Infant. New York: Basic Books.

Malone, C.A. (1963). Some observations on children of disorganized families and problems of acting out. American Journal of the Academy of Child Psychiatry, 2, 22-49.

Marcus,J., Hans, S.L., Patterson, C.B., and Morris, A.J. (1984). A longitudinal study of offspring born to methadone-maintained women. I. Design, methodology and description of women's resources for functioning. American Journal of Drug and Alcohol Abuse, 10(2), 135-160.

Martin, J.A., Maccoby, E.E., Baran, K.W. and Jacklin, C.W. (1981). Sequential analysis of mother-child interaction at 18 months: A comparison of microanalytic methods. Developmental Psychology, 17(2), 146-157.

Musick, J.S., Stott, F.M., Spencer, K.K., Goldman, J., and Cohler, B.J. (1987). Maternal factors related to vulnerability and resiliency in young children at risk. In E.J. Anthony and B.J. Cohler (eds.), The Invulnerable Child, (pp. 229-252). New York: The Guilford Press.

Nyswander, M. (1956). The Drug Addict as a Patient. New York: Grune and Stratton.

Oppe, T.E. (1967). Risk Registers for Babies. Development and Medical Child Neurology, 9, 13-21.

Ramey, C.T., Farran, D.C. and Campbell, F.S. (1979). Predicting I.Q. from mother-infant interactions. Child Development, 50, 804-814.

Rocissano, L. and Yatchmink, Y. (1983). Language skill and interactive patterns in prematurely born toddlers. Child Development, 54, 1229-1241.

Rocissano, L., Slade, A., and Lynch, V. (1987). Dyadic synchrony and toddler compliance, Developmental Psychology, 23(5), 698-704.

Rocissano, L. and Yatchmink, Y. (1984). Joint attention in mother-toddler interaction: A study of individual variation. Merrill-Palmer Quarterly, 30, 11-31.

Rosen, T.S. and Johnson, H.L. (1982). Children of methadone-maintained mothers: Follow-up to 18 months of age. Journal of Pediatrics, 101, 192-196.

Rosen, T.S. and Johnson, H.L. (1984) Long-term effects of prenatal methadone maintenance. Paper presented at the National Institute on Drug Abuse Conference, Washington, D.C..

Sackett, G.P. (1978). Measurement in observational research. In G.P. Sackett (Ed.), Observing Behavior, Vol. II: Data Collection and Analysis Methods (pp. 25-43). Baltimore, MD: University Park Press.

Sackett, G.P. (1987). Analysis of sequential social interaction data: Some issues, recent developments, and a causal inference model. In J.D. Osofsky (Ed.), Handbook of Infant Development (pp. 855-878). New York: Wiley and Sons.

Sameroff, A.J. (1975). Early influences on development: Fact or fancy? Merrill-Palmer Quarterly, 21(4), 267-294.

Sander, L. (1969). The longitudinal course of early mother-child interaction: Cross-case comparison in a sample of mother-child pairs. In B.M. Foss (Ed.), Determinants of Infant Behavior IV (pp. 189-225). London: Methuen Press.

Sander, L. (1975). Infant and caretaking environment. In J.A. Anthony (Ed.), Explorations in Child Psychiatry, (pp. 129-165). New York: Plenum Press.

Sander, L. (1983). To begin with: Reflections on ontogeny. In Lichtenberg, J. and Kaplan (Eds.), Reflections on Self Psychology (pp. 85-104). Hillsdale, NJ: Analytic Press.

Schneider, J.W. and Chasnoff, I.J. (1987). Cocaine abuse during pregnancy: Its effects on infant motor development--A clinical perspective. Topics in Acute Care and Trauma Rehabilitation, 2(1), 59-69.

Sowder, B.J. and Burt, M.R. (1980). Children of Heroin Addicts: An Assessment of Health, Learning, Behavioral and Adjustment Problems. New York: Praeger Scientific.

Spitz, R. and Cobliner, W. (1965). The First Year of Life. New York: International Universities Press.

Strauss, M.E., Starr, R.H., Ostrea, E.M., Chavez, C.J. and Stryker, J.C. (1976). Behavioral concomitants of prenatal addiction to narcotics. Journal of Pediatrics, 89(5), 842-846.

Suomi, S.J. (1981). The perception of contingency and social development. In M.E. Lamb and L.R. Sherrod (Eds.), Infant Social Cognition: Empirical and Theoretical Considerations, (pp. 127-153). Hillsdale, NJ: Lawrence Erlbaum Associates.

Werner, E.E. and Smith, R.S. (1979). An epidemiologic perspective on some antecedents and consequences of childhood mental health problems and learning disabilities. Journal of the American Academy of Child Psychiatry, 2, 292-306.

Wulbert, M., Inglis, S., Kriegsman, E. and Mills, B. (1975) Language delay and associated mother-child interactions. Developmental Psychology, 11(1), 61-70.

Zegiob, L.E. and Forehand, R. (1975). Maternal interactive behavior as a function of race, socioeconomic status, and sex of the child. Child Development, 46, 564-568.