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Individual differences in clinical judgments of mother-child interaction

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The Ohio State University, 1990
INDIVIDUAL DIFFERENCES IN CLINICAL JUDGMENTS
OF MOTHER-CHILD INTERACTION

DISSERTATION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

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CHAPTER I

INTRODUCTION

Current perspectives on early intervention cite the importance of the multidisciplinary process and parent involvement to successful referral, evaluation, and treatment of developmentally delayed young children. These two themes point to the importance of a cross-disciplinary understanding of the criteria professionals use to evaluate mother-child interaction. Yet, little data exist on the similarities and differences among professions or individual professionals in describing mother-child interactions.

The variability in the evaluation of mother-child interaction among professionals has roots in the training and clinical focus of each profession. Theoretical issues central to each profession influence clinical evaluations. In the field of speech-language pathology, some researchers support the notion that the nature of the linguistic input a mother provides influences language development. For example, evidence from Gordon Well's Bristol Language Studies (1981) shows a relationship between adult input features and child language development. Professionals adhering to this view will value certain types of adult language input over others. Bruner (1983) suggests that routines such as peek-a-boo allow the child to see how
language works. Consequently, Bruner's perspective views the parent who provides the child with such routine experiences as assisting the child in developing insight into the pragmatic nature of language.

Other professions may emphasize different types of parental influence. In the field of early childhood education, researchers such as Brazelton and Als (1979) emphasize the importance of providing an emotional shelter or envelope, that enables children to discover their own capacities to turn outward and explore the world. The investigations of these researchers describe variables, such as the freedom to explore, which allow the child to experience success in learning.

Another notion, attachment, influences some interpretations of optimal mother-child interaction. Social work and nursing researchers frequently cite examples of this notion as in Ainsworth's (1972) strange situation experiment, an experimental exploration of attachment theory. She demonstrates that reunion behavior divides infants into two groups, securely attached and anxiously attached. Further, Ainsworth showed correlations between nine-month reunion behavior and early face-to-face interactions. Mothers of securely attached infants were described as playful and smiling. They also responded contingently to their babies and continued playful episodes with them. Professionals who hold this viewpoint will look
for behaviors thought to influence the development of attachment.

Professionals will likely be influenced by these and other notions emphasized in their training and clinical focus. Theories of concept formation, attribution and social comparison play a role in professional interpretations of mother-child interaction as well. Theories of concept formation (Smith & Medin, 1981) suggest that methods of evaluation can influence interpretation of any phenomena. Heider's (1980) attribution theory proposes that interpretation of phenomena depend upon the relative weights the observers give to the persons, stimuli, or circumstances involved. In his theory of social comparison, Festinger (1954) argues that through human nature, individuals tend to evaluate their opinions and actions by comparing them with the opinions of people like themselves. Professional training programs use principles of social comparison to develop observation skills in their trainees, since trainers generally evaluate clinical judgments against their own.

Mother-child interaction provides an ideal context to explore the clinical judgment process because the complexities involved in dyadic interaction may yield major dimensions professionals use as a clinical index. Experimental sampling of professional behavior in the evaluation process may provide clues to similarities and
dissimilarities among professionals and the basis of these individual differences. Uncovering these issues may lead to improved interaction and understanding among professionals in the multidisciplinary evaluation process.

Statement of the Problem

The similarities and differences in professional interpretations of mother-child interaction provide the fuel for this investigation. The investigator will explore the major dimensions and the correlates of individual differences in clinical judgments of mother-child interactions among professionals. The subjects will represent four professions who regularly assess the quality of mother-child interaction: speech-language pathologists, social workers, early childhood special educators, and nurses. Video-taped samples of mothers with their twelve month-old children who had health problems at birth, will provide the stimuli for their judgments. The children vary according to developmental level and will include a high and low functioning group. The mothers will vary according to communication style, and include a non-directive and a directive group.

The primary research questions include the following:

1. Do professionals use a common set of perceptual dimensions to discriminate among mother-child interactions?

2. What variables relate to the dimensions professionals use in the discrimination process?
3. Does professional background influence the discrimination process?

**The Purpose, Need and Potential Impact of the Investigation**

Due to the mandates of The Education of the Handicapped Act Amendments of 1986 (Public Law 99-457), a range of professionals have become involved in the evaluation and treatment of developmentally delayed young children and their families. According to the law, referred children receive a multidisciplinary evaluation specified in the rules and regulations of the Federal Infant and Toddler Programs (Federal Register, June 22, 1989). Evaluation to determine eligibility for services must be multidisciplinary, defined as two or more disciplines providing integrated and coordinated services including evaluation and assessment activities.

Several disciplines provide evaluations and services related to aspects of mother-child interaction under the regulations of P.L. 99-457; included among them are speech-language pathology, nursing, social work, and early childhood special education. The regulations specify the following as in the domain of professionals in these four disciplines: 1) speech-language pathologists, charged with the assessment of communication disorders and delays, 2) nurses, who often provide primary service in nutrition intervention, including the evaluation of feeding skills and feeding problems, 3) social workers, mandated to evaluate
patterns of parent-child interaction and a psychosocial assessment of the child within the family context and, 4) early childhood special educators, directed to provide families with skills related to enhancing the development of the child (Section 303.12, Federal Register, June 22, 1989).

The law and its accompanying regulations include guidelines for all service providers in each area of early intervention service which specify that they are responsible for: 1) consulting with parents, other service providers, and representatives of appropriate community agencies to ensure the effective provision of services in that area; 2) training parents and others regarding the provision of those services; and, 3) participating in the multidisciplinary team's assessment of the child and the child's family and in the development of integrated goals and outcomes for the individualized family service plan (IFSP).

Guidelines specific to professions and general professional role descriptions point to the need for an awareness of the origins of multiple points of view across professions in assessing and providing service in parent-child interaction. Since assessment instruments and intervention techniques vary across and within disciplines, this variability often contributes to confusion in the referral, evaluation, and treatment of children and their parents.
The results of the investigation should influence multidisciplinary clinical practice as it relates to the assessment/intervention of mother-child interaction. The existing service system most frequently depends upon referral from one agency to assessment and possible intervention at others. Such a system assumes a common point of view among professionals on phenomena such as mother-child interaction; an assumption which is likely invalid. The transition process from referral to intervention may benefit from increased knowledge among professionals regarding existing biases in clinical judgments. Such knowledge may also assist communication among professionals from a range of disciplines functioning in the multidisciplinary process.

The small bridge between the clinical and research community which this investigation creates may lead to further investigations which use input from practicing professionals as data. Clinical professionals who participate as subjects in such investigations may begin to see themselves and their point of view as important to the research community. Such links can enhance the utility of clinical research as well as the clinical use of research data. The threads of similarity and differences in clinical judgments discovered in this investigation may lead to further investigation of other groups of professionals and/or impaired populations.
CHAPTER II

REVIEW OF THE LITERATURE

The review of the literature consists of two parts. The first part considers issues which may provide foundations for individual differences in clinical judgments of mother-child interaction. These include the multidisciplinary process and perspective and the clinical assessment process as influenced by frameworks of concept formation, attribution theory, and social comparison theory. In addition, this part of the review provides background regarding clinical tools and motivations for evaluating mother-child interaction in each of the four professions under study.

The second part of the literature review provides theoretical and empirical support for the attribute rating scale which the subjects use in the investigation. The rating scale includes three sets of variables: 1) descriptions of the child, 2) descriptions of the mother, and 3) descriptions of the mother-child interaction. The attribute scale models the kinds of judgments professionals are required to make in evaluating young children in interaction with a parent.
Part One: Foundations for Individual Differences

The Multidisciplinary Process

P.L. 99-457 defines the early intervention services of child find, assessment, service planning, and service delivery as multidisciplinary functions (Gallagher, Trohanis, & Clifford, 1989). Multidisciplinary describes one process disciplines use to work together. These processes are generally viewed on a continuum which include intradisciplinary, multidisciplinary, interdisciplinary and transdisciplinary process (Sands, 1988). A review of several works on the process of disciplines working together (Golin, 1981; Delkeskamp 1977; Sands 1988; Germaine, 1984) suggest the following differentiations between the four processes. Intradisciplinary refers to within discipline activity. Delkeskamp (1977) defines discipline as "a specific body of teachable knowledge with its own background of education, training procedures, methods and content areas..." (p.325). Activities described as disciplinary generally refer to self-contained professional activities or those completed in conference with members of a single discipline. Multidisciplinary activity involves coordination and cooperation among participants who have training in a variety of disciplines. These activities may take a hierarchical form, particularly when led by a physician (Germaine, 1984). Interdisciplinary activity generally assumes a shared responsibility and accountability
for outcomes. Consequently, these activities involve more sharing of perspectives and skills in order to achieve joint problem-solving. Transdisciplinary processes transcend individual disciplines and tend to be guided by a shared perspective. Processes surrounding early intervention may be best described as multidisciplinary since they frequently involve a variety of agencies, professions, and individual professionals. Such groups can generally coordinate and cooperate to varying extents, but rarely share responsibility for outcomes or a common perspective. This investigation of individual differences in clinical judgments of mother-child interaction may provide insight into more efficient operation of the multidisciplinary process related to early intervention.

**Theoretical Issues Related to Clinical Assessment**

Many factors influence the clinical perceptions of a professional in any discipline. For example, when a report precedes a child's visit for evaluation, some professionals may view the report as important collateral information for their evaluation. Others may view the report as contaminating information, likely to influence their view of the child in manner often referred to as the self-fulfilling prophecy (Rosenthal & Jacobson, 1968). Some clinicians may consider objective information, that is information they obtain from direct observation of the child as the most valid information. Others consider this same information as
suspect, and tend to side with Bronfenbrenner (1975) who describes psychological evaluation of children as "behavior observed ... in a strange situation for the briefest period of time" (p.19).

Disciplinary training influences professional judgment as well. Professions as well as perspectives within professions differ in their emphasis on mother-child interaction in the child's development and in the way they train their students to evaluate that interaction. As individual professionals shape a clinical view of mother-child interaction three processes may be involved: concept formation, attribution and social comparison.

Frameworks of concept formation.

Principles derived from the work of Smith and Medin (1981) describe frameworks of concept formation which suggest that the way a person learns to categorize information shapes his formation of a concept. Professionals may form a concept of mother-child interaction using a variety of categorization approaches including a feature identification system or approaches which quantify a set of dimensions on rating scales. Some professionals may learn through case work and adopt a holistic framework.

Clinical tools which use a feature approach to describing mother-child interaction, provide a list of features, and clinicians decide whether the interaction does or does not include the feature. For example, the clinical
tools in Barnard's (1985) Nursing Child Assessment Satellite Training Model (NCAST), require that the professional determine whether the interaction includes the feature and check yes or no. Features include such notions as "the parent laughs or smiles at the child during the teaching" or "the child actively resists food offered". To professionals trained in this model, evaluation tells whether or not the feature exists in the repertoire of the dyad or the frequency with which it occurs. Feature approaches tend to create high inter-observer reliability, and so are frequently used in clinical assessments.

Other professionals may view mother-child interaction according to a dimensional approach, deciding the degree to which certain dimensions describe the interaction. MacDonald, Gillette and Hutchinson's (1989) Ecological Communication Scales uses a dimensional approach. The tool provides professionals with a series of variables related to the adult, child, or the interaction between them which they rate on a scale of 1-9. Examples of the variables include "the adult responds to the child" or "the child uses actions in a functional and meaningful ways". While these types of ratings may seem to assist professionals in measuring the variable more precisely, reliability problems often exist in using these types of measures. This occurs because it is more likely to have two people agree on whether a feature exists or does not in a given interaction than it is to have
them agree on a numerical rating of the feature. The use of case examples approximate a holistic model in the analysis of mother-child interaction. The use of case examples may appear less scientific than the use of scales which have varying degree of psychometric integrity. However, many social psychology experiments have shown that people are frequently influenced more by the vivid information supplied by a case example than by base-rate information, such as statistical evidence (Nisbett & Ross, 1980; Hamill, Wilson, & Nisbett, 1980). While holistic models have the advantage of integrating many pieces of information, it is often difficult to determine which pieces of information have the most descriptive power. Judgments about mother-child interaction will likely be influenced by professional experience with a feature, dimensional, or holistic approach to evaluation.

**Attribution theory.**

Attribution theory may play a role in professional interpretation of mother-child interaction as well. Principles from Heider's (1980) attribution theory suggest that people attribute behavior to persons or situations. In the case of mother-child interaction, this would suggest that professionals may place various emphases on the mother, the child, or the situation depending upon their interpretation of the observed event. As Bell, (1968) suggests some professionals may view the child as a passive
recipient of parental influence in the interaction; others may view the child as a more active participant. Such variety in outlook creates diverse views in professional evaluations of mother-child interaction.

**Social comparison theory.**

Festinger's (1954) theory of social comparison suggests that individuals seek social comparison with others to evaluate their own opinions. The act of clinical training includes components of social comparison. Individuals training in a profession learn from a mentor the variables which the profession or the mentor considers important and the priority of each variable to clinical analysis. Mentors judge the individuals they train on how well they can approximate the model of clinical interpretation presented. Professionals may value interaction style which approximate their own as most appropriate. Many students and professionals may not realize that a phenomenon such as mother-child interaction can be interpreted in more than one way. Even if these individuals become aware of multiple perspectives, they rarely have training which helps them understand or value other perspectives. Due to biases in professional training, misunderstandings arise in the multidisciplinary process.

**Assessment Across the Professions**

Professionals often use formal clinical assessment instruments because of their utility in documenting
observations and the possibility of measuring change over
time more objectively than is possible with subjective
comments. The content and organization of the tools may
provide another source of influence in shaping clinical
perceptions. During the 1970's and 1980's clinical tools
for measuring parent-child interaction began to emerge in
the four professions investigated here, speech-language
pathology, nursing, social work, and early childhood special
education. The investigator will review the clinical
instruments most commonly used in the research and practice
of each profession because of the likelihood of their
influence on issues under investigation in this study.

Speech-language pathology.

The field of speech-language pathology has just begun
to consider its role in the evaluation of mother-child
interaction. The interest has emerged because of the
growing evidence that maternal input may have some effect on
child language development, particularly in the area of
pragmatics. When professionals begin to consider how
language is used, the language of both communicating
partners, mother and child, becomes a source of study.

Lund and Duchan (1988) note that

Until recently, researchers and clinicians have studied
language as though form and meaning existed independent
of the contexts in which language occurs. Research in
the last decade has shown the dramatic effect of
contexts on the way language is used in interpreted,
making it clear that language cannot be realistically
assessed if it is isolated from what is going on with
the speaker and listener. Pragmatics is the study of
the effects of context, and it has been investigated in a variety of ways that offer alternative approaches to analyzing children's use of language. (See Simon, 1985; Duchan, 1984; Gallagher & Prutting, 1983; and Irwin, 1982 for a sampling of many of these approaches.) (p. 48)

Despite an apparent need, few clinical assessment approaches address the relationship of early mother-child interaction to later language development. Perhaps this results from the fact that few clinicians in the field of speech-language pathology have the opportunity to assess or intervene with children until after the age of two, when the child can demonstrate an expressive language delay. Consequently, clinicians lack tools to use when they do participate in programs for young children which are designed to prevent a problem from developing or to promote existing potential in communication and language skills. Lund and Duchan's (1988) offer some direction by urging the clinician to consider sensemaking, functionalism, and fine-tuning in their assessment of the child's development of communication skill.

They define sensemaking as attempts by participants to make sense of experiences by relying on their background knowledge, orientation, and theories about how the world operates. They cite the work of Bruner (1975, 1977; Ratner & Bruner, 1978) to make a case for the importance of routines to teaching the child some rules of communication. These articles describe the mother as scaffolding, at first
taking responsibility for the routine, such as peek-a-boo, or passing objects back and forth, then gradually allowing the child to participate as an equal partner as he can. A few of the communication rules the child can derive from such routines include the arbitrariness of topic maintenance and the responsibility of both partners to accomplishing a communicative exchange.

Lund and Duchan also urge the practicing clinician to look at messages on several levels including the intent of the message, the content or semantics of the message, and the effects of the message. They base this recommendation on the work of Searle (1969) who defines three components of the communicative act, the actor's intent, the conventional meaning of the act, and the effect of the act. In their efforts to stress the importance of context, including the mother-child interaction to language-learning, Lund and Duchan also refer to the concept of fine-tuning. They describe fine-tuning as achieving the optimal match between language input and child thinking. Recent research supports the notion that fine-tuning is more important to semantic than syntactic learning (Gleitman, Newport & Gleitman, 1984; Furrow, Nelson, & Benedict, 1986; Cross, 1977; Snow, 1977).

In an attempt to fill the need for an interaction-based assessment tool, MacDonald, Gillette & Hutchinson, (1989) have recently published a clinical instrument, The ECOScales, which assists clinicians in assessing the child's
communication skills within the context of an adult-child interaction. The tool provides a framework for clinicians to consider the adult and child's role in maintaining interactions and learning language. The ECOScales include forty variables, each with a list of 3-8 component behaviors. The forty variables span five scales titled Becoming (Play, Turntaking, Communicating, Language, or Conversation) Partners. Each scale includes an interactive goal, problems (interactive, child and/or adult), child goals, and adult strategies. Clinicians rate each variable on a scale of 1-9, with one describing a poor quality of the behavior and 9 describing an outstanding quality. The scales can assist a clinician in assessing preverbal and verbal interactive skills of the child, assessing the strengths and needs in the adult's attempts to play, interact, communicate, talk, and have conversations with the child. The scales also allow clinicians to describe the communicative routines adults and children create together.

While the authors derived the scale items from a range of sources, the principles of turntaking and matching provided a primary foundation. Kenneth Kaye (1977) defines turntaking as a crucial precursor of language development. He notes that Bruner (1975) points out that one early skill language learners must learn is the importance of alternating their own attempts at expressing propositions and semantic relations with the attempts of a model. He
also suggests the importance of mutual gaze direction to turntaking which is profitable for language learning, since the child will be unlikely to extract much information from adult utterances unless the adult and child are communicating about the same thing. Kaye reported on the concept of turntaking between mothers and their two-year old children in Kaye and Charney (1981). Their units of analysis and the related definitions were: responses, mands (a turn that expects a response from another), turnabouts (a turn that both responds to another and expects a response from the other), and unlinked turns (neither responses nor mands). They noted both the strong individual differences in the balance of each turn type across dyads, as well as the negative effects of mother's use of mands upon the child's language comprehension, puzzle-solving, and conversational engagement with an investigator, even with social class controlled.

Matching directs the adult to act more like the child and occasionally act in a manner which shows the child the next steps which build upon his current behavior. The authors derived the matching principle from the works of a range of investigators including: (1) Hunt, (1965) who describes the importance of minimally discrepant modeling for learning educational tasks; (2) Stillman & Battle (1984) who describe Van Dijk's sequence of interpersonal methods (resonance, co-active, and imitation activities) which build
toward the use of gestures in interpersonal contexts; 3) Vygotsky's (1962) zone for optimal learning; 4) Mahoney's (1988) motivational matching; and 5) Bruner's (1983) concept of fine tuning. All suggest the importance of the adult matching the child's abilities, motivations, interests, and pace in order to foster the development of the child in a range of skills including communication as well as cognitive and social learning.

While the field of speech-language pathology has begun to take note of the importance of context and parent-child interaction to language learning, clinical tools for assessing communicative context have only begun to emerge. This is particularly true for parent-child interaction with children operating at a preverbal level, as do the twelve month old children who provide the stimuli for this study. Efforts will undoubtedly be made to correct this situation in light of the fact that P.L. 99-457 has mandated speech-language pathologists to provide assessments of children in the birth through two age range. Existing and on-going research which identifies child precursors to language development and adult strategies which foster communication skills will form the basis for the development of such tools.

Nursing.

The clinical tools in Barnard's (1985) Nursing Child Assessment Satellite Training Model (NCAST), provide a focal
point for clinical judgments of parent-child interaction among nurses, particularly those in family and community practice. It's broad use may be accounted for by the fact that it includes scale to evaluate feeding and teaching routines, and consequently provides a continuum of behavior along which a practicing clinician may view the parent-child interaction as the child matures. A video program facilitates training professionals in the use of the scales.

The Nursing Child Assessment Feeding Scale (NCAFS), (Barnard, 1978a) includes 76 items considered valid for infants birth through one. The Nursing Child Assessment Teaching Scale (NCATS) (Barnard, 1978b) includes 73 items considered valid for children birth through three. Both scales include six categories of variables: parent sensitivity to cues, parent response to distress, parent social-emotional growth fostering, parent cognitive growth fostering, child clarity of cues and child responsiveness to parent. These categories will likely encourage its users to view the parent's as well as the child's contribution to the interaction a view promoted by R.Q. Bell (1968, 1971, and 1974). Bell's series of articles advance the view that professionals should consider bidirectional influences when interpreting parent-child interaction. The tools also encourage a feature approach to conceptualize parent-child interaction by proposing an extensive list of features, which professionals rate as yes/no, depending upon whether
the feature was observed or not. Such a rating system generally results in high reliability in scoring, which is important for consistency in clinical assessment.

In the years since its publication, Brazelton's Neonatal Behavioral Assessment Scale (1973) has become the most widely used newborn behavioral assessment procedure. Its wide use may influence the concepts professionals familiar with the instrument use in judging parent-child interaction, even though the tool evaluates newborn behavior. This review includes the NBAS because infant educators frequently use the categories of infant behavior it includes to teach professionals and parents ways to observe infant behavior. Nine items describe possible ratings for each of the 28 standard items. These twenty-eight items have been categorized in various ways. Als, Tronick, Lester, & Brazelton (1977) reported that Adamson proposed a four dimensional approach to categorizing the items: interactive processes, motoric processes, state control, and physiological response to stress. Lester & Brazelton (1982) used cluster analysis to yield seven constructs of neonatal behavior from the NBAS: habituation, orientation, motor, range of state, regulation of state, an autonomic cluster which describes signs of stress related to the homeostatic adjustments of the nervous system, and a reflex cluster which counts abnormal response. Brazelton supports the notion that teaching parents to observe their
child's reactions can sensitize the parent and change the parent's behavior.

Another health professional, Censullo, has published two parent-child interaction assessment tools in *Nursing Research*, the Dyadic Interaction Code (DIC), (Censullo, Lester & Hoffman, 1985) and the Dyadic Minicode (DMC), (Censullo, Bowler, Lester, & Brazelton, 1986). The works of Tronick (1979, 1980) influenced the development of both tools. The DIC scores each second of a transcript of parent-child interaction in one of six ways: no opportunity for interaction, one partner eliciting, the other not oriented, one eliciting, the other oriented but sober, one eliciting, the other oriented and bright, acknowledged greeting of other's response leads to turntaking, parent and child behave simultaneously, move and vocalize together. The tool is limited to use in research because of the complications involved in scoring video-taped interactions. However, it forms a bases for the DMC, which does have clinical utility. The DMC provides a framework for the clinician which includes six variables that are rated 1 or 2: mutual attention, positive affect, mutual turntaking, maternal pauses, infant clarity of cues, maternal sensitive responsiveness to the infant. The ratings sum to a synchrony rating, 6-9 considered low, and 10-12 considered high.
Tronick published two tools, Dyadic Phases (Tronick, Als, and Adamson, 1979) and Monadic Phases (Tronick, Als, and Brazelton, 1980), the content of which influenced the development of the Censullo instruments, but which require a tedious scoring process, only possible in a research setting. Dyadic Phases proposes to describe adult-infant interaction based upon specific adult and infant variables occurring in combination. The system summarizes data in a phase flow diagram depicting status at ten second interval. Variables include ten infant behaviors (vocalization, direction of gaze, head orientation, facial expression, body position, head position, amount of movement, blinks, specific hand movements, specific foot movements) and six adult behavior, (vocalization, direction of gaze, head orientation, facial expression, body position, specific handling of the infant). The two variable sets cluster to describe various dyadic phases, such as disengagement, initiation, mutual orientation, greeting, play dialogue. Monadic Phases built upon the earlier instrument to describe infant-adult interaction systematically. The tool describes both members of the dyad with the same variables: vocalization, direction of gaze, head orientation, facial expression, and body pattern. Combinations of expressive modalities combine to categorize a monadic phase, second by second.
As is the case across the professions, each nurse will be influenced by her clinical training and experience. Possible frameworks for nurses in viewing parent-child interaction include clinical assessment tools. The tools discussed here, NCAST, NBAS, DIC, DMC, Dyadic Phases and Monadic Phases direct the clinician to particularly monitor reciprocity within the dyad and the responsiveness of each member of the dyad. Even if the clinician does not use the instrument in a formal manner, it is likely that exposure to the content of items and exemplars of clinical ratings will influence the ratings professionals make on the interactions presented in this investigation.

Social work.

Reviews of assessment instruments frequently used in the field of social work (McCubbin, 1987; Bailey and Simeonsson, 1988) suggest that family assessment instruments are more prominent in the field than are those which measure parent-child interaction specifically. Social workers frequently refer to the concept of attachment in their evaluation of the parent-child relationship. The research and writings of Ainsworth and Bowlby provide cornerstone works to establish the concepts of attachment and bonding in the parent-infant interaction literature.

In her work with Blehar and Lieberman, Ainsworth (1977) studied face-to-face interactions with 26 mother-child pairs several times longitudinally from 6-15 weeks, then
correlated the results with later attachment behavior. Factor analysis of the data suggested two primary factors described the differences among the pairs during face-to-face interaction. Factor one had as its poles 1) mother playfulness combined with child smiling and, 2) mother silent, expressionless and abrupt. Factor two poles were 1) contingent mother behavior and continued episodes and, 2) fussy infants and brief episodes. Then, at nine months, they put the pairs through the strange situation experiment described by Ainsworth and Wittig (1969). Nine month correlations of strange situation behavior and characteristics of early face-to-face interactions showed that optimally attached infants had face-to-face interactions with their mothers from 1-3 months characterized by playful mothers, smiling infants, contingent mother behaviors, and continued episodes. Anxiously attached infants had early interactions with mothers characterized by silence, lack of facial expression, brief episodes and fussy infants.

Previously, Ainsworth, Bell, and Stayton (1971) had demonstrated that infant behavior in the standard strange situation divides infants into two main groups, securely attached and anxiously attached infants. She based her rating on the quality of attachment on infant re-union behavior. The first group made a smooth transition to reunion with the mother. The second group had a variety of
anxious reactions including passivity (not involved with the environment or the mother), anxiety (overly involved with the mother), or independence (overly involved with the environment).

Bowlby has also investigated the notion of attachment and bonding extensively (1958; 1960; 1969). His work can be summarized by the notion that the infant appears to develop a working model of the mother over time and through direct social experience with her. He hypothesizes that this model influences the infant's current expectations and later behavior. This notion countered the earlier work of Freud (1955) which suggested that attachment grew from the fulfillment of early physiological needs. Bowlby finds that this working model of the mother appears to influence behavior across time and situations.

The field of social work may find the notion of attachment particularly important to their clinical practice because some correlations appear to exist between early attachment and later behavior patterns, some of which may be viewed as pathological. Many studies illustrate this continuity in that the type of attachment at twelve months has been shown to predict: (1) type of attachment at eighteen months (Waters, 1978; Main & Weston 1981); frustratability, persistence, cooperativeness, and task enthusiasm at twenty-four months (Matas, Arend & Sroufe, 1978); (3) social competence of preschoolers (Lieberman,
1977; Easterbrook & Lamb, 1979; Waters, Wippman, & Sroufe, 1980); and (4) self-esteem, empathy, and classroom deportment (Sroufe, 1979). Stern (1986) warns that these results should be viewed tentatively, particularly since they appear not to hold up in cross-cultural research.

The works of Stern (1977, 1986) attempt to bridge the distance between the fields of mental health and psychology, a bridge social workers must make in clinical practice. Stern's early work, *The First Relationship: Infant and Mother* describes the caregiver and infant's repertoire within the relationship and stresses the importance of structure and timing. During the first six months of life, interactions allow the infant to learn how to initiate, maintain, terminate and avoid interactions with his caregivers. He cautions professionals about interfering in the early development of interaction, however, and feels that self-adjustment may lead to the greatest enduring bond between infant and caregiver.

In his later work, *The Interpersonal World of the Infant* (1986) Stern attempts to reconcile views from his background and research in psychoanalysis and developmental psychology. The insights he offers in this volume suggest that infants appear to differentiate themselves from others at birth, then progress through ever increasing modes of relatedness. This contrasts with early developmental models which suggest that infancy is a period of gradual
differentiation and individuation. He also contends that clinical issues such as attachment, trust, and dependency may be life span issues, rather than issues confined to the infancy period. Such views challenge traditional views in the mental health and child development fields.

Early childhood special education

The field of early childhood special education is influenced by scholars from the fields of psychology, special education, and child development. The Education of the Handicapped Act Amendments of 1986 (PL 99-457) including infants and toddlers in the rights to special education, has increased interest in research in the area of parent-child interaction. This interest stems from the emphasis in the legislation on the importance of family-centered assessment and intervention for young children.

Research and development scholars have begun to survey and categorize available instruments and methods for measuring parent-child interaction (Rosenberg, 1986; Towle, Farran, & Comfort, 1988). Towle et al. (1988) reviews 29 different instruments and concludes that the instruments comprise a variable set which differ in both content and procedure. The article categorizes instruments in two major ways, behavioral count systems and rating scale systems. Subsections in each category include the subjects used, procedures, reliability information, variable exemplars, and representative research questions. She emphasizes the
importance of striving within the profession for a common metric which professionals can easily use and comprehend; an instrument like the Bayley Scales of Infant Development (Bayley, 1969), known and understood by most professionals in the field.

Rosenberg (1986) illustrates three systems for assessing parent-child interaction: molar rating scales, molecular coding systems, and checklists. His review presents a set of guidelines for selecting a parent-child measure: (1) the ease with which observers can be trained to use a system reliably, (2) the utility of information provided by the measures for program planning and evaluation, (3) the expense in personnel time associated with the use of the measure, and (4) the appropriateness for use with parents of differing backgrounds and with children displaying a range of disabilities. He concludes that the profession may never develop a common metric due to the differing criteria varied uses will present.

Developers of current instruments commonly cite a few early works as the foundation for their instruments. The work of Clarke-Stewart (1973) is one such work. She investigated the relationships of thirty-six infants and their mothers. The sample included black and white rural dyads from disadvantaged backgrounds. Data collection was conducted at seven home visits while the child matured from nine to eighteen months; three half-hour samples of
interaction were recorded at each session. Seventy-six infant, maternal, mutual or environmental variables were included in the observation codes. She factor analyzed her data and concluded that mother factor one, optimal maternal care, correlated highly with infant factor one, overall infant competence. She also concluded that optimal maternal care included a nurturing and a stimulation component. Her work has influenced authors of several parent-child assessment instruments to include both social-emotional and cognitive-growth fostering components in the evaluation of maternal skills.

Caldwell's (1979) Home Observation for Measurement of the Environment (HOME) is one such instrument. It assesses aspects of the quality of care young children age birth to three years receive in their own homes. The HOME scale includes forty five behaviors which the observer records for presence or absence; its six scales include responsivity, acceptance, organization, play materials, parental involvement and variety in stimulation. The HOME has been extensively studied and studies have frequently demonstrated a relationship between scores on the HOME and cognitive development of the child (Gottfried, 1984). Its extensive empirical support related to the predictive strength of the measure make it a frequently cited basis for many current instruments.
Field's (1980) Interaction Rating Scale (IRS) was developed as one of the measures for her study which compares the interactions of preterm and term infants with their lower- and middle-class teenage and adult mothers. The two-part scale measures infant behaviors and mother behaviors in face-to-face and feeding interactions. Each of the items includes three descriptive phrases from which the rater selects to complete the scale. For example, possible maternal gaze behaviors are described as: 1) seldom looks at infant, 2) sometimes looks at infant, 3) constantly looks at infant. The high item by item reliability (.82-.98) and limited number of behaviors observed (17 items on the face-to-face rating and 14 items on the feeding rating) suggest the instrument may be valuable in clinical assessments.

A few of the recently developed parent-child assessment instruments are more frequently cited in clinical literature because they are also a part of a related infant/toddler intervention strategy. These include Mahoney, Finger and Powell's (1986) Maternal Behavior Rating Scale, Rosenberg and Robinson's (1984, 1985) Teaching Skills Inventory, Bromwich's (1978) Parent Behavior Progression, and McCollum and Stayton's (1985) Social Interaction Assessment/Intervention (SIAI) model. These key works will be reviewed here, because of the difficulty in reviewing the great range of existing tools.
Mahoney et al.'s work is part of an overall program known as the Transactional Intervention Program (1984) developed throughout the 1980's and which the group continues to develop and disseminate. The work involves teaching several principles of interaction to parents of handicapped children, which include turntaking and responsiveness, as well as matching the child's developmental level and interest. The Maternal Behavior Rating Scale continues to evolve. Within revisions frequently cited variables include enjoyment, sensitivity, responsiveness, appropriate stimulation, physical stimulation, and sensitivity to interest as the most useful variables to evaluation and include in a teaching program directed toward developmentally delayed infants and toddlers.

Rosenberg and Robinson (1985; Rosenberg, Robinson & Beckman, 1984) developed their Teaching Skills Inventory in order to evaluate the effects of their experimental infant-parent intervention program at the Meyer Children's Rehabilitation Institute, University of Nebraska Medical Center. The basis of the program was to teach parents effective styles of interaction with their children which could be expected to carry on in the home environment as well as beyond the time frame of the program. Their Teaching Skills Inventory included items such as clarity of verbal and nonverbal instruction, modeling/pointing, and
modification of the task. Fifty-seven mother-infant dyads attended the program for a twelve-month period; the infants ranged in age from 2-36 months and represented handicapping conditions such as Down syndrome, cerebral palsy, spina bifida, and deaf-blind. Use of the scale helped researchers quantify changes parents made after instruction within a session as well as long-term changes in parent behavior.

Bromwich's (1978) Behavior Progression Scale is an integral part of the program she outlines in her book, *Working with Parents and Infants: An Interactional Approach* (1978). The first form spans birth to nine months and includes 54 items, the second spans 9-36 months and includes 70 items. Observers familiar with the family complete the checklist form. Items on both forms fall into six levels: enjoyment of the infant, sensitivity/responsivity, mutuality of interaction, developmental appropriateness, initiation of new activities based on those presented previously, and independent generation of new developmentally appropriate activities. Little work has been done to document the instrument on the validity or reliability of the items with the exception of Allen, Affleck, McQueeny and McGrade (1982) who found a high correlation between the total scores on the Parent Behavior Progression and the HOME Inventory. The lack of this kind of documentation reflects the fact that Bromwich considers the tool an instrument for intervention planning and monitoring more than an assessment tool.
McCollum and Stayton's (1985) Social Interaction Assessment/Intervention (SIAI) model also forms the basis of a clinical strategy. In the assessment phase, the clinician interviews the parent to select a child behavior which they wish to increase. Then, the clinician observes the dyad interacting to determine the parent behaviors which increase the interaction. The clinician scores the effectiveness of interaction by counting the targeted parent and child behaviors on a video-tape sample of interaction. The strategy has more clinical utility than most behavioral count systems because it counts only a few, targeted behaviors, such as eye contact or smiling. Other count systems, such as those offered by Kysela, Daniels, Marfo, and Mabbot (1984) or McConkey and Martin (1983) require video transcription; the time involved limits their utility to well-financed research operations.

This brief review suggests that many instruments and methods for evaluating parent-child interaction influence the early childhood education field. This may lead to some confusion in sharing information among professionals, yet certain themes emerge. These include noting the bidirectional nature of parent-child interaction and the importance of parent responsiveness to the child.

Summary of Part One: Foundations for Individual Differences

The first part of the literature review explored possible influences upon the development of individual
differences in clinical judgment of mother-child interaction. First, the review noted that the evaluation process in early intervention is multidisciplinary in nature. Consequently, evaluation requires the perspectives of several professions as well as an integration of those perspectives. Several processes interact to form the clinical perspective of each professional including concept formation, attribution, and social comparison. Professionals may use a feature, dimensional or holistic approach to evaluate mother-child interaction. They may have formed habits which influence them to see the adult, child, or the situation as having the greatest influence on the interaction. They may be locked into social comparisons with examples of mother-child interactions viewed as optimal from their own social background or clinical training. They may be unaware of other models of interpreting parent-child interaction. Clinical evaluation tools commonly used in the professions may also influence their judgments. This review has described only a few of the possible sources of individual differences in the evaluation of mother-child interaction.

Part Two: The Attribute Scale

To assist in the investigation, the investigator constructed an attribute scale including features of child, mother, and interactive behavior that would be important and familiar to the four groups of professionals (Appendix A).
The scale included a child and mother variable for each of the five child development areas: cognition, communication, socialization, physical development, and self-help. For each variable, the investigator included two or more descriptive phrases derived from the mother-child interaction literature. In the case of the child attributes, the descriptive phrases related to characteristics children normally develop during the first year of life. In the case of the maternal attributes, the descriptive phrases related to behaviors commonly cited in the literature as influencing the development of specific skills. In the case of the mother-child attributes, the descriptive phrases related to the development of a relationship. The investigator attempted to avoid wording in the descriptive phrases that might be specific to a profession or method of assessment in order to prevent biases in making the ratings. This part of the review will provide theoretical and/or empirical support for each component of the attribute scale.

The Child Attributes

The investigator developed the child attributes to assist the subjects in describing the child's level of development in these five areas of development: cognition, communication, physical development, personal/social skills and self-help skills. Phrases below each child attribute described behaviors children typically develop between birth
and twelve months of age. Three child evaluation tools provided the source for the descriptive phrases: 1) The Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984), 2) The Battelle Developmental Inventory (Newborg, Stock, & Wnek, 1984), and 3) The Hawaii Early Learning Profile (Furuno, O'Reilly, Hosaki, Allman, & Zeisloft, 1985). The investigator expected overlap among developmental skill domains because human behavior tends to be an integrated process. The often artificial boundaries were drawn between domains in order to make the judgment task like the one most professionals must make as they assess the child's eligibility for services according to the mandates of Public Law 99-457.

The investigator expects that self-help will prove the most unreliable child attribute in the study. This is due to the fact that feeding is the primary self-help skills expected during the first twelve months of life. Since the interactions did not include opportunities for the child to demonstrate feeding, the investigator asked the subjects to interpret the child's behavior in order to determine whether he demonstrated an attitude that would foster self-help. This included attention to people and objects in the environment and attempting to do things with others (cooperation).
The Maternal Attributes

In this series of attributes, the investigator presented the subjects with descriptions of five possible types of influence the mother's behavior could have on the child. The attributes suggested that the mother could influence the child to communicate, to socialize with her, to use cognitive skills, to use his/her body, and to help himself or herself. The investigator will present empirical and theoretical support for the attributes in five parts, one for each of the maternal attributes the subjects rated.

ATTRIBUTE ONE: The mother influences the child to use cognitive skills.

Bandura's (1977) social learning theory states that learning occurs through integrating four processes: motivation, attention, retention, and reproduction. This theory of learning suggests that adults who provide motivating models of life experiences, show the child what to do, then allow the child time to perform have set the stage for optimal learning conditions. This can be true for cognitive, motor, or daily living tasks. Several researchers have studied aspects of this process as described below.

Mahoney, Finger, and Powell (1986) have investigated the influence of parent interaction style on child developmental competence in young mentally handicapped children. In a study of 60, 1-3 year old mentally
handicapped children they looked for a relationship between the mental measure on the Bayley Scales of Infant Development (Bayley, 1969) and three independent maternal dimensions: 1) the degree to which the mother was child-oriented and enjoyed interacting with the child; 2) the amount of stimulation they provided for the child; and 3) the degree of maternal control. They found maternal interaction style accounted for a large portion of the difference in the children's current level of development. Mothers who rated high in child-orientation and enjoyment and low in amount of control had children with the highest levels of developmental competence.

Mahoney et al. (1986) also offers evidence of the influence of maternal style on child development. They found that mothers may differ in their use of action requests depending upon whether the child is normal or mentally handicapped. In their study comparing mothers of normal and Down syndrome children, they noted that mothers of Down syndrome children used four times as many requests as mothers of normal children. These same mothers also used nine times as many requests for difficult actions. An integration of this comparative study with the findings reviewed above suggest that while it is least beneficial to the child's developmental competence to use a controlling style, this is the style mothers of handicapped children may more frequently adopt. Kaye's 1976 study, mentioned
earlier in this review corroborates these findings. When previous experience suggested the child had competence for the task, mothers showed their children what to do, then waited for the child to do it. If previous experience suggested the child did not understanding the task, mothers were more likely to control or direct the child by shoving his hand.

The tendency for parents of young, handicapped children to direct and control their behavior, may foster the development of the outer-directed behavior in problem-solving situations identified in older mentally handicapped children by Zigler (1971). His research has shown that in general, mentally handicapped children are less likely to choose to tackle a difficult problem than are their nonhandicapped peers. They also show lower self-esteem and tend to look outward more than trusting their own internally generated solutions.

Clarke-Stewart's (1973) investigation supports the importance of maternal mediation of the environment to the child's cognitive development. She recruited thirty-six poor black and white families who resided in the greater New Haven area, because they represented the kind of families to which early intervention programs often direct their efforts. She looked for correlations between infant cognitive development and maternal behaviors, using the Bayley Scales of Infant Development as her measure of infant
cognitive development. She found that the child's cognitive development and complexity of his play with objects was apparently influenced by the amount of time the mother spent playing with the child using the materials. She did not find a correlation between cognitive development and the amount of stimulation available in the environment per se. Her results suggest the importance of the mother as the mediator of the environment.

These investigations suggest a mother can influence the child's cognitive skill by providing motivating models of behaviors within the child's ability to perform. Time for the child to experiment with the behavior also appears essential. A directive style which substitutes adult verbal and physical direction for child initiated behavior may have a negative influence on child motivation to learn through self-initiated behavior.

ATTRIBUTE TWO: The mother influences the child to communicate

The mother's role in the development of communication has been considered in many arenas. In his symbolic interaction theory, G. H. Mead (1934) proposed that how we come to think is a reflection of social interaction; we internalize significant symbols which can have the same effect on the speaker and the listener. Bruner (1977) suggests that preverbal interaction provides the scaffolding which is essential for symbolic language to develop. In
Talking to Children (1977) Ferguson describes effective maternal language as that which is prosodic, higher pitched than normal speech, simpler in form, redundant, and semantically simple.

Empirical support exists for the importance of maternal influence to language development. Bretherton (1979) notes that attachment theory as described by Bowlby (1958, 1960, 1969) and Ainsworth (1972) allows for a direct and indirect influence of attachment on communicative as well as cognitive development. She expands their view through her two hypothesis notion. The attachment-exploration suggests that a securely attached infant is free to explore his environment. The attachment-teaching hypothesis suggests that through an effective interaction style, the infant can more readily acquire communicative and cognitive skills. Bretherton (1979) correlated the attachment categories of 25 children (12-Italian and 13-American) with various communicative and cognitive measures at four intervals between 9 1/2 and 12 1/5 months of age. The attachment categories were A and C two forms of poor attachment and B securely attached infants. Over time, she found strong correlations between the development of a secure attachment and three cognitive factors thought of as important to language development: 1) gestural communication, 2) tool use (means-end understanding) and 3) symbolic play. She did not find a strong relationship,
however, between attachment category and the development of language comprehension or production, suggesting another mechanism, perhaps Chomsky's (1975) Language Acquisition Device (LAD) is involved in language development. This analysis considers language development as a skill separate from communication development, at least in part.

A body of literature known as motherese or maternal input literature suggests through correlational research that a relationship may exist between the semantic-discourse features more than the syntactic features. Snow (1977) suggests that motherese may vary as the child matures. She bases this upon an investigation by Phillips (1973) which show that simplicity of form and semantics do not appear until a child can begin to respond.

Wells (1985) notes five motivators for motherese. First, it may serve the function of gaining attention. Garnica (1977) found that the mothers she investigated told her in formal interview that they spoke to their infant in high-pitched prosodic ways in order to gain their attention. Second, adults may use motherese to be understood. Bridges (1979) noted that adults used nonverbal devices in order to insure that the child understood their message. Third, motherese can assist adults as they attempt to understand the child. This appeared to motivate the contingent queries Garvey (1977) found in her mother's language samples. Fourth, motherese can serve to keep the conversation going.
Kaye and Charney's *turnabout* (1981) and Wells' *continuent* (1981) appear to serve this function. Fifth, motherese may help teach the child language. Wells (1985) noted mothers did appear to teach their children semantics and politeness, but little direct evidence for teaching the other aspects of language. Bruner (1983) identifies a naming game which he proposed as a semantic teaching routine.

All five functions appear to unite in Bruner's (1983) naming game and Cross' (1984) synergistic sequences. Bruner traces a four step sequence in which the mother call the child's attention (attention vocative), asks the child the name (query), give the child the name (label), and provides the child with information on his effort (feedback). Cross describes a similar sequential function in which the mother and child appear to negotiate meaning. The child uses an utterance; the adult queries the child to determine whether she got the message; the child affirms the mother's query; then the adult responds. Cross' synergistic sequences seem to negotiate meaning with the child which both Wells (1985) and Bruner (1983) consider as critical to language learning, particularly at a semantic and pragmatic level.

In his Bristol Language Studies, Gordon Wells (1981, 1985) set out to discover the course of child language development in the preschool years, the possible relationships between adult input features and child language development and possible ecological and
sociological influences on child language. He selected 128 children representing four socio-economic levels and an equal representation of boys and girls. One-half of the group was 15 months old and the other 39 months old at the start of the study. He took samples every three months from each child until the young group become 39 months. In an effort to get naturalist language samples, he fit them with a recording device which turned on and off randomly between the hours of 9 a.m. and 6 p.m.. He obtained an average of 27 minutes per child in 90 second segments.

From his extensive corpus of data Wells drew two primary inferences. First, the fairly stable order of language acquisition suggested that the complexity of the language structure to be learned may be more of a factor in acquisition than input. Second, he finds that the input does appear to influence the rate and relative ease of acquisition. Both quantitative and qualitative features of the adult input appear to have an enabling influence. The design of his study allows him to note this quantitative feature within a representative ecological context, which few others studies can, since investigators generally study mother-child communication in a staged play interaction.

Ellis and Wells (1980) investigated the language development of 20 of these children between 18 and 27 months of age. All children spoke in one to two word utterances. Ellis and Wells divided the children into three groups, fast
accelerated, slow accelerated, and normal. They found that the mothers of the most rapidly developing children used language semantically related the child's, directed more speech to the child, and used the child as the locus of reference.

Cross published two studies (1977, 1978) which investigated the role of maternal input to child language acquisition. Her samples included 16 children who spoke in one to three word utterances. She correlated various adult input measures (semantic relatedness, novelty of utterances, etc.) with child language measures such as receptive language, mean length of utterance, and child age. Her correlations showed that the most significant relationships occurred between certain adult measures and the child's receptive ability. This points to the notion that adults adjust their input to the child's ability to understand. In his introduction the volume Talking to Children, Roger Brown (1977) comments on the way correlations vary between adult input and the child's increasing language level. For example, expansions, repetitions, extensions, and semantically-related maternal utterances occur primarily with the least developed children, while novel utterances and references to non-present conditions occur with the most developed children. This illustrates that effective motherese needs to be adjusted to the language level of the child.
McDonald and Pien (1982) investigated whether maternal styles could be differentiated and whether style was a stable feature. They used the speech of eleven mothers to their 2 1/2 year-old children as their corpus of data. Using an illocutionary force categorization system, they plotted the frequency of questions against directives. They noted that at the extremes two styles did appear to exist, a directive style associated with the primary use of directives and a conversational style, associated primarily with the use of questions. In a reanalysis of the same data, Olsen-Fulero (1982) further investigated a middle group of mothers not described in the first study. She found these mothers tended to use declarations as a way to teach children language, particularly semantics. She labelled these mothers as didactic. She also studied the stability of this maternal style by sampling language at two points in time, but within days of each other. She concluded that style was a stable feature of maternal input.

Declarations appear to be the least studied illocutionary function of language. Olsen-Fulero suggests her didactic mothers used declaration to teach language as well as to challenge them to an adult conversational role. Moerk (1974) found mothers of his youngest children used declarations to teach their children language. He describes a move from declarations meant to teach, followed by questions meant to enlist the child in a conversation role.
These investigations suggest that mothers can have an influence upon their child's ability to communicate. Effective influence may include keeping interactions going by responding to the child with messages the child can understand, using some messages he can imitate, and regularly allowing the child opportunities to communicate. Mothers who show a desire to communicate with the child will be more likely to have interactions that are effective in influencing the child to communicate.

ATTRIBUTE THREE: The mother influences the child to use his/her body

Few studies focus specifically of the relationship between motor skills development and the quality of parent-child interaction. Goldharber (1982) notes that this is mostly likely because cognitive and social skill indicators are frequently linked with fine motor behaviors. Examples include imitating the ringing of a bell or waiving good-bye. The work of Uzgiris (1973, 1976) also notes the pattern of interdependence among the developmental domains in the young child.

Some researchers do support the notion of maternal influence on motor skills. Field (1980) found that maternal attitude about the infant's motor skills at birth predicted motor skills at four months. Dietrich, Starr, & Kaplan (1980) studied abused children and determined that
developmental delay was exacerbated in this group when physical neglect was present. They found both mental and motor development as measured on the Bayley correlated significantly with tactile stimulation for a group of abused children. On the other hand, in a study of premature infants, Siegel (1984) found motor development measured on the Bayley Scales of Infant Development correlated only with two scale of the HOME which did not involve tactile stimulation, the avoidance of restriction and play materials sub-scales. Bandura's (1977) social learning theory suggests that models of all kind of behavior influence development in many domains. While it is likely that there is maternal influence on motor skill development, this area has not been widely studied independent of cognitive or social skills. This is probably because at young ages, motor skills are viewed as windows to development in the other domains. Consequently, the investigator constructed the attribute scale to reflect the similarities between maternal influence in the motor domain and the descriptions of maternal influence in cognitive and social development.

ATTRIBUTE FOUR: The mother influences the child to socialize with her.

The work of Ainsworth has been among the most influential in determining maternal social influence on the child. As discussed earlier, her notion of attachment has influenced the view of mother-child interaction particularly
in the field of social work. To Ainsworth (Ainsworth, Bell & Stayton, 1974), attachment means "a tie that one person or animal forms between himself and another specific one—a tie that bind them together in space and endures over time" (p.100). Ainsworth investigates the existence of attachment through several behavioral manifestations "...which promote proximity or contact, including approaching, following, clinging and signaling behaviors such as smiling, crying, and calling" (Ainsworth, Bell, & Stayton, 1970, p.50). The research and writings of Ainsworth suggest that mothers promote these social behaviors in their children through responsiveness. Although a wide range of responsive behaviors exist, they frequently include smiling and in other ways showing interest in the child and cooperating with the child. Further, her work with Bell and Stayton (1971) illustrated that mothers who worked with the child's social repertoire and appeared to cooperate with the child, tended to facilitate the child's acquisition of social skills. Mothers who attempted to train the infant to cry less, demand less, adapt to household schedules, or to do what adults wished they would do, acquired social skills less quickly.

Based on this evidence, the attribute scale in this study considered that mothers who cooperated with their child and signaled liking for the child provided a positive social influence for the child. Ainsworth, et al. (1974)
also found that freedom to explore was important to the child's social and overall development. The children who tolerated the separation floor freedom entailed, tended to be the infants who had the more secure attachment to the mother. It was also noted that mothers who allowed floor freedom tended to have infants who cooperated with their requests. At the same time, the infants who tended to comply with their mother's requests, had mothers who were responsive and cooperative with them.

Another infant researcher, Stern (1977) emphasizes the contribution of timing and pacing toward the development of social skills in the child. Stern notes that infants respond and maintain interactions when the stimulation is at an optimal level, described as above a certain threshold so the child will notice and attend, but not overly intrusive. Mothers who present themselves to the infant in such an optimal way, will foster social skills in the child which increase the likelihood that the child will interact in appropriate ways with her and with others. In a microanalysis of mother-child behavior, Stern (1971) demonstrated that a mother of three and one-half month old fraternal twins could establish an optimal social relationship with one of her children, but not the other. In a follow-up at fifteen months, the child who experienced the optimal level of stimulation, had successful social relations with the family and strangers. The other child
was not successful in initiating, responding to, or maintaining interactions with others. The contrast in the mother's skill across the two infants implies the likely contribution of the infant to the success or failure of the relationship. Egeland & Farber, (1984) also noted the importance of timing and pacing to the development of social skills in the child. They found that timing and pacing of the mother during routine caretaking had a more substantial influence on the child's social development than did the mother's expressive, affective behavior during play.

It appears that mothers who cooperate with their infants will have children who cooperate with them. Mothers who time their behavior in everyday routines, will influence their children to behave in ways that society values. However, it does appear, from the work of Stern, that certain dyads have an easier time developing such mutual sensitivity. It may be easier for certain mothers to respond effectively to certain children; consequently, the influence of the child cannot be ignored.

ATTRIBUTE FIVE: The mother influences the child to help himself/herself

A similar form of logic applies to the self-help (adaptive) skill area as outlined for the motor skill area. The investigator was aware that the subjects would have no opportunity to view any adaptive skills, such as feeding, when participating in the experiment. Consequently, ratings
here were made on the basis of maternal skills that were demonstrated during play which could be useful in developing adaptive skills. The descriptive phrases provided for the subjects included avoidance of restriction (Caldwell, 1979), gaining attention (Bandura, 1977) and responsiveness (Barnard, 1985).

The Mother-Child Interaction Attributes

The subjects rated three mother-child interaction variables as well. First, the rated the pair on the degree to which they acted together as partners. Then, they rated two variables meant to measure the degree to which the subjects saw the mother and the child as influencing each other. Literature support each of the mother-child attributes is reviewed below.

ATTRIBUTE ONE: The mother and child behave like partners.

The literature and assessment tools of parent-child interaction include a range of terms which describe the way the members of the dyad act together. The investigator listed many of these terms below the descriptive phrases in case the term partner did not fit the subject's understanding of the concept. These included exchange, reciprocity, mutuality, bidirectional behavior, turntaking, contingency, and waltzing.

The Oxford English Dictionary (1989, Second Edition) defines partner as "one who has a share or part with another; one who is associated with another or others in the
enjoyment or possession of anything; a partaker, sharer". The works of Bruner, Trevarthen, and Stern strongly support the importance of partnerships between the parent and child to foster the child's acquisition of a range of human skills. In *Child's Talk*, Bruner (1983) lends support to the value of interactive sequences in the development of early infant communication. First, Bruner proposes the notion of a Language Acquisition Support System (LASS) which aids the activation of the Language Acquisition Device (LAD) proposed by Chomsky (1975). Four social and cognitive endowments contribute to the LASS: 1) infant recognition of means-end relationships; 2) development of transactionality (reciprocity, turn-taking); 3) understanding systematicity; and 4) understanding of abstractness. Bruner argues that the two most social endowments, transactionality and systematicity develop primarily within formats which the adult and child develop together. Bruner describes formats as routinized ways infants and adults do things to and with each other.

Bruner also proposes that infants can learn much about the nature of communication within formats. Formats embed the infants experience in culture, allow the infant to detect the timing and sequence of human interaction, and assist him in relating to here and now. Additionally, the infant who becomes involved in a routine developed over time, such as peek-a-boo, begins to see the notion of
presupposition. Presupposition suggests that a topic exists which communicating partners can presuppose and that new information should become the focus of the current comment. Bruner also suggests the these formats allow the child to begin to see how language works. He draws parallels between the format of social games and deep structure of language. Games, like language, have a deep structure which can be realized in a variety of surface structures by applying realization rules.

Bruner (1983) proposes that two principles operate to gradually increase the child's role toward full participation in a game. His handover principle states that "where there was once a spectator, let there now be a participant" (p.60). His up the ante principle proposes that adults expect the child's best form of participation and up the ante for a more full response when the child is capable of it. Bruner suggests both the handover and up the ante principles operate to shift the balance of power in the interaction toward the child.

Trevarthen (1979) discusses the principles of subjectivity and intersubjectivity as crucial to the development of interaction between parent and child. In videos of thirty-four parent-child pairs, he has detected behaviors which suggest that in order to be an interactive partner, the infant must convey two skills to the adult. First, he must exhibit subjectivity, that is some form of
rudimentary consciousness and intentionality. Second, he must exhibit intersubjectivity, or the ability to adapt and fit himself into the subjectivity of another. Trevarthen traces the development of intersubjectivity through a primary and secondary level. Primary intersubjectivity begins with the notion of exchange (1-3 months), develops into social games (3-7 months), and completes the move toward intentional communication during the period of 7-15 months. Secondary intersubjectivity concerns the period of the development of symbolic representation and meaningful exchange with another. Trevarthen's conceptualization of the parent-child partnership stresses the importance of the child's contribution in forming the partnership.

In his 1977 volume, The First Relationship, Stern notes the importance of the infant and the caretaker to the development of the individualized interaction system he refers to as their dance. Stern suggests that the infant gradually develops skills which allow him to initiate, maintain, terminate, and avoid interactions with his caregivers. The behaviors at the disposal of the infant include gaze, vocalization, head behavior, and facial expression. He describes the behaviors as functional at three months, while integration of the behaviors to create interactive events with others may not be fully realized until six months. Caregiver contribution to the interactions include gaze, vocalization, facial
presentations and expressions, waiting for and watching the infant, body (especially hand) movements, and proxemics (the invasion of personal space). The dyad develops a rhythm to what they do together. Stern concludes that both partners have a role in the development of this early interaction system, yet he notes that the particular dance the partners develop has particularly strong influence upon the child. This influence affects the child because for a long period of time, the child has few opportunities to learn that there are other ways to be with others than the way he has come to know, through interaction with his mother. Stern carries the dance notion further, calling interactional difficulties missteps in the dance. Barnard (1985) also recognizes the similarity between the mother-child interaction and dancing through her notion of waltzing.

Another researcher, Goldberg (1977) supports the notion that both partners need to feel effective in their interactions together so that interaction becomes habitual and for emotional attachment to occur. Her theory of social competence hinges on the principle of mutual efficacy. She suggests that when both partners regularly feel success in their interactions, each can grow toward fuller social competence, both with each other and with the outside world.

The works of these researchers and theoreticians together suggest that both the infant and mother must contribute as initiators and responders to maintain the
interaction in order for it to be effective. Effective interactions have these characteristics: a balance of power, rhythm, and emotional attachment. The development of an effective partnership between the mother and child may have influence across domains of child development.

ATTRIBUTE TWO: The mother responds to the child.

The parent-child interaction literature and existing parent-child interaction scales are replete with inferences supporting the importance of maternal responsiveness to child development. Ainsworth et al. (1974) describes four essential components of maternal responsiveness: 1) her awareness of signals, 2) her accurate interpretation of the signals, 3) an appropriate response to the signal, and 4) a prompt response to the signal. Her support for the notion of responsiveness grew from earlier work (Ainsworth et al. 1971) in which she and her colleagues rated mothers on a nine-point scale across four dimensions, sensitivity-insensitivity, acceptance-rejection, cooperation-interference, and accessible-ignoring. They defined sensitivity as perceiving and responding promptly and appropriately to infant signals and communications. They found that sensitivity was a key variable. Mothers rated high on the sensitivity scale, rated high on all other scales. Mothers rated low in any one of the other scales, were also low in sensitivity. She described sensitive mothers as those who respond to the child appropriately, and
do not overestimate him by acting in too intense, too vigorous, too prolonged, or to excited a manner. She states, "...these sensitive mothers can see things from the child's point of view" (p.131).

Clarke-Stewart's research (1973) also supports the importance of responsiveness. In her work, described earlier in this review, she found a relationship between maternal responsiveness and individual differences in infant cognition, language, and social competence. Responsiveness is considered important at many levels: 1) Goldberg (1977) finds it essential to primitive interaction; 2) Bates (1976) and Sugarman (1984) find evidence to support its importance to nonverbal communication development; 3) Snow, Midkiff-Borunda, Small and Proctor (1984) find it essential for the child to form concepts and interpret experience; and 4) Cross (1984) considers responsiveness as key in relating language to topic development.

Responsiveness maintains a position on several key parent-child interaction scales as well. These include Barnard's (1978a, 1978b) Nursing Child Assessment Teaching Scale and Nursing Child Assessment Feeding Scale, Field's (1980) Interaction Rating Scale, MacDonald, Gillette, and Hutchinson's (1989) ECOScales, and Caldwell's (1979) HOME among others.

Research findings and clinical instruments unite to emphasize the importance of maternal responsiveness to child
development across domains. Maternal responsiveness implies that the mother waits and looks for the child to behave, and then uses a behavior that is contingent to the child's. In order for the child to have the opportunity to behave, the mother must pace her own behavior in time with that of the child. Successful mothers will find ways, such as waiting with anticipation, to shift the balance of power to the child in order to have the child behave she can respond.

ATTRIBUTE THREE: The child influences the mother

Richard Q. Bell (1968, 1971) began uniting a small community of researchers by noting that since 1961 several investigators have commented on the fact that the child's contribution to parent-child interaction is frequently overlooked by the research community. Since most of the parent-child interaction research takes a correlational form, it can be interpreted as a parent or child influence because a correlation does not indicate the direction of the effects. Bell's work has increased efforts to note the importance of the child's influence on the adult.

An example, Lewis and Rosenblum's (1974) The Effects of the Infant on Its Caregiver, unites a series of essays and investigations which supported the notion of the influence of the offspring to interactions with humans as well as other primates. In one essay, Lewis and Painter (1974) note that attempts to isolate infant influences may be as pointless as those made to isolate adult influences. They
suggest a model which has neither elements nor beginnings/ends. Such a model sounds ideal in theory, but is obviously quite difficult to operationalize. Rosenblum and Youngstein (1974) conducted an experiment in which they anesthetized the infant or mother member of a dyad of macaque monkey then looked for the contacts made by the able-bodied member of the dyad. They varied the age of the infant monkeys into a younger an older group. The results showed a balance and high rate in contact made by the mothers with disabled younger infants, as well as by the younger infants with a disabled mother. However, in the older infant group, the infant pursued contact more frequently than the mother. The results suggested the possibility of increased responsibility for initiation of contact as the infant matures. These early works emphasize the difficulty in isolating the source of influence in dyadic interaction.

Murray and Trevarthen (1986) devised an ingenious experiment which lends support to the influence of the infant within an interaction. When the infants were two months old, eight mother-infant pairs interacted over video monitors in two conditions without the mother being aware of the experimental manipulation. In the first condition, the infant and mother interacted in a live condition, and in the second, the infant's role was replayed to the mother in a lagged replay. Differences in maternal behavior showed that
in a live condition, mothers worked off the child's behavior. They asked genuine questions, commented positively about the infant and responded to what he did.

In the replay condition, mothers directed the child, called his attention, corrected him, and made negative comments.

The results suggest the importance of the infant's contribution to the interaction and the infant's influence on the nature of the adult's input to the interaction.

Kaye (1976) noted how the behavior of the child influenced the teaching style of mothers. He asked mothers to teach their six-month old infant a task which involved reaching around a clear barrier. First, he administered a pretest which he allowed the mother to observe. He found a strong relationship between child performance on the pretest and mother teaching style. When children approximated reaching around the barrier prior to teaching, mothers showed the infant what to do. When the infant did not demonstrate an understanding of the task at pretest, the mothers either shoved the baby's hand around the barrier or shaped the task into closer approximations of the barrier set up. Als (1977) demonstrated that even neonates largely control the behavior of the adult. Awake and alert infants elicit talking, smiling and en face holding from adults. Crying and fussing infants elicit rocking, moving and cuddling but rarely movement to an en face position.
Tronick's (1978) experiment seems to demonstrate that even very young (1-4 month old) infants expect to have an influence on the adult. He asked generally playful mothers to keep a still face in an interaction with an infant. At first the infants continued to smile and look at the mothers. Gradually they began to look away alternated with brief glances toward the mother. Then, after receiving no response the infants slumped turned away altogether.

While early researchers considered the parent's influence as the primary variable in interaction, Bell's recognition of the importance of the child's influence has prompted a new perspective in parent-child interaction. Researchers and practitioners have become more aware that infants send signals which invite or inhibit adult involvement, and that infants and children expect to have effects on adults. Such awareness has an influence upon the evaluation of parent-child interaction.

Summary: The Attribute Scale

Part two of the review of the literature has presented empirical and theoretical support for the attributes. The attributes are listed below.
CHILD ATTRIBUTES - The child acts like most twelve-month old children in terms of:

1. cognitive skills.
2. communication skills.
3. physical development.
4. personal/social skills.
5. ability to help himself.

MATERNAL ATTRIBUTES - The mother influences the child to:

1. use cognitive skills.
2. communicate.
3. use his/her body.
4. socialize with her.
5. help himself/herself.

MOTHER–CHILD INTERACTION ATTRIBUTES

1. The mother and child behave like partners.
2. The mother responds to the child.
3. The child influences the mother.
CHAPTER III

METHOD

Design

The investigator designed the experiment to sample and analyze professional clinical judgments of mother-child interaction. The professionals serving as subjects completed a series of ratings on eight, one-minute video samples of mother-child interaction (dyadic stimuli). The first clinical judgment task involved a series of paired comparisons among the eight dyadic stimuli (dissimilarity rating). The second clinical judgment task involved applying an attribute scale to each dyadic stimulus (attribute rating). The investigator completed two parallel experiments, to be called here, Analysis A and Analysis B. Each involved different professionals who served as subjects and different dyadic stimuli, but from the same mother-child pairs. Consequently, the study is a partial replication.

Subjects

The investigator recruited subjects from four professions which conduct evaluations and interventions with mother-child dyads: speech-language pathologists, social workers, early childhood special educators, and nurses. Eighty-six subjects completed the experimental tasks, 43 in
each of the parallel analyses, analysis A and analysis B. Analysis A participants included 11 speech-language pathologists, 11 nurses, 10 social workers, and 11 educators. Analysis B participants included 10 speech-language pathologists, 11 nurses, 10 social workers, and 12 educators.

Each participant provided information on their educational preparation and current profession, including certifications and licenses; the information determined their assignment to one of the four professional groups in the study. They rated their experience with the developmentally delayed birth through two-year population on a scale of 1 = little to 10 = extensive. They also described any specialized training they might have had in parent-child interaction and signed an informed consent (see Appendix B for subject information and consent forms).

Subject recruitment.

The investigator recruited subjects in two ways. First, the investigator made two brief presentations to the Franklin County Early Childhood Resource Network (ECRN), a local collaborative group on early intervention. Representatives of agencies in the county attend monthly meetings to coordinate their efforts to identify and serve children and their families in need of early intervention services. Agencies include schools, social services, public health services, hospitals, and rehabilitation centers. The
investigator distributed flyers (Appendix C) which described the time and tasks required and included a sign-up form. The representatives who attended the ECRN meetings distributed the flyers at their agencies, collected the sign-up sheets, and returned them to the investigator. Participants donated the $12.50 they earned through participating in the study to the Franklin County Early Childhood Resource Network (ECRN). Participants were motivated by the fact that the organization had a debt of $9000, and $12.50 from 80 participants would earn the group $1000 toward that debt.

Another group was recruited through the mail from a thirty-three county area surrounding Franklin County, known as Ohio Perinatal Region IV. This area is served by Children's Hospital which maintains a mailing list of professionals interested in early intervention. The investigator distributed approximately one hundred flyers (Appendix D) to these individuals through the mail; one fifth of the participants were recruited in this way. Individuals received the $12.50 they earned for participating. The fund for payment to subjects came from an Ohio State University Graduate Student Alumni Research Award which the investigator applied for and received.
The Dyadic Stimuli

One-minute video segments of eight mother-child interactions served as the dyadic stimuli for the investigation. A total of sixteen dyadic stimuli were required to complete the cells of the matrix for Analyses A and B, as illustrated in Table 1. Each cell included two different mother-child dyads to represent a level of child development (high or low) paired with a mother interaction style (non-directive or directive). Different dyadic stimuli from each of the eight mother-child dyads were used for the parallel analyses, A and B.

The dyadic stimuli came from ten-minute video-taped samples of mother-child interaction collected during the twelve-month data collection activities of a longitudinal federal project at Children's Hospital. The project, known as Project CATCH (A Collaborative Approach to the Transition from the Hospital to the Community and Home), is a Handicapped Children's Early Education Program (HCEEP) sponsored by the U.S. Department of Education and the Early Intervention Research Institute (EIRI) at Utah State University, an on-going U.S. Department of Education Research Institute. Project CATCH demonstrates transition services for medically fragile infants and their families and evaluates the longitudinal efficacy of the services on child health, child development and family functioning outcomes over a two-year period.
Table 1

Two Analyses Representing Combinations of Child (Low/High: L/H) and Mother (Non-directive/Directive: N/D) Variables stimuli.

Analysis A: Two mother-child dyadic stimuli (a) per cell

<table>
<thead>
<tr>
<th>MOTHER STYLES:</th>
<th>Non-Directive</th>
<th>Directive</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHILD LEVELS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>NL1a NL2a</td>
<td>DL1a DL2a</td>
</tr>
<tr>
<td>High</td>
<td>NH1a NH2a</td>
<td>DH2a DH2a</td>
</tr>
</tbody>
</table>

Analysis B: Two mother-child dyadic stimuli (b) per cell

<table>
<thead>
<tr>
<th>MOTHER STYLES:</th>
<th>Non-Directive</th>
<th>Directive</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHILD LEVELS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>NL1b NL2b</td>
<td>DL1b DL2b</td>
</tr>
<tr>
<td>High</td>
<td>NH1b NH2b</td>
<td>DH2b DH2b</td>
</tr>
</tbody>
</table>
At the time the investigator selected the stimuli, fifteen mother-child dyads from the project had been videotaped during their twelve-month evaluations. The investigator followed these three steps to select the dyadic stimuli for the study. First, the investigator used total scores at 12 months, corrected chronological age (CCA), on the Battelle Developmental Inventory (Newborg et al. 1984), as the criteria for infant selection. Children in the low group obtained 3, 4, 5, 6, or 7 month equivalent Battelle total scores; those in the high group obtained 8, 9, 10, 11, and 12 or more month equivalent Battelle total scores.

Second, the investigator determined the mother styles, directive or non-directive, which the ten-minute video samples represented. To make this determination, the investigator created two categories of maternal communication, directive and non-directive, based on the pragmatic categories of the maternal vocalizations. The directive category included imperatives (Get the ball!) and questions (What is that?). As Kaye & Charney (1981) note, both imperatives and questions imply directiveness in that the speaker expects a response of a certain nature from another. The non-directive category included comments (pretty ball) and vocalizations (ooo) which leave the decision of when or how to respond up to the other. When directive vocalizations exceeded the number of non-directive vocalizations, mothers were classified as directive.
Remaining mothers were classified as non-directive. The balance of directive to non-directive vocalizations (D/N) for the eight mothers included in the final selection was: directive mothers: 100/86 (1.16); 90/61 (1.48); 80/53 (1.51); 117/104 (1.13); non-directive mothers: 47/184 (0.26); 29/48 (0.60); 54/79 (0.68); 62/96 (0.65).

The third step enabled the investigator to select segments in which the child was active and attentive. To complete this process, the investigator divided the ten-minute video samples into one-minute segments by the clock running in the corner of the video. Then the investigator and another professional experienced in mother-child interaction analysis rated each one-minute segment on a scale of 1-7, where 7 indicates a high level of infant activity and attention and 1 a low level. Selection for the study required an activity/attention rating of four or greater by each professional. In each case, the investigator selected segments with the highest ratings by both professionals for inclusion in the investigation. Two, one-minute segments from the video samples had to meet the activity and attention criteria, since the same mother-child pair would be represented by a different one-minute segment in Analyses A and B.

From the original pool of fifteen mother-child dyads, the investigator found eight to complete the experimental cells illustrated in Table 1. The investigator selected two
dyadic stimuli from these samples in which the child was active and attentive. The dyads represented each level of child development (low/high) paired with each mother style (non-directive/directive). The investigator randomly assigned dyadic stimuli from each of the eight mother-child pairs to Analysis A or Analysis B.

**Descriptive Data on Mother/Child Pairs**

The investigator collected additional data to describe the mother-child pairs for use in the investigation. The data came from the twelve-month Project CATCH evaluations on the mother and child and transcripts of the dyadic stimuli.

**Evaluation data.**

Data on the child included age equivalent scores achieved on the Battelle Developmental Inventory (BDI). In addition to a total score, the profile obtained from the BDI includes measures of personal/social, adaptive, cognitive, and communication skills. Communication skills are scored for receptive and expressive skills as well as a total communication score. Motor skills are scored for gross and fine motor skills as well as a total motor score.

Additional descriptive data on the mother included socio-economic status, which the investigator scored as (1) all families whose primary source of income is public assistance (2) working families with less than $25,000 annual income and (3) working families with more than $25,000 annual income. Table 2 presents the twelve-month evaluation data.
Table 2

Descriptive Data for the N/D\textsuperscript{a} Mothers and L/H\textsuperscript{b} Children from Twelve-Month Evaluations

A. Child Measures

Battelle Developmental Inventory (BDI) Scores in Months

<table>
<thead>
<tr>
<th></th>
<th>NL1</th>
<th>NL2</th>
<th>DL1</th>
<th>DL2</th>
<th>NH1</th>
<th>NH2</th>
<th>DH1</th>
<th>DH2</th>
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</thead>
<tbody>
<tr>
<td>Total BDI</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Personal-social</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Adaptive</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>12</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Total Motor</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Gross Motor</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>4</td>
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<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Fine Motor</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>11</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Communication</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Receptive</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>13</td>
<td>11</td>
<td>11</td>
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<tr>
<td>Expressive</td>
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<td>10</td>
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<tr>
<td>Cognitive</td>
<td>3</td>
<td>9</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>13</td>
<td>16</td>
<td>11</td>
</tr>
</tbody>
</table>

B. Maternal Measures

| Socio-economic Status\textsuperscript{c} | 3   | 1   | 3   | 1   | 2   | 1   | 2   | 3   |
| Age                                 | 37  | 17  | 32  | 19  | 25  | 18  | 25  | 32  |

\textsuperscript{a} L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

\textsuperscript{b} N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

\textsuperscript{c} Socio-economic status measure:
(1) for families whose primary source of income is public assistance
(2) for working families with less than $25,000 annual income
(3) for working families with more than $25,000 annual income.
Transcript Data

A graduate student in speech and hearing science at the Ohio State University completed the transcripts of the action and vocal content of each of the sixteen dyadic stimuli used in the investigation. This student was trained in identification of the variables and paid to complete the assignment. The transcripts were coded for these features: child actions, vocalizations, and total behaviors (action + vocalization); maternal actions, vocalizations/verbalizations, and total behaviors (action + vocalization/verbalization). Maternal verbalizations were further categorized into total number of phrases and total number of words.

The investigator transcribed fifteen seconds (25%) of each transcript to check for reliability. Agreement between raters ranged from .82 to .95 across the 16 samples. The investigator created a mother/child balance measure by obtaining the percent of total number of behaviors (actions and vocalizations) which the child contributed to the interaction based on frequencies obtained in the transcripts and recorded in Table 3. Table 3 presents the transcript data for the dyadic stimuli in Analysis A and Analysis B.
Table 3

Descriptive Data for the N/D\textsuperscript{a} Mothers and L/H\textsuperscript{b} Children and from Transcripts

Analysis A: Dyadic Stimuli:

<table>
<thead>
<tr>
<th></th>
<th>NL1</th>
<th>NL2</th>
<th>DL1</th>
<th>DL2</th>
<th>NH1</th>
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Analysis B: Dyadic Stimuli

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\textsuperscript{a} L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

\textsuperscript{b} N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

\textsuperscript{c} Balance-percent of child behaviors which the child contributed to the total of mother and child behaviors.
Narrative Descriptions of the Dyadic Stimuli

The dyadic stimuli differed for Analysis A and B although they represented the same mother-child pairs. To assist in describing possible differences across the two experiments, the investigator will describe the dyadic stimuli. The description will include a summary of evaluation data on the child and mother from Table 2 and a brief scenarios describing the on-going action in the two dyadic stimuli (a and b) which represented the eight mother-child interactions in Analysis A and B. The scenario descriptions will be enhanced by transcript information from Table 3.

NL1: The child, categorized in the low developmental group achieved a total BDI score of four months, at 12 months CCA, the high score being eight months in expressive communication. The thirty-seven year old mother was categorized as non-directive and in the highest SES category of this investigation.

Analysis A participants viewed a scene in which the child bangs on a drum; his mother assisted him while they exchange playful vocalizations and smiles. Analysis B participants viewed a scene in which the mother hold the child on her knee and in the air, bouncing him about while they exchange vocalizations and smiles. Transcript information suggests that the child participated at a higher rate (44%) in stimulus a than in b (34%). The mother used
sounds (17-a; 25-b) more frequently than phrases (10-a; 8-b). In stimulus a, phrases averaged 3.8 words each while in stimulus b, phrases averaged 2.6 words each.

**DL2:** The child was in the low developmental category, with an overall BDI score of six months and with a strength in expressive communication and a weakness in gross motor skills. The nineteen year-old mother was categorized as directive and in the lowest SES category.

In both Analysis A and B the mother directs the child in a ball playing activity, in stimulus a she sits behind the child, holding her hands to assist in the ball game, and in stimulus b, the two are across from each other. The child contributes 25% (a) and 33% (b) of the behaviors to the mutual activity. The mother speaks at a rate of one word per second in both scenes, using phrases which average three words each. The child vocalizes only once and it occurred in Analysis B.

**DL1:** Total BDI score for the child categorized into the low developmental group was four months, with weaknesses in communication and adaptive skills and strengths in the personal/social and fine motor area. The thirty-two year old mother was categorized as directive and rated in the highest SES category.

Analysis A participants viewed a scene in which the mother holds the child over her knee so he can reach down and put blocks in a bucket while she both demonstrates and
directs the activity. In Analysis B, the mother changes from an unsuccessful doll activity to a ball activity in which the two roll the ball back and forth while she provided direction and encouragement with words and smiles. The child contributed 39% (a) and 32% (b) to the on-going activity. The mother verbalized less (27 phrases of 2.0 words each) in the first interaction than in the second (24 phrases of 3.2 words each); the child vocalized 3 times in the first scene and not at all in the second.

**NL2:** The child was categorized in the low developmental category, with a total BDI of seven months, with a strength in expressive communication. The seventeen year old mother was categorized as non-directive and in the lowest SES level.

Analysis A participants viewed a scene in which the child reaches to the mother to stand, and hand in hand they exchange a *ba-ba* sound. In Analysis B, a similar scene takes place except that they exchange silly noises instead of the *ba-ba* sound. Transcript information indicates that the child contributed 50% (a) and 52% (b) to the mutual activity, vocalizing and acting almost equally in both. The mother used only one phrase in stimulus a, but six in stimulus b, averaging 2.5 words each.

**NH1:** At twelve months CCA, the child achieved a total score of eight months on the *Battelle Developmental Inventory* (BDI) and was categorized in the high
developmental group. The BDI profile indicated a strength in the cognitive and social areas and weakness in adaptive and motor skills. The twenty-five year old mother was categorized as non-directive based on a transcript of her vocalizations; she was ranked in the middle SES level on the categorization system used in this investigation.

Analysis A participants viewed a scene in which the mother and child played ball together, patting it and tossing in back and forth while they exchanged vocalizations and smiles. Analysis B participants viewed a scene in which the mother-child pair moved from a pretend phone conversation to a game of peek-a-boo, again exchanging smiles and vocalizations. The transcript information indicates that child behaviors accounted for 41 and 40 percent of the on-going activity. The mother spoke to the child using 18 phrases averaging 1.33 words each in stimuli a, and 14 phrases averaging 1.78 words each in stimuli b.

NH2: The child in the high developmental category scored an overall BDI of 11 months with a strength in receptive communication and a weakness in gross motor skills. The eighteen year old mother was categorized as non-directive and in the lowest SES level.

Analysis A participants viewed a scene in which the mother extends a doll toward the child, then pulling it back, then she places the doll on a chair for the child to go after. In Analysis B, the scene involves two parts. At
first, the mother rubs a doll on the child's face, when he objects, she stops. She then lets him crawl on her to select a toy from the basket. Data from the transcript indicates that the child contributes 39% (a) and 47% (b) of the behaviors to their mutual interaction. The child's vocalizations balanced with the mother's, 6:9 (a) and 9:7 (b). She spoke in phrases that averaged 1.8 (a) and 2.7 (b) words.

**DH1:** The child, categorized into the high developmental group, scored a total of twelve months on the BDI at twelve months CCA. The cognitive area was a strength at 16 months and personal/social skills a weakness at 8 months. The twenty-five year old mother was categorized as directive and in the middle SES level.

Analysis A participants viewed a scene in which the mother set up a game of ball, aiming for the child to name and find it. In Analysis B, the mother demonstrates an activity of putting blocks in a bucket and directs the child to perform the desired action. Transcript information indicates that the child contributed 31% (a) and 37% (b) of the behaviors in the activities, but vocalized only three times across both scenes. The mother spoke at a rate of at least one word per second, using an average phrase length of 3.7 words per phrase across both scenes.

**DH2:** At the age of twelve months, a total BDI score of 10 months defined the child's developmental level, with a
strength (13 months) in receptive communication skills and a weakness (7 months) in personal/social skills. He was categorized in the high developmental group. The thirty-two year old mother was categorized as directive and in the highest SES category.

Analysis A participants viewed a scene in which the mother verbally and physically assists the child as he puts blocks in a container. Analysis B participants observed the mother physically assisting and verbally directing the child in a ball kicking activity. Transcript information indicated that the child contributed 33% (a) and 21% (b) of the behaviors to the interaction, and never vocalized. The mother spoke at a rate of more than one word per second in both interactions and in phrases that averaged 2.8 (A) to 2.1 (B) words each.

Procedures

The subjects completed two clinical judgment tasks, a dissimilarity rating and an attribute rating. Three-fourths of the subjects completed the tasks at home or at work individually. Another fourth completed the tasks in small groups at work.

The investigator created two experimental tapes, one for each different experiment (A and B). Subjects received tape A or B depending upon the availability of tapes at the time they were recruited. Each subject received a description of the general purpose of the investigation and
directions for completing the two rating tasks (see Appendix C). The investigator did not supply any additional information to the subjects.

**Dissimilarity rating.**

The first part of the experimental tape consisted of all possible different pairs of the eight dyadic stimuli. This produced 28 different pairs \(\frac{n(n-1)}{2}\). On the experimental tapes, the investigator recorded the dyadic stimuli with no pause between compared stimuli, followed by a fifteen second pause during which the subjects responded to the question, "How similar or dissimilar are the interactions?" They provided a similarity/dissimilarity rating using a seven point scale. On this scale, a 1 indicated the dyadic stimuli were very similar and a 7 indicated the dyadic stimuli were very dissimilar. Subjects responded on the rating form provided (see Appendix D). The twenty-eight paired comparisons required one-hour to complete and subjects were given the opportunity for a break at the halfway point.

**Attribute ratings.**

On the second part of the experimental tape, each dyadic stimuli was presented separately followed by a break during which subjects were required to make the attribute ratings. Following the dissimilarity rating, the subjects opened an envelope containing an attribute study guide and eight rating sheets,(one for each dyadic stimuli, see
Appendix A). This task separation allowed subjects to complete the dissimilarity ratings without influence from knowing the attributes. Subjects reviewed the attribute study guide, then viewed the dyadic stimuli one by one and rated each on the series of attributes. Time for completion varied from twenty to thirty minutes.

The investigator created the thirteen attributes to represent mother, child, and mother-child interaction variables professionals commonly consider when evaluating parent-child interactions. The investigator described each variable with phrases derived from the literature or on parent-child interaction assessments. The literature review provides theoretical and empirical support for each variable included in the attribute scale.

The attributes represent the kinds of judgments professionals make in determining eligibility for early intervention services and in designing early intervention treatment programs. As prescribed in PL 99-457, children eligible for services must show a delay in one of five developmental categories: communication, cognition, physical development, psycho-social development, or self-help skills. The child portion of the attribute scale asked subjects to rate the child in relationship to most twelve-month old children in the developmental areas of communication, cognition, physical development, personal/social skills and the ability to help himself/herself. The maternal portion
of the attribute scale asked subjects to rate the mother's influence in helping the child to develop his skills in these same five developmental areas.

The mother-child portion of the attribute scale asked subjects to rate three mother-child interaction variables since literature of the four disciplines each considered these attributes as essential in evaluating mother-child interaction. The mother-child interaction variables were: 1) the mother and child behave like partners; 2) the mother responds to the child; and 3) the child influences the adult. Subjects rated each attribute on a scale of one to seven, where one indicated the attribute was a poor description of the dyadic stimuli and a seven indicated it was an excellent description.

The attributes are listed below.

CHILD ATTRIBUTES - The child acts like most twelve-month old children in terms of:

1. cognitive skills.
2. communication skills.
3. physical development.
4. personal/social skills.
5. ability to help himself.

MATERNAL ATTRIBUTES - The mother influences the child to:

1. use cognitive skills.
2. communicate.
3. use his/her body.
4. socialize with her.
5. help himself/herself.

MOTHER-CHILD INTERACTION ATTRIBUTES

1. The mother and child behave like partners.
2. The mother responds to the child.
3. The child influences the mother.
CHAPTER IV

RESULTS

The investigator used an individual differences model of multidimensional scaling (MDS) to analyze the dissimilarities data collected for the parallel analyses, A and B. The analyses included: 1) submitting the dissimilarity data to a three-way MDS analysis; 2) determining the appropriate dimensionality of the solution; 3) interpreting the dimensions; 4) determining the individual differences among the professional groups. The investigator then compared the results from Analysis A and Analysis B to test for the replicability of the results. In the results chapter the investigator will describe the methods used to complete the analysis, present the results for Analysis A and Analysis B, then draw parallels between the two analyses.

The Analysis

Three-way multidimensional scaling analysis.

The investigator used INDSCAL, a three-way MDS model (Kruskal & Wish, 1978) to analyze the data. MDS is a class of techniques which use proximities among objects as input. In this analysis, the subjects provided proximities data in
the form of dissimilarities ratings among the dyadic stimuli. The dissimilarity ratings collected from the four groups of professionals provided the proximities input to the INDSCAL model of the SAS ALSCAL program (Takane, Young, & DeLeeuw, 1976). Four matrices represented the average dissimilarity ratings of each professional group, speech-language pathologists, nurses, social workers, and early childhood special educators. The three ways of the data were dyadic stimuli x dyadic stimuli x professional group. MDS analysis produces a geometric space as the output; each point on this group stimulus space represents the position of each dyadic stimuli in relation to the others. Subject perceptions of dissimilarity are represented as distances among the stimuli along various dimensions.

By averaging the dissimilarities ratings within in each group of professionals, the investigator developed the study as an investigator of the clinical judgment behavior of professional groups rather than each individual. Initial manipulations of the data indicated that a group solution accounted for considerably more variance in the data than did individual analyses.

**Determining dimensionality.**

Finding the appropriate dimensionality is a primary problem in an MDS analysis. Investigators use MDS in an attempt to discover the major perceptual dimensions or features that subjects use to discriminate among stimuli.
Several goodness-of-fit measures can assist in this interpretation; these include STRESS and RSQ (Young, 1987). STRESS is defined on distance with good fit values near zero and poor values near one. RSQ is the squared multiple correlation between the optimally scaled dissimilarities and the distances produced by the MDS model. Investigators interpret RSQ as the proportion of variance of the optimally scaled data that can be accounted for by the MDS model. Good fit values approach one and poor fit values approach zero. The dimensionality of the solution allows the investigator to discover how many dimensions the subjects used to discriminate among the stimuli. In order to determine the appropriate dimensionality, the investigator looks for a sharp decrease in STRESS or increase in RSQ, followed by little change from adding dimensions. This point of change is often called an elbow in MDS terminology.

Labelling the dimensions.

Once the dimensionality of a solution is determined, the investigator seeks to interpret or label the dimensions. In this investigation, the attribute ratings the subjects made and other data describing the stimuli were used to assist in labelling the dimensions. Three methods which can be used to determine the relationship between the dimensions and other data are described below.

A high correlation between the positions of the dyadic stimuli along a dimension and data external to the MDS
analysis suggest a relationship between the two measures. In this investigation, the mean attribute ratings (Appendix G) and descriptive data on the mother-child pairs (Table 2 & 3) provide the external measures. Another method used for dimensional interpretation, multiple regression (Cohen & Cohen, 1975), can determine the relationship between a set of external measures and a dimension, and select the external measure which best predicts the position of the dyadic stimuli on a dimension. This investigation used a stepwise multiple regression with criteria to enter the equation set at \( p < .05 \) and criteria for removal from the equation set at \( p < .10 \). The investigator also visually inspected the position of the dyadic stimuli in relation to each other while reviewing categorical information about the stimuli to determine existing patterns in the geometric space.

**Determining the individual differences.**

The INDSCAL model of ALSCAL produces a subject space in addition to the group stimulus space. This space is a geometric representation of the relative weight each subject gave to a dimension in rating the stimuli. Nygren and Jones (1977) recommend the use of a summary measure, weight ratios, in describing subject weights. They consider comparison of subject weights meaningful only when the ratio of the weights on pairs of dimensions are used, rather than the values directly estimated from the program.
In this investigation, each professional group is considered a subject in the INDSCAL model. Relationships drawn between the subject weight ratios on pairs of dimensions and data obtained from the subjects, such as their profession, experience level, and specialized training, may assist the investigator in determining aspects of the individual differences related to the group stimulus space.

**Analysis A**

The investigator averaged the dissimilarities ratings of each professional group (speech-language pathologists, n=11; nurses, n=11; social workers, n=10; and educators, n=11) to create the four matrices used for Analysis A input in the INDSCAL model of the SAS ALSCAL program.

**Determining dimensionality.**

The investigator compared two fit measures, STRESS and RSQ across 1, 2, 3, 4 and 5 dimensions to determine the appropriate dimensionality for the solution. As Figure 1 illustrates, an elbow is indicated in adding a second dimension, but no such point of change occurs in expanding beyond two dimensions. The RSQ value increased by .105 (.694 to .799) from one to two dimensions and the STRESS values decreased by .15 (.320 to .170). From two to three dimensions, RSQ changed by only .065 (.799 to .862) and STRESS by .05 (.170 to .120). Additional variance accounted for by adding a fourth (RSQ = .886; STRESS = .081) and fifth
Figure 1. Analysis A: STRESS and RSQ values for MDS of mean perceptual space.
dimension (RSQ=.902; STRESS = .052) was negligible. These comparisons indicated a two-dimensional solution would best represent the dissimilarities the four professional subject groups perceived among the dyadic stimuli.

The individual RSQ values for each professional group (speech-language pathologists [RSQ=.779], nurses [RSQ=.773], social workers [RSQ=.881] and educators [RSQ=.761]) also indicated that the two dimensional space accounted for a substantial amount of the variance for the individual subject groups. Based upon the obtained RSQ value, the group stimulus space for the ALSCAL, INDSCAL model analysis accounted for .799 of the variance in the optimally scaled data in Analysis A. Figure 2 presents the two dimensional solution.

**Labelling the dimensions.**

The process of labelling the dimensions began with Pearson correlations between variables external to the solution and the two dimensions obtained in the solution. Pearson correlations between Dimension 1 (D1) and Dimension 2 (D2) and the evaluation and transcript data presented in Table 2 and 3 indicated no significant correlations (Table 4 and 5). This would indicate that these objective data did not account for the differences the subjects perceived among the dyadic stimuli.

Pearson correlations (Table 6) between D1 and the attributes indicated a high correlation (p < .01) for these
N/D = non-directive/directive maternal communication style
L/H = low/high child developmental level

**Figure 2.** Analysis A: Group stimulus space for four professional groups (N=43)
Table 4

Analysis A: Correlations Between D1 and D2 and the Descriptive Data for the N/D\textsuperscript{a} Mothers and L/H\textsuperscript{b} Children from Twelve-Month Evaluations

Analysis A Dimensions: D1 D2

A. Child Measures

Battelle Developmental Inventory (BDI) Scores in Months

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B. Maternal Measures

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\textsuperscript{a} L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

\textsuperscript{b} N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

\textsuperscript{c} Socio-economic status measure:

(1) for families whose primary source of income is public assistance
(2) for working families with less than $25,000 annual income
(3) for working families with more than $25,000 annual income.
Table 5

Analysis A: Correlations Between D1 D2 and Descriptive Data for the N/D\(^a\) Mothers and L/H\(^b\) Children from Transcripts

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\(^a\) L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

\(^b\) N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

\(^c\) Balance-percent of total behaviors which the child contributed to the interaction
Table 6

**Analysis A: Pearson Correlations Between the Coordinates from a Two-Dimensional Solution and the Mean of the Attribute Ratings Across the 43 Subjects**

The Attributes

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<td>Personal/social</td>
<td>.29</td>
<td>.16</td>
</tr>
<tr>
<td>Self-help</td>
<td>.14</td>
<td>.39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Influence:</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>.69</td>
<td>.77</td>
</tr>
<tr>
<td>Communication</td>
<td>.79*</td>
<td>.05</td>
</tr>
<tr>
<td>Physical</td>
<td>.61</td>
<td>.61</td>
</tr>
<tr>
<td>Personal/social</td>
<td>.85*</td>
<td>.14</td>
</tr>
<tr>
<td>Self-help</td>
<td>.68</td>
<td>.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mother-Child:</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partners</td>
<td>.79*</td>
<td>.25</td>
</tr>
<tr>
<td>Mother responds</td>
<td>.82*</td>
<td>.07</td>
</tr>
<tr>
<td>Child influences</td>
<td>.66</td>
<td>-.07</td>
</tr>
</tbody>
</table>

* *see Appendix A for complete title of attributes as presented to the subjects

* *p < .01
attributes: maternal social influence (r [43] = .85), maternal responsiveness (r [43] = .82), the mother-child are partners (r [43] = .79) and maternal communication influence (r [43] = .79). Stepwise multiple regression between D1 and the attributes resulted in a multiple R = .8483 which accounted for .72 of the variance. The attribute described as maternal influence on the child's social skills was entered on the first step and achieved a significant F (1, 6) = 15.4, p = .0078. No other variables entered into the stepwise multiple regression equation. Based upon the multiple regression, D1 was labeled maternal social influence.

Pearson correlations between D2 and the attributes indicated one significant correlation (p < .05) with maternal influence on the child's cognitive skills. A stepwise multiple regression between D2 and the attributes resulted in a multiple R = .724, which accounted for .54 of the variance. The attribute maternal influence on the cognitive skills of the child was entered into the equation on the first step and achieved significance (F (1, 6) = 6.64, p = .0419). At the second step, a multiple R = .895 explained an additional .27 of the variance on D2. The attribute describing the child influence on the mother was significant, F (1, 6) = 10.14, p = .017. Based upon these results, the investigator labeled D2 maternal cognitive influence.
Table 7 illustrates the correlations among the maternal attributes in Analysis A. Strong relationships are obtained between the cognitive and adaptive maternal influences, which appear related to D1. Another strong relationship holds between the social and communication maternal influence attributes which are the labels given to D2. Maternal physical development influence holds a strong relationship across both dimensions labelled with the attributes, maternal social and maternal cognitive influence.

Describing the individual differences.

The subject weight space (Figure 3) and subject weights and weight ratios (Table 8) for Analysis A indicated individual differences among the subject groups. The weight ratio D1/D2 (1.36) indicated that social workers discriminated among the dyadic stimuli primarily on the basis of maternal social influence. Discriminations by speech-language pathologists were formed primarily on the basis of maternal cognitive influence, as indicated by the weight ratio of D1/D2 (.61). Weight ratios for nurses (D1/D2=1.06) and educators (D1/D2=.93) indicated that these groups placed close to equal weight on both dimensions in making their discriminations.
Table 7

Analysis A: Pearson Correlations Among the Subject Ratings on the Maternal Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>M-1</th>
<th>M-2</th>
<th>M-3</th>
<th>M-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1: Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-2: Communication</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-3: Physical</td>
<td>.84**</td>
<td>.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-4: Social</td>
<td>.64*</td>
<td>.93***</td>
<td>.94**</td>
<td></td>
</tr>
<tr>
<td>M-5: Adaptive</td>
<td>.82**</td>
<td>.64*</td>
<td>.69*</td>
<td>.75*</td>
</tr>
</tbody>
</table>

*  \( p < .05 \)
** \( p < .01 \)
*** \( p < .001 \)
Figure 3. Analysis A: Subject weight space for four professional groups
Table 8

Analysis A: Subject Weights on Dimension 1 (D1) and Dimension 2 (D2) and the Weight Ratio of D1/D2

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>Subject Weights</th>
<th>Ratio</th>
<th>D1</th>
<th>D2</th>
<th>D1/D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech-Language Pathologists</td>
<td>11</td>
<td>.4639</td>
<td>.7511</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>Nurses</td>
<td>11</td>
<td>.6394</td>
<td>.6031</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>Social workers</td>
<td>10</td>
<td>.8259</td>
<td>.4468</td>
<td>1.36</td>
<td></td>
</tr>
<tr>
<td>Educators</td>
<td>11</td>
<td>.5934</td>
<td>.6394</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>.4146</td>
<td>.3841</td>
<td>1.07</td>
<td></td>
</tr>
</tbody>
</table>
Analysis B

For the second set of stimuli, the investigator again averaged the dissimilarities ratings of each professional group (speech-language pathologists, n=10; nurses, n=11; social workers, n=10 and educators, n=12). This created the four matrices used for Analysis B input in the INDSCAL model of the SAS ALSCAL program.

Determining the dimensionality.

The investigator compared two fit measures, STRESS and RSQ across one, two, three, four, and five dimensions to determine the appropriate dimensionality of the solution. As Figure 4 illustrates, an elbow is indicated by adding a second dimension, but no such point of change occurs in expanding beyond two dimensions. The RSQ value increased by .20 (.611 to .811) from one to two dimensions and the STRESS value decreased by .203. From two to three dimensions, RSQ increased by only .05 (.811 to .861) and STRESS decreased by .05 (.165 to .110). Additional variance accounted for by adding a fourth (RSQ = .884; STRESS = .081) and fifth (RSQ = .924; STRESS = .052) dimension was negligible.

The individual RSQ values for each professional group (speech-language pathologists [RSQ=.762], nurses [RSQ=.904], social workers [RSQ=.762], and educators [RSQ=.816]) also indicated that the two dimensional space accounted for a substantial amount of the variance for the individual subject group. Based upon the obtained RSQ value, the group
Figure 4. Analysis B: STRESS and RSQ values for MDS of mean perceptual space
stimulus space for the ALSCAL INDSCAL model solution accounted for .811 of the variance in the optimally scaled data in Analysis B. Figure 5 presents the two dimensional solution.

Labelling the dimensions.

The process of labelling the dimensions began with Pearson correlations between the dimensional values along D1 and D2 and variables external to the solution. Pearson correlations between D1 and D2 and descriptive data from the evaluations (Table 2) and transcripts (Table 3) indicated some significant correlations (Table 9 and 10). One significant correlation was obtained between the child's personal-social score on the Battelle Developmental Inventory and D2 ($r[8] = .72, p < .05$) However, investigators may expect one significant correlation to occur by chance when twelve variables are considered.

A more interesting pattern is noted in the correlations between D1 and the descriptive data from the transcripts. Significant correlations were obtained between child actions ($r[8] = .71, p < .05$), total child behaviors ($r[8] = .64, p < .05$), and maternal actions ($r[8] = .81, p < .01$). This could indicate that a relationship existed between the activity level of the dyad and D1.

Pearson correlations (Table 11) between D1 and the attributes indicated a high correlation ($p < .01$) for maternal influence in the cognitive ($r[43] = .97$), social
Figure 5. Analysis B: Group stimulus space for four professional groups (N=43)

N/D = non-directive/directive maternal communication style
L/H = low/high child developmental level
Table 9

Analysis B: Correlations Between D1 and D2 and the Descriptive Data for the N/D<sup>a</sup> Mothers and L/H<sup>b</sup> Children from Twelve-Month Evaluations

<table>
<thead>
<tr>
<th>Analysis B Dimensions</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Child Measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battelle Developmental Inventory (BDI) Scores in Months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total BDI</td>
<td>-.14</td>
<td>.44</td>
</tr>
<tr>
<td>Personal-social</td>
<td>-.14</td>
<td>.72&lt;sup&gt;+&lt;/sup&gt;</td>
</tr>
<tr>
<td>Adaptive</td>
<td>.14</td>
<td>-.02</td>
</tr>
<tr>
<td>Total Motor</td>
<td>-.09</td>
<td>.33</td>
</tr>
<tr>
<td>Gross Motor</td>
<td>-.24</td>
<td>.37</td>
</tr>
<tr>
<td>Fine Motor</td>
<td>.08</td>
<td>.28</td>
</tr>
<tr>
<td>Communication</td>
<td>-.17</td>
<td>.20</td>
</tr>
<tr>
<td>Receptive</td>
<td>.02</td>
<td>.39</td>
</tr>
<tr>
<td>Expressive</td>
<td>-.27</td>
<td>-.09</td>
</tr>
<tr>
<td>Cognitive</td>
<td>-.17</td>
<td>.60</td>
</tr>
<tr>
<td><strong>B. Maternal Measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-economic Status&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-.06</td>
<td>-.34</td>
</tr>
<tr>
<td>Age</td>
<td>.07</td>
<td>-.40</td>
</tr>
</tbody>
</table>

<sup>a</sup> L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

<sup>b</sup> N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

<sup>c</sup> Socio-economic status measure:

(1) for families whose primary source of income is public assistance
(2) for working families with less than $25,000 annual income
(3) for working families with more than $25,000 annual income.

<sup>*</sup> p < .05
Table 10

**Analysis B: Correlations Between D1 D2 and Descriptive Data for the N/D<sup>a</sup> Mothers and L/H<sup>b</sup> Children from Transcripts**

<table>
<thead>
<tr>
<th>Analysis B: Dimensions</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHILD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actions</td>
<td>.71*</td>
<td>.18</td>
</tr>
<tr>
<td>Vocalizations</td>
<td>.03</td>
<td>.31</td>
</tr>
<tr>
<td>Total Behaviors</td>
<td>.64*</td>
<td>.37</td>
</tr>
<tr>
<td><strong>MOTHER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actions</td>
<td>.81**</td>
<td>-.0006</td>
</tr>
<tr>
<td>Vocalizations</td>
<td>-.005</td>
<td>-.65*</td>
</tr>
<tr>
<td>Total Behaviors</td>
<td>.39</td>
<td>-.54</td>
</tr>
<tr>
<td>Total Phrases</td>
<td>-.13</td>
<td>-.29</td>
</tr>
<tr>
<td>Total Words</td>
<td>.08</td>
<td>-.25</td>
</tr>
<tr>
<td>Balance&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-.006</td>
<td>.59</td>
</tr>
</tbody>
</table>

<sup>a</sup> L/H: Low/high child developmental category based on the total score on the Battelle Developmental Inventory

<sup>b</sup> N/D: Non-directive/directive maternal category based on the pragmatics of the maternal vocalizations

<sup>c</sup> Balance-percent of total behaviors which the child contributed to the interaction

* p < .05

** p < .01
Table 11

**Analysis B: Pearson Correlations Between the Coordinates from a Two-Dimensional Solution and the Mean of the Attribute Ratings Across the 43 Subjects**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D1</td>
</tr>
<tr>
<td><strong>Child Skills:</strong></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>.33</td>
</tr>
<tr>
<td>Communication</td>
<td>.10</td>
</tr>
<tr>
<td>Physical</td>
<td>.46</td>
</tr>
<tr>
<td>Personal/social</td>
<td>.38</td>
</tr>
<tr>
<td>Self-help</td>
<td>.10</td>
</tr>
<tr>
<td><strong>Maternal Influence:</strong></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>.97*</td>
</tr>
<tr>
<td>Communication</td>
<td>.77</td>
</tr>
<tr>
<td>Physical</td>
<td>.77</td>
</tr>
<tr>
<td>Personal/social</td>
<td>.90*</td>
</tr>
<tr>
<td>Self-help</td>
<td>.82*</td>
</tr>
<tr>
<td><strong>Mother-Child:</strong></td>
<td></td>
</tr>
<tr>
<td>Partners</td>
<td>.86*</td>
</tr>
<tr>
<td>Mother responds</td>
<td>.90*</td>
</tr>
<tr>
<td>Child influences</td>
<td>.85*</td>
</tr>
</tbody>
</table>

* see Appendix A for attributes as presented to the subjects

* p < .01
(r [43] = .90), and self-help (r [43] = .82) skill areas, as well as all three mother-child interaction attributes (partners [r (43) = .86], mother responds [r (43) = .90], child influences [r (43) = .85]). Stepwise multiple regression between the D1 and the attributes resulted in a multiple R = .9658, which accounted for .93 of the variance. The attribute describing the maternal influence on the child's cognitive skills was entered into the equation on the first step and achieved significance (F [1,6] = 83.4, p = .0001). No other variables entered into the stepwise multiple regression equation. Based on these results, D1 in Analysis B was labeled maternal cognitive influence.

Pearson correlations between D2 and the attributes indicated one significant correlation (p < .05) with maternal influence on the child's communication (r [43] = .70). A stepwise multiple regression between D2 and the attributes indicated that no attributes were entered into the equation. Visual inspection of the group stimulus space indicated that three of the four mothers grouped as non-directive communicators occupied a similar position on D2. The Pearson correlation between D2 and maternal communication influence and the similarity in the position in the group space of the non-directive communicators suggest that based upon the available information, D2 could best be labelled maternal communication influence. Table 12 illustrates the relationships which hold among the maternal
Table 12

Analysis B: Pearson Correlations among the Subject Ratings on the Maternal Attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>M-1</th>
<th>M-2</th>
<th>M-3</th>
<th>M-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1: Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-2: Communication</td>
<td>.74*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-3: Physical</td>
<td>.85**</td>
<td>.67*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-4: Social</td>
<td>.89***</td>
<td>.93***</td>
<td>.82**</td>
<td></td>
</tr>
<tr>
<td>M-5: Adaptive</td>
<td>.85**</td>
<td>.73*</td>
<td>.93***</td>
<td>.89***</td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001
attributes based upon Pearson correlations. Significant correlations occurred among all the attributes. The social influence attribute correlations at a level of $p < .001$ with both the cognitive (D1) and communication (D2) dimensions.

Describing the individual differences.

The subject weight space (Figure 6) and subject weights and weight ratios (Table 13) for Analysis B indicated individual differences among the subject groups. The weight ratio of D1/D2 for nurses (4.27), social workers (1.94) and educators (1.84) indicated that these groups discriminated among the dyadic stimuli primarily on the basis of maternal cognitive influence. Speech-language pathologists discriminated among the dyadic stimuli primarily on the basis of maternal communicative influence, as indicated by the weight ratio of D1/D2 of .67.
Subject weight on dimension 2: maternal communication influence

Subject weight on dimension 1: maternal cognitive influence

Speech-language pathologists
(n=10)

Early childhood special educators
(n=12)

Social workers
(n=10)

Nurses (n=11)

Figure 6. Analysis B: Subject weight space for four professional groups
### Table 13

**Analysis B: Subject Weights on Dimension 1 (D1) and Dimension 2 (D2) and the Weight Ratio of D1/D2**

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>n</th>
<th>D1</th>
<th>D2</th>
<th>D1/D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech-Language Pathologists</td>
<td>10</td>
<td>.4649</td>
<td>.7386</td>
<td>.67</td>
</tr>
<tr>
<td>Nurses</td>
<td>11</td>
<td>.9257</td>
<td>.2165</td>
<td>4.27</td>
</tr>
<tr>
<td>Social workers</td>
<td>10</td>
<td>.7767</td>
<td>.3988</td>
<td>1.94</td>
</tr>
<tr>
<td>Educators</td>
<td>12</td>
<td>.7942</td>
<td>.4298</td>
<td>1.84</td>
</tr>
<tr>
<td><strong>Total Group</strong></td>
<td>43</td>
<td>.5768</td>
<td>.2341</td>
<td>2.46</td>
</tr>
</tbody>
</table>
Parallels Between Analysis A and B

Analysis A and B analyzed the dissimilarity data on dyadic stimuli collected from different groups of 43 professionals including almost equal numbers of speech-language pathologists, nurses, social workers, and educators. The dyadic stimuli were one-minute video samples of mothers interacting with their twelve-month old children who had been health-impaired at birth. Analysis A and B involved dissimilarity judgments on different video samples of the same mother-child pairs. The eight mother-child pairs were selected to represent two levels of child functioning (low and high) and two maternal communication styles (non-directive and directive). The dissimilarities data represented their response to the question, "How similar or dissimilar are these two interactions?" using a scale of 1 to 7.

Group Space Similarities and Differences: Analyses A and B

Similarities and differences across the group space resulting from Analysis A and Analysis B can be noted by contrasting Figure 2, (Analysis A) and Figure 5, (Analysis B). Contrasts between the group space representations for Analyses A and B are illustrated in Table 14 and described for each mother-child pair. Table 14 reduces the distance information from the two group space figures to two categories, similar or different. When the position of a mother-child pair is similar along a dimension in both
Table 14

Similarities Across the Group Space for Analyses A and B

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Dimension 1**</th>
<th>Dimension 2***</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL1</td>
<td>S*</td>
<td>D*</td>
</tr>
<tr>
<td>NL2</td>
<td>S</td>
<td>D</td>
</tr>
<tr>
<td>DL1</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>DL2</td>
<td>S</td>
<td>D</td>
</tr>
<tr>
<td>NH1</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>NH2</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>DH1</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>DH2</td>
<td>S</td>
<td>D</td>
</tr>
</tbody>
</table>

* S- indicates the mother-child pair occupied a similar position along a dimension in both Analyses, A and B

D - indicates the mother-child pair occupied a different position along a dimension in both Analyses, A and B.

** - Spearman r for D1 across Analysis A and B r (8) = .59

*** - Spearman r for D2 across Analysis A and B r (8) = .23
analyses, an $S$ is recorded. When the position along a dimension differs from Analysis A to B, a $D$ is recorded.

Comparing the two Analyses, A and B, indicates that most of the similarity across analyses relate to D1. Seven of the eight mother-child pairs occupied a similar position along D1 in the Analyses, A and B. Only three of the eight mother-child pairs occupied a similar position along D2, however. NL1 approaches the same pole along D1 ($S$) in both analyses, but this does not occur when comparing positions along D2 ($D$). NL2 also approaches the same pole along D1 ($S$) in both analyses, but opposite poles along D2 ($D$). DL1 occupies a similar position along D1 ($S$) and D2 ($S$) in both analyses. DL2 is located in a similar position along D1 ($S$) in both analyses, but approaches opposite poles along D2 ($D$). NH1 occupies a similar position along D1 ($S$) and D2 ($S$) for both analyses. NH2 approaches the same pole of D1 ($S$) and D2 ($S$) in both analyses, but the relative position differs. DH1 approaches opposite poles on D1 ($D$) and D2 ($D$) in both analyses. DH2 approaches the same pole along D1 ($S$) in both analyses, but opposite poles along D2 ($D$). Seven of the eight mother-child pairs occupied a similar position along D1; no consistent trend was noted along D2.

The parallels across the Analyses A and B for D1 may indicate a trend in the data not evident from the labels generated by the multiple regression of the attributes with dimensions for the individual Analyses, A and B. The
multiple regression had generated different labels for D1 in Analysis A and B. Visual inspection of the positions of the mother-child pairs along with a review of the evaluation and transcript data presented in Table 2 and 3 may indicate a label for D1 which holds across both of the Analyses, A and B.

**Labelling D1 Across Analyses A and B**

The position of DL2, NL2 and NH2 along D1 contrasts with the position of the other mother-child pairs. Each of these mothers (DL2, NL2, NH2) were young and poor as the data in Table 2 indicates. Additional information available on these mothers further indicated that none of these mothers had graduated from high school. The other mothers were older, in a higher socio-economic status, and had graduated from high school; one had graduated from college (DH2).

The professional subjects did not receive any demographic information on the dyads, yet the youth of the mothers in DL2, NL2, and NH2 was probably obvious in the video samples. Also, dialect and vocabulary differences among the mothers also may have provided the subjects with additional information about the education level of the mothers. The contrast in the positions along D1 of three dyads compared to all other dyads indicates a possible trend in professional evaluations of mother-child interactions. A culturally related label for D1 is the only label which
holds across both Analyses A and B. The variance accounted for by D1 can be obtained by examining the RSQ values of a one-dimensional solution of the Analyses, A and B. RSQ values for a one dimensional solution equalled .694 in Analyses A and .611 in Analysis B.

The positions of the mother-child pairs along D2 indicates variability along this dimension when the experiment is replicated. Only three of the eight mother-child pairs occupy a similar position along D2 when Analysis A and B are compared. Consequently, the additional variance accounted for by D2 can not be consistently explained across the two Analyses, A and B. This may provide evidence for a one dimensional solution as the best description of the data across the parallel analyses. If D1 is best described as a culturally related dimension, over 60% of the variance in the data is related to cultural differences the professionals noted among the mothers in the dyads.

**Individual differences.**

Trends in individual difference will be explored below. These trends, however, must be considered in the context of the explanation of the group space obtained from contrasting Analysis A with Analysis B.

Table 8 and 13 present the weight ratios that indicate the individual differences among professional groups. These weight ratios are used to explore trends across and within professions. D1 was the dimension most professionals used
to make their discriminations among the mother-child pairs across both analyses. This includes nurses (A and B), social workers (A and B), and educators (B). If D1 is related to a cultural discrimination, most of the professionals used culture as the primary way they discriminated among the mother-child pairs. The use of D2 by both groups of speech pathologists and one group of educators may indicate variability among the professionals in these groups rather than an evaluation trend. This caution is based upon the lack of consistency in the use of D2 across the Analyses A and B.

Table 15 presents information on individual differences within and across the professional groups including experience and specialized training. Professionals rated their experience level on a scale of 1 to 10, where a 1 indicated little experience and a 10 indicated extensive experience (Appendix B). Data summarized in Table 15 indicated the professionals participating in Analysis A and B had a similar level of experience and amount of specialized training. Table 15 also indicates that over half of the professionals have not had training in the evaluation of mother-child interaction.
Table 15

**Mean of Subject Ratings of Their Experience with the Birth Through Two Population and Descriptions of Special Training in Parent-Child Interaction**

**Analysis A:**

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>Experience Ratings&lt;sup&gt;a&lt;/sup&gt;</th>
<th>ECO&lt;sup&gt;b&lt;/sup&gt;</th>
<th>NCAST&lt;sup&gt;c&lt;/sup&gt;</th>
<th>OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech-Language Pathologists</td>
<td>5.17</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Nurses</td>
<td>6.72</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Social Workers</td>
<td>5.20</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Educators</td>
<td>5.72</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.72</td>
<td>5</td>
<td>9</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

**Analysis B:**

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>Experience Ratings&lt;sup&gt;a&lt;/sup&gt;</th>
<th>ECO&lt;sup&gt;b&lt;/sup&gt;</th>
<th>NCAST&lt;sup&gt;c&lt;/sup&gt;</th>
<th>OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech-Language Pathologists</td>
<td>4.80</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Nurses</td>
<td>5.18</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Social Workers</td>
<td>5.00</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Educators</td>
<td>6.25</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Group</strong></td>
<td>5.34</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

<sup>a</sup> Experience self-rated on a scale with 1=little experience and 10=extensive experience

<sup>b</sup> ECO-Ecological Communication Program (MacDonald & Gillette, 1986, Gillette, 1989)

<sup>c</sup> NCAST-Nursing Child Assessment Satellite Training (Barnard, 1985)
Speech pathologists. Weight ratios for speech-language pathologists in Analysis A (D1/D2 = .61) and in Analysis B (weight ratio D1/D2 = .67) indicated they discriminated on the basis of D2. Data from Table 15 indicate that 8 of 10 of the speech-language pathologists in Analysis B had specialized training in the ECO program (MacDonald & Gillette, 1986 and Gillette, 1989). This program trains professionals to notice maternal communication style, such as directive/non-directive contrasts.

Nurses. Weight ratios for nurses in Analysis A indicated they used D1 and D2 equally in making their discriminations (D1/D2 = 1.06). Weight ratios for nurses in Analysis B (D1/D2 = 4.27) used D1 as a major way to discriminate among the dyadic stimuli. Data from Table 15 indicate that the nurses in Analysis A rated themselves higher than those in Analysis B in experience with the birth through two population (6.72/5.18); twice as many had specialized training (6/3) in the NCAST program, Barnard (1985). This training assists professional in noting social and cognitive influence of the mother in mother-child interactions.

Social workers. Social workers in both analyses discriminated among the dyadic stimuli on the basis of D1. In Analysis A the weight ratio D1/D2 was 1.36; in Analysis B the weight ratios D1/D2 was 1.94. Experience ratings
(5.2/5.0) and specialized training (5/5) were close to equal for the professionals in the two analyses (Table 15).

**Educators.** Educators in Analysis A used D1 and D2 equally in making discriminations \( (D1/D2 = .93) \). Educators in Analysis B placed the most weight \( (D1/D2 = 1.84) \) on D1. Experience ratings \( (5.72/6.25) \) and specialized training \( (4/4) \) were comparable for educators in each analysis (Table 15).

**Summary.** Explanations for the trends within professions are difficult to support. Possibly ECO training accounted for the difference between speech pathologists in Analysis B and those in Analysis B. NCAST training in may have explained some of the differences between the nurses in the two analyses. However, a separate experiment would need to be developed and run in order to determine the effects of training.

Explanations for trends across professions can be supported by evidence obtained by contrasting Analysis A with Analysis B. These trends in the data suggest more similarity than difference in the judgments made by the four professional groups. D1 was the dimension most professionals used to make their discriminations among the mother-child pairs across both analyses. If D1 is related to a cultural discrimination, most of the professionals used culture as the primary way they discriminated among the dyads.
CHAPTER V

DISCUSSION AND CONCLUSIONS

The study employed an individual differences model of MDS analysis to investigate the multidisciplinary evaluation of mother-child interaction. An MDS analysis could provide an experimental model for the clinical judgment process because it involved two common clinical judgments tasks: comparison and attribution. Clinically, professionals frequently compare mother-child interactions in deciding who qualifies for further evaluation or treatment. This may include comparisons with an ideal model or with other interactions they may have evaluated. Professionals make formal or informal attributions regarding the mother-child pairs in order to explain the judgments they make.

Using an MDS analysis as an experimental model of clinical evaluations of mother-child interactions did include several possible sources of experimental error. First, differences between the two groups of professionals, defined or not, may have made a difference. Second, the parallel analyses used different one-minute samples of the same eight mother-child interactions as dyadic stimuli. This difference provided an additional source of
experimental error.

In spite of these possible limitations, the results of this study highlight several interesting issues which underlie the clinical evaluation of mother-child interaction. First, the investigation points to a consistent trend in the clinical evaluation of mother-child interaction. A comparison of Analyses A and B indicated that a culturally related dimension was the primary way professionals discriminated among the samples. This trend seems to indicate that professionals may use social comparison more than mother-child interaction concepts in evaluating mother-child interaction. Second, the lack of other consistent trends across the analyses also indicate that there is much variability in clinical evaluation of mother-child interaction. The professional early intervention community should consider these points as long as mother-child interaction continues to be prescribed as a feature of multidisciplinary evaluation.

The study can provide preliminary data which suggests a need for specialized training the evaluation of mother-child interaction. Over half of the professionals indicated that they had not received any specialized training in the evaluation of mother-child interaction. The lack of training among professionals, their using of social comparison in making ratings, and the variability in the ratings that the investigation could not account for
indicated a need for professional training in mother-child interaction. The review of the literature does suggest that many different theoretically-based evaluation systems do currently exist and that many have some experimental support. It is interesting to note that in spite of this, many professionals have not been trained at all and those who have been trained often receive training which varies in intensity, organization, and content.

The investigation also suggests features of a simple mother-child interaction evaluation system. The features of this system arise from the data generated by the experiment and the mother-child interaction literature. If professionals used a common system in making clinical evaluations of mother-child interaction, it could assist them as they share evaluation findings with each other.

Trends in the Evaluation of Mother-Child Interaction

A comparison of the group stimulus space for the Analyses A and B (Figure 2 and 5 and Table 14) points to a consistent trend in the clinical evaluation of mother-child interaction. The trend is the consistent use of a culturally related dimension in discriminating among the mother-child interactions. This dimension accounts for more variance in the data across the two Analyses than any attribute arising from the parent-child interaction literature or other descriptive data on the dyads presented in Table 2 and 3. Possible sources for this finding relate
to issues which concern the professional evaluation process: social comparison, professional training, concept formation and attribution.

**Social comparison.**

When professionals lack training or when the training they do receive is supported by ineffective tools or poorly defined concepts, social comparison (Festinger, 1954) may take the place of objective criteria in the process of evaluation. When professionals use social comparison in clinical evaluations, they place a positive evaluation on people whom they perceive to be like themselves. Sign of social comparison include statements such as "That's the way my mother did it, and I turned out okay." or "I didn't like the way that mother acted; she doesn't act like any mother I know."

In this study, social comparison may have been at the root of the dissimilarities ratings professionals made which appear related to culture differences among the mother-child pairs. Social comparison must be considered an a contributing factor to the professional judgment process.

**Professional training.**

Data from Table 15 indicate that over half of the professional participants did not have training in mother-child interaction concepts and evaluation techniques. Twenty participants in each analysis reported specialized training in parent-child interaction. In Analysis A, 9 of
the 20 had training in the NCAST (Barnard, 1985) parent-child interaction model. This model focuses professional attention on both social and cognitive aspects of maternal input. In Analysis B, 10 of the 20 participants had training in the ECO (MacDonald & Gillette, 1986) parent-child interaction model. The model focuses professional attention on the influence of maternal pragmatics on mother-child interaction.

These were the only two models professionals identified by name in reporting their training. The differences in training may have contributed to differences in the group space and subject weight space generated for Analysis A and B. Further research comparing differing types of training would be required to support this notion.

Data from this investigation does support the need for some consistent training across professionals in order to enhance the multidisciplinary evaluation process. The lack of training of some professionals coupled with the diversity in training among the remaining professionals may have contributed to the two major findings of this investigation. The use of social comparison in the evaluation of mother-child interaction indicated professionals lacked objective criteria with which to evaluate mother-child interaction. The difficulty in accounting for the remaining variability in the data indicates that professionals use idiosyncratic systems to evaluate mother-child interaction.
Concept formation.

Professional may unconsciously resort to social comparison or idiosyncratic evaluation systems when evaluating mother-child interactions due to the diversity in the tools and methods available to make evaluations. These clinical tools and methods provide the source from which professionals form concepts of mother-child interaction. These concepts are frequently supported by limited definitions of concepts related to mother-child interaction.

The review of the literature selected assessment tools and seminal works across four disciplines regularly included in the mother-child assessments the federal early intervention law (PL99-457) require. The review illustrates that while the disciplines of speech-language pathology, nursing, social work, and early childhood special education, regularly participate in multidisciplinary mother-child assessments, no clear multidisciplinary framework for assessment exists.

Another source of variability related to concept formation, arises from vague interpretations of concepts commonly used in evaluating mother-child interaction. Concepts which do emerge as common across the disciplines, are frequently poorly defined. This can be illustrated with the concept of responsiveness. Often the assessment tools define the variable in terms of itself as these three example illustrate 1) Rosenberg and Robinson (1985) 1=parent
is entirely unresponsive to child's interests and moods;  
7 = parent is entirely responsive to child's interests and 
moods (p.110); 2) Mahoney et al. (1985) who define a highly 
responsive mother as "...mother responds promptly and 
appropriately to child's signals. Her responses are 
temporarily contingent..." (p.300); and 3) Farran, Kasari, 
Comfort and Jay (1986) who define appropriateness of 
response as 1 = seldom good synchrony of response to child's 
activities; adult overwhelms child with quickness of 
response or is too slow in response; 5 = adult response to 
child is almost always appropriate to child's needs (p.85). 
Good synchrony of response; neither too quick nor too slow." 
Such tautologies leave the practitioner with little guidance 
as to what responsiveness is.

The work of Watzlawick, Beavin, and Jackson (1967) 
suggest that this problem may not easily be resolved through 
better definitions, however. Throughout the Pragmatics of 
Human Communication the authors suggest the futility in 
attempting to punctuate the system of human interaction in 
terms of such notions as initiation and response. Their 
work highlights the problems inherent in defining 
interaction as a linear chain of events. If mother-child 
interaction is defined as a system rather than a linear 
chain of events, new concepts may be needed for adequate 
evaluation.
Attribution.

Concept formation is not the only source of confusion for the professional evaluation process, however. Professionals may also engage in faulty attribution. The work of Heider (1980) on attribution theory suggests that interpretation of an observed event is often influenced by sources other than objective data.

A comparison of Analyses A and B did suggest that professionals used a culturally related dimension in evaluating mother-child interaction. On the other hand, the individual Analyses, A and B, suggested that professionals overly use of maternal attribution in professional assessment of mother-child interaction. In both Analysis A and Analysis B the labels for the dimensions which emerged from the multiple regression between the attributes and the dimensions were attributed to the mother. This suggests that the child's contribution to the interaction was not a major influence in the professional evaluations. This incomplete attribution likely extends beyond the sample of professionals studied here.

Early works by Bell (1971) and Lewis and Rosenblum (1974) both indicate that parental influence has often been the focus of social science research, while child influence is ignored. Bell (1971) noted that the child's behavior is seldom viewed as the independent variable and that social scientists frequently overlook the child's contribution to
interaction. Lewis and Rosenblum (1974) edited *The Effect of the Infant on the Caregiver* to begin to correct this unidirectional view of parent-child interaction. Yet, it is likely that such a view still persists and is common in the community of practitioners.

Developmental imbalance between the mothers and their children may account for the fact that a child attribute did not account for the major variability in either Analysis A or B. For example, in this investigation, all of the children were nonverbal. Consequently, the mothers contributed to the auditory and visual channel of the professional observer, while the child contribution was mainly visual. While this problem is inherent to the evaluation of mothers with twelve-month old children, developmental imbalance of the interaction partners may have contributed to the over use of maternal attribution in this investigation.

**Summary: Trends in mother-child evaluations.**

Trends in mother-child evaluation explored here indicate that a culturally related dimension accounted for the majority of the variance in professional judgments of mother-child interaction. Another trend indicated that the remainder of the variability could not be systematically accounted for. Based on the findings, professional evaluations of mother-child interaction seem to be culturally based as well as highly idiosyncratic. These
trends may result from lack of specialized training and considerable diversity in the types of training available. Poor concept formation provides another possible source for this problem. The proliferation of clinical tools and methods for mother-child evaluation coupled with the poor definitions of the concepts which provide the foundation for evaluation may contribute to professional confusion over parent-child interaction concepts.

The over use of social comparison coupled with idiosyncratic evaluation of mother-child evaluation appears to support the need for a simple system professionals can use to evaluate the mother-child interactions they observe. Such a system could serve two functions: 1) pinpoint strengths and needs from a common set of criteria, and 2) promote understanding across disciplines.

A System to Evaluate Mother-Child Interaction

Data from Analysis A and B and the mother-child interaction literature do suggest components of a simple system professionals can use to evaluate mother-child interaction. The system has four components, maternal social, cognitive and communicative influence on the child and child influence on the interaction.

The mother-child interaction evaluation system presented here allows professionals to consider maternal input to the child across three domains, cognitive, social and communicative. Correlational data from Tables 6 and 11
indicate that some professionals were able to separate maternal influence across these three domains. Having such a rich interpretation of maternal influence would enhance the professionals ability to identify strengths and weaknesses in maternal input when making evaluations or designing intervention programs.

Data from this investigation also suggest that professionals may ignore the child's influence in evaluating mother-child interaction. A child dimension was conspicuous by its absence in either analysis. Consequently, the system has as its goal insuring that the professional includes the child in the evaluation. To that end, the system recommends a single child variable which acknowledges child participation in the interaction without consideration of developmental level. The four components of the system for evaluating mother-child interaction which arise from the experimental data are: maternal social influence, maternal cognitive influence, maternal communication style, and child influence on the interaction.

**Maternal social and cognitive influence.**

In Analysis A, the professionals appeared to identify a social and a cognitive component to the maternal input. Such an analysis provides a rich interpretation of maternal input to the interaction and one which is in accord with the mother-child interaction literature. For example, a social and cognitive interpretation is supported by the work of
Clarke-Stewart (1973) who found that optimal maternal care included a nurturing and a stimulation component. Analysis B, suggests that this type of evaluation is not universally employed however. In this analysis professionals viewed the mothers on a more black and white basis, seeing maternal influence as either positive or negative across social and cognitive aspects as a whole. The system presented here suggests both social and cognitive maternal input as important components for professionals to consider in evaluating mother-child interaction.

Maternal communication.

Analysis B indicated that some professionals, namely speech-language pathologists, may have observed a difference among the mothers based upon the pragmatics of their messages to the child. However, most professionals did not. Maternal pragmatics was a criteria used to assign a mother-child dyad to a stimuli category for the study. The categories used for this assignment were non-directive and directive maternal pragmatics.

While pragmatics may not be used across professionals to discriminate among mother-child pairs, it may provide another feature of a system to pinpoint strengths and needs in mother-child interaction. The subtle difference between the directive, Get the ball., and the non-directive, There's the ball., may send children messages about adult perception of their competence. Kaye (1976) and Murray and Trevarthen
(1986) found that mothers became more directive when they felt their child could not do a task or understand the situation at hand.

Over-use of directive pragmatics may be at the root of the outer-directiveness Zigler (1971) noted in the mentally retarded children in his sample. Perhaps these children had been directed by adults so frequently, they did not have a chance to develop inner-directedness. While this relationship remains to be shown, professionals may provide a richer interpretation of mother-child interaction if they are aware of the pragmatic style of the mother and, in turn, watch for its effect upon the child.

**Child influence.**

A system for evaluating mother-child interaction should include a child-related component. While this appears to go without saying, neither analysis indicated that professionals used a component related to the child in this experimental model of evaluation. The unique features of MDS analysis allowed this omission to emerge from the dissimilarities ratings. As Kruskal and Wish (1978) note, when subjects merely rate stimuli on the basis of dissimilarities, they are neither restrained by theoretical assumptions of the researcher, nor by the task of making their underlying criteria explicit. Insuring that professionals simply notice the influence of the child on the mother-child interaction system may be the most
important goal of the child-related variable in this system.

**A Simple System to Evaluate Mother-Child Interaction**

The investigation does suggest that professionals use maternal attribution in their analysis of mother-child interaction, but the richness of that attribution may vary from one group of professionals to another. A system for evaluating mother-child interaction may work best if it spreads maternal influence over three components: cognitive and social influence as well as the pragmatics of maternal communication. In this way, the maternal influence could be conceptualized along aspects which can be provide professionals with the guidelines for identifying strengths and needs in the mothers they observe in interaction with their children.

The investigation also suggests that professionals may not consider the child's role in making attributions about mother-child interaction. A generic child influence component would free the professional from the notions which come into play when developmental level is considered. At the same time, it would display the child's ability to enter into the mother-child feedback loop.

This component would help to reinforce the notion of the feedback loop which Watzlawick et al. (1967) has pointed out is frequently ignored in the clinical evaluation process. Emphasis upon the notion of feedback would encourage the professional to determine whether the child
did have any effect on the interaction, or whether impressions of the interaction were based upon evaluation of the mother alone. It could also prompt professionals to temper a positive evaluation of the mother if her interaction style did not allow much child participation.

The advantages of the simple system for evaluating mother-child interaction proposed here are two-fold. First, the simplicity of the system could promote multidisciplinary understanding and communication about this complex phenomenon. Second, it could assist professionals as they attempt to incorporate interactional concepts in the evaluations they conduct and treatment programs they design in their disciplinary roles.

Conclusions

The investigation indicated two trends in professional evaluation of mother-child interaction. First, a culturally related dimension accounted for the majority of the variance accounted for across the parallel Analyses, A and B. This dimension indicated that professionals generally perceived the dyads in which the mothers were young, poor, and uneducated as different from the others. Second, a lack of any other consistent trend in the data across the analyses indicated that professional evaluations of mother-child interaction beyond the culturally related dimension is highly idiosyncratic. Further research systematically controlling for cultural differences using a
multidimensional scale design could provide important data related to this finding.

Trends in the data appear unrelated to professional background, however. No consistent trends could be supported by the data which related to either membership in a profession or specialized training. Background information on the eight-six professional participants indicated that over half had not training in parent-child interaction and only thirty could identify the model they had been trained in by name. Further research could determine whether professional bias related to cultural differences could be eliminated with specific training.

Three trends in the data indicate a need for a simple system to evaluate mother-child interaction. The first trend is the use of cultural background more than objective criteria in clinical evaluations. The second is the inconsistency in evaluation among the professionals beyond the culturally related dimension. The third is lack of consistent professional training in parent-child interaction.

Such a system could assist in multidisciplinary communication about aspects of mother-child interaction. A simple system could also help professional incorporate interaction concepts in their disciplinary evaluations and treatment programs. Data from this investigation and the mother-child interaction literature suggests the components
of a simple system to evaluate mother-child interaction. In the system, maternal influence could be conceptualized across three components: social, cognitive, and communication. The system recommends a single child component, child influence on the mother. A single child component can insure that professionals attend to the feedback loop that should be created when the child influences the mother-child interaction system.

Further research on this suggested system could answer the following questions: 1) Do professionals trained in the proposed system use the components to evaluate mother-child interaction; 2) Do the professionals find the components useful in communicating with other professionals about mother-child interaction; 3) Do the professionals incorporate the concepts in their own clinical evaluations and treatment programs?
Appendix A

ATTRIBUTE STUDY GUIDE AND RATING FORM SAMPLE
STUDY GUIDE FOR ATTRIBUTE DEFINITIONS
PLEASE READ BEFORE BEGINNING THE ATTRIBUTE RATING TASK

Now you will rate each of the eight, one-minute samples of parent-child interactions on thirteen attributes. Below you will find a list of the attributes and elements which describe each one. The attributes encompass the five skill categories in which children qualify for early intervention services under Public Law 99-457. The list includes related parent interaction and teaching strategies along with some key variables from the parent-child interaction literature.

Familiarize yourself with each attribute and its descriptive elements before you make your ratings. Use this information, along with your own experience and knowledge to rate the samples.

I selected the elements used to describe each attribute as I reviewed the parent-child interaction literature. In developing the elements for the child attribute, I also used the Battelle Developmental Inventory, the Vineland Adaptive Behavior Scales, and the H.E.L.P. Developmental Checklist.
CHILD ATTRIBUTES

1. The child acts like most twelve month olds in terms of cognitive skills.

Look for:  
*a general awareness of the environment.  
*visual exploration of people and objects.  
*expressed interest in novel sights and sounds  
*use of objects/people indicating a knowledge of their purpose.  
*variety in what the child does

2. The child acts like most twelve month olds in terms of communication skills.

Look for:  
RECEPTIVE SKILLS  
*responds to sights and sounds in some way  
*responds differentially to tones of voice  
*association of some words with objects or actions

EXPRESSIVE SKILLS  
*uses different sounds and moves mouth, hands, body in variety of ways  
*use of some strings of sounds, or word approximations  
*varies voice to express emotions  
*uses facial expressions or bodily gestures to send others a message  
*imitates some of the messages he/she see or hears

3. The child acts like most twelve month olds in terms of physical development.

Look for:  
USE OF HANDS  
*uses hands to reach toward people and objects and touch them  
*uses two hands to hold objects  
*uses hands to move objects toward his face or toward others  
*transfers objects from hand to hand  
*uses fingers as well as hands to explore or pick up objects
USE OF THE BODY

*moves arms, legs, head
*independent sitting and good head control
*independent body movement such as rolling, a move from lying down to sitting, assuming a crawling position and moving forward or, attempting to stand with assistance from people or objects

4. The child act like most twelve month olds in terms of personal/social skills.

Look for: *awareness of, interest in, and responsiveness to others
*playful and emotionally expressiveness
*initiates toward others
*imitates others at times

5. The child act like most twelve month olds in terms of ability to help himself/herself.

(In making your rating here, consider that the child's behavior in the play interaction can imply some general attitudes which can promote self-help)

Look for: *attention to the people and objects in his environment
*attempts to do something with others

MOTHER ATTRIBUTES:

1. The mother influences the child to use cognitive skills.

Look for: *inventing learning situations.
*providing play experiences with people or objects in which the child can take part
*showing the child things to do, followed by time for him/her to do something

2. The mother influences the child to communicate.

Look for: *treating the child as though he/she sends messages
*providing responses to child actions and messages that keep things going between them
*using sound, gesture, or word messages, then waiting for the child to imitate or respond in some way?
*showing a desire to communicate with the child.
3. **The mother influences the child to use his/her body.**

Look for:  
*providing the child with movement opportunities for hands, body, or both  
*making movements herself then waiting for the child to imitate or move in some way  
*providing responses to child movements that seem to keep him/her using hands or body

4. **The mother influences the child to socialize with her.**

Look for:  
*pacing in tune with the child's rate of behaving  
*allowing the child freedom  
*smiling and in other ways showing interest and liking for her child  
*cooperating with her child.

5. **The mother influences the child to help himself/herself.**

Look for:  
*gaining child attention before acting and communicating toward him/her  
*allowing opportunities to go after the things in the environment  
*responding to attempts to gain her attention.

**OTHER MOTHER-CHILD INTERACTION ATTRIBUTES**

1. **The mother and child behave like partners.**

Look for:  
*both partners working toward the goal of maintaining the interaction  
*both influence the situation  
*taking turns as initiators and responders  
*a rhythm to what they do together  
*working together to create a game  
*a balance of power in what they do together  
*neither partner runs the show  
*a feeling of emotional attachment between the two

Some words to keep in mind: exchange, dancing, reciprocity, mutuality, bidirectional, turntaking, contingency, waltzing.

2. **The mother responds to the child.**

Look for:  
*waiting and looking for child behaviors, then responding  
*pacing herself to allow the child opportunities to act  
*finding ways to shift the power balance
toward the child?

3. **The child influences the mother.**

*after doing something, waiting and looks for adult reactions*
*sending signals which invite or inhibit adult involvement*
*the child changes behavior to produce an effect in the adult*
ATTRIBUTE RATING TASK

Plan about a half-hour to complete this task. Please read the Attribute Study Guide before you begin. You can use the attributes and the 7-point rating scale below to more carefully describe the interactions you have just compared.

<table>
<thead>
<tr>
<th></th>
<th>POOR</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>EXCELLENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESCRIPTION</td>
<td>DESCRIPTION</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

View the first one minute interaction on your tape, stop the VCR and rate the sample you just viewed. Repeat for each interaction; there are eight.

Be discriminating. Use the seven point scale to your best advantage to describe the interactions. However, do not spend a lot of time on any one rating; your first impression is most important. Move continuously through the task; be as consistent and reliable as possible.

CHILD ATTRIBUTES: The child acts like most twelve month olds in terms of:

___ 1. cognitive skills.
___ 2. communication skills.
___ 3. physical development.
___ 4. personal/social skills.
___ 5. ability to help himself.

MOTHER ATTRIBUTES: The mother influences the child to use:

___ 1. cognitive skills.
___ 2. to communicate.
___ 3. to use his/her body.
___ 4. to socialize with her.
___ 5. to help himself/herself.

OTHER MOTHER-CHILD INTERACTION ATTRIBUTES

___ 1. The mother and child behave like partners.
___ 2. The mother responds to the child.
___ 3. The child influences the mother.

If you saw this mother-child interaction occurring in a waiting room (for example) how likely would you be to refer the family for a multidisciplinary assessment, as described in Public Law 99-457?

____ (Write referral rating here, using a scale of 1-7 where 1 = not likely and 7 = very likely.)
APPENDIX B

SUBJECT INFORMATION FORM AND CONSENT FORM
Please complete the information below. It will be used in the analysis of individual differences among the subjects participating in the investigation.

Please list the following educational information:

University(s) attended - degree earned - year obtained

(1) ____________________________________________________________
(2) ____________________________________________________________
(3) ____________________________________________________________

Licenses/Certifications held: ____________________________________

Current profession: ____________________________________________

Age range of clients served: _________________________________

Using a scale of 1=little to 10=extensive; how would you rate your experience with the developmentally delayed birth through two population? ______

If you have any special training in parent-child interaction, please note here: _________________________________

(Examples include Barnard's NCAST training, MacDonald & Gillette's ECO Program)
Subject Consent Form
Division of Speech and Hearing Science
Project Name: Individual Differences in Clinical Judgments of Mother-Child Interactions

I, ______________________________ (name) agree to participate in the experiment being conducted by Yvonne Gillette.

There is no deception involved in the experiment and there are no known risks or discomforts associated with experimental procedures. I understand that I will evaluate video-taped segments of mother-child interactions in a variety of ways.

The investigation may yield information as to the similarities and differences in the perceptions of mother-infant interactions. Results of the investigation may lead to greater understanding among professionals who work in multidisciplinary settings.

I understand that the constraints of confidentiality apply regarding the mother-infant tapes.

I agree to donate the $12.50 my participation will earn to the Early Childhood Resource Network (ECRN) of Franklin County. I also agree that if the U.S. Department of Education proposal written to support this research is funded, I will donate the additional $17.50 per participant requested in that proposal to ECRN.

Date: ______________________________
Signed: ____________________________

I certify that no discomforts or risks are associated with the procedures to be conducted.

Signed: ____________________________
     (Signature of project director)
APPENDIX C

EARLY CHILDHOOD RESOURCE NETWORK RECRUITMENT FORM
To: Early Intervention Professionals
From: Yvonne Gillette and Ellen Gow

Your opinion is important to an early intervention research project and to the future of early intervention Franklin County. Why?

The Ohio State University's Graduate School Research Award fund has granted Yvonne Gillette $1000 to recruit: 20 early intervention specialists (psychologists/teachers), 20 nurses, 20 speech-language pathologists, and 20 social workers to take part in a research project. The project investigates individual differences in clinical perceptions of mother-child interaction. A series of guidelines for the interdisciplinary evaluation of mother-child interaction will result from the project.

Ellen Gow, coordinator of the Franklin County Early Childhood Resource Network (ECRN) has agreed to recruit 80 professionals to participate in the research project. Each participant will earn $12.50 toward the total $1000 to help defray the $9,000 budget deficit facing ECRN.

Note: Your participation has the potential of netting ECRN $2400, 1/4 of the current deficit, if a pending U.S. Department of Education grant submitted by Yvonne Gillette is funded.

WHAT WILL YOU NEED TO DO TO PARTICIPATE?

You can complete the experiment at home or work in an hour and a half or in three half hour blocks of time at home or at work during a one week period; tapes and protocols will be sent through the mail. You need a VCR and a little time.

Experimental Task #1: You will compare pairs of one minute samples of parent-child interactions and rate their similarity or dissimilarity on a scale of 1-7. (Total time=1 hour)

Experimental Task #2: You will watch eight samples of parent-child interactions and rate each sample on a series of attributes related to the child, the parent, and the interaction between them. (Total time=1/2 hour)

Your opinion is important!

1. It will contribute to research needed in our field.
2. It can help keep ECRN going

Thanks for your support, please sign up below:
Name: __________________________
Profession: ________________________
Agency: ________________________
APPENDIX D

MAILING LIST RECRUITMENT FORM
To: Professionals Interested in Early Intervention  
From: Yvonne Gillette, Ph.D. Candidate, The Ohio State University, Division of Speech and Hearing Science

Your opinion is important to an early intervention research project, investigating individual differences in clinical perceptions of parent-child interactions. Why?

The project is in progress in Ohio. The results should impact upon the implementation of Public Law 99-457 (Education of the Handicapped Act Amendments, 1986). The law requires that professionals assess parent-child interactions. A series of guidelines for the interdisciplinary evaluation of parent-child interaction will result from the project.

The Ohio State University's Graduate School Research Award fund has granted $1000 to recruit:

- 20 developmental professionals (psychologists/teachers)
- 20 nurses
- 20 speech-language pathologists
- 20 social workers

Areas of professional experience may vary since the project investigates the referral process, in which any professional may be involved. Each participant will receive $12.50 (plus postage expenses) and possibly an additional $17.50, pending funding from the U.S. Department of Education.

WHAT WILL YOU NEED TO DO TO PARTICIPATE?

You can complete the experiment at home or work in an hour and a half or in three half hour blocks of time at home or at work during a one week period; tapes and protocols will be sent through the mail. You need a VCR and a little time.

EXPERIMENTAL TASK #1: You will compare pairs of one minute samples of parent-child interactions and rate their similarity or dissimilarity on a scale of 1-7. (Total time=1 hour)

EXPERIMENTAL TASK #2: You will watch eight samples of parent-child interactions and rate each sample on a series of attributes related to the child, the parent, and the interaction between them. (Total time=1/2 hour)

YOUR OPINION IS IMPORTANT!

It will contribute to research needed in our field.  
Thanks for your support, please sign up on the reverse side and mail in the envelope provided.
I agree to participate in the research project titled: An Investigation of Individual Differences in Clinical Perceptions of Parent-Child Interactions sometime during the months of May or June, 1990.

I understand that the tape and protocols will be mailed or delivered to me and that I should return them within a week of receiving them.

Name: _____________________________ Profession: _____________________________
Address: ___________________________ Phone: ___________________________
City: _____________________________ State: ___ Zip ___________

NOTE: You will be sent an adequate amount of postage to return the tape and protocols. You will also be sent a stamp to cover the expense of returning this form.

DO YOU HAVE ANY FRIENDS WHO MIGHT WANT TO PARTICIPATE?

Please send the information needed to contact them below.

Name: _____________________________ Profession: _____________________________
Address: ___________________________ Phone: ___________________________
City: _____________________________ State: ___ Zip ___________

Name: _____________________________ Profession: _____________________________
Address: ___________________________ Phone: ___________________________
City: _____________________________ State: ___ Zip ___________

A group of people may also want to participate in order to make a donation to a group such as a local county collaborative group or an early intervention program. If your group wishes to participate, please call Yvonne Gillette at 614-461-2706 to make arrangements.
APPENDIX E

BACKGROUND AND INSTRUCTIONS FOR THE STUDY
BACKGROUND AND INSTRUCTIONS FOR:

AN INVESTIGATION OF THE INDIVIDUAL DIFFERENCES IN CLINICAL JUDGMENTS OF MOTHER-CHILD INTERACTIONS

The information you provide during this clinical rating task will help to investigate individual differences in the clinical judgments of mother-child interactions. Four groups of professionals will take part in the investigation: speech pathologists, social workers, early educators, and nurses. From the results, the investigator expects to produce a set of guidelines for interdisciplinary considerations in the evaluation of mother-child interactions.

The investigator has designed two clinical rating tasks to conduct the investigation. Please read the description of each below.

RATING TASK #1: PAIR COMPARISONS

First you will view a one-minute sample of a mother-child interaction followed immediately by another one-minute sample. Then, during a fifteen second pause built into the tape, you will respond to two questions:

QUESTION ONE:

How similar or dissimilar are the interactions on a scale of 1-7:

\[
\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\text{VERY SIMILAR} & \text{VERY} & \text{DISSIMILAR}
\end{array}
\]

Write the number that corresponds to your reaction in the space provided.

QUESTION TWO: Which do you prefer?

Circle the "1" if you prefer the first sample, the "2", if you prefer the second.

The samples will pass by very quickly. Don't think too hard, just give your first reaction, then watch the next set of pairs of mother-child interactions and make a judgment on them. Do not stop your VCR to think, just keep moving.

You will view twenty-eight pairs, and make judgments on each. Before you get started, think over some major criteria you use to judge mother-child interactions, keeping in mind that the infants are twelve months old.
The rating task will take about an hour. You may divide the task in two, and take a break once you have completed fourteen of the pair comparisons the tape will give you a signal.

When you have completed all twenty-eight samples, the tape will signal you to stop your VCR. You will need to open and read the instructions for Rating Task #2. Please do not open the instructions until you have completed Rating Task #1.

RATING TASK #2: ATTRIBUTE RATINGS

The attribute rating task will take about thirty minutes to complete. Now you will view each one minute sample separately, stop your VCR and rate each sample on thirteen attributes.

First, read over the study guide which will help you better understand the thirteen attributes. Then, restart your tape, watch the first sample, stop the VCR, and rate the interaction on the thirteen attributes. When this is complete, start the VCR again, watch the second sample, rate sample and so on, until you have rated all eight parent-child interactions.

Thank-you for your time.
APPENDIX F

DISSIMILARITIES RATING FORM
Name: ________________________ Profession: _____________________

DISSIMILARITIES/PREFERENCE RATING TASK

You can complete rating task #1 in about an hour. You can divide the task into two half-hour segments.

Before you begin, consider a few major criteria you use to evaluate mother-child interactions, when the infant is twelve months old. Write them here to keep in mind as you watch pairs of one minute interactions, and respond to two questions:
CRITERIA: ________________________________________________________

QUESTION ONE: How similar or dissimilar are the interactions on a scale of 1-7:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMILAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DISSIMILAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

QUESTION TWO: Which do you prefer?

Write a number from 1-7 corresponding to your dissimilarity rating. Circle the "1" if you prefer the first sample, the "2", if you prefer the second. Make both ratings in fifteen seconds, do not stop your VCR. These ratings require your first reactions.

1. ___ 1 2  15. ___ 1 2
2. ___ 1 2  16. ___ 1 2
3. ___ 1 2  17. ___ 1 2
4. ___ 1 2  18. ___ 1 2
5. ___ 1 2  19. ___ 1 2
6. ___ 1 2  20. ___ 1 2
7. ___ 1 2  21. ___ 1 2
8. ___ 1 2  22. ___ 1 2
9. ___ 1 2  23. ___ 1 2
10. ___ 1 2  24. ___ 1 2
11. ___ 1 2  25. ___ 1 2
12. ___ 1 2  26. ___ 1 2
13. ___ 1 2  27. ___ 1 2
14. ___ 1 2  28. ___ 1 2
APPENDIX G

MEAN ATTRIBUTE RATINGS BY SUBJECT GROUPS
Table 16

Analysis A: Mean Attribute Ratings for Eight Dyadic Stimuli Across 43 Subjects on Thirteen Attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Dyadic Stimuli:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N^a L1</td>
</tr>
<tr>
<td>Child Skills:</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>3.78</td>
</tr>
<tr>
<td>Communication</td>
<td>3.14</td>
</tr>
<tr>
<td>Physical</td>
<td>3.16</td>
</tr>
<tr>
<td>Personal/social</td>
<td>4.62</td>
</tr>
<tr>
<td>Self-help</td>
<td>3.53</td>
</tr>
<tr>
<td>Maternal Influence:</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>4.42</td>
</tr>
<tr>
<td>Communication</td>
<td>5.33</td>
</tr>
<tr>
<td>Physical</td>
<td>4.42</td>
</tr>
<tr>
<td>Social</td>
<td>5.38</td>
</tr>
<tr>
<td>Self-Help</td>
<td>4.23</td>
</tr>
<tr>
<td>Mother-Child:</td>
<td></td>
</tr>
<tr>
<td>Partners</td>
<td>4.54</td>
</tr>
<tr>
<td>Mother Responds</td>
<td>5.35</td>
</tr>
<tr>
<td>Child Influences</td>
<td>4.50</td>
</tr>
</tbody>
</table>

a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations.
b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI).
c - Exact wording of attributes is presented in Appendix A.
Table 17

Analysis B: Mean Attribute Ratings for Eight Dyadic Stimuli Across 43 Subjects on Thirteen Attributes

<table>
<thead>
<tr>
<th>Dyadic Stimuli:</th>
<th>(N^{a}L_1)</th>
<th>(NL^{b}b_2)</th>
<th>(D^{a}L_1)</th>
<th>DL2</th>
<th>(NH^{b}b_1)</th>
<th>NH2</th>
<th>DH1</th>
<th>DH2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Child) (Skills:)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>4.04</td>
<td>4.02</td>
<td>2.76</td>
<td>2.32</td>
<td>4.41</td>
<td>4.69</td>
<td>5.46</td>
<td>5.02</td>
</tr>
<tr>
<td>Communication</td>
<td>3.37</td>
<td>4.14</td>
<td>2.14</td>
<td>1.86</td>
<td>4.14</td>
<td>3.48</td>
<td>4.74</td>
<td>2.97</td>
</tr>
<tr>
<td>Physical</td>
<td>3.27</td>
<td>4.39</td>
<td>2.14</td>
<td>2.00</td>
<td>4.18</td>
<td>5.34</td>
<td>5.30</td>
<td>5.04</td>
</tr>
<tr>
<td>Personal/social</td>
<td>4.67</td>
<td>4.18</td>
<td>2.55</td>
<td>2.30</td>
<td>5.02</td>
<td>4.42</td>
<td>5.32</td>
<td>4.74</td>
</tr>
<tr>
<td>Self-help</td>
<td>3.74</td>
<td>4.39</td>
<td>2.51</td>
<td>2.07</td>
<td>4.23</td>
<td>5.37</td>
<td>5.23</td>
<td>5.14</td>
</tr>
<tr>
<td>(Maternal) (Influence:)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
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<td>3.44</td>
<td>5.44</td>
<td>3.32</td>
<td>5.27</td>
<td>5.48</td>
</tr>
<tr>
<td>Communication</td>
<td>5.74</td>
<td>4.04</td>
<td>4.27</td>
<td>2.60</td>
<td>5.55</td>
<td>2.65</td>
<td>4.79</td>
<td>4.46</td>
</tr>
<tr>
<td>Physical</td>
<td>5.23</td>
<td>3.93</td>
<td>3.48</td>
<td>4.20</td>
<td>5.32</td>
<td>4.72</td>
<td>5.23</td>
<td>5.11</td>
</tr>
<tr>
<td>Social</td>
<td>6.20</td>
<td>3.39</td>
<td>4.65</td>
<td>2.88</td>
<td>5.67</td>
<td>3.11</td>
<td>4.88</td>
<td>5.44</td>
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<tr>
<td>Self-Help</td>
<td>5.30</td>
<td>3.37</td>
<td>4.25</td>
<td>3.18</td>
<td>4.81</td>
<td>4.25</td>
<td>4.88</td>
<td>5.16</td>
</tr>
<tr>
<td>(Mother-) (Child:)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Partners</td>
<td>5.39</td>
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<td>5.51</td>
<td>2.79</td>
<td>4.60</td>
<td>4.76</td>
</tr>
<tr>
<td>Mother Responds</td>
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<td>3.60</td>
<td>5.25</td>
<td>2.86</td>
<td>5.59</td>
<td>2.93</td>
<td>4.72</td>
<td>5.39</td>
</tr>
<tr>
<td>Child Influences</td>
<td>4.90</td>
<td>3.81</td>
<td>4.18</td>
<td>1.55</td>
<td>5.25</td>
<td>2.86</td>
<td>4.65</td>
<td>5.04</td>
</tr>
</tbody>
</table>

a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

c - Exact wording of attributes is presented in Appendix A
Table 18

Analysis A: Mean Attribute Ratings for Eight Dyadic Stimuli Across 11 Speech-Language Pathologists on Thirteen Attributes

<table>
<thead>
<tr>
<th>Dyadic Stimuli:</th>
<th>$N^aL1$</th>
<th>$NL^b2$</th>
<th>$D^aL1$</th>
<th>$DL2$</th>
<th>$NH^b1$</th>
<th>$NH2$</th>
<th>$DH1$</th>
<th>$DH2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attributes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child Skills:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>3.27</td>
<td>3.63</td>
<td>3.72</td>
<td>4.50</td>
<td>5.81</td>
<td>5.00</td>
<td>5.09</td>
<td>5.00</td>
</tr>
<tr>
<td>Communication</td>
<td>2.72</td>
<td>3.63</td>
<td>2.45</td>
<td>3.00</td>
<td>4.81</td>
<td>4.54</td>
<td>3.00</td>
<td>4.54</td>
</tr>
<tr>
<td>Physical</td>
<td>3.00</td>
<td>3.90</td>
<td>3.72</td>
<td>2.90</td>
<td>5.18</td>
<td>5.36</td>
<td>5.36</td>
<td>5.36</td>
</tr>
<tr>
<td>Personal/social</td>
<td>4.09</td>
<td>4.18</td>
<td>3.45</td>
<td>3.63</td>
<td>5.63</td>
<td>4.81</td>
<td>4.63</td>
<td>4.81</td>
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<tr>
<td>Self-help</td>
<td>3.36</td>
<td>3.63</td>
<td>3.45</td>
<td>3.70</td>
<td>5.72</td>
<td>4.81</td>
<td>5.18</td>
<td>4.81</td>
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<tr>
<td><strong>Maternal Influence:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Cognitive</td>
<td>3.54</td>
<td>2.63</td>
<td>4.27</td>
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<td>5.90</td>
<td>4.27</td>
<td>5.09</td>
<td>4.27</td>
</tr>
<tr>
<td>Communication</td>
<td>4.72</td>
<td>3.72</td>
<td>3.00</td>
<td>3.18</td>
<td>5.18</td>
<td>4.90</td>
<td>3.45</td>
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<td>Physical</td>
<td>3.81</td>
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<td>Social</td>
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<td>5.54</td>
<td>4.36</td>
<td>3.63</td>
<td>4.36</td>
</tr>
<tr>
<td>Self-Help</td>
<td>3.72</td>
<td>3.09</td>
<td>3.72</td>
<td>4.18</td>
<td>5.27</td>
<td>4.54</td>
<td>3.81</td>
<td>4.54</td>
</tr>
<tr>
<td><strong>Mother-Child:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Partners</td>
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<td>5.54</td>
<td>4.45</td>
<td>3.00</td>
<td>4.45</td>
</tr>
<tr>
<td>Mother Responds</td>
<td>4.72</td>
<td>4.54</td>
<td>4.63</td>
<td>4.00</td>
<td>5.27</td>
<td>4.63</td>
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</tr>
<tr>
<td>Child Influences</td>
<td>3.18</td>
<td>4.27</td>
<td>4.09</td>
<td>3.36</td>
<td>4.72</td>
<td>4.45</td>
<td>2.63</td>
<td>4.45</td>
</tr>
</tbody>
</table>

- **a** - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations
- **b** - L/H: Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)
- **c** - Exact wording of attributes is presented in Appendix A
Table 19

Analysis B: Mean Attribute Ratings for Eight Dyadic Stimuli Across 10 Speech-Language Pathologists on Thirteen Attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>N&lt;sup&gt;a&lt;/sup&gt;L&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sup&gt;b&lt;/sup&gt;L&lt;sub&gt;2&lt;/sub&gt;</th>
<th>D&lt;sup&gt;a&lt;/sup&gt;L&lt;sub&gt;1&lt;/sub&gt;</th>
<th>D&lt;sub&gt;L2&lt;/sub&gt;</th>
<th>N&lt;sup&gt;b&lt;/sup&gt;H&lt;sub&gt;1&lt;/sub&gt;</th>
<th>N&lt;sub&gt;H2&lt;/sub&gt;</th>
<th>D&lt;sub&gt;H1&lt;/sub&gt;</th>
<th>D&lt;sub&gt;H2&lt;/sub&gt;</th>
</tr>
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a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

c - Exact wording of attributes is presented in Appendix A
Table 20

Analysis A: Mean Attribute Ratings for Eight Dyadic Stimuli Across 11 Nurses on Thirteen Attributes

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<th>D°L₁</th>
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</table>

a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

c - Exact wording of attributes is presented in Appendix A
### Table 21

**Analysis B: Mean Attribute Ratings for Eight Dyadic Stimuli Across 11 Nurses on Thirteen Attributes**

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a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

c - Exact wording of attributes is presented in Appendix A
Table 22

**Analysis A: Mean Attribute Ratings for Eight Dyadic Stimuli Across 10 Social Workers on Thirteen Attributes**

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*a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

*b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)*

*c - Exact wording of attributes is presented in Appendix A
Table 23

**Analysis B: Mean Attribute Ratings for Eight Dyadic Stimuli Across 10 Social Workers on Thirteen Attributes**

<table>
<thead>
<tr>
<th>Dyadic Stimuli:</th>
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<th>N(^b)L2</th>
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\(^a\) - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

\(^b\) - L/H: Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

\(^c\) - Exact wording of attributes is presented in Appendix A
Table 24

Analysis B: Mean Attribute Ratings for Eight Dyadic Stimuli Across 11 Educators on Thirteen Attributes

<table>
<thead>
<tr>
<th>Dyadic Stimuli:</th>
<th>(N^aL1)</th>
<th>(NL^b2)</th>
<th>(D^aL1)</th>
<th>(DL2)</th>
<th>(NH^b1)</th>
<th>(NH2)</th>
<th>(DH1)</th>
<th>(DH2)</th>
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</table>

* a - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

* b - L/H:Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

* c - Exact wording of attributes is presented in Appendix A
Table 25

Analysis A: Mean Attribute Ratings for Eight Dyadic Stimuli Across 12 Educators on Thirteen Attributes

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<th>DL2</th>
<th>NH&lt;sup&gt;b&lt;/sup&gt;1</th>
<th>NH2</th>
<th>DH1</th>
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</table>

<sup>a</sup> - N/D nondirective/directive maternal category based on the pragmatics of the maternal verbalizations

<sup>b</sup> - L/H: Low/High-child category based on Total score achieved on Battelle Developmental Inventory (BDI)

<sup>c</sup> - Exact wording of attributes is presented in Appendix A
REFERENCES


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Mahoney, G., Finger, I., & Powell, A. (1986). The maternal behavior rating scale. Topics in Early Childhood Special Education. 6(2), 44-45.


