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UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

MOTHER AND SPECIAL EDUCATION PRESCHOOL TEACHER
PERCEPTIONS
OF THE COMMUNICATIVE COMPETENCE
OF CHILDREN WITH SEVERE, MULTIPLE DISABILITIES

A Dissertation
SUBMITTED TO THE GRADUATE FACULTY
in partial fulfillment of the requirements for the
degree of
Doctor of Philosophy

By
JUNE IRENE MADDOX
Norman, Oklahoma
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A Dissertation APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

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June I. Maddox

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Abstract

Communication development for children begins with the early interactions of mothers and their infants. This developmental process between mothers and their infants is altered when an infant is born with severe disabilities, or encounters some devastating environmental impact early in life. Mother-child interactions are disrupted when the child does not respond to the mother in expected ways. Children with severe, multiple disabilities may exhibit a limited repertoire of behaviors; mothers may be unable to "read" the behaviors as infant communications. Mothers then begin to identify more subtle behaviors as communication and assign them meaning.

Early childhood special education teachers who perceive children's behaviors as communications respond accordingly. Mothers and teachers respond to perceived child behaviors as communications when they contingently respond to those communications. Further support for the development of child communication depends upon the efforts of families and school personnel as individuals recognize child communications and respond in predictable ways. It would seem important that adults in the child's environment agree on the child's communication means and their communicative functions.

This study asked mothers and preschool special education teachers to describe the communications of young children with severe, multiple disabilities. Each participant-pair

completed a survey instrument and participated in a structured interview as they described seven children's communicative behaviors (means) and the function of those communications.

The combined responses of the participating mothers identified more child communication means than participating teachers. Both groups agreed on the functions of the children's communicative behaviors. Wide variability was found among participant-pair descriptions of specific children's communications. Communication statements found in the children's IEP documents were not generally found to be associated with the child's level of communication as it was perceived by a participant-pair. While some IEP statements addressed the child's perceived communication means and functions; the majority did not.

Chapter One

Introduction

Human communication evolves from the social interactions of individuals which begin at birth and continue throughout one's lifetime. The way in which mothers respond to infant behaviors seems to determine to a large extent the later development of effective child communication skills (Dunst & Lowe, 1986). Mothers expect infants to communicate. They attribute meaning to nonsymbolic infant behaviors, and respond to those perceived communications accordingly (Fafouti-Milenkovic' & Uzgris, 1979). Descriptions of the interactions between mothers and their infants, and how it relates to communication development is found throughout the literature on child development, and is supported by research focused on mothers and their infants.

The communications which develop between mothers and infants without disabilities is a reciprocal, circular process when their experiences are typical, and the infant responds in predictable ways. However, infants who have severe, multiple disabilities at birth are launched into a series of atypical natal/postnatal experiences which include life-threatening medical problems, a series of caregivers, and separation from their mothers; infants whose problems

develop later in infancy endure similar experiences. All of these children require ongoing medical attention for numerous, medical crises throughout infancy and early childhood. The impact of these early medical interventions on the infant with disabilities results in developmental experiences quite different from those experienced by infants without disabilities. These experiences impact the infant, and dramatically change the lives of their families (Haring, Maddox, & Arnett, 1996).

Infants and children who have severe, multiple disabilities require total care and consequently are passive recipients of the actions of others. This passiveness is reflected in their characteristically low response levels, and their limited communications. The expectations and perceptions of the child as a communicator which are held by others seems to influence the recognition of the child's communicative means (behaviors), and mediates the responses made to the child's messages (communicative functions).

Some researchers speculate that when an infant has disabilities at birth, their mothers select other, perhaps unconventional infant behaviors as communications, e.g., idiosyncratic eye, limb, or head movements (Yoder, 1988). Some studies have focused on the behaviors identified as communication by mothers of infants who have severe disabilities. However, no studies found which describe the topography of those behaviors (Yoder & Feagans, 1988). If mothers of children who have severe multiple disabilities identify idiosyncratic child behaviors as communication and others within the child's milieu do not recognize those

behaviors as child communications, the communication opportunities available to the child are severely limited, and in the absence of the mother, the child cannot communicate.

Adults in the lives of children who have severe, multiple disabilities may have altered expectations for communication interactions with the child as a result of the adult's involvement with the child, societal reactions, the child's medical history/prognosis, and/or information obtained from medical/non medical professionals (Haring & Lovett, 1992).

The degree to which the child uses infrequent and possibly nonconventional communication behaviors impacts and seems to determine the amount of adult and peer attention the child receives. Supporting data came from an observational study of classroom interactions between school personnel, classroom peers with moderate disabilities, and children who have severe, multiple disabilities (Maddox, 1995). Data from that study indicated that in the majority of the classrooms observed, communicative attempts by children who have severe, multiple disabilities generated low numbers of adult responses. The child's behaviors frequently failed to "connect" with adults in the environment, and seemed to be unrecognized as communicative. It was clear that whether the child's message was received and/or reacted to depended upon the adults (rather than peers) in the classroom. One could speculate that their limited and unpredictable responses to children's communicative behaviors may have been the result of the adults' perceptions of the child as a communicator.

Results from that study (Maddox, 1995) made it evident that to understand why communications between adults and children occur (or fail to occur), it would be necessary to first understand how adults perceive child communicative behaviors when the child has severe, multiple disabilities.

The existing research literature on the communicative competence of children with disabilities contains numerous studies directed toward child communication development: mother and child interaction (Brooks-Gunn & Lewis, 1984; Fafouti-Milenkovic' & Uzgiris, 1979); communication delays (Yoder & Warren, 1993); and the effects of communication interventions (Mahoney & Powell, 1988; Siegel-Causey & Guess, 1989). Even though the communications of preschool children with the most challenging disabilities have been discussed in the literature, systematic research studies specific to this population are limited. Studies which directly address the communicative behaviors (means) of children who have severe disabilities often exclude children who have severe, multiple disabilities from the sample (e.g., Yoder, 1986). Thus, empirical studies of the communication development of young children in this specific population were not found.

The Primary Caregiver and the Developing Child

The communication development of children without disabilities was the starting point of this research, as an understanding of conventional communication development might help to answer questions about the ways in which children who have severe, multiple disabilities are supported in their communications by significant others in their environments.

The literature on research-based descriptions of mother

and infant interactions produced several theories of communication development; each theory stressed the importance of quality interactions between children and their primary caregivers (Messer, 1994). Existing research on the communication development of children without disabilities recognizes that any primary caregiver i.e., mother, father, sibling, nurse, etc. might provide the major support for the infant's communications, however, the majority of the research studies focused on birth mothers and their infants. Oft-cited research studies during the last 30 years and the theories which support them describe the ways in which mothers support their infant's communication development, and at least partially explain the importance of early mother-infant interactions to that process.

Communication development in infants begins when caregivers respond to and reinforce child behaviors that are perceived to have communicative meaning. Children react to their caregivers and repeat behaviors that increase caregiver response. These reciprocal interactions are the basis for the development of additional and increasingly effective communication skills (Dunst & Lowe, 1986). Reciprocal communications or the transactions between the caregiver and the child occur at different times, with varying behavioral sequences, and in assorted social contexts. Thus the child's communication development is one product of multiple, continuous, dynamic child-caregiver interactions (Sameroff & Fiese, 1990).

An effective caregiver-child communication system generally progresses from an apparent dominance of one

partner (the mother) to the mutual assumption of responsibility by both child and mother as they initiate, synchronize, and regulate their interactions. These communicative transactions change as each member of the dyad adapts to the other; a more sophisticated pattern evolves as the less competent communicator (the child) develops more functional skills (Fafouti-Milenkovic' & Uzgiris, 1979).

When infants are born without disabilities, their communication development follows a fairly predictable course, even though maturational differences in individual developmental sequences create variations among children of the same age (Messer, 1994). From infancy through adulthood, every individual uses signs, body language, and sounds as means of communication and thus influences the behavior of others. Unless a disability is present or a devastating environmental impact occurs, a child's language skills emerge within two to three years.

Disrupted Communications Between Mothers and Their Infants

The primary caregiver plays a critical role in the development of communication for infants and young children as communication begins with their interactions (Dunst & Lowe, 1986). Communication which occurs in the earliest phases of normal child development results from the mother's tendency to attribute meaning to her infant's nonsymbolic and frequently unconventional behavior (Wilcox, Kouri, & Caswell, 1990). This process is disrupted when the mother is insensitive to infant behaviors, or when the infant who has severe multiple disabilities is unable to respond in predictable ways.

While some mothers are able to discern and accommodate to communicative differences in their infants, other mothers can not or do not. In those instances, disturbed interactions between mothers and their infants frequently occur (Fields, 1974; 1983). The experiences provided by caregivers and others in the child's environments may depend upon the child, as his previous behaviors (or lack thereof) may be strong determinants of his ongoing experiences. The mothers who are able to accommodate to their children's disabilities may select other, perhaps less conventional behaviors as communications and respond to them accordingly (Yoder, 1988).

Children who have severe, multiple disabilities may produce idiosyncratic or low incidence responses which are less likely to elicit interactions with a caregiver, as the children provide only limited support for adult-initiated interactions (Walker, 1982), and the child's ability to engage in social interactions may be mediated by its biological state. Therefore, the child is less available to the mother than is an infant with milder disabilities (Als, 1982). The child's unclear and infrequent communications can result in caregiver feelings of inadequacy, and possibly depress the caregiver's further use of facilitating input (Goldberg, 1977). The severity of the child's disabilities and consequent levels of maternal support would seem to greatly influence the rate at which communication develops.

The Role of the Service Provider in Communication Development

Early intervention services for children who have severe, multiple disabilities may begin at the child's birth, and are available until the child is three years old. The

primary purpose of these early intervention services is to provide support for the family and to train the primary caregiver to be a facilitator for the infant's developmental progress. Early interventionists from a variety of disciplines support family-based decision making, provide information, and work directly with the child. Direct services to the the child are limited, and usually allow only weekly contact with the child's caregivers. Thus, the mother remains the primary teacher of her child, and along with caregiving activities, becomes the major support for the infant's developing communications.

As young children who have severe, multiple disabilities age, a major service transition occurs. Those who have reached the age of three are generally moved from early intervention services into center-based public school early childhood special education programs. The mother's predominate influence on the child's communication remains, even though additional adults assume responsibility for the child for longer periods of time. The number of individuals available to support and encourage the child's communications increases, and additional opportunities for the child to communicate appear.

Preschool personnel begin to play a substantial role in the support for child communications. This support ideally occurs in a manner similar to the reciprocal relationship between the child and the mother (MacDonald & Gillette, 1986). As with mothers, service provider responses to child-initiated communications are influenced by the perceptions adults hold of the child as a communicator. In program

planning, these adults have a major influence on the nature and intensity of interventions directed to a child's communication development, and the quality/quantity of the services provided (Houghton, Bronicki, & Guess, 1987).

Studies of interventions used by service providers which focus on changing the interactive behaviors of primary caregivers have demonstrated that training can modify caregiver interactions with children with disabilities (Girolametto, Verbey, & Tannock, 1994; Mahoney & Powell, 1988). Studies with service providers had similar results (Kaiser, Ostrosky & Alpert, 1993). Therefore, an investigation of the perceptions of the communications of children who have severe, multiple disabilities as they are described by mothers and direct service providers serves to provide further understanding of the dynamics involved between the children and the adults in their environment. Agreements among these adults on a child's communication behaviors (means) and functions (meanings) would increase the support for the children's communicative development in at least two environments (home and school).

Support for Communication Development

The National Joint Committee for the Communicative Needs of Persons with Severe Disabilities (1992) asserted that current best practices in communication intervention focus on developing and maintaining child communications. Effective communication interventions focus on targeted communicative behaviors which can be; (a) acquired by a child with disabilities, (b) comprehended by significant people around the child, (c) matched with the communicative needs in the

child's environments, and (d) taught in ways that are effective for both the initial acquisition and the generalization of child communicative acts (National Joint Committee for the Communicative Needs of Persons with Severe Disabilities, 1992).

Techniques to support communication development in the young child who has severe, multiple disabilities begin with recognizing child behaviors as potential communications. MacDonald and Gillette (1986) proposed that consistent adult responses to nontraditional behaviors will, over time teach the child that nonsymbolic behaviors can be used to communicate. The challenging task for caregivers and direct service providers would be to recognize and consistently respond to nonsymbolic and perhaps idiosyncratic behaviors as communications (Downing & Siegel-Causey, 1988). To do so, adults must first agree on the child's communicative means and functions.

Recent studies of child communication development found adults were more likely to respond appropriately to child communications when the adults accurately perceived the means by which children communicated, and the functions those means served (Messer, 1994). Adults who perceive and assign meaning to specific child behaviors provide additional support for the increased development of the child as a communicator. Conversely, major discrepancies among significant adults in the child's life provide inconsistent (or nonexistent) support for the child's communication development. Therefore, caregiver and teacher perceptions of a child who has severe, multiple disabilities as a communicator influence

the quality and quantity of their support for the child's efforts.

Communication Intervention Goals: The Individualized Education Program

One of the ways in which parents and teachers interact and plan for school services for children with disabilities is the development of an Individualized Education Program (IEP). The annual IEP meeting is the method by which parents and school personnel can interact in the best interests of the child. This meeting between the teacher, the parent(s), an administrator, and related service personnel requires review of the child's strengths and weaknesses in all areas of development, discussion of program goals and objectives, and a plan designed to enhance the child's progress. The annual goals and short term objectives for a child are developed by consensus among the members of the IEP team, and the written Individualized Education Program becomes the documentation of their agreed-upon decisions. Evaluation of the goals at least annually tracks the child's progress, and provides a foundation for further planning.

One area of development discussed in meetings of the IEP team is that of communication. Assessing communication development when the child has severe, multiple disabilities, is fundamental to the provision of planned, coordinated efforts directed to the development of child communicative competence. Parents and school staff who agree on the topography and intent of the child's communications are more likely to develop an IEP which reflects the child's level of communicative functioning, and consequent design of

appropriate goal statements. The statements on the IEP regarding the child's communication levels and the goals addressing communication should reflect a program emphasis on the communication development of young children who have severe, multiple disabilities.

Problems occur when adults perceive the child as a noncommunicator; fail to recognize child communicative behaviors, or misinterpret their meanings; respond to perceived child communications inconsistently; or fail to agree on the majority of the child's communicative means (behaviors).

The Research Questions

This research study explored perceptions of the communications of seven children who have severe, multiple disabilities as reported by the mothers and their children's early childhood special education teachers. Members of each participant-pair (one mother and one teacher) described the child's communicative behaviors and their meanings. Their individual and paired responses to questions about child behaviors (means) and the meanings (functions) attached to those behaviors were used to answer the following research questions.

1. How do mothers define/describe their child's communicative behaviors?
2. How do the children's special education preschool teachers define/describe the child's communicative behaviors?
3. What is found when mothers' definitions of communicative behaviors were compared to those of the special education preschool teachers?

4. What meanings were ascribed by mothers to each of the child's identified communicative behaviors?

5. What meanings were ascribed by the special education preschool teachers to each of the child's communicative behaviors?

6. What was found when comparing mother and teacher reports of the meaning of each child's communications?

7. Did the Individualized Education Program (IEP) communication goals reflect the teacher's perception of the child's current levels of communicative competence?

8. Did the Individualized Education Program (IEP) communication goals reflect the mother's perception of the child's current level of communicative competence?

Summary

Reciprocity in caregiver-infant interactions refers to the ways in which each member of a communicative dyad reads and reacts to the signals of the other with appropriate and timely responses. From infancy, children learn communication through what appears to be selective, contingent caregiver reinforcement of communicative behavior. Supportive caregivers perceive children as reciprocal partners in communicative interchanges, and respond to the child's behaviors as communications. This support from the caregiver is thought to be an important part of establishing early contingency experiences (Goldberg, 1977), as it plays a critical role in furthering a child's communication development. The transactional nature of adult-child interactions results from adult responses which are contingent upon the perception of the child as a

communicator; the child continues to use communicative behaviors as long as those behaviors result in caregiver response.

Children who have severe, multiple disabilities have been found to have low response rates and require an extended period of time to acquire new skills (Schweigert & Roland, 1992). Intense, long term interventions to support and expand their communications require that those with whom the children spend the majority of their time agree on the children's communications and reinforce the children as they strive to communicate effectively.

Chapter Two

Review of the Literature

In order to understand the development of communicative competence in children who have severe, multiple disabilities, it was necessary to understand the development of communication in children without disabilities; specifically, the nature of the caregiver perceptions and behaviors that support and extend a child's early attempts to interact. Considerable research attention has been directed toward the interactions between mothers and infants, as they are critical to the process by which children develop communication. The studies reviewed here begin with those which examine the interactions between mothers and their infants without disabilities, and are followed by studies of the communications between mothers and their children with disabilities. The emphasis is on the earliest of mother-infant interactions, and is specific to their nonsymbolic communications. Nonsymbolic communications are those which transmit a message without using symbols, i.e., words, signs, graphics. Body movement, facial expression, eyegaze,

vocalizations, etc. are all ways in which individuals may convey nonsymbolic messages. This focus on nonsymbolic rather than presymbolic or prelinguistic communication is considered particularly appropriate to studies involving young children who have severe, multiple disabilities as they are unlikely to use symbols to communicate (Siegel-Causey & Downing, 1987).

Studies of child communication development and the theories derived from them provide a basic understanding of the early interactions between mothers and their infants without disabilities. In all existing theories, the role of the caregiver seems to be the key factor in the development of child communicative competence.

The mother-infant interaction literature is followed by studies of mother-infant interactions when the infants had disabilities. In comparing the interactions between mothers and their infants without disabilities, researchers found altered interaction patterns when the infant had disabilities. Some research suggested that mothers whose children have multiple, profound disabilities may see behaviors as communicative when others in the environment do not (Yoder & Feagans, 1988). However important the mother's perceptions of her child's communications are thought to be, no studies were found which investigated those critical beliefs. How the child's primary caregiver(s), early intervention service providers, and preschool special education teachers perceive a child's communicative means (behaviors) and functions (messages) has a direct impact on the ways in which these adults respond to the communications

of children who have severe, multiple disabilities.

The final section of this review describes a developmental model of communicative competence which may be used to assess a child's communications, and provides a scaffold upon which further interventions may be based. This model is one way in which a child's primary caregiver and special education teacher could use their agreed-upon perceptions of the child's communications to design appropriate interventions.

Communication Development

Theories of communication development based on data (rather than anecdotal reports) came from early 20th century studies of child language development. These studies of child language generally occurred as a subset of the larger field of child development, and were influenced by the theoretical bent of each researcher. The most prominent theories were not concerned with how infants communicated, but focused on the ways in which children learned to speak and understand language. As a general rule, infants were considered to be passive, underdeveloped organisms.

In the absence of a general theory to explain the broad scope of communication and eventual language development, several theoretical approaches were developed and articulated; (1) behavioral approaches (Skinner, 1957), (2) linguistic approaches (Chomsky, 1968), (3) interactionist approaches (Warren & Kaiser, 1988), and other theories i.e., cognitive, information processing which were subsequently subsumed under the umbrella of interactionist theory (Bohannon, 1993). Interactionist theories of normal

infant communication development can be found in the writings of Piaget (1926), Vygotsky (1986), Kaye (1982), and Trevarthen (1977).

Behavioral Approaches

Behavioral theorists consider language one of many learned behaviors. As with other skills, observable and measurable language behaviors are mastered through cognitive associations between environmental events (stimuli) and communicative responses. The principles of classical conditioning, e.g., the process of forming a connection or association of stimuli in the environment and the response of the organism, was used by behaviorists to account for the development of language. Behavioristic accounts of language acquisition assumed that children's productive speech is shaped by differential reinforcers and punishments supplied by environmental events. The focus of early behaviorists was on learning the functions of language, the stimuli that evoked communicative behavior, and the subsequent consequences. Skinner (1957) argued that language is a skill which is learned through modeling, imitation, practice, and selective reinforcement. As a learned behavior, language is unique only in that it is reinforced solely by other humans. Without human models and reinforcement, language would not occur. Infant vocalizations are selectively reinforced by adults in the environment, and those sounds are gradually shaped into acceptable verbal forms. Children are seen by behaviorists as the recipients of knowledge who learn language as they learn other skills.

There are limitations to a strict behavioral theory, as

it does not sufficiently explain certain aspects of language development. Chomsky (1959) attacked Skinner's book Verbal Behavior as providing simplistic explanations (derived from animal behavior studies) to the complexities found in human verbal behavior. Bruner (1981) later criticized behavioral approaches as they failed to consider the nature of the human generative system that makes it possible to speak sentences never heard. Behaviorism failed to specify how the imitating infants figured out what to imitate and when to initiate. Even though the behavioristic approach contributed greatly to our understanding of learning, the view that language development is caused by feedback in the form of reinforcement of correct utterances has been generally disproved (Sameroff & Fiese, 1988). The major contributions of the behaviorists is in the development of successful research-based intervention strategies which enhance, encourage and teach communication skills to individuals with disabilities (Reid, Phillips, & Green, 1991).

Linguistic Approaches

Noam Chomsky (1959), a leading proponent of psycholinguistic theory attempted to describe and explain linguistic processing by identifying universal rules of human language. His concern with infant development was minimal, as he saw the skills developed in infancy as irrelevant to subsequent linguistic communication. He viewed language as being different from other forms of communication because it involves the structural-dependency of elements. How the elements are organized impacts the message that is conveyed.

Chomsky limited the influences of environmental and pre

linguistic experiences on the language acquisition process. His term "language acquisition device" (LAD) referred to the innate, pre-programed human abilities which account for the development of language. As the innate LAD matures, Chomsky theorized, it is triggered by environmental events and the child develops language. Chomsky placed little emphasis on the contributions of linguistic acquisition mechanisms prior to the occurrence of at least single-word speech. Those using a linguistic approach assert that language is innately human as they assume that; (1) only humans have a genetic predisposition for language development; (2) language is acquired rapidly (by the fourth year of life); and (3) children cannot learn such complex, adult grammar through known learning principles (Bohannon, 1993). These assumptions were tested and expanded during the 1960's by developmental psychologists whose research with nonhuman primates suggested that language was not uniquely human. Children who did not develop spoken language were able to learn American Sign Language, and psychologists began to associate degrees of cognitive development with language development. Their major departure from Chomsky's theory proposed that social interactions in the child's first two years of life were important precursors to the acquisition of language (Bates, 1979).

Interactionist Approaches

Behavioristic and psycholinguistic approaches to issues of language development seem at times to be at two ends of the nature/nurture spectrum. This dichotomy is manifested by the extremes; Skinner's theory of classical conditioning, and

Chomsky's theory of the LAD in humans. Interactionist approaches to language development theory seemed to have borrowed from both camps by recognizing and incorporating both arguments; humans have existing innate qualities which are shaped by an individual's interactions with his environment. Interactionist approaches incorporated certain operant and psycholinguistic notions with an overriding emphasis on the social bases of language acquisition and use (Warren & Kaiser, 1988).

The interactionist theoretical spectrum spans a wide range; from claims that infants are endowed with quite sophisticated social capacities, to claims that social and non-social abilities are similar. In some approaches, the focus is on maturation, while in others social experience is the critical piece. For comparison, four interactional theories of communication development are briefly described in the following section.

Piaget.

Piaget's theoretical approach to cognitive development is not unlike that of the linguistic approach in emphasizing that certain innate structures determine human behavior. Jean Piaget was one of the foremost influences on modern cognitive development theory, as he described cognitive development as a series of qualitative changes in the process of thought. Changes in the organization and structure of the intellect were as a result of the individual's active involvement with the environment. Cognitive structures, which Piaget labeled "schemata" were thought to process incoming sensory information from the environment and then

became cognitively organized. Changes in responses to the new information occur through adaptation by the established schemata. Incoming data which is incompatible with the existing schema creates an internal disequilibrium which is unresolved until the organism assimilates the new information into old schemata or creates new ones. Piaget called these the stages of cognitive development; a series of qualitative changes in the organism's schemata (Piaget, 1926).

The earliest period of intellectual development described by Piaget is the sensorimotor stage which lasts from birth to 18 months through two years of age. Piaget believed children in the sensory-motor stage can only understand the world through direct sensation and by their activities. The Piagetian concept that abilities develop as a result of the feedback children receive from their motor activities has been weakened by the finding that infants with motor disabilities can develop an understanding of space and location. However, the interaction of motor and cognitive impairment remains unclear, as language delays and spatial location conceptual delays are common (Telzrow, Campos, Shepherd, Bertenthal, & Atwater, 1987). Piaget's understanding of infant-toddler development does not incorporate what is presently known about neurological damage and cognitive delays.

Piaget asserted that social and communicative development emerge through the child's cognitive constructions, with no specifically defined cognitive structures serving the specific functions of communication or language. Studies have since found that some of the general

cognitive abilities identified by Piaget as occurring around the end of the infant's first year are indeed closely associated with the development of communicative capacities (Bates, Camaioni, & Volterra, 1975). Piaget's concepts are thus supported in some instances and limited in others.

Vygotsky.

According to Vygotsky (1934/1986), understanding has to occur in a social context before it can be incorporated into a person's cognitive structures. One concept of Vygotsky's theoretical position of interest to researchers is the zone of proximal development. The "zone" refers to the difference between what the child can do acting alone and what she can do when acting with the guidance of a caregiver. In terms of the emergence of intentional communication, the caregiver who is sensitive to an infant's current level of functioning provides learning scaffolds, and provides a model for the child that fosters growth.

Vygotsky believed that caregiver support and assistance results in increasing child competence, and the child eventually functions without assistance. Communication acquisition may be modified by social and cognitive factors, as the acquisition of communicative skills may modify social and cognitive factors. Socialization, cognition, and communication were considered interactive and their causal relationships reciprocal. Vygotsky's work has since been extended by others to help explain the transitions between social interaction, intentional communication and language acquisition (Messer, 1994).

Kaye.

Kaye (1977, 1982) maintained that social interaction is responsible for many of the cognitive developments of infancy. He suggested that infants have the potential to develop the characteristics of a mature adult, but initially lack the social skills needed. In a process Kaye labeled "parental framing" (which is similar to Vygotsky's notion of mediated learning), adults provide support or context for an infant's activities. When an infant lacks a skill, adults compensate for its absence by providing the appropriate structure. Kaye identified seven parental frames universal to all cultures; each frame affected by the specific culture, and all frames are altered by variations among caregivers:

(1) nurturance framing is in the adult acts of nourishing, comforting, cleaning, consoling and fondling infants;

(2) the protective frame is described as adults assuring safety for the young;

(3) the instrumental frame is the active interpretation of the child's behavior as if it were intentional, and contributes greatly to the development of intentionality in the infant;

(4) the feedback frame is used by adults to provide more information to the child than the physical world provides.

The instrumental frame simplifies tasks for the infant, while the feedback frame provides reinforcement. These two frames overlap and their effectiveness is enhanced by the consistency and timing of parental responses.

(5) the modeling frame serves social functions and is

evident in turn-taking patterns, adult demonstrations, and joint adult-child focus. The adult models an action and waits for the child's attempt to imitate it.

(6) the discourse frame is found in the exchanges between the adult and the infant in conversation-like patterns, recognition of the infant's intentions and fostering the emergence of shared intentions.

(7) shared intentions and shared memories emerge through the memory framing process. The adult's memory, in that it is a shared memory with the infant, provides the frame which organizes the infant's subsequent experiences (Kaye, 1982).

Critics of Kaye's theory point out that it ignores the possibility that non-social experiences can lead to changes in infant functioning. Kaye's approach is also closely related to Western culture, and does not account for language development in cultures with less intense adult-child social interactions.

Trevarthen.

Trevarthen (1977) believed newborns have latent sociability and intentionality, and claimed infants play an active role in interactions with the mother. He saw social and cognitive development as proceeding, not through a relationship with a more competent adult, but as the maturation of an infant's innate capabilities for interacting with people in a communicative mode. A communicative mode includes hand movements (labeled pre-gestures) and pre-speech mouth movements. Pre-speech consists of those active movements of the mouth and tongue which often occur when

infants are interacting with others. In Trevarthen's approach, psychological processes, as opposed to neurological processes, have a minimal role in development. The role of the more competent communicator, although needed, is undervalued in Trevarthen's theory, and thus, the theory was incompatible with the premise of this research.

Transactional Approach

The fifth approach, transactional (Sameroff, 1983) formed a basis for the present research as it provided a way to view the critical contributions made by primary caregivers to the communication development of children who have severe, multiple disabilities. The study is based on transactional theory: interactive and reciprocal transactions between children who have severe, multiple disabilities and others in their environments have profound effects on how the children are perceived, how their communications develop, and why many children initiate, or cease to initiate, communicative interactions. Examining the degree to which adults in the environment perceive a child's communications may explain why the non-initiating children come to be passive recipients of one-way conversations.

In the transactional model (Sameroff & Fiese, 1990, 1988; Sameroff, 1983), changes in behavior result from a series of interchanges between individuals within a shared context, following specifiable regulatory principles. The child and the surrounding environment change and affect each other in a corresponding fashion. The child's development at any given time is not simply a function of the initial state of the child nor of the initial state of the environment, but

is a complex function of the interplay between child and environment over time (Sameroff & Fiese, 1990).

Sameroff further posited that family interactions are maintained through cultural codes which (through sets of social controls and social supports) organize and regulate child rearing practices. The child's experiences within the family are partially determined by the beliefs, values, and personality of the parents; partially by the way the family interacts under the influence of its transgenerational history; and partially by the socialization beliefs, controls, and supports of the culture in which the family exists (Sameroff & Fiese, 1990).

Understanding the nature of these complex transactions provides a theoretical basis for understanding communication development. The eventual developmental outcomes are a result of the complex, continuous dynamic interactions of the child, the experiences provided by the family, and the social context in which all exist. An unresponsive or difficult infant's behavior is interpreted in a variety of ways, and each interpretation impacts the behaviors of those in the environment. It is possible that limits frequently attributed to the child are actually limitations imposed on the child's development in a given context (Sameroff, 1983). Information given to parents by others concerning the child's competence and expected prognosis, when imposed on caregivers of fragile infants can diminish adult tendencies to perceive behavior as communication and respond contingently. These perceptions and expectancies are incorporated into the families' own codes, and those codes are used to organize

individuals within the context of their family system. Transactions among families are further tempered by perceptions held by individual members of the family.

Changes in caregiver-child interactions are indeed multidirectional, but can be modified by directing interventions toward the regulatory sources that mediate family change. By pinpointing the specific strengths and weaknesses of the family system, interventions can be targeted to those which affect the child's communication development. In some cases, intervention may be directed to the child's behavior, while in others changes in adult perceptions of the child as a communicator may be effective.

Caregiver-Infant Interactions

In studies of infant behavior during the last thirty years, infants have been found to be actors and reactors to the environment (Nadel & Camaioni, 1993). The ways in which infants interact with others, and how others perceive those interactions, are important to understand, as these early forms of communication are necessary precursors to the development of adult language. The developmental period from birth through the first twelve months is identified as a critical time for communication development, and the early communicative interchanges between infants and their primary caregivers are of consequence.

Studies of the behaviors of primary caregivers have generally focused on mothers, as they are often the available parent. However, others (e.g., fathers, grandparents, daycare providers, foster parents, siblings, nurses) may be the infant's primary caregiver and the major support for the

infant's communications. The terms mother, caregiver, and parent are used interchangeably in this review, and refer to whoever is recognized as the infant's primary caregiver.

A unique parent-infant system develops from the personal, social, and cultural variables each member brings to the relationship. An infant brings its own immature biological organization; parents bring the expectation that their infant is an interactive being. Brazelton, Koslowski, and Main (1974) found in several studies that parents actively sought infant communication. Mothers dealt with neonate behaviors as if they had meaning and were intentional. They give each movement a highly personal meaning and reacted to them affectively. Mothers, through imitation, joined in and enlarged on even the least possible interactive behaviors. Clear and frequent communication from the child increased the probability that caregivers used behaviors that further facilitated infant development (Goldberg, 1977).

Thus an effective caregiver-infant communication system generally progresses from an apparent dominance of the adult partner to a mutual assumption of the responsibility for the initiation, synchronization, and regulation of their communicative exchanges (Fafouti-Milenkovic & Uzgiris, 1979). The child's communication development is the product of these continuous dynamic interactions between the child, his caregivers, and the experiences provided within the family and its social context. These experiences within the environment are not independent of the child, as his previous behaviors (or lack thereof) may be strong determinants of his

current experiences.

Caregiver behaviors (e.g., responsiveness to infant behaviors, modeling, and reinforcement of the infant's communicative acts) support the development of a child's increasingly effective communications (Fafouti-Milenkovic & Uzgis, 1979; Dunst & Lowe, 1986). The constant ebb and flow of these interactions evolves as each member adapts; a more sophisticated interaction pattern emerges as the infant becomes more competent.

Caregiver responsiveness to infant behavior plays an important role in modeling and reinforcing the child's ability to acquire progressively more efficient ways of communicating (Dunst & Lowe, 1986). Snow (1977) analyzed the speech of two mothers to their babies, beginning when the infants were 3 months old and ending when they were 20 months of age. All of the mothers' speech related to the infants, or infant activities and direction of attention. The mothers' communications were predominately conversational, rather than a monologue model, as they attempted to evoke or maintain a reciprocal interaction with the infant. Snow concluded that the way mothers talk to their babies reflects their belief that the babies are capable of reciprocal communication. Their choice of the conversational mode provided opportunities to reinforce communication by giving meaning to infant behaviors that occur. Within the rules of conversational turn-taking, the mothers in this study engaged in "chats" with their preverbal infants, and played both roles in the conversation. These one-way mother "talks" are referred to by Schaffer (1977) as a pseudo-dialogue; Fafouti-

Milenkovic´ & Uzgiris (1979) termed it protocommunication, while Trevarthen (1977) named this maternal activity a protoconversation.

In one study, Trevarthen (1977) filmed five infant-mother dyads once a week during the infants' first six months of life. Although he found differences between pairs, a general pattern of development in social behavior was found in all infants. Even premature infants displayed behaviors which were described as social communication. Van Rees and de Leeuw (as cited in Trevarthen, 1993), using video tapes of parents communicating with their newborns in a neonatal intensive care unit, and found that even a fetus born by caesarean section in the seventh gestational month responded by smiling and cooing in response to gentle, sensitive actions by caretakers. This investigation found that the newborns in the study oriented to the mother's individual odor, and to the pitch and quality of her voice. Infants responded discriminatively to the feel and movement of the mother's body and to the touch of her hands. Conversely, infants withdrew and attempted to defend themselves against abrupt, unsympathetic or insensitive handling by caregivers (Trevarthen, 1993).

The mother and infant are members of a dyad which functions as a system. These early forms of communication are a series of social interactions that include the behavior of both members as they exchange information. These interactions are characterized by mutual gazing, turn-taking, response reciprocity, cycles, and interest in sharing information with each other (Fafouti-Milenkovic´ & Uzgiris,

1979).

Brazelton, et al. (1974) described this dyadic, reciprocal process as having a rhythm, a cyclic quality characterized by a pattern of mother-infant attention and withdrawal. The mother's pattern was found to be generally synchronized with the infant, and the baby's pattern with hers. The investigators found that the mother's behavior was influenced by the behavior of the infant, and the behavior of the infant was influenced by the the behavior of the mother. This interdependency of rhythms seemed to be the basis for the dyad's attachment as well as the foundation for their communications.

Camaioni (1993) used the term "asymmetrical" to describe the initial imbalance found in the interactions of the mother-infant dyad. The mother and the child actively participated in social exchanges, but the child's early contributions were initially dependent on the adult's contributions much more than vice versa. As soon as the child approached the point of independent performance on some activity or task, parental support decreased accordingly; their interactions became symmetrical.

Studies of the interactions between mothers and their infants without disabilities, found that mothers model and extend their infant's communicative behaviors. They build upon the social interactions which they have mastered by providing more complex communicative challenges at different times and in varying behavioral sequences. This mutual teaching-learning system becomes increasingly refined as the mother and child interact.

Transactions Between Caregivers and Infants with Disabilities

Fraiberg (1974) conducted longitudinal naturalistic studies of interactions of mothers and their infants with total blindness. The 5 boys and 5 girls were sightless from birth, but had no other disabilities. Each dyad was observed twice monthly in the home during normal care taking routines. A continuous narrative was made of each observation by the researchers, and a fifteen minute video tape of mother-infant interaction was recorded. From this rich body of data Fraiberg analyzed the differential responses exhibited by the infants. Some aspects of her study are included here as they contribute to an understanding of mother-infant interactions when the child has disabilities.

Eye language as described by Fraiberg (1974), is the visual behavior that enables an infant to engage the mother in an interaction. Infant eye contact connotes greeting and acknowledgement, elicits the caregiver's smile, and leads to the infant's preferential smiling. In the case of the infant who is blind, a large vocabulary of visual signs is either obliterated or distorted for the mother, as the baby without sight has a meager repertoire of behaviors that can initiate social exchanges. Mothers in Fraiberg's study found it difficult to interpret infant signals since the child's vision and basic social initiative behavior was absent. Beyond the vocal utterances of need and distress, the infant without vision had virtually no signal vocabulary that triggered an automatic response from his mother (Fraiberg, 1974).

For a sighted child, the human face becomes a stimulus

for an automatic smile by the time he is two to two and one-half months old. Infant smiles are seen as social responses and are interpreted positively by persons with whom they interact. Mothers read and interpret their infant's facial expressions as social responses; even unintentional facial movements are thus given communicative power and reinforced. By contrast, the baby who does not use vision has limited facial expressions which mothers find difficult to read. This lack of expression does not mean that an infant has limited affect, as researchers in the Fraiberg (1974) study found the infants in the study used other, less conventional signals to express the range of emotions expected of babies of the same age; they displayed emotion through their hand movements. By examining the video tapes, Fraiberg (1974) found it was possible to "read" the movements of the infants' hands in order to understand the meanings of the infant's emotional experiences. The researcher's interpretation of the hand movements were subsequently taught to some the mothers. Once those mothers learned the alternative infant cues, the hand signs provided sufficient stimuli for a maternal response. They were then able to engage their infants and enjoy their mutual interactions. The study reported that other mothers were able to recognize and interpret their children's hand movements with no instruction.

In a study comparing normal mother-infant dyadic interactions to interactions between infants identified as high-risk, Field (1983) found that high-risk infants were less attentive to their partners, smiled less, frowned more,

and cried more frequently than full-term infants. Videotapes of spontaneous face-to-face interactions between mothers of normal and high-risk infants were used to demonstrate that when compared to mothers and their nondisabled infants, the high-risk dyads were less synchronous in their interactions. The mothers' natural attempts to engage their infants appeared to be more stressful for the infants, and resulted in increased infant aversion behaviors; signals that an infant is overstimulated (Field, 1983). On the infrequent occasions when the mother was able to elicit a positive response, she increased her efforts to reengage her infant. Rather than eliciting the expected interaction, the mothers' amplified and sustained stimulation resulted in infant gaze aversion and negative affective behaviors. Field proposed that cumulative aversive experiences resulting from these failed attempts to connect with the child would create feelings in the mother that would alter the nature of her future interactions with the infant.

The disruption of normal interactions between an infant with disabilities and his mother may be as a result of the infant's unresponsiveness or incompetence in soliciting social interaction. Infants with disabilities seem to be less ready for engagement and less responsive to social interactions in general. The level of affect that the infant is capable of bringing to the interaction may be depressed, and the infant who has severe, multiple disabilities may be even less readable and less fun in social interactions (Walker, 1982).

One comparison study of three mother-infant pairs

examined their interactions over time (Als, 1982). The purpose of the study was to identify the developmental progression of the dyadic interactions when the infant (1) had no disabilities, (2) was blind with no other identified disabilities, or (3) was born with multiple anomalies. Biweekly face-to-face infant and mother behaviors were videotaped beginning in the infants' first few days of life. These tapings continued for the first three months, and dyads were taped monthly for an additional three months. The video tapes of face-to-face interactions, when coded for infant and mother behaviors, produced data reflected in infant and parent interactive behavior scores.

Second-by-second analysis of the scores found all three mothers were sensitive to their infants. Each seemed ready to acknowledge her infant's organizational state, reward his efforts, and provide support for the next step in their relationship. As the normal infant expanded his responses, the mother provided the framework for the next step in the infant's social growth. The mother and her infant with blindness displayed a similar, smoothly regulated process.

Unlike either of the other two mothers, the mother of the infant with multiple disabilities found it necessary to repeatedly recycle through early support phases as her baby frequently averted its gaze from her. In this study, the infant's ability to engage with his mother was mediated by his biological state, and the mother's efforts to support the child's expansions were frequently thwarted. Als (1982) found that for the infant with multiple disabilities, the developmental process was much more protracted. Each step

was slow and painful in developing, and once emerged it was sparsely implemented and relatively poorly modulated.

Infants who have severe, multiple disabilities may produce idiosyncratic or low incidence responses which are less likely to elicit or sustain interactions with caregivers who do not see nor recognize them as communicative intentions (Dunst & Lowe, 1986). Disabilities severely disrupt the interactive feedback system of the parent and infant, as the child may not support adult-initiated interactions. The child's unclear and infrequent communications may produce feelings of inadequacy in the caregiver and may depress the adult's initiations and facilitation attempts (Goldberg, 1977). Disabilities severely disrupt the interactive feedback system of the parent and child, and set the stage for future difficulties with their interactions.

Perceptions of the child as a communicator impact adult recognition and their support of a child's communications. Children with the most severe, multiple disabilities may be slow to develop communication, and the behavior they utilize for communication may not appear in a form that is culturally defined, and will not evolve into a spoken language (Reid, Phillips & Green, 1991).

Reading Infant Behaviors

Caregivers want to be able to read the infant's signals in order to appropriately respond. Dunst and Lowe (1986) perceive the adult's ability to read the child's initiations as critical to the quality of their interactions and the development of the child's communicative competence.

Assigning communicative intent to an infant's nonverbal

behaviors and consistently responding to that intent is a naturally occurring behavior in mother-infant dyads. The capacity of the infant to produce distinctive, readable behavior determines to a large degree the manner in which the caregiver is likely to respond to infant behaviors as communications. An absent, or unrecognized style of infant interactive behavior confuses the mother and mediates her responses. The synchrony found in mothers and their infants without disabilities is less likely to be found, as the babies with disabilities do not communicate in expected ways (Fraiberg, 1974). These unexpected, idiosyncratic infant responses cannot elicit or sustain interactions with a mother who does not see nor recognize them as having communicative intent (Dunst & Lowe, 1986).

Caregiver Responsivity

The primary caregiver plays a critical role in the development of communication for every child. For the child with disabilities, communication occurring in the earliest phases of development are improved by a mother's tendency to attribute meaning to the infant's nonsymbolic and frequently unconventional behavior (Wilcox, Kouri, & Caswell, 1990). Some mothers as Fraiberg (1974) found, were able to discern and accommodate to the communicative differences in their infants, but for other mothers, disturbed interactions with their infants occurred frequently (Field, 1983). Dunst & Trivette (1988) noted the mother's interaction style and an infant's unpredictable or unreadable signals could also be impacted by the greater social context in which the dyad exists. Long-lasting effects on the behaviors of the

caregiver may result when the family is informed that a newborn will never walk, learn to speak, or live independently (Haring, 1995). Interactions of parents and their children are often further disrupted by major medical crises, separations, and chronic health problems (Haring & Lovett, 1992).

Qualitative differences in mother behaviors seem to reflect the mother's adjustment to her infant with disabilities. In an observational study of one hundred and eleven preschool children (ages three months to 36 months) with a variety of disabilities including Down Syndrome, cerebral palsy, and developmental delay, Brooks-Gunn and Lewis (1984) found that a mother's responsivity was related more closely to the child's behavioral repertoire than to an assigned diagnostic category. All of the infants attended center-based infant stimulation programs, and the research was conducted at those sites. Mother-infant dyads were observed in a small room at the site, while an observer recorded data from behind a one way mirror. Ongoing mother and infant behaviors were dictated into an audiotape that contained a 10 second timer and tone. The presence or absence of all behavior was recorded live, as were the mother's responses to infant behavior. The recorders were not informed of the researcher's interest in maternal responsivity. Maternal and infant behaviors were recorded as occurrence or response. Three general qualitative measures of mother and infant interaction were used: (1) total, (2) proximal, and (3) distal behavior. The study measured the frequency of infant behavior, frequency of maternal behavior,

maternal response/maternal total behavior, and maternal response/infant total behavior. Controlling for overall maternal behavior and infant behavior, the research suggested that differences in mother responsivity toward their young children seemed to be a function of the child's mental age rather than any particular disability or diagnostic category (Brooks-Gunn & Lewis, 1984).

Caregiver Responsivity and Degree of Child Disability

The relationship between mother responsivity to infant communicative cues and the degree of infant disability was explored by Yoder (1986) with a sample of 16 mothers and their infants. All of the infants had hearing and vision within normal limits, were approximately 11 months old, and had identified disabilities. The sample included infants who had severe motor and cognitive disabilities; mild physical disabilities and moderate cognitive delays; mild overall delays; and one infant who was developmentally at risk. Each child was assessed in four areas of functioning: muscle tone, autonomic reactions, primitive reflexes, and volitional movement, as extraneous physical movement could affect the clarity and frequency of the child's communicative signals.

Mothers were asked to view a tape of a free-play session of she and her child, and then asked to signal to indicate observed infant communication cues. The number of times the mother pushed the button to indicate infant-initiated communications was the measure of the frequency of mother-identified cues.

Independent observers coded the same video tape into two target behavior classes: (1) the occurrence of a researcher-

defined communicative infant behavior and (2) the presence or absence of a maternal response to each researcher-identified infant cue. Researcher-defined infant cues included two types; unintentional (i.e., nonfuss or noncry vocalization, sustained shift of attention) and intentional (i.e., conventional gesture, coordinated attention). Trained coders found only 3 of the 16 infants in the study exhibited an instance of an intentional cue. Of the three infants coded as initiating an intentional cue, no more than two cues per infant were identified. Analysis of the study results found that mothers of infants who have severe handicaps responded to about the same proportion of research-defined infant cues as did mothers of babies with milder handicaps.

Yoder (1986) suggested that the degree of infant disability did not significantly predict individual differences in maternal responsiveness to researcher-defined cues, but mothers of infants who had severe disabilities tended to respond to mother-identified cues more frequently than did mothers of infants with fewer disabilities. These mother-identified cues elicited more maternal responsiveness than did the types of cues identified by coders, and mothers were found to identify a greater proportion of subtle cues. Coders identified fewer researcher-defined cues than did the mothers, and were found to have more difficulty agreeing on the occurrence of cues in infants who had severe handicaps than they did with infants with milder handicaps. The investigators noted that when a sample under study includes infants with severe handicaps, mothers will identify subtle and perhaps idiosyncratic cues that otherwise may go uncoded.

The mother-identified cues elicited maternal responses more frequently than did coder-identified cues.

Yoder and Feagans (1988) published additional results from the same study. It is included in this review as it further examined mothers' perceptions of the communicative cues used by their infants with disabilities. The same 16 subject pairs were used as in the 1986 study by Yoder, with five infants identified as having severe disabilities. This study tested the premise that mothers of infants who had severe disabilities do not attribute communication to their infants' behavior as frequently as mothers with infants without disabilities. Yoder and Feagans made their predictions from the viewpoint of an "infant driven" model which posited that; (1) babies with more severe disabilities would exhibit fewer behaviors which could be identified as communicative than would infants with mild disabilities, and (2) mothers of children with mild disabilities would perceive their infants as more communicative than would mothers of infants with severe disabilities.

The second model predicted that mothers of infants who had severe disabilities would more likely to attribute meaning to their infants than would be mothers of infants with mild disabilities. The researchers further speculated that, in addition to the frequency of infant cues, the general tendency for mothers to attribute communicative intent to their infants' behavior would increase when the level of disability increased.

In ratings of the identical interactive scenes used in the 1986 Yoder study, mothers of infants who had severe

handicaps were indeed found to attribute communication more frequently and with more certainty to an unknown infant's behaviors than did mothers of less handicapped infants. When faced with atypically low levels of researcher-defined infant communicative behaviors, mothers of handicapped infants attributed meaning to other subtle cues, and were able to provide themselves with a basis for responsive interaction (Yoder & Feagans, 1988). The degree of infant disability had apparent influence upon these mothers' attributions of nonsymbolic communication. A mother may be sensitive to subtle child behaviors which have communicative potential; the same child behaviors may be identified and reinforced as communications by others; or the same child behaviors might be ignored or misread by others in the child's environment.

Contingency Awareness

The child's ability to understand the relationship between his or her own behavior and the consequences of the behaviors is termed contingency awareness (Dunst, 1981). This awareness is facilitated by environments that provide clear contingencies between the child's actions and the consequences which follow. Certain types of response-contingent behaviors represent the earliest forms of communication (Dunst, 1981). However, the child who has severe, multiple disabilities has fewer opportunities for functional response-contingent behaviors as his ability to act may be limited (Daniels, Sparling, Reilly, & Humphry, 1995; Schweigert & Rowland, 1992). When caregivers and direct service providers fail to identify child behaviors as having communicative potential, no clear behavioral

contingencies will result. An environment that does not recognize nor respond contingently to a child's possible communications cannot effectively support nor encourage further development of the child's communications.

Partner Sensitivity to Child Communication

Wilcox, Kouri, & Caswell (1990) use the term "sensitive" to describe the partner in a communicative dyad who responds to the child in a contingent, appropriate, and consistent manner. Sensitivity to communication behaviors is demonstrated by consistent recognition of a child's communicative or potentially communicative behaviors by another, specifically those with the most frequent contact; the primary caregivers and the child's service providers.

The sensitivity of typical adult interactive partners to the communication behavior of young children with generalized developmental delays was examined in a study of children with presymbolic communication (Wilcox et al., 1990). The primary focus of the investigation was to analyze the adult's initial and consistent recognition of child communicative cues. Mothers, early childhood special educators, and speech-language pathologists participated in the study.

Videotaped samples of the continuous mutual interactions between preschool presymbolic children and their mothers were viewed separately by each child's mother, speech-language pathologist, and teacher. Every adult was then asked to indicate when the child's behavior was communicative, and what function it served. The adult-identified communication occurrences and associated behaviors were then compiled for each child. These data were used to determine the extent to

which there was agreement across adults in their identification of communication occurrences, and if there was agreement on each occurrence. Communication occurrences were recorded whether there was agreement on (a) occurrence only; (b) occurrence and behavior; (c) occurrence and meaning; or (d) occurrence, behavior, and meaning.

Results from the data were used to rate the adults' basic recognition sensitivity, or the tendency to identify the children's behavior as communication. The investigators found that adult ability to recognize individual children's communication occurrences was highly variable, while there were no significant differences found in recognition sensitivity among the groups.

Further analyses of the data examined recognition consistency or agreements in adult identification and descriptions of communicative behavior. The majority of those (mothers, teachers, and speech-language pathologists) who identified communicative behaviors were in some level of agreement with another adult. However, a number of adults rarely identified the communications perceived by other adults. Agreements were found for combinations of (a) mother and speech-language pathologists; (b) mothers and teachers; (c) teachers and speech-language pathologists; and (d) all three adults. The range of the agreements found that a fair amount of individual differences were present. For almost all children some agreement combinations never surfaced. The study demonstrated wide individual variability in the adults' basic recognition abilities as well as the recognition consistency of each child's communicative behaviors. As in

Fraiberg's (1974) study, Wilcox et al. (1990) found in some dyads more partner sensitivity than in others.

The essential first step in the chain of partner responsivity is the ability to recognize a communicative or potentially communicative act. Wilcox et al. (1990) speculated that the tendency to perceive communicative behaviors is a highly dyad-specific event. The results of their investigation supported the idea that sensitivity was dyad-specific and influenced by interactions between a particular partner's beliefs and knowledge about a child and the child's abilities. It is not difficult to postulate that if mothers and teachers agree on the child's communicative behaviors and meanings, they are more likely to provide a supportive and consistent communicative environment.

A Model of Communicative Competence Development

The Developmental Model of Communicative Competence proposed in several articles (Dunst, Lowe, & Bartholomew, 1990; Holdgrafer & Dunst, 1986; Dunst & Lowe, 1986) provides a conceptual framework for characterizing participant perceptions of a child's level of communicative competence. Levels within the model were derived from the literature on infant development, and describe a full range of developmental behavior changes which occur in the infant's communications over time. Used as a functional assessment of child communicative competence, this model proposes that the communications of children with disabilities can be targeted for early intervention. Seven progressively more complex levels of child communicative behaviors are exemplified by a representative set or class of operationally defined

behaviors. Assigning a level to a child's communications may be one way to focus the strategies used by caregivers and service providers to support and extend the communicative repertoires of children with the most disabling conditions.

The six classificatory features are used to establish communicative competence within each level: (1) the child must display an awareness of stimuli, and be able to discriminate among them; (2) the child is able to attain a goal or end state in sustained interactions with the environment, or goal directedness; (3) the child can use easily recognized conventional culturally defined communicative behaviors which can be interpreted by anyone in the child's community; (4) intentional refers to the child's ability to access a goal directly and/or use some intermediary behavior as a signal to indicate the goal to someone else; (5) the child uses a conventional system of signals which are rule-governed, and referred to as the linguistic feature; (6) symbolic refers to the child's ability to use symbols or signs to represent past or future events and occurrences in the absence of perceptually present stimuli.

The model in its present form does not provide for children whose disabilities preclude the use of conventional, recognizable communication behaviors. If one strictly applies the existing classificatory system (see Table 1), children who have severe, multiple disabilities would be unlikely to demonstrate their increased communications. However, this proposed model (Dunst, Lowe, & Bartholomew, 1990; Holdgrafer & Dunst, 1986) can serve as one framework

for improving the communicative competence of children with less severe disabilities, and holds some potential for use with children who have severe, multiple disabilities. The six levels of communicative competence may not prove to be sensitive enough to capture the subtleties of the communication behaviors used by the children in this study, as the model does not accommodate for their physical limitations. Nevertheless, the model does provide a gross measure of the level of a child's communicative competence by using the agreements found in mother and teacher reports of children's communication means and functions.

Level I. Behavior state communication - refers to conditions in which communicative intent is assigned to an child's nonverbal, nonintentional behavior. An infant at this level is considered to be communicative only in the sense that its behavior is believed to be communicative by others. The child's competence at this level is distinguishable from all other levels by the absence of each of the six classificatory features. This level requires only that the adult in the dyad believes that the child is attempting to communicate.

Level II. Recognitory communications are infant behaviors that may be interpreted by others as infant recognition of persons, objects, or events. The child cries or postures upon seeing aversive stimuli or exhibits anticipatory behaviors upon seeing a familiar person, or hearing a familiar voice, i.e., smiling, vocalizing.

Level III. Contingency communicative acts are operant behaviors used by an infant to initiate and sustain the

Table 1.

Levels of Communicative Competence: Means and Code Numbers

<u>Level of Communication</u>	<u>ICS Behaviors</u>	<u>Data Code #</u>
I. Behavior State	passive gaze	3
	pause	16
	turns head, raises arm	20
	thrusts tongue	22
II. Recognitory	vocalizations/noise	8
	active gaze	9
	facial expression	11
	generalized body movements	14
	muscle tone change	15
	orientation	17
	clenches/grinds teeth	21
	kicks/stomps	30
III. Contingency	touch/move other's face	5
	grabs/reaches	6
	vocalizations/noise	8
	averts head	18
	raises or lowers head	19
	spits out food/drink	23
	closes eyes	24
	averts eyes	25
	tracks object, person	26
	swipes	28
uses leg as pointer	31	

(table continues)

Table 1. (continued)

<u>Level of Communication</u>	<u>ICS Behaviors</u>	<u>Data Code #</u>
IV. Instrumental	gestures/points	10
	shakes "no" nods "yes"	12
	waves	27
	uses electronic signals	
	or switches	29
V. Triadic	aggression	1
	proximity	2
	pulling other's hands	4
	enactment	7
	gestures/points	10
	intonation	33
VI. Verbal		
(Contextualized)	one-word signs	13
	uses communication board	
	or objects	32
VII. Verbal (Decontextualized)	Uses socially recognized and culturally defined words or equivalent form used to describe persons, objects, or events not present.	
		No code number assigned

Note: Column 1 is from "Communicative Competence: From Research to Practice" by G. Holdgrafer and C. J. Dunst, 1986, Topics in Early Childhood Special Education 6 (3), pp. 8-9. Behaviors listed are from the Initial Communication Survey Instrument. Data Code # are codes assigned for data analysis.

attention or behavior of another person. Infants without disabilities exhibit this level of communicative behavior between the ages of 2 and 8 months. Holdgrafer & Dunst (1986) describe this as means-end behavior, rather than intentional communication. At this level the infant uses behavior as a means to reach certain ends; it is not clear that the communication is intentional. Behaviors at this level include gaze aversion, pushing away, banging to attract attention, or vocalizations to sustain or terminate interactions with adults. These behaviors are most often "read" by those familiar with the child, but are not recognized by others.

Level IV. Instrumental communicative acts are acts which are socially recognized and culturally defined nonverbal communicative behaviors that are used as a means to obtain a desired object or state. These behaviors include pointing, pulling, shaking the head yes or no, waving hi and bye, etc.

Level V. Triadic communications are communicative acts that are intentional, socially recognized and culturally defined nonverbal behaviors used to obtain a desired goal. This level requires the coordination of the infant, adult and an object in the communicative exchange.

Level VI. Verbal communicative (contextualized) acts use socially recognized and culturally defined words to intentionally express rejection, requests, and comments. Formal sign language use is included. The child's utterance is evoked by perceptually present persons and objects.

Level VII. Decontextualized verbal communication is characterized by the use of socially recognized and

culturally defined words that are used as signs or symbols that describe events without relying on perceptually present objects or persons.

The Developmental Model of Communicative Competence (Dunst, Lowe, & Bartholomew, 1990; Holdgrafer & Dunst, 1986; Dunst & Lowe, 1986) provides a framework for establishing the child's level of communicative competence, and may prove to be an indication of the point at which primary caretakers and direct service providers can focus their collaborative intervention strategies

Summary

Empirical studies of the communication development of children who have severe, multiple disabilities are limited, as the degree of disability may have precluded the child's participation in quantitative research activities which included children with moderate to severe disabilities. These children often do not meet established subject criteria, even when the study is designed for children with disabilities. Therefore, the studies directed to this population have limited numbers of subjects available to them. The characteristics of children who have severe, multiple disabilities are specific to each child, and the variability in their skill levels often precludes the use of study results with other children identified as having similar disabilities (Schweigert & Rowland, 1992). Perhaps the most efficient way to proceed with the investigation of communication development in young children who have severe, multiple disabilities would be to investigate the ways in

which their communications are supported by adults in the children's environments.

This review of the extant literature began by surveying numerous theories and approaches to the early communication development of children without disabilities. Findings from the selected studies of the interactions between primary caregivers and their children with disabilities were used to emphasize the critical role of the communication partner in recognizing child-initiated communication behaviors and assigning them meaning. The complex nature of communication development by a child who has severe, multiple disabilities has been described in comparison to the communicative behaviors used by children without disabilities. To state that a child who is five years old communicates at the level of a one-month-old infant is misleading, at best.

The effects of severe, multiple disabilities on the interactive behaviors of mothers and the children's inability to use expected response behaviors were applied to Sameroff's (1990) transactional developmental model. This model is the framework for this study, as a transactional approach to caregiver-child interactions considers the impact of the child (and his disabilities) upon caregivers, subsequent caregiver behaviors, and the contexts in which their interactions occur.

This study examined one facet of the multiple communication transactions which occur in the home and school; the perceptions held by primary caregivers and direct service providers regarding the communicative competence of children who have severe, multiple disabilities. The

responses of mothers and preschool special education teachers were collected to identify their perceptions of each child's communicative behaviors (means), and the meanings (functions) ascribed to communications by significant adults.

The study was designed to describe how adults who are close to a child who has severe, multiple disabilities perceive his communications. Agreements and disagreements between the adults who live and work directly with the child are thought to impact the quality and quantity of current and future communication interventions. Descriptions found in this initial investigation of dyad-specific perceptions may be useful in designing specific intervention programs for the children and/or training the adults who are important to the child's communication development.

Chapter Three

Method

Study Overview

Coded survey methodology and structured face-to-face interview techniques were used to collect data on the perceptions held by mothers and special education preschool teachers of the communicative means and functions used by young children who have severe, multiple disabilities. A descriptive research design was used, as young children (three, four, or five years old) who have severe, multiple disabilities are a low-incidence population (Schweigert & Rowland, 1992), and few were found in the sampled special education preschool populations.

Survey items and structured interviews solicited responses from mothers of children who have severe, multiple disabilities and the children's preschool special education teachers. Their responses indicated their perceptions of the children's communicative behaviors (means) and meanings (functions), and were used to answer the research questions posed in Chapter One.

Procedures

The study was approved by the University of Oklahoma Institutional Review Board prior to initiation of study activities. Chief school administrators (or their designates) of nine public school districts were contacted with a request to conduct research in their schools. The study was subsequently approved in seven school districts which, at the time the study was conducted had a combined student enrollment of 112,966 (16% of the state's student population) and a total preschool special education enrollment of 152 children (see Table 2).

Recruitment Activities

Participants were recruited in the eight schools in the seven cooperating districts which provided early childhood special education preschool classrooms for children with disabilities. These schools did not provide preschool services to children without disabilities.

The investigator contacted the principal from each school to explain the study activities. The principals, in turn talked with the preschool special education teachers, and subsequently obtained their written consent to participate in the study. The preschool special education teachers were asked to refer children who were identified by the school evaluation process as having the most severe disabilities.

All children referred to the study were to be no younger than three years, nor older than six years by the date the first instrument was administered. Selection of this age group was based on several factors: (1) the children were

Table 2.

School Districts

<u>District/ School</u>	<u>Total</u>	<u>Preschool</u>	<u>Number</u>	<u>Number</u>
	<u>Enrollment</u>	<u>Enrollment</u>	<u>Referred</u>	<u>Selected</u>
I a	12,555	16	1	1
II a	19,207	35	2	1
III a	15,520	63	7	4
IV a	6,456	8	1	1
V	40,000			
	a	15	4	2
	b	33	9	0
VI a	16,197	54	1	0
VII a	3,031	6	0	0
Total 8	112,966	152	25	9

Note: Total enrollment includes children enrolled in preschool and grades 1-12 classrooms.

Preschool enrollment is the number of children with disabilities in district special education settings.

Number referred is the number of children with severe disabilities who were referred to the study by special education preschool teachers.

Number Selected is the number of children who met the study criteria.

more likely to be medically stable than younger children with the same level of disability; (2) service providers had more consistent contact and more time available to work with the children than did early interventionists; and (3) additional adults and children were available in each setting to provide opportunity and support for the communications of children who have severe, multiple disabilities.

Subjects

The subjects needed for the study were mothers and teachers of young children who have severe, multiple disabilities. To identify those individuals, it was first necessary to identify children who met the study criteria as having severe, multiple disabilities (see Appendix C, Definitions). Those who met the study criteria are hereafter referred to as selected children.

The Process Used to Identify Selected Children

Teachers who agreed to participate in the study were asked to complete a Likert-type scale for each anonymously referred child, by rating each child on nine characteristics, and responding to four additional questions. The questions were related to the child's health problems, feeding and toileting skills, sensory deficits, and/or whether the child's behavior required systematic intervention. The Student Descriptor Scale II used in this study is described further in the section on Study Instruments.

The selection criteria required that the child's level of functioning as indicated by teacher ratings fall in the severe to profound range (4, 5, or 6) on seven of nine disability characteristics. These study criteria were

established by the investigator in order to select children who had severe, multiple disabilities. Teachers were not informed of the selection criteria before or after the study forms were completed.

Thirteen certified special education teachers referred 25 children to the study; 16 of those children did not meet the study criteria. Nine children from six classrooms (four boys and five girls) between the ages of three years nine months and five years 11 months met the study criteria and were selected (see Table 3). Six of the nine selected children were Caucasian, two were of African-American descent, and one was Hispanic.

The children themselves were not directly involved in the study. but their disabilities were the criteria by which appropriate participant-pairs were selected. Information on the child's age, diagnosis, and identified characteristics are listed on Table 4.

Following the selection process, the mothers of nine selected children were contacted by school personnel to determine their interest in the study. All nine mothers were willing to participate, and were subsequently selected for the study.

Participants in the Study: The Participant-Pairs

Nine mother-participants constituted the original study sample; seven biological mothers, one adoptive mother, and one foster mother. Each was the primary caregiver for a child who has severe, multiple disabilities. Seven mothers completed the study activities (Table 5). Two mothers were lost to the study; one child was moved to a foster home in

Table 3.

SDS II Teacher Ratings for Selected Children

Characteristics	Participant Pair Children								
	1	2	3	4	5	6	7	8	9
A. Intellectually disabled	6	6	6	6	6	6	6	4	5
B. Health condition	2	6	6	2	2	6	5	5	0
C. Feeding difficulties	5	6	6	5	4	6	5	4	0
D. Motor dysfunction	5	6	6	4	6	6	6	3	6
E. Communication	6	6	6	6	6	6	5	5	6
F. Self care	6	6	6	6	6	6	6	5	6
G. Response to environment	5	6	6	4	4	4	5	3	4
H. Sensory impairment	5	5	6	4	4	6	5	3	4
J. Behavioral disorder	1	1	0	0	0	5	0	4	6
Characteristics Identified for Each Child	9	9	8	8	8	9	8	9	7
Number of Characteristics Rated 4, 5, or 6 on the scale	7	8	8	7	7	9	8	7	7

Note: Numbers represent the degree of disability on each characteristic as rated by the child's teacher on a Likert-type scale; 1 indicates a moderate degree of disability, and 6 indicates a profound degree of disability. When a listed characteristic did not apply to the child, a zero was assigned. Children selected for the study were rated 4, 5, or 6 by their teachers on seven of the nine characteristics. Two children (x,y) selected for the study are included in the table, but not in the response data because two participant pairs did not complete the study activities.

Table 4.

Selected Child Demographic Data

<u>Pair</u>	<u>Age</u>	<u>Diagnosis</u>	<u>Area of Disability</u>				
			<u>Hearing</u>	<u>Vision</u>	<u>Orthopedic</u>	<u>Seizure</u>	<u>npo</u>
1	5/7	Psychomotor dysfunction	√	x	x	x	
2	5/7	Birth asphyxia	√	√	x	x	
3	3/9	Birth anoxia	√	√	x	x	x
4	5/1	Cerebral palsy	x	x	x	x	
5	4/6	Microcephaly		x	x	x	
6	5/0	Dandy Walker syndrome ^a			x	x	x
7	4/0	Lissencephaly ^a			x	x	x

Note:

x = documented disabilities

√ = disabilities thought to be present by teacher, but not documented.

Npo = Feedings are through a gastrostomy tube.

^a = see Appendix C, Definitions.

an unknown location, and one mother chose to drop out. The participant-mothers ranged in age from 23 to 48, and with one exception, had more than one child. All were married, and all were the principal caregivers for the selected child.

The children's special education teachers (all female) had taught special education from two to 23 years, been in the current position from two to 15 years, and worked with the selected child for an average of one and a half years. Each teacher was responsible for the educational program of one or two of the selected children (see Table 5).

Study Instruments

Researcher-designed instruments which were used in the study are described in the following sections. When necessary, descriptions are followed by the rationale for their development. Study instruments include a demographic data form, the Initial Communication Survey (ICS), the Modified Structured Interview (MSI), and the Individualized Education Program (IEP) form.

Demographic Data Form

The demographic data form solicited the following items: the participant's age; age of the child; child's diagnosis; the participant's relationship to the child; and the length of time the participant had been the child's primary caregiver or service provider (Appendix B).

Additional data solicited from the teacher-member of the participant-pair included: (1) the number of years the teacher had been a certified special education teacher; (2) the number of years the teacher had been employed in a special education preschool position; (3) the number of years

Table 5.

Participant Pairs

<u>Dyad</u>	<u>Mother</u>		<u>Teacher</u>		<u>Years of Experience</u>		
	<u>Name</u>	<u>Age</u>	<u>Name</u>	<u>Age</u>	<u>Teaching</u>	<u>Job</u>	<u>W/Child</u>
1	Alice ^a	48	Ardeth	43	20	5	2-4 yr
2	Dorothy	29	Jewel	42	19	8	6 m-1 yr
3	May	37	Erma	33	12	12	6 m-1 yr
4	Polly	32	Eunice ^b	33	2	2	1-2 yr
5	Marion	34	Eunice ^b	33	2	2	1-2 yr
6	Marie	25	Hazel	45	23	15	6 m-1 yr
7	Gladys	23	Betty	--	11	8	6 m-1 yr

^a Adoptive mother

^b Teacher for two selected children

the teacher had worked with the identified child; and (4) the number of hours per week the child attended the program.

The Student Descriptor Scale II

The Student Descriptor Scale (Goetz, Haring, & Gee, 1989) was the instrument used to identify the children who met the study criteria. It was appropriate for use in this study because the scale sampled several major categories of disability and could describe a child's functioning in the school environment. Its demonstrated reliability for identifying children who have severe disabilities (Goetz et al, 1989) increased its value for use in the study. To capture only young children with the most severe, multiple disabilities, the investigator modified the scale, and retitled it "The Student Descriptor Scale II," to differentiate it from the original.

Modifications to the Goetz, et al (1989) scale realigned and added items to sample all the child characteristics found in the Reid, Phillips, and Green (1991) definition of children who have severe, multiple disabilities (See Appendix C, Definitions). Three scale items were changed: (1) item c on the original statement "assistance required in using the toilet (needs assistance in any aspect of toileting)," was altered to read, "physical difficulties with food ingestion;" (2) statements on items d, "upper torso motor impairment (needs assistance and/or adaptations to participate)," and item e "ambulation impairment (needs assistance and/or adaptations to participate)," were combined into one statement. The item d statement subsequently read "unable to walk (may use a walker or wheel chair). Has limited control

over upper body movement;" and (3) item e was added to the scale to identify the degree to which the child depended upon others for personal care needs. The item e statement, "dependence in performing self-care routines," was the only characteristic added to the Student Descriptor Scale (1989). No other modifications were made.

The Student Descriptor Scale II required the respondent to identify (on a Likert-type scale of 1 moderate disability, to 6 profound disability) the degree of child disability on nine student characteristics; intellectual disability, health impairment, feeding problems, motor difficulties, communication disorders, self-care, environmental sensitivity, sensory impairment, and behavior disorder (see Appendix B, Instruments).

Initial Communication Survey of Communicative Means

The Initial Communication Survey was a researcher-developed instrument which used a series of communicative means items found in the current literature on the communications of children without disabilities or those with communication delays. Lists of communication means found in published articles by Schuler, Peck, Willard, & Theimer (1989) and Chen (1995) were compared (see Table 6) and merged. The combined means list was then modified in the following ways: (1) items which required physical movements which, by definition cannot be performed by a young children with severe physical disabilities were eliminated; (2) nonsymbolic behaviors which may serve as communication means for children with severe disabilities (as discussed by Downing & Siegel-Causey, 1988) were added, e.g., subtle

Table 6.

Communication Means Listed in Two Interview Instruments

Schuler et al. (1989)	Chen (1995)
1. aggression	1. generalized movements & changes in muscle tone
2. crying	2. vocalizations
3. tantrums/self injury	3. facial expressions
4. passive gaze	4. orientation
5. proximity	5. pause
6. pulling other's hands	6. touching, manipulating, or move with another person
7. touching/moving other's face	7. acting on objects & using objects to interact with others
8. grabs/reaches	8. assuming positions & going to places
9. enactment	9. conventional gestures
10. removes self/walks away	10. depictive actions
11. vocalization/noise	11. withdrawal
12. active gaze	12. aggressive & self-injurious behavior
13. gives object	13. echolalia
14. gestures/points	14. one-word speech
15. facial expression	15. one-word sign
16. shakes "no" nods "yes"	16. combined words
17. intonation	17. others
18. inappropriate echolalia	
19. appropriate echolalia	
20. one-word speech	
21. one-word signs	
22. complex speech	
23. complex signs	

Note. Column 1 is from "Assessment of communicative means and functions through interview: Assessing the communicative capabilities of individuals with limited language," by A. Schuler, C. Peck, C. Willard, and K. Theimer, 1989, Seminars in Speech and Language, 10, p.54. Used by permission. Column 2 is from Starting Points: Instructional Practices for Young Children Whose Multiple Disabilities Include Visual Impairment (p.61), by D. Chen & J. Dote-Kwan, 1995, Los Angeles: Blind Childrens Center. Used by permission.

changes in facial expression, differentiated vocalizations, eye movements; and (3) the list was extended to include behaviors found in extant behavioral research in which individuals with severe disabilities served as study subjects (Reid et al., 1991; Alvares & Sternberg, 1994). The criterion used for listing a behavior on the Initial Communication Survey instrument was that it could serve as a nonsymbolic communication mean (Siegel-Causey & Guess, 1988).

The resulting list of 50 possible communicative means were used on the Initial Communication Survey (see Appendix B, Instruments). An additional six items were scattered among the other items on the Initial Communication Survey to allow participants the opportunity to describe other, unlisted behaviors which could serve as a communication mean for a particular child.

The Modified Structured Interview

The structured interview technique was selected as a way to elicit information from study participants about each child's communications, as it had several advantages for use in the study: (1) interviews require the active participation of adults familiar with the behavioral repertoire of the child; (2) the written interview responses document each participant's perceptions of the child's communications for data analysis; (3) the interview format allows the participant the opportunity to supply in-depth information on the means and functions of the child's communications; and (4) the researcher is able to encourage participant responses to questions regarding the child's communications (means and functions).

The Modified Structured Interview technique and the recording instrument were adapted from two interview techniques/instruments found in the current research literature; (1) the structured interview developed by Schuler, et al. (1989), and (2) an instrument designed and used by Chen (1995) to conduct communication interviews with the parents of young children with multiple disabilities.

The Modified Structured Interview questions (see Appendix B, Instruments) were developed by modifying those used by Chen (1995) and Schuler et al., (1989). Each MSI question was designed to solicit descriptions of a child's communicative means which served a communicative function. Two lists of child communicative functions were found in the articles by Chen (1995), and Schuler, et al. (1989). They were compared (see Table 7) and merged to form one list of 14 possible communicative functions. The 14 MSI questions sampled communication functions including one question designed to capture any child-specific communicative functions which might not otherwise be identified.

Research Activities

Participant-pairs were involved in study activities in which the members signed a consent form, completed a demographic data sheet, responded to the Initial Communication Survey items, and participated in an interview. All study activities were completed in two or three sessions, none of which required more than an hour of the participant's time, and were conducted at the school or in a participant's home.

Completing the Initial Communication Survey (ICS)

Table 7.

Communication Functions Listed in Two Interview Instruments

Schuler et al. (1989)	Chen (1995)
1. requests for affection or interaction	1. protest
2. requests for adult action	2. refusal
3. request for object, food or things	3. rejection
4. protest	4. request social routine
5. declaration/comment	5. request permission
	6. greet
	7. call
	8. show off
	9. comment on object or action
	10. request information
	11. expression/intonation

Note. Column 1 is from "Assessment of communicative means and functions through interview: Assessing the communicative capabilities of individuals with limited language," by A. Schuler, C. Peck, C. Willard, and K. Theimer, 1989, Seminars in Speech and Language, 10, p.54. Used by permission.

Column 2 is from Starting Points: Instructional Practices for Young Children Whose Multiple Disabilities Include Visual Impairment (p.61), by D. Chen & J. Dote-Kwan, 1995, Los Angeles: Blind Childrens Center. Used by permission.

Each participant was asked to review the listed behaviors (communication means) and to mark those used by the child to communicate. For each marked behavior (mean), the respondent was to explain its communication function. If a behavior had more than one function, the respondent was asked to clearly explain the difference. For instance, a child's facial expression may convey a request for affection in one context, but in a different context the child's facial expression may communicate a need for adult assistance. In an attempt to capture possible idiosyncratic child behaviors used as communications, participants were encouraged to include behaviors not found on the instrument, but which were used by the identified child as a means for communication.

The Modified Structured Interview (MSI) Protocol

When the completed Initial Communication Survey form was received by the researcher, an interview was scheduled (a minimum of two weeks later) at a time and place convenient for the participant. All interviews were conducted by the investigator. Each MSI question was posed to an interviewee, followed by probes as needed. When necessary, the researcher rephrased questions in order to clarify the participant's response and/or elicit a yes or no response, e.g., "does your child point to an object that he wants to have?" Rephrasing a question was permitted by the interview protocol, and seemed to trigger participant responses which were in more detail, and/or prompted additional examples of the child's communications. Mother and teacher responses thus described the communication means the child used to transmit messages which served particular communicative functions. All

participant responses which related to the child's communication means during the interview were recorded on the MSI form by the researcher. Other unsolicited but salient information was recorded when it related to the selected child's developmental experiences, or current medical status.

The Individualized Education Program

The Individualized Education Program (IEP) for each child was reviewed by the researcher, and all IEP statements directed to the child's communications were copied verbatim. Verbatim statements were altered in two ways which did not change their content: (1) the word "child" was substituted for all proper names, and (2) the multiple formats used in the communication statements were converted into one outline format (see Appendix D for IEP Communication Statements).

Response Coding

The Initial Communication Survey contained 50 communication means which were then collapsed by the researcher into 34 behaviors. A university professor and two doctoral candidates reviewed the two lists and agreed the shorter list maintained the integrity of the original ICS items.

Behaviors such as cry (item 1), hums or sings (item 2), and mouth noises (item 3) were all identified as vocalizations and coded with the numeral 8; grimace (item 18), frown (item 11) and smile (item 20), were identified as facial expressions and coded, using the numeral 11. Table 8 lists the 34 means categories and the coding numerals assigned to participant responses which identified a child behavior as a communicative mean. Participant responses on

Table 8.

Code Numbers Assigned to Communication Means

Code Number	Communicative Means	Code Number	Communicative Means
1.	aggression	20.	turns head, raises arm
2.	proximity	21.	clenches/grinds teeth
3.	passive gaze	22.	thrusts tongue
4.	pulling other's hands	23.	spits out food/drink
5.	touch/move other's face	24.	closes eyes
6.	grabs/reaches	25.	averts eyes
7.	enactment	26.	tracks object, person
8.	vocalizations/noise	27.	waves
9.	active gaze	28.	swipes
10.	gestures/points	29.	uses electronic signals or switches
11.	facial expression	30.	kicks/stomps
12.	shakes "no" nods "yes"	31.	uses leg as pointer
13.	one-word signs	32.	uses objects or communication board
14.	generalized body movements	33.	intonation
15.	muscle tone change	34.	other
16.	pause		
17.	orientation		
18.	averts head		
19.	raises or lowers head		

Note: Mean 34 (other) denotes a child communicative behavior which was reported by the child's mother and/or special education teacher, or could not be coded as one of the listed means.

the Initial Communication Survey and the Modified Structured Interview which described a child's communicative mean were assigned one of the number codes. Communicative means found in the participant responses which were not included on the communicative means list were coded as 34 (Other).

Participant responses to the Initial Communication Survey and the Modified Structured Interview which described communication functions were assigned one of 14 communication function letter codes (Table 9). Communication functions found in the participant responses which were not included on the communication functions list, were coded as N (Other). Nonresponses or responses to items which did not meet the definition of a communicative mean, or did not serve a communicative function were coded as nonresponses (n/c), and excluded from the data analysis process, e.g., "When he sighs, he is content."

Participant-Pair Coded Responses.

The coded responses of the child's mother and teacher to both the ICS instrument and the MSI questions were recorded on the appropriate data form and later combined for comparison (the complete coding process, communicative means and function descriptions, and data recording forms can be found in Appendix E).

Participant-pair coded responses to ICS items were identified as in agreement or disagreement in two categories; child communication means or communication functions. If the mother identified a child communication mean, and the teacher identified the same communication mean, the responses were in agreement (+). If either participant identified a

Table 9.

Code Letters Assigned to Communication Functions

Letter	Function
A.	requests for affection or interaction
B.	requests for adult action
C.	request for object, food or things
D.	protest
E.	declaration/comment
F.	refusal
G.	rejection
H.	request permission
I.	greet
J.	call
K.	show off
L.	request information
M.	expression/intonation
N.	other

Note: Code letter N (other) was applied when a function was reported that could not be placed into one of the existing codes.

communication that was not identified by the other member of the participant-pair, the item was in disagreement (-).

Behaviors which were not identified as communicative by either participant were considered nonresponses, as an absent response had ambiguous meaning, and could not be assigned intention. Questions about communicative functions which did not elicit from either participant a response which could not be coded, e.g., "I don't know," or "He doesn't do that," were considered nonresponses (n/c) and were not used in the calculation of participant-pair agreements or disagreements.

The percent of agreement found in the coded responses of participant-pairs was calculated by comparing mother-reported child communication means/functions to teacher-reported child communication means/functions. Percent of participant agreement on means or functions was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100.

ICS and MSI Participant-Pair Shared Perceptions

Participant responses from the survey and interview were first coded separately on ICS and MSI coding sheets (Appendix E) to prevent bias in the coding process. The individual member coding sheets were subsequently combined onto a participant-pair coding sheet to identify the number of participant-pair shared perceptions of the child's communications. All shared perceptions of the child's communications were located on a matrix of communication means/functions (see Appendix E, Coding Instruments). The position of a shared perception on the child's matrix was equated to a representative set or class of behaviors found

on each of the levels (Table 1) described in The Developmental Communicative Competence Model (Dunst, Lowe, & Bartholomew, 1990; Holdgrafer & Dunst, 1986; Dunst & Lowe, 1986). The investigator thus assigned a level of communicative competence to each child, based on the matrix location of each participant-pair's shared perceptions.

Coding the IEP Communication Statements

Key words on each communication statement were used for coding. If the statement referred to a communicative mean, one of the communication mean numbered codes was assigned (Table 8). If the statement referred to a communicative function, it was assigned a letter code (Table 9).

Statements which did not appear to refer to a communicative mean or function were considered non communications and coded as (n/c). When a coded IEP statement included both a communicative mean and its function, it was placed on the child's matrix and assigned to one of the levels on the Developmental Model of Communicative Competence (see Table 1).

The communicative competence level found in the shared perceptions of the participant pair and the level of communicative competence addressed by the IEP communication statements of the current were compared. When the coded means and function of an IEP statement agreed with a participant-pair's shared perceptions, the IEP intervention goal or objective was considered congruent with the child's level of communication. The agreements and disagreements between the communication level assumed by the Individualized Education Program and the level perceived by the participant-

pair, were recorded for each child, and a communication profile was written for each child as a means of describing the individual further.

Summary

The Initial Communication Survey asked participants to identify a child's communication means and functions; the structured interview methodically sampled them. Using both instruments at two different points in time allowed the investigator to elicit similar data, and obtain at least two exemplars of each participant's perceptions of a selected child's communications.

The mother and teacher of a child who has severe, multiple disabilities completed the Initial Communication Survey in isolation from each other, and were interviewed separately. The coded responses of each member of a participant-pair were compared to identify the ways in which the pair agreed or disagreed on the child's communications, and their shared perceptions.

Each child's Individual Education Program communication goals and objectives were coded into communicative means and communication function categories and were assigned a level of child communicative competence. The participant-pair's perception of the child's communicative competence was compared to the level found in the child's IEP communication goals. Agreement between the communication levels addressed by the IEP perceptions held of a child's communication level was one measure of the degree to which the child's level of communicative competence was considered in the program planning process.

The data collected from demographic surveys, archival records, the Initial Communication Survey, participant responses to the Modified Structured Interview, and IEP communication statements provided sufficient information to answer the research questions posed.

Chapter Four

Results of the Study

Analysis

The study data obtained from the participants included information on the selected children, data on participant-pairs, participant response data on the child's communication means and functions, and coded Individualized Education Program communication statements. The coded response data from the participant-pairs did not result in the quantity of data required for parametric statistical testing. Nonparametric statistics were considered, but were not used to analyze the data. The use of descriptive statistics is an accepted practice when one has a small sample size, and assumptions of normality are not met (Hays, 1994).

The data from the study instruments was used to describe the selected children, the study participants, the perceptions held of the children's communications, and to sample one indicator of appropriate programming. The coded response (nominal) data was analyzed by using frequency counts of the reported child communicative means and functions.

Intercoder Reliability

Data from the survey instrument, interview notes, and the IEP were coded into categories of communicative behaviors and functions. The study investigator coded all instruments. A faculty member who is a nationally known expert in early childhood special education served as the independent coder. Procedural instructions and coding sheets were used by both coders, independent of each other. Eight of the 24 instruments ($8/24 = 29\%$) and 3 taped interviews ($3/14 = 21\%$) were used to calculate intercoder reliability.

Initial Communication Survey and Interview coding sheets were compared for intercoder agreement and disagreement on each coded item. Total agreements were calculated for all means and function category items. The sum of the agreements, divided by the total number of agreements plus disagreements multiplied by 100 resulted in the percent of agreement between coders.

Three of the interviews (21%) were preserved on audiotape for use in intercoder reliability checks. Randomly selected interviews were taped with the knowledge of and permission from the interviewee. The second coder listened to the audiotaped interviews, and coded the responses.

The reliability of the coding process ranged from 91% to 100% on both instruments. Intercoder agreement on codes for items in the means category of the Initial Communication Survey was 91%, while the percent of agreement on the codes assigned to responses to the ICS function items was 95%.

Intercoders agreed on the codes assigned to the responses on the Modified Structured Interview means items at

100%. The percent of agreement on the coded function items on the MSI form was 100%.

The percent of agreement of the coders on the taped interview responses was 100%. The reliability of the coding process was affirmed by the levels of agreement found in comparing the response coding of the primary investigator and the independent coder.

Responses of Mothers and Teachers to the Initial Communication Survey

The ICS listed fifty possible communicative means which were grouped into seven categories for data analysis. The categories were the section headings on the ICS instrument (see Appendix C) which were followed by lists of behaviors with similar topography: (1) Section A. Vocalizations/Noises is followed by items i.e., cry, yell, hum, raspberries; (2) head nods, shakes, etc. are listed in Section B. Head Movements. The remaining categories were constructed in a similar manner, with each communicative mean item relating to the category under which it falls: (3) Section C. Mouth and Face Movements, (4) Section D. Eyes, (5) Section E. Hands, Legs and Arms; (6) Section F. Symbols, was an added category, as symbolic behaviors, e.g., sign language, switch use, etc. could not be subsumed under other categories. The final category, (7) Section G. General Body Movement lists items i.e, tenses muscles, stops all movement, moving whole body, etc.

The number of responses made to each category of the ICS by each participant-pair is reported in Table 10. The participants identified communication means on 177 items or

Table 10.

ICS Communication Means Categories: Total Number of
Participant-Pair Responses

<u>Item Category (Number Possible)</u>	<u>Participant-Pairs</u>							<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	
A. Vocalizations/Noises (8)	4	6	3	6	5	3	5	32
B. Head Movement (10)	2	3	4	3	3	1	4	20
C. Mouth/Face Movements (18)	6	4	11	10	6	2	10	49
D. Eyes (18)	0	2	12	1	2	2	3	22
E. Hands, Legs and Arms (13)	1	4	2	2	3	4	3	19
F. Symbols (3)	2	1	1	1	2	2	1	10
G. General Body Movement (7)	3	6	2	5	1	1	7	25
Total Responses for each Participant-Pair (100)	18	26	35	28	22	15	33	177
Percent of Participant-Pair Responses to the Number Possible on the ICS	23	34	46	36	29	20	43	33

Note: Response frequency counts only. Responses were counted whether or not the behavior reportedly served a communication function.

33 percent of the total communication means possible (539). Mouth and face movements were the items most often marked as child communication means (49) on the ICS. In descending order of frequency were vocalizations/noises (32), general body movement (25), eyes (22), head movement (20), hands, legs, and arms (19), and symbols (10).

Participant-pair response agreements to the communication means categories are found on Table 11. Participant-pairs were in agreement on 34 of their 177 responses; the percent of agreement on ICS communication means items was ten. The percent of possible agreements reported by the pairs resulted in a different category order from that of the category response frequency data. In descending order of agreement vocalizations (36%) were the most often agreed upon communication means, followed by mouth and face movements (25%), eyes (17%), symbols (17%), general body movements (14%), head movement (9%), and hands, legs, arms (2%).

Communication means items on the ICS required that if a mean was identified by a participant, it was to be given a communicative function, e.g., if a child used a cry to get someone to play, the communication mean would be a vocalization, and the communicative function would be a request for attention. Analysis of means/function responses to the ICS resulted in the number of shared perceptions. The number of shared perceptions was calculated as a percent of the total participant-pair response agreements on the child's communication mean or function (see Table 12). The number of shared perceptions in all participant-pair responses to the

Table 11.

ICS Communication Means Categories: Total Number of
Participant-Pair Response Agreements

<u>Item Category (Possible Agreements)</u>	<u>Participant-Pairs</u>							<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	
A. Vocalizations/Noises (4)	1	2	1	2	1	1	2	10
B. Head Movement (5)	0	1	1	0	0	1	0	3
C. Mouth and Face Movements (9)	0	2	3	2	0	0	2	9
D. Eyes (9)	0	0	6	0	0	0	0	6
E. Hands, Legs and Arms (13)	0	0	0	0	1	1	0	2
F. Symbols (3)	0	0	0	0	0	0	1	1
G. General Body Movement (7)	0	2	0	1	0	0	0	3
Total Number of Agreements (50)	1	7	11	5	2	3	5	34
Percent of Agreement	2	14	22	10	4	6	22	10

Note: Frequency counts are of participant-pair agreements on ICS communication means response categories. Agreements on communication functions are not included.

Table 12.

ICS Responses: Participant-Pair Shared Perceptions

	<u>Participant-Pairs</u>							
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>Total</u>
1. Number of Shared Perceptions	1	3	3	0	1	1	1	10
2. Number of ICS Responses Marked by Both Participants	14	16	14	15	7	12	11	89
3. Percent of the Marked Responses which were Shared Perceptions	7	19	21	0	14	8	9	9

Note: A response on which the mother and teacher agreed with both the child's communication mean and function is a participant-pair shared perception.

ICS was ten, or nine percent of the total number (89) of response agreements. The highest percent of shared perceptions by a pair (21) was found in the responses of Pair 3; while Pair 4 had no shared perceptions in their responses to the ICS.

The responses which could be coded on the Initial Communication Survey were found to be limited in number, and produced few shared perceptions between the mothers and teachers in the participant-pairs. A total of 53 responses were coded as non communications (n/c) in the responses of the mothers and the teachers.

The Initial Communication Survey probed for communicative means which were specific to a child, but which were not listed specifically on the ICS. Responses not found on the existing list were coded number 34, "other." These items from the Initial Communication Survey were added to responses coded N, "other" on the Modified Structured Interview questions, and are reported later in this chapter. Responses of Mothers and Teachers to the Modified Structured Interview

While items on the Initial Communication Survey required the participant to choose a communication mean and indicate its function, the MSI questions required the adult to describe the means used by the child to communicate specific communicative functions. The responses to these open-ended questions could describe child communication means as (1) one behavior, e.g., "She grimaces;" (2) a series of behaviors, e.g., "She cries a little, and if you don't come right away, she begins to wave her arms;" or (3) a combination of

behaviors, e.g., "He moves his whole body and yells." The MSI questions generated more response data on child communicative means than did items on the ICS.

There were thirteen communication functions probed by the interview questions, with one additional question which allowed the participant the opportunity to add "other" communicative functions not already identified. One function was added to the original 13 by one teacher-participant.

Participant-pair responses indicated that all mothers and teachers agreed that the children communicated their refusals and greetings, that all children used some communication means to show off and express emotion. Two functions were never applied to the communication means of the selected children. According to the responses of the mothers and teachers interviewed, the children did not communicate declarations or make comments, and no child had ever asked permission.

Participant-pair agreements that the children had not communicated a specific function were combined with their agreements on the means and functions found in the children's communications (see Table 13). Participant-pairs responded to MSI questions regarding the communicative function questions by identifying child communicative means 75 times out of 91 possible responses. Participant pairs agreed on 51 percent of their responses

MSI Responses: Participant-Pair Shared Perceptions

Participant-pair shared perceptions on responses to the Modified Structured Interview questions are reported on Table 14. As with their response agreements on child communicative

Table 13.

MSI Communication Functions Categories: Percent of Agreement
in Participant-Pair Responses

Pair	Number Reported	Agreements	Percent of Pair Agreement
1.	10	9	90
2.	10	3	30
3.	11	5	46
4.	12	6	50
5.	11	4	36
6.	9	3	33
7.	13	8	62
Response Totals	<u>75</u>	<u>38</u>	
Number Possible	<u>91</u>	<u>75</u>	
Percent of Possible	<u>80</u>	<u>51</u>	

Note: A coded function or mean is reported as 1 response, regardless of the number of times the specific mean or function occurred in the response data of a single participant.

Table 14.

MSI Responses: Participant-Pair Shared Perceptions of
Communicative Means and Functions

	<u>Participant-Pairs</u>							<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	
Number of Shared Perceptions	9	3	5	5	4	6	8	40
Number of Responses	10	10	11	11	10	7	12	71
Percent of Responses Which Were Shared Perceptions	90	30	46	46	40	86	67	56

Note: Participant-pair responses which agree on both the child's communication mean and its function are shared perceptions.

functions, all participant-pairs had shared perceptions of the children's communication means and functions. The lowest percent of shared perceptions was 30 percent by Participant-Pair 2, while the highest was 90 percent by Participant-Pair 1.

ICS and MSI Combined Responses: Communication Means

There were thirty-four possible communication means identified in the response codes (see Table 15). The participants reported 314 child communication means in their combined responses to both instruments. Mothers reported 27 different behaviors in 172 responses, and teachers identified 20 different communicative means in 142 responses. Teachers answered with 45 percent of the total responses; mothers 55 percent.

Participant responses indicated that none of the children used the following communication means: (1) proximity, (2) enactment, (3) turns head, raises arm, (4) electronic signals or switches, (5) leg as a pointer, (6) objects or a communication board, or (7) intonation.

ICS and MSI Combined Responses: Communication Functions

The participant-pair combined responses to the Communication survey and the Modified Structured Interview Questions which identified the communication functions served by the children's communicative behaviors are reported in Table 16. Mothers as a group identified eleven of fourteen different communication functions, as did the teachers. The functions identified were not the same. Three mothers indicated that their children asked for information by their behavior; none of the teachers reported child behaviors which

Table 15.

Communication Means Found in Mother and Teacher Responses to the ICS and MSI

<u>Mother Reported Means</u>	<u>f</u>	<u>Teacher Reported Means</u>	<u>f</u>
Vocalizations	55	Vocalizations	43
Facial expression	24	Facial expression	15
General body movement	15	General body movement	15
Other	12	Muscle tone change	14
Muscle tone change	11	Other	10
Avert head	7	Avert head	9
Kicks/stomps	6	Passive gaze	5
Orientation	5	Grabs/reaches	5
Passive gaze	5	Raises or lowers head	5
Raises or lowers head	4	Orientation	4
Tongue thrust	4	Kicks/stomps	4
Close eyes	3	Swipes	3
Grabs/reaches	3	Aggression	2
Shakes head "yes" or "no"	3	Active gaze	2
Pause	3	Touch/move other's face	1
Active gaze	2	Tongue thrust	1
Aggression	2	Spits out food/drink	1
Clench/grinds teeth	2	Closes eyes	1
Spits out food or drink	2	Averts eyes	1
Swipes	2	Waves	1

(table continues)

Table 15. (continued)

<u>Mother Reported Means</u>	<u>f</u>	<u>Teacher Reported Means</u>	<u>f</u>
Averts eyes	1	Proximity	0
Gestures/points	1	Pulling other's hands	0
Pulling other's hands	1	Clenches/grinds teeth	0
Touch/move other's face	1	Gestures/points	0
Tracks object, person	1	Tracks object, person	0
One word signs	1	One word signs	0
Waves	1	Pause	0
Proximity	0	Shakes head "yes" or "no"	0
Enactment	0	Enactment	0
Turns head, raises arm	0	Turns head, raises arm	0
Uses electronic signals or switches	0	Uses electronic signals or switches	0
Uses leg as pointer	0	Uses leg as pointer	0
Uses objects or communication board	0	Uses objects or communication board	0
Intonation	0	Intonation	0
Total Number of Responses	<u>172</u>		<u>142</u>
Different Communication Means Reported	27		20

Note: All reported communicative means are listed, regardless of the function assigned.

served that function. One teacher reported a function which was coded N "other," that was not reported by a mother. The mothers as a group reported the children used communication to serve one of the thirteen functions 66 times; teachers reported 55 times. Of the total number possible (196), the participant-pairs reported 121, or 62 percent.

Communicative Means Responses Coded 34.

In an attempt to capture possible idiosyncratic child communication means, the study instruments contained items listed as "other" (see table 17). Mothers and teachers were given opportunities to identify additional child behaviors on the Initial Communication Survey. Each of the questions on the Modified Structured Interview encouraged descriptions of all child communicative behaviors.

Twenty-seven responses of the participant-pairs were coded in the communicative means category of "other." Participant-Pair 5 coded responses indicated "other" on 15 items of the ICS and MSI instruments; pair 7 described six, pair 4, three; pair 3, two; pair 1 listed one; and pair 2 had none.

One participant pair had shared perceptions of a selected child's "other" communication means and the functions they represented. Three communicative behavior means were reported by both the selected child's mother and teacher; when the child wanted to protest, she "fell apart," or threw a "fit;" to refuse, she placed her arm over her eyes.

The Communication Matrix: Participant-Pair Shared Perceptions

Shared perceptions from the Initial Communication Survey

Table 16.

Communication Functions Found in Mother and Teacher Responses to the ICS and MSI

<u>Function</u>	<u>Mothers</u>	<u>Teachers</u>	<u>Totals</u>
* Refusal	7	7	14
* Greet	7	7	14
* Call, get attention	7	7	14
* Expression/Intonation	7	7	14
* Requests for Affection or Interaction	7	6	13
* Reject	7	6	13
* Protest	7	5	12
* Requests for Adult Action	5	5	10
* Request for Object, Food or Things	4	3	7
* Show Off	5	1	6
* Request Information	3	0	3
* Other	0	1	1
* Declaration or comment	0	0	0
* Request Permission	0	0	0
* Total Number Reported	66	55	121

Note: An unduplicated count of the survey and the interview data are reported on this table. If a function was identified by all teachers and all mothers, the total is 14. If a function was not identified by any participant, the total is zero.

Table 17.

"Other" Child Communication Means

1. arm over face/eyes
2. purposeful gagging
3. moved head closer to adult's head
4. falling apart - throwing a "fit" - tantrum
5. shut down - will not respond to others - does not display any behavior. May go to sleep.
6. rolls eyes - not seizure related
7. pulls body or arm back from person or object
8. glares
9. pushes away - from table when unwanted activity is presented - from unwanted object
10. telling - start and stop cries as if the "tell" mom about problem encountered at school
11. teeth chattering
12. opens mouth
13. pull hair - rub head
14. pull off socks
15. close mouth
16. pat table
17. breathes harder
18. mimes eating (as a signal for "more")
19. uses rapid eye movements
20. grips object and resists

Note: The majority of these behaviors are not unusual, except for the fact that they are read as communicative means by members of a participant-pair.

and the Modified Structure Interview were combined to establish a level of communicative competence for each child. When a participant-pair held a shared perception of the child's communication mean and its function, the perception was entered onto the communication matrix (see Appendix E, Coding) and assigned to a developmental level of the Model of Communicative Competence (Dunst, et al., 1986; 1990). Two levels were assigned, e.g., I/II, II/III, when communicative means were reported by the participants which appear in more than one level of the model.

The Communication Statements on the Individualized Education Programs

The Individualized Educational Programs of all participant-pair children contained communication statements and assessments. The data from the key phrases from each communication statement is listed in the order found in the IEP (see Table 17). Twenty-one key phrases were found in the communication statements. Six of Of the 21 phrases were assigned levels of the Developmental Communicative Competence Model (Dunst, Lowe, & Bartholomew, 1990; Holdgrafer & Dunst, 1986; Dunst & Lowe, 1986).

The IEP communication statements addressed imitative behaviors, choice making, responding, and following mands. Other statements encouraged the child's increased use of vocalizations, head turning, facial expressions, and switch use. Fifteen of the 21 statements listed behaviors, but did not assign a communicative function to the behavior listed. Five statements had no communicative means or communicative functions which could be coded. One set of IEP communication

statements were written by the classroom special education teacher (Child 1), but the remaining communication statements were written by persons other than the teacher or mother.

Individual Education Program communication goals and objectives are required by Federal regulations and State policy to be measurable (34 CFR 300.346). There were assorted types of goal or objective measurements listed in the communication statements of the Individualized Education Programs reviewed. Four statements listed a percent of achievement, e.g., will activate ... switches to make...wants known w/80% success. Other statements used the number of times the behavior was expected to occur as a measure of success, e.g., 8 of 10 times (see Appendix D, IEP Communication Statements).

The mothers and teachers who participated in the study were members of a selected child's IEP team. Whether or not they discussed the child's communication means and functions during the IEP meeting is a question which was not asked during the study activities.

Communication Profiles of the Selected Children

In order to answer the research questions, the perceptions held by participant-pairs as a group, the mothers as a group, and the shared perceptions of each participant-pair were examined. In order to accurately reflect that data on a child-by-child basis, a communication profile was developed. The communication profiles were based on the mothers' descriptions of their children, and the participant-pair shared perceptions of the children's communications. The assigned level of communicative competence found on each

Table 18.

IEP Communication Statements:Codes and Assigned Levels

<u>Child</u>	<u>Key Words in</u> <u>IEP Statement</u>	<u>Assigned Codes</u>		
		<u>Mean</u>	<u>Function</u>	<u>Level</u>
1.	Vocalize	8	n/c	-
	Vocalize for adult attention	8	A	II
	Vocalize for more	8	C	II
	Appropriate behaviors	34	n/c	-
2.	No mean or function	n/c	n/c	-
	Strengths	n/c	n/c	-
	Weaknesses	n/c	n/c	-
3.	Weakness	n/c	n/c	-
	Switch-use/wants and needs	29	B	III
	Vocalizations/needs and wants	8	B	II
4.	Turn eyes & head	17	n/c	-
	Facial expressions and/or	11	n/c	-
	vocalize	8	n/c	-
5.	vocalize	8	n/c	-
	body movements	14	n/c	-
	facial expressions	11	n/c	-
	activating a switch	29	J	IV
6.	imitative behaviors	n/c	n/c	-

(table continues)

Table 18. (continued)

IEP Communication Statements:Codes and Assigned Levels

<u>Child</u>	<u>Key Words in IEP Statement</u>	<u>Assigned Codes</u>		
		<u>Mean</u>	<u>Function</u>	<u>Level</u>
7.	activate switch to get			
	response from object	29	n/c	-
	vocalizations and/or gestures	8	n/c	-
	to get attention	10	J	II
	respond to social greetings		n/c	-
	respond to simple commands		n/c	-
	waving and/or raising hands	27	n/c	-
	and/or clap hands and/or	10	n/c	-
	babbling	8	n/c	-

Note:

Numbers (8) reflect codes for communication means.

Letters (A) are coded functions.

Non communications are coded n/c.

Verbatim IEP statements can be found in Appendix D.

profile was taken from the data found on each child's communication matrix. Levels of the The Developmental Model of Communicative Competence (Dunst, et al., 1986; 1990) are found on Table 1. The participant-pair perceptions of a child's communication level are then compared to the communicative competence level addressed by Individualized Education Program communication statements.

The Communication Profile: Child 1.

This child had severe, multiple disabilities as a result of brain trauma as an infant. He was diagnosed as having psychomotor retardation, cerebral dysgenesis, seizure disorder, and visual impairments. He was dependent upon others for all of his needs.

The 11 shared perceptions found in the responses of the mother and teacher established the child's predominate communicative means as his vocalizations. This method of communicating was used for 11 of the 14 possible function codes. An added communicative behavior was total body movement which in combination with vocalizations, served the function of greeting others in the environment.

The teacher and mother agreed that the child used differentiated vocalizations specific to his messages. The various vocalizations were described as; (1) coos, (2) whiny, (3) forceful demanding cry, (4) cry, (5) fussy, (6) "happy" vocalizations, (7) holler, (8) squeals, (9) screaming, "shut down" cry, and (10) screaming "hissy fit."

This participant-pair was in agreement on the Initial Communication Survey only one time, but were in 90 percent agreement on the Modified Structured Interview. The

profile was taken from the data found on each child's communication matrix. Levels of the The Developmental Model of Communicative Competence (Dunst, et al., 1986; 1990) are found on Table 1. The participant-pair perceptions of a child's communication level are then compared to the communicative competence level addressed by Individualized Education Program communication statements.

The Communication Profile: Child 1.

This child had severe, multiple disabilities as a result of brain trauma as an infant. He was diagnosed as having psychomotor retardation, cerebral dysgenesis, seizure disorder, and visual impairments. He was dependent upon others for all of his needs.

The 11 shared perceptions found in the responses of the mother and teacher established the child's predominate communicative means as his vocalizations. This method of communicating was used for 11 of the 14 possible function codes. An added communicative behavior was total body movement which in combination with vocalizations, served the function of greeting others in the environment.

The teacher and mother agreed that the child used differentiated vocalizations specific to his messages. The various vocalizations were described as; (1) coos, (2) whiny, (3) forceful demanding cry, (4) cry, (5) fussy, (6) "happy" vocalizations, (7) holler, (8) squeals, (9) screaming, "shut down" cry, and (10) screaming "hissy fit."

This participant-pair was in agreement on the Initial Communication Survey only one time, but were in 90 percent agreement on the Modified Structured Interview. The

responses of the participant-pair to both instruments were consistent with Level II/III on the communicative competence model.

Level II communication behaviors may be interpreted by others as child recognition of persons, objects, or events. The child cries or postures upon seeing aversive stimuli or exhibits anticipatory behaviors upon seeing a familiar person, or hearing a familiar voice, i.e., smiling, vocalizing.

Level III represents operant behaviors used by a child to initiate and sustain the attention or behavior of another person. Infants without disabilities exhibit this level of communicative behavior between the ages of 2 and 8 months. Holdgrafer & Dunst (1986) describe this as means-end behavior, rather than intentional communication. At this level the child uses behavior as a means to reach certain ends. Behaviors at this level include gaze aversion, pushing away, banging to attract attention, or vocalizations to sustain or terminate interactions with adults. These behaviors are most often "read" by those familiar with the child.

The content of the communication statements on the Individualized Education Program pertained to the child's communicative means and functions, and were written by the teacher-participant. These statements were commensurate with the shared perceptions of this participant-pair. The child of Participant-Pair 1 was perceived at Level II/III and his IEP reflected that level.

The Communication Profile: Child 2.

The child of participant-pair 2 was multiply disabled as a result of birth asphyxia. She was identified as having mental retardation, cerebral palsy, a speech-language impairment, and was other health impaired. This child could use vocalizations, and did so when her tracheotomy was capped. However, the tracheotomy was closed infrequently and for short periods of time; she could not use vocalizations for everyday communications.

This participant-pair had six shared perceptions of the child's communications. The communication behavior agreed upon most was facial expression, although the child also used generalized body movements and muscle tone changes to communicate. The communication functions perceived by both members of the pair included requests for adult action, rejection, and expression/intonation. The mother and teacher relied heavily on the child's facial expressions. She was able to let them know when she was frightened, needed help, was ready to move, etc. All of the functions served by this child's facial expressions and body movement appear on Level II of the Communicative Competence Model.

None of the communication statements in this child's Individualized Education Program (see Table 18) were identified as relating to a communicative mean or function, therefore a communication level could not be assigned. The absence of any communicative behaviors or functions on the IEP did not necessarily mean the school team was ignoring the child's communication development. The shared perceptions of this participant-pair placed the child's communicative competence at Level II.

The Communication Profile: Child 3.

Child 3 was the youngest in the study. He had multiple severe disabilities as a result of anoxia at birth. Feeding was through a gastrostomy tube, he had serious breathing difficulties, and a history of chronic upper respiratory infections. Although he had no documented vision loss, he responded slowly and sporadically to visual stimuli.

There were eleven shared perceptions by this participant-pair. They agreed that he used vocalizations, active gaze, facial expressions, passive gaze, and muscle tone changes to send his messages. The child's differentiated vocalizations were identified as cries, whines, and louder cries. The vocalizations were generally accompanied by facial expressions which the mother and teacher used to interpret the meaning of the communication. The mother and teacher read his communications as; (1) requests for affection or interaction, (2) requests for adult action, (3) protest, (4) greetings, and (5) expression.

The mother reported one communicative behavior which was coded as "other." She said he would "breathe hard" when he wanted to be picked up and held. This child's combined communicative means and their functions were identified at Levels I and II of the model. Therefore, the child of Participant-Pair 3 was assigned developmental Level I/II.

Level I refers to conditions in which communicative intent is assigned to a child's nonverbal, nonintentional behavior. An infant at this level is considered to be communicative only in the sense that its behavior is believed to be communicative by others. This level requires only that

the adult in the dyad believes that the child is attempting to communicate. The child's competence at this level is distinguishable from all other levels by the absence of each of the six classificatory features.

The child's communication development was reported at a three to six month level on the IEP. Two communication statements were found in the Individualized Education Program for this child. The first statement required the child to use a variety of switches to choose between two toys or items when requested to do so. Switch use for this purpose is a Level IV instrumental communication on the developmental model of communicative competence. Level IV (instrumental communications) are nonverbal behaviors which are socially recognized and culturally defined. These communications are exemplified by waving bye-bye, pointing to object, or obtaining an object. Level IV is beyond the Level I/II assigned to the participant-pair's shared perceptions.

The second communication statement provided for stimulation to the child, and encouraged his vocalizations. The child would increase the number of vocalizations needed to make his needs and wants known. This communication statement was assigned a Level II which is the same level assigned to the participant-pair's perceptions of the child's communications.

The Communication Profile: Child 4.

The child belonging to Participant-Pair 4 was a five year one month old boy who was diagnosed with cerebral palsy. He had severe feeding problems, and was fed by his mother at home. He had active seizures, even though he was on Klonopin

and Depakote granules (see Appendix C, Definitions).

The mother reported this child used 16 different communication means to serve 11 different functions; teacher responses included nine communication means and six functions. There were several responses which were coded as "other" communication means. When refusing foods or medication the child would purposefully gag as if to throw up; to protest, he would close his eyes and, as his mother said, "shut down." He would not respond to others in any way and would often fall asleep. The teacher identified rapid eye movement as a communication means, but did not specify what the function of the communication could be.

Even though there were discrepancies in the number of communicative means and functions, this participant-pair shared perceptions on nine child communications; vocalizations, facial expressions, generalized body movements, and muscle tone changes were recognized by both members of Participant-Pair 4 as the means by which their child communicated: (1) requests for affection or interaction, (2) requests for adult action, (3) refusal, (4) greetings, (5) show off, and (6) to request information. These shared perceptions are all found at Level II of the communicative competence model.

The communication statements on the Individualized Education Program for the child reported communication skills at the two month level. A stated goal of the IEP was to improve the child's communication skills. Four possible communication behaviors were listed in the communication statements: (1) turn eyes & head, (2) show facial

expressions, (3) vocalize, and (4) activate a switch. There were no communication functions listed, and a level of communicative competence could not be assigned. Three of the behaviors were within the level assigned to the shared perceptions of the participant-pair, however switch use is generally assigned at Level IV, but a communicative function was not addressed in the statement.

It is interesting to note that the participant-pair agreed the child used vocalizations as a communicative means to: (1) request adult affection or interaction, (2) request adult action, (3) to refuse, (4) to show off, and (5) to convey emotion. Facial expressions were used as a means of greeting others. The IEP statements were directed toward developing those same communication means.

The Communication Profile: Child 5.

Child five was a four year, six month old girl who was diagnosed as having microcephaly from birth. The child had a seizure disorder, poor muscle tone, and consequently was unable to support her head for more than short periods of time. She had no documented hearing loss but wore glasses. The teacher noted that this child was well-fed, but reported that the mother had described meal times as time-consuming and difficult. This child was totally dependent on others for her care.

The mother and teacher responses to the study instruments found 15 child communicative means coded as "other." Five different behaviors were listed; (1) arm over face, (2) opens mouth, (3) mimes eating (for more), (4) tantrum, and (5) "shut down" (did not respond with any

behavior; often went to sleep). Participant-Pair 5 held two shared perceptions of "other" means to communicate. Both mother and teacher agreed that when the child wanted to protest, she displayed tantrum behavior; "fell apart," or threw a "fit." They also agreed the child placed her arm over her eyes as a refusal.

The mother and teacher shared four perceptions of the child's communications; two of which were read from "other" communication means. The child used vocalizations to show off, and expressed unhappiness and anger in similar fashion. Three of the four shared perceptions found the child's communications were negative communications. The participant-pairs shared perceptions found the child communicating at a II/III level on the developmental communicative competence model.

The communication statements in the Individualized Education Program called for several communication behaviors: (1) vocalize, (2) body movements, (3) facial expressions, and (4) activating a switch. One of the behaviors was associated with a communicative function; the child was to activate a switch to get a response. The nature of the response, or from whom it was to be solicited was not clear. The use of switches for communication is at Level IV on the model. The IEP communication statement did not reflect the level of the child's communicative competence as perceived by the participant-pair.

The Communication Profile: Child 6.

Child 6 was a five year old girl who had been diagnosed with Dandy-Walker syndrome with secondary hydrocephalus (for

a description of the syndrome, see Appendix C, Definitions). Immediately prior to this study, the child had been hospitalized for a shunt revision. She had been hospitalized for several months following a diagnosis which indicated bacterial meningitis and a yeast infection in the spinal fluid. She had a gastrostomy tube at the time of the study, and was totally dependent on others for her basic needs. However, the mother reported this child often worked her way out of her bed at night so she could roll around and play on the floor while the parents slept.

She had hearing within normal limits, and had been assessed for vision problems. At the time of the study it was believed she was visually aware, but did not consistently use her vision to track objects or people. This child was reported to have self-stimulatory behaviors, i.e., arm/hand in mouth, or rubbing objects on her head, and the teacher was using a systematic behavioral intervention to reduce those behaviors at school.

The responses from Participant-Pair 6 included 16 different means of communicating. Both members agreed on the nine functions served by this child's communicative behaviors. Their shared perceptions included: (1) averts head to refuse and reject; (2) vocalizations to protest, show off, and emote; (3) generalized body movements to greet others and show excitement (combined with vocalizations). These shared perceptions of the child's communications were assigned to Level II of the communication model.

One communication statement was listed on the Individualized Education Program for this child. The

statement listed desired imitative behaviors, but did not refer to communication means or functions. The statement could not be assigned to a level of communicative competence.

The Communication Profile: Child 7.

Child 7 was a four year old boy who was diagnosed as having lissencephaly at birth (see Appendix C, Definitions for a description of the disorder). The child had a seizure disorder, was dependent upon others for basic needs, and had difficulty in tracking visually. He could drink from a cup and eat pureed food, but his nutritional intake was primarily through a gastrostomy tube.

The members of Participant-Pair 7 reported this child used seventeen communication means. They agreed on two. Their shared perceptions involved vocalization as the primary means by which he communicated. His differentiated vocalizations included coos, fuss, whine, and blowing bubbles from his mouth. These vocalizations were frequently combined with other behaviors, e.g, averting head, kicking, as means to communicate: (1) requests for affection or interaction; (2) requests for adult action; (3) protest; (4) refusal; (5) rejection; (6) greetings; (7) show off; and (8) expression or intonation.

There were eight behavior responses from the mother and the teacher which were coded as "other" communicative means: (1) puts arm over face to refuse; (2) moves head closer to adult's head for affection or interaction; (3) "falls apart" or tantrums as protest and when angry; (4) pulled back from the person or thing he was protesting; (5) "shut down," refused to look, did not respond to others when angry; (6)

glared when angry or jealous; (7) rolled his eyes for adult attention; and (8) "tells" on others with cries which appeared to reflect the intonations of a child who was telling its mother about a bad event. The "tells" description came from his teacher. This behavior was seen on two occasions, each following a negative event which occurred during the school day. The "telling" cry was used when his mother came to pick him up after school. Although the participant-pair reports of communication means coded "other" are interesting, they were not shared perceptions. Those child communication perceptions shared by this participant-pair were assigned to Level II on the communication model.

The Individualized Education Program contained three communication statements. The first required the child to use a switch to initiate a response from a desired object. Switch use is a communicative means at Level IV, but initiating a response from an object is not a communicative function. Statement 2 involved vocalization as a communicative means to get attention. This was assigned a Level II communication which was commensurate with the perceptions of the participant-pair. The remaining statements involved communicative behaviors as responses to social greetings and following simple commands. When no specific communication behavior was addressed, and no communication functions served, a level could not be assigned to a communication statement.

Summary

Participant response data from two study instruments were combined to identify the shared perceptions held by

mothers of children who have severe, multiple disabilities, and special education preschool teachers regarding children's communication. Response comparisons were made between participant-pairs, mothers as a group, teachers as a group, and the communication statements found in Individualized Education Programs. The communicative competence of each selected child was based on the participant-pair's perceptions of the child's communication means and behaviors. Data were reported for individual children in a communication profile containing the child's communicative means and functions as perceived by adults in the milieu.

Chapter Five

Discussion

The findings of this study are presented as responses to each of the research questions posed in Chapter One. General discussion of the study follows and includes recommendations generated by this research. Implications for practice, research and teacher training based on the data obtained are discussed in the final sections.

How the Mothers Defined/Described Their Children's Communicative Behaviors

The review of extant research supports the notion that mothers tend to find infant behaviors as communicative, regardless of whether or not their infants have disabilities. Although the children identified for this study were no longer identified as infants, the mothers' tendency to recognize their children's behaviors as communicative continued. The participant-mothers found more behavior as communicative than did the teachers (see Table 15). This study data supports the results of Yoder and Feagans (1988) study in which they found a high rate of attribution to infant behaviors by mothers of infants with disabilities.

There was some relationship found between the degree of disability and the number attributions given by mothers (Yoder, 1988). Mothers seemed to attribute communications to more behaviors when the child had more severe than mild disabilities, or when the child had no disabilities. Attributions may be of value to a child's communicative development because the mother responds to all of the behaviors seen as communicative; on the other hand one could speculate that the tendency of the mother to respond to all behaviors at high rates could reduce the incentives for a child to increase the clarity and extension of communicative behavior (Yoder & Feagans, 1988).

Analysis of the participant response data from this study found differences between the participant mothers' recognition of behaviors as communicative, and the number of child behaviors recognized as communicative by the children's preschool special education teachers. In the earlier study, Yoder and Feagans (1988) found that even coders who were trained to identify child communications reported fewer child behaviors as communicative than the mothers who participated in the study.

Mothers' responses to the Modified Structured Interview questions support the anticipatory nature of their actions with their children. Participant-mothers reported they were often proactive, rather than reactive to their children's needs. When asked to describe the communication behaviors the selected child used to request adult actions (e.g., "How does your child let you know it is time to eat?" or "How does the child tell you to turn on favorite music?"), it was not

uncommon for the mother to say: "I just feed him when it is time for him to eat," or "I just know what he needs."

During the interview sessions, the mothers reported structured and busy daily routines involving their children. Mothers participated in the child's home therapy treatments, usually transported the child to and from school, followed various feeding regimens, performed most child-care routines, and accompanied the child to medical appointments. Mothers often stated that the children were on predictable daily schedules. As one mother put it, "She doesn't tell me she's hungry; I just feed her when it is time for lunch."

Mothers seemed to be uncomfortable with the idea their children might need or want something, and tried to prevent the situation from occurring. When asked what the child did to get the television program he wanted to see, one mother said, "He never has to ask me to turn the television to his favorite station; I just automatically turn it on when I put him in his room." The anticipatory behaviors of the mothers are problematic, as children whose wants and needs are automatically supplied have little need to communicate; these anticipatory maternal actions can reduce the number of opportunities available for the child to participate in reciprocal interactions during daily routines.

Communicative exchanges between mothers and their children in natural contexts, during daily activities are recognized as essential to the language development of infants without disabilities, and should be fertile ground for increasing the number and quality of the communications of children with disabilities (Siegel-Causey & Ernst, 1988).

These mother and child activities provide multiple opportunities for the child to initiate interactions in face-to-face situations, e.g., feeding, bathing, and toileting.

The response data indicate that mothers in this study recognized the child-initiated communications which solicited attention or assistance; most mothers reported that their children used vocalizations. The mothers attributed different meanings to the childrens' differentiated cries (vocal behaviors); altered tones, louder sounds, screams, and hums were reported. Some reported vocalizations were combined with other behaviors, e.g., generalized body movements. Mothers found meaning in the children's facial expressions. Mothers reported varying communication messages when the children frowned, smiled, glared, displayed a sad face, snarled their lips or pouted. Although frequently accompanied by vocalizations or body movements, at times a child's facial expression was the only communicative mean reported.

Child communication means reported by mothers in this study were not dissimilar from those reported in literature on infant development; i.e., vocalizations, facial expressions, and some body movement patterns. Less than half of the participant-mothers reported their children used conventional nonverbal behaviors commonly found in the communications of young children without disabilities. Pointing, shaking one's head "yes" or "no," and waving, as a child's means for communicating were found in few mother-participant responses (see Table 15). The limited number of these communication means is not surprising when one

considers the extent of the selected children's physical disabilities. This study data supports the need for individualized communication programming.

Professionals and parents who have children who have severe, multiple disabilities have the responsibility to evaluate each child's physical abilities, and consider the use of adaptations/appliances which could enhance the child's ability to communicate. Supports of any kind which enable child communication with others should be routinely considered in Individualized Education Program team meetings, with particular attention paid to technological supports (RESNA Technical Assistance Project, 1992).

As a group, mothers responded to items soliciting "other" behaviors more often than their teacher-partners. Those who reported "other" child behaviors also listed the specific communicative functions the behaviors meant, i.e., "He opens his mouth when he wants his pacifier," "She pulls her socks off when she wants me to put her to bed." The type of communicative means reported as unique to one child underscores the importance of continued reflection on each child's developing communication skills by all involved communication partners. Partners who share their observations and perceptions of a child's communications are more likely to recognize new child communicative means and support the child's further communication development. Supportive communication partners increase the probability that children will increase their communicative repertoires.

New communication behaviors were perceived by the mothers when the behavior seemed to serve a communicative

function. The meanings mothers assigned to the behaviors were based on the circumstances in which they occurred. When the child continued to use one of these "new" behaviors over a period of time, it seemed to confirm the mother's perception that the behavior had meaning. The mothers' reports of how they interpreted these child behaviors mirrors the data found in research on interactions between mothers and their infants without disabilities (Bohannon, 1993; Fafouti-Milenkovic' & Uzgris, 1979; Brazelton, Koslowski, & Main, 1974).

In their responses to interview questions, some mothers voiced a reluctance to interpret communicative behaviors which implied a higher level of communication development than they could or would acknowledge. In one interview, the mother plainly stated that she had been "disappointed too many times after my hopes were up" to expect more from her child. A number of the mothers admitted they just had not thought much about their children's communications.

If asked about the behaviors evinced by a child when a routine was disrupted, or an item was withheld pending a communicative response, mothers were almost unanimous in their negative verbal responses, and in their body language. It was as if the investigator had made an outrageous suggestion. The children were evidently not to be denied. It was obvious from these maternal responses (later also found in the responses of the teachers), that no conscious effort was being made to require conditional communications from the selected children.

The Initial Communication Survey served as a

consciousness-raising activity for the mothers; it seemed as if they became aware of the child's communications as they completed the survey. They described child communicative behaviors in more detail during the subsequent structured interview. The response data show that mothers reported fewer child communication means on the Initial Communication Survey than they did in their responses to the interview questions. This suggests that mothers had become more aware and thus more observant of their children's communications as a result of the study activities. These data indicate that assessment information specific to child communications, when solicited from mothers of children who have severe, multiple disabilities, requires the use of more than one instrument, and/or a series of meetings.

How the Special Education Preschool Teachers Defined and Described the Children's Communicative Behaviors

The children's special education teachers all reported the selected children could communicate. Most of the teachers had spent the majority of their careers working with children with severe disabilities, and often sounded like the mothers as they talked about their interactions with specific children: "He coos when he's happy;" "He listens for my voice;" "He seems to know what 'no' means." This is not an uncommon phenomenon, as service providers over time often assume similar roles to caregivers in the immediate family (Siegel-Causey & Ernst, 1988).

Teachers as a group were generally knowledgeable about each child's caretaking regimens and aware of the medical problems associated with each disability, but more than half

of the six teacher-participants were surprisingly uninformed about how much a child could see or hear. The teachers of four of the children admitted they were unaware of the child's sensory deficits: "She wears glasses, but I don't know why;" "None that I'm aware of;" "Seems to respond to some sounds;" "Unable to test." This lack of information regarding two major learning modalities (auditory and visual) is a critical gap in planning appropriate interventions, as sensory deficits strongly impact on a the child's ability to perceive the environment, and interact with others. Instructional strategies designed for children with sensory impairments (Schwartz & McBride, 1995) are less likely to be utilized when teachers and parents are unaware of what the child sees or hears.

The teachers identified vocalizations, facial changes, and general body movements as the communicative means used most often by the selected children (see Table 15). Some child communication means identified were recognized by teachers at a slightly higher frequency than those recognized by mothers; changes in muscle tone, averting heads, gross arm movements (swiping objects across table), or raising/lowering heads. The frequency of these behaviors found in teacher responses which described the children's communication behaviors could arise from the activities provided the children in the context of the classroom, i.e, routine care, physical therapy, occupational therapy, etc.

How Mother and Teacher Definitions of Communicative Behaviors Compared

Mothers identified more child communicative means with

higher frequency than did the teachers (see Table 11). The fact that teachers as a group spent less time with the children, and dealt with more than one child at a time, could explain why teachers described fewer child communication means and reported them at lower frequencies than did the mothers as a group. As an example, the children were not fed lunch at school; the teachers had scant opportunity to see child communications involved with eating or drinking activities.

Some behaviors identified as communicative by the teachers were reported at a higher frequency rate than those of the mothers (see Table 11). This may reflect that teachers perceived these behaviors because they had a more visible topography, rather than any substantive difference between the two groups. The differences in the frequency at which the teachers as a group identified communicative means and the rate at which the mothers as a group identified communicative means cannot be considered significant in all cases.

Some individuals in a participant-pair identified fewer behaviors as communication means than did others. The lowest number of singular communicative behaviors identified by one mother was eight; the highest number reported by a mother was 19. Teacher responses also varied, as one teacher reported eight different behaviors as communicative, while another teacher reported 14 different means. In one participant-pair, both the mother and the teacher reported the same number of communication means, but agreed on only half (seven) of them.

The variations found in participant responses which identified singular child communication means may be related to the sensitivity of the participants to child communications, or it may simply reflect low child response rates or the unusual nature of the child's behaviors. A child whose communicative behaviors are difficult to read affects the recognition of the child's communications by others. The child's limited contributions to dyadic interactions lowers the number of initiations made by a communication partner, and may add to the perception that the child does not communicate (Sameroff, 1983). Unfortunately, the data from this study does not provide sufficient information to clarify the relationship of the children's behaviors to the number of communication means reported in the responses of the participants. It would be interesting and possibly enlightening to observe the interactions of the children with each of the participants. An independent observer could add some insight into the rate at which the child exhibits identifiable communicative behaviors.

Regardless of the child's level of responsiveness, it remains incumbent upon adults, as the more accomplished communicators, to support and sustain the communications of children with disabilities. Parents and teachers have the responsibility not only to recognize and reinforce the children's communicative behaviors, but also plan for interventions to increase the rate at which a child's communications expand: systematic arrangement of the environment for communication (Gee, Graham, Goetz, Oshima, & Yoshioka, 1991); instructional strategies designed to expand

opportunities for communication (Haring, Neetz, Lovinger, Peck, & Semmel, 1987); and application of research-based interventions which may improve upon the quantity and the complexity of child communications (Goetz, Gee, & Sailor, 1985). These findings and the supportive research found in the extant literature have strong implications for teacher trainers and will be discussed further in this chapter under Recommendations for Teacher Training.

The Meanings (Communicative Functions) Mothers Ascribed to Child Communicative Behaviors

The functions assigned to the children's communicative means were identified without hesitation by each mother. When asked to explain the means by which their children transmitted messages, mothers as a group agreed that the children's communications served at least seven different functions. The participant-mothers identified the positive social interactions found in the children's greetings, requests for affection or interaction, and their calls for attention. The ways in which children communicated certain emotional messages. i.e., confusion, anger, fright, frustration, excitement, or unhappiness, were described by the mothers. While some of the children's communicative functions served as positive mother-child interactions, others clearly functioned as "behavior regulation" (Chen, p.59, 1995) communications. These child communications served to regulate the behaviors of the mothers by getting them to do, or to stop doing something. These child behavior regulating communications were found in all of the mothers' responses, as each reported that her child protested,

refused, and rejected the actions of others. The majority of these behaviors are within the communicative repertoire of all children and are considered socially appropriate ways to communicate, e.g., crying, or turning away. However, three of the reported regulatory communications signal the formative stages of unacceptable and possibly harmful communication behaviors, i.e., shutting down; tantrums (intense, violent screaming paired with exaggerated, forceful body movements); and gagging. The regulatory behaviors which have potential to harm a child or others in the milieu need to be recognized and, if necessary, reduced through planned behavioral interventions.

In the selection process of the study, one child was identified on the Student Descriptor Scale II as exhibiting behaviors which required a systematic intervention plan to reduce "self-stimulation" behaviors. These identified behaviors were not perceived as having a communication function. However, behaviors of children who have severe disabilities should be considered potential communication means. Some may be used to initiate positive social interactions. Other behaviors which also serve to influence the actions of others in the environment may be less positive. Less positive behaviors may include those identified as self-stimulatory behaviors, e.g., biting self, sucking on fingers, or regurgitating food and drink.

Development of appropriate communication behaviors and interventions designed to modify unwanted child communication behaviors require appropriate models, support for alternative behaviors, and continued reinforcement for positive

communications (Wacker, Wiggins, Fowler, Berg, Reimers, Cooper, Cigrand, & Donn, 1990).

Within the responses concerning the children's emotional messages, mothers disclosed that their children discriminated among people, and altered their communications accordingly. Children seemed to respond selectively to strangers, other children, and extended family members (some of whom were disliked). When approached by members of the family or friends who were liked, children were reported as "excited." Descriptions of those behaviors included whole body movements, kicking, smiling and cooing. When "disliked" individuals or strangers were near some children, the children often became quiet and watchful. One mother seemed to just "know" when her child disliked someone; those feelings appeared to be shared perceptions of the mother and her child toward a relative.

More than half of the children communicated requests for adult actions, requests for objects, food, or toys, and displayed behaviors which the mothers identified as "showing off." Children who were "showing off" generally repeated behaviors which made others around them laugh. The behavior seemed to serve as a means by which children continued their interactions with others.

Three of the seven mothers reported their children had requested information. The descriptions of child behaviors interpreted as asking for information included the following paraphrased statements: (1) when she was with her dad and the door opened, she looked as if she was asking where her mother was; (2) when the mother was late with the child's tube

feeding, he whined to ask when he would be fed; and (3) the child knew when it was about time for his dad to come home from work. If dad was late, the child whined as a way to ask where dad was. Although these behaviors could be interpreted differently by others, these three mothers had decided they were requests for information.

Behaviors which functioned as declarations, comments, or requests for permission were not found in the mothers' responses. These functions may have been absent because children did not express them, or may have required the children to display movements which were beyond their physical abilities, i.e., pointing or pulling on others, or imitating speech with vocal intonation. It is also possible that these child communications were expressed in alternative ways which were not recognized by the mothers.

The Meanings (Communicative Functions) Teachers Ascribed to Child Communication Behaviors

Fewer child communicative messages were perceived by the teachers than by the mothers, but the participating teachers agreed with the mothers about the children's positive social communications, e.g., greetings, requests for affection or interaction, and calls for attention. Teachers also agreed with the mothers regarding the three behavior regulation communications which served to get others to do or stop doing something. The regulating behaviors of the children were reported in the responses of five of the six teachers, as they perceived protests, refusals, and rejections as part of the selected children's communicative repertoires.

Teachers reported physical therapy as the activity which

was most rejected by children, followed by taking medications or rejecting disliked textures. Children refused these activities by gagging or spitting out the undesired substance. Teachers also reported children used other communicative behaviors as rejection, i.e., pushing away, or refusing to take/relinquish an object. The selected children reportedly used vocalizations as a communication means to express anger, convey needs, and resist certain disliked activities. Teachers did not report any child communication means which functioned as declarations or comments, or as a way to request permission. Unlike some of the mothers, the teachers did not report that any of the children communicated requests for information.

Members of each participant-pair responded to survey communication means items with less information than they provided in the interviews. This may have been related to differences in the data collection process, the design of the study instruments or a reflection of increased participant attention to the children's communications during the study activities. There were no substantial differences in the total number of responses by mothers with older children and mothers with younger children; no differences were found in comparing the responses of experienced teachers with the teacher with the least experience.

Comparison of Mother and Teacher Descriptions of the Functions Served by Child Communication Behaviors

Participant-pairs reported the children used varying communication means to serve 13 of 14 possible communication functions (see Table 16). The absence of some communication

functions for individual children in the responses of the participants has several possible explanations: (1) some communicative functions require behaviors which were beyond the child's capabilities, or were perceived to be beyond the child's capabilities, e.g., asking a question or making a declaration; (2) communicative functions were not reported because the child had no opportunity or a need to express them; (4) the child's communications were not seen, or if seen, were misperceived; (5) participants did not expect the child to use communications found in developmental levels beyond those the child was predicted to attain; (6) and/or the child had never communicated the particular function. This study did not address these possibilities directly. However, the perceptions held by potential communicative partners regarding the communicative competence of young children who have severe, multiple disabilities is one of the critical factors which could impact any of the preceding scenarios.

In some instances, participants identified and agreed on child communicative behaviors which served the function of getting others to do, or stop doing something, e.g., stop touching or manipulating the child's body; refusing food or drink; or perhaps interfering with treatment regimens. These communication functions were referred to earlier as child behavior regulating communications. Current literature proposes that socially inappropriate child behavior regulating communications may accelerate when positive social interaction communicative behaviors are not recognized nor reinforced in a consistent manner. If the message is one the

child intends to express, and appropriate child communication behaviors are unrecognized, the child may use less socially appropriate behaviors to elicit desired responses from others (Durand, 1993; Durand & Carr, 1991; Carr & Durand, 1985).

That the responses of the participant mothers and the teachers were not in agreement is similar to the findings of Wilcox, Kouri, and Caswell (1990). Adults were found to be highly variable in their recognition of individual children's communicative acts. The researchers found that sensitivity was extremely dyad specific, as each adult seemed to apply his or her own standards to what constituted a communication, how a communicative behavior was described, and the communicative function of the behavior. These differences in adult perceptions creates problems for children who have severe, multiple disabilities as they attempt to communicate. If adults in the environment sporadically ignore or respond indiscriminately to child behaviors, children may not be motivated to use, refine, or increase the complexity of their communications.

Regardless of what adults believe about children who have severe, multiple disabilities and their communications, adult actions must demonstrate that adults expect children to communicate. Adult actions which demonstrate the commitment to developing children's communicative competence include coordinated planning for the child's communication development, application of systematic interventions, and consistent support for each child's attempts to influence others within the environment.

Mother and Teacher Perceptions of the Child's Level of

Communicative Competence and the Individualized Education Program (IEP) Communication Statements

The Individualized Education Program reviews were used to document the level of congruence between the children's perceived communication levels and the IEP team plans for anticipated improvement in child communicative competence. The Individualized Education Programs reviewed did not contain statements which addressed the nonsymbolic communications of these children, nor statements which established clear goals for extending the children's communications. To keep this finding in perspective, it must be remembered that two key members of the IEP team (teacher and mother) did not consistently agree on their perceptions of the children's communications. One participant-pair had only four shared perceptions of the child's communications, while another participant-pair shared perceptions in nine of 14 possibilities. No participant-pair agreed on the communication means and functions of a single child. It was not surprising then, that a speech/language pathologist who sees a child on a more limited basis than either the teacher or the mother, did not concur with their perceptions. In most cases, however, it appeared that the speech/language pathologist was responsible for the communication goals written on six of the seven IEPs.

An unexpected finding of this study was the absence of any meaningful, specific, measurable or observable goal statements directed to nonsymbolic communication in any of the Individualized Education Programs of these children. The majority of the IEP statements were directed to increasing

specific child behaviors rather than providing opportunities for communication interactions which could be meaningful in the context of the classroom. The goal statements anticipated changes in: (1) the number of child vocalizations; (2) child eye tracking, or looking at appropriate (undefined) stimuli; (3) use of the child's facial expressions and/or vocalizations when a switch was activated; (4) responses to sounds by child vocalization while using body movements and/or facial expressions; (5) choice making; (6) developing imitative behaviors; (7) responses to social greetings and simple commands; and to (8) switch activation to get a response from an object. None of the statements attended to communication development, nor did goals imply that the children were expected to increase their communications by the end of a year-long intervention.

One IEP written by a participant teacher contained two statements which matched the participant-pair's perceptions of the child's level of communication. In the six remaining IEPs, only two communication statements addressed the appropriate level of child communicative competence as it was perceived by the participant-pairs; the remaining communication statements did not.

In summation, the IEPs written for the selected children contained limited information about long or short term objectives for improving their communications. Although standard language assessment information was found in some IEPs, no descriptive data specific to the children's daily communications, in terms of current communicative means and functions, were found. Statements which addressed team goals

and assigned individual responsibility for programs addressed to child communications were not found in these IEP's. The absence of communication goal statements on the written document did not necessarily mean that the school programs avoided appropriate communication interventions. However, the absence of goal statements directed toward the children's communications is one indication that the adults who are charged with increasing the communications of children who have severe, multiple disabilities may not perceive these children as candidates for learning to communicate at a higher level of competence.

The Individualized Education Programs reviewed did not describe the children's existing communication behaviors nor establish long and short term goals to extend or support those behaviors. The listed goals were generic and unrelated to specific communication skills. There was no written evidence of team focus on child communication means and functions as identified in this study.

IEP teams should assess the children's communication means and functions, the available opportunities for children to communicate, and implement appropriate team interventions. Effective teaching for communication development begins with the child's identified level of communicative competence and builds upon that information by using the child's strengths (Drasgow & Halle, 1995; Kaiser & Goetz, 1993; MacDonald & Gillette, 1986). There is no question that children who have severe multiple disabilities require multiple contingent experiences and a great deal of time to learn new skills, so interventions must be consistent and long-lasting.

This study was not designed to find out how teams, or individuals on teams determine appropriate communication goals for children who have severe multiple disabilities. It did not explore how teachers and mothers approached communication training for the selected children. The study investigated data which indicated that disparities exist between the communication statements found in the IEPs of the selected children, and the level of child communicative competence perceived by two essential team members: the special education teacher and the child's primary caregiver.

One could speculate that teams are not trained to focus on the child as a communicator, but trained to identify language development milestones, and begin interventions accordingly. Interventions may be based on prelanguage child behaviors which develop in similar ways and in roughly the same developmental sequence found in the communications of children without disabilities. These study data indicate that the teachers and mothers who responded to the study instruments agreed on the children's communicative means about half the time. From the responses of the participant-pairs, one could reasonably speculate that adult responses to these children's communication attempts are disparate.

Limitations of the Study

One difficulty in conducting research with this population is determining the subject selection criteria. Empirical studies involving children who have severe, multiple disabilities is limited. Irritability and low rates of response are characteristics of infants who have severe, multiple disabilities (Orelove & Sobsey, 1991), and these

behaviors are not often included in the criteria established by researchers. It is difficult to include children with the most significant disabilities in studies which require large sample sizes, as they become statistical outliers. An example of this need to exclude children with the most severe disabilities was found in a study of maternal responsivity to the communications of infants with disabilities (Yoder & Feagans, 1988). One infant was excluded from the sample because he cried too much to assess his neuromotor status; the second infant had low response rates (exhibited fewer than five mother-identified cues), and was dropped from the sample to avoid misleading proportions.

None of the instruments used in this study were standardized on similar populations. However, the items selected for the survey instrument and the structured interview questions were found in the existing literature on current practices and assessments of the communicative competence of children who have severe multiple disabilities. The instruments used in this study solicited an appropriate and accurate amount of response data to answer the questions posed.

The study results have low external validity as the findings cannot be generalized beyond the participant-pairs who completed the study activities. The limited number of children whose mothers and teachers were selected for this study is proportionate to the number of preschool children identified as having severe multiple disabilities in the general population. Participants were not randomly selected, but were obtained by a process by which children were

identified by the severity of their disabilities. This study did not replicate the research designs used in previous studies of maternal perceptions of children's communications, but the findings support that found in previous research studies.

Mothers and teachers were asked to participate in the study activities subsequent to the child selection process. This study elicited data which described some of the perceptions held by adults who work with children with the most challenging disabilities. The unique configuration of the selected children's disabilities, the differences evident in the participant-pairs, and the diversity of the preschool classrooms precluded attempts to generalize the perceptions held by the participant-pairs in this study to perceptions held by other mothers and teachers of preschool children in this or any other disability category.

Recommendations for Practitioners

The absence of communication goals in the IEP statements should be of concern to special education professionals. Accepted practices in communication assessments and preschool interventions require adults to treat a child as a communicator, increase the opportunities for children to communicate, participate in collaborative team planning, and provide response contingency across environments. Children who have severe multiple disabilities are limited in the means by which they can affect their environments; they should not be further restricted by the perceptions and lowered expectations of other, more competent communicators.

This study resulted in limited but interesting data

obtained by a method which probed for the perceptions mothers and teachers hold about the communications of children who have severe multiple disabilities. These adults generally served as communication partners for the selected children. The critical nature of their role requires the recognition and support of child communications by key adults. Contingent responses to a child's infrequent and limited communicative behaviors and messages are critical to further development. Mothers and preschool special education teachers who are sensitive to low incidence and nontraditional child communications must take an active part in designing interventions to increase the number of communication opportunities available (Kaiser, Ostrosky, & Alpert, 1993; Haring, Neetz, Lovinger, Peck, & Semmel, 1987). Numerous interventions are described in the existing literature on the communications of children with severe disabilities (Kaiser & Goetz, 1993), and the work by van Dijk (1966) with children with dual sensory impairments can be adapted for use with children who have severe, multiple disabilities (McFarland, 1996).

The mothers and teachers in this study described the children's lives as scheduled; the structure inherent in everyday routines provides ample opportunities for caregivers and service providers to model appropriate communications and increase the child's need to communicate during functional activities. Techniques which have been found to be successful with nonsymbolic communicators include: (1) time delay (Gee, Graham, Goetz, Oshima, & Yoshioka, 1991); (2) behavior chain interruption strategies (Goetz, Gee, & Sailor,

1985): touch cues and object cues (Rowland and Schweigert, 1989; Siegel-Causey & Guess, 1989); (3) contingent reinforcement of child social responses (Dunst, Lowe, & Bartholomew, 1990); and (4) assistive technology to establish reinforcer preferences (Wacker, Berg, Wiggins, Muldoon, & Cavanaugh, 1985), and provides a means by which children who have severe, multiple disabilities can make choices (Houghton, Bronicki, & Guess, 1987).

Communication is the primary means by which children who have severe multiple disabilities can impact their environments. Next to the child's safety and comfort, communication should be the focus of preschool special education programs. If not implemented earlier in the child's programming, e.g., early intervention services, it becomes the responsibility of preschool programs and special educators to initiate these interventions. Early childhood classrooms in segregated and/or inclusive settings are the appropriate place and a critical time for focused instructional energy on the development and enhancement of the communications of young children who have severe, multiple disabilities.

Appropriate interventions begin with assessing the child's current communications. As this study found, useful data can be gathered from the child's caregivers and teachers. Their perceptions of the child's communicative means and functions can provide a basis for child interventions, staff training, and planned parental involvement, even if adults do not unanimously agree on the child's communicative means or the messages they convey.

Communication interventions must focus on the child, as well as the perceptions held by others of the child as a communicator. It begins with parent and team awareness of the child as a communicator. Collaboration among team members develops through agreements about the child's current level of communication. It proceeds into the process of designing an appropriate plan of intervention. Collaborative efforts are needed to: (1) provide an environment in which every child is expected to communicate, (2) supply the opportunities for children to communicate, and (3) support low incidence communication means and functions through adult and child interactions (Orellove & Sobsey, 1991).

Recommendations for Teacher Training

The findings from this investigation indicate that preschool special education teachers, at least in this sample, were cognizant of communications used by the selected children. Their perceptions of those communications differed from those of the mothers of the children, as the teachers identified fewer behaviors as communicative, and recognized the functions attached to those communications differently from the mothers.

These results indicate that the participant teachers and mothers disagreed at a level which confounds their attempts to respond to the child with consistency. Training for preservice teachers requires they have knowledge about the communication development of children with and without disabilities. It is needed for all teachers. and is particularly pertinent for those preparing to work in early intervention, preschool, and school age programs. Preservice

teachers preparing to work with children who have severe, multiple disabilities of any age should know direct teaching techniques for increasing nonsymbolic communications. They should also possess a knowledge of research-based classroom activities which are known to improve children's communications. Knowledge of the various techniques must be combined with opportunities to learn from teachers in the field of special education who have integrated communication interventions into their daily instructional activities.

The team meetings which produced the IEPs reviewed in this study appeared to be multidisciplinary team decision making; this model involves members of various professions, each of whom examines a child, reports assessment data, makes recommendations, and intervenes with the child on a scheduled basis. Therefore, each professional remains within a specialty area, and is responsible for that one aspect of the child's functioning. There are alternative models for team planning (Orellove & Sobsey, 1991). Teams of parents and school personnel involved in planning Individualized Education Plans need to consider various models and develop a process through which the communication development of children who have severe disabilities can be collaboratively addressed and plans developed with contain measurable attainable goals, and provide for home/school agreement on interventions.

Teachers who are training to become part of the ever-changing world of special education must be prepared to work with persons trained in other areas of child development. Special education teachers have a key role in the IEP

process, and need to assume a collaborative, leadership role throughout their careers. Teachers must understand how to make IEP meetings valuable for the child, encourage information sharing, and meld the expertise of parents and others.

Teacher training can address the issue of how to plan interventions when low levels of agreement are found in the perceptions of a child's communications by families in their homes and the service providers in the school. In particular, understanding the communications of children who have severe, multiple disabilities requires time and consistent interactions between school personnel and families. Teachers must be able to solicit information from children's primary caregivers, listen to the answers, and value their contributions. Without these important interpersonal skills, teachers may find themselves in isolated settings, seen as providing care, not instruction, and find limited satisfaction in their teaching positions.

In the context of this research, it is evident that the challenge facing the beginning teacher is to extend what is done for improving children's communications. New teachers will be expected to: (1) develop a communicatively rich classroom environment; (2) plan for child communication development; and (3) develop opportunities for communication among all children with focus on the less capable communicators, with the support of others who are more capable.

Implications recommended for teacher-trainers are: (1) impart to preservice teachers the results of classroom-based

research on practices which have been found effective for children with severe disabilities; (2) teach methods to assess, recognize, and support child communications; (3) provide experiences with inservice teachers who model the skills needed to support children's communications; and (4) teach preservice teachers how adult perceptions can interfere with proactive support and instruction that develops children's communication.

A final recommendation for inservice and preservice teacher trainers is continuing education courses focused on improved professional practices. The response data from the participating teachers, though limited, imply a lack of teacher emphasis on communication training for children who have severe, multiple disabilities. Special education teachers, regardless of the number of years in the field, need to remain current with effective teaching practices. The continuing developments in assessment and classroom interventions which have potential for increasing the communicative competence of children who have severe, multiple disabilities, must be practiced in the field.

Recommendations for Future Research

The responses on the Student Descriptor Scale II by special education teachers who contributed to this study were used to select the children of interest. The SDSII was found to be an appropriate screening device, as it contained the characteristics used to describe children who have severe, multiple disabilities. Individuals familiar with the children were able to rate the level at which the specific child functioned, and the scale could be completed in a short

amount of time. The SDS II was effective in identifying the children of interest in this study, and could be used to find children with comparable skill levels in future investigations.

The Student Descriptor Scale II provided an appropriate screening device and provided useful descriptions of the functional skill levels of children who have severe, multiple disabilities. It is recommended that in the future, studies which focus on this population consider this instrument as a means by which one can identify children who have severe multiple disabilities at moderate to profound levels of functioning. Investigators may find it necessary to further refine the scale as it is not a standardized instrument.

The tools and techniques used to assess children's communicative means and functions to establish a level of communicative competence of children who have severe, multiple disabilities came from applied settings (Schuler, et al, 1989; Chen 1995), and proved to be adequate for this study.

The data collected in the responses of the children's communication partners found that mothers and teachers did not consistently agree upon the communicative means and functions of these children. Although this study did not directly investigate the interactions between the participants and the children, future research addressing these interactions should be conducted. Interviews of primary caretakers and teachers, combined with observations of the their interactions with the children of interest would more effectively examine the relationship between perceptions

held by significant adults, and the responses they make to child communications.

Communication assessments for this population require a team effort; primary caregivers, special education preschool teachers, and other possible communicative partners, i.e., peers, paraprofessionals, teacher assistants, speech therapists, and speech/language pathologists should be involved. Developing a communication profile is one way to describe a child's level of functioning, as it can provide a starting point for planning appropriate strategies. Effective communication intervention can only be accomplished with the involvement of mothers, special education teachers and other individuals in the child's milieu who have shared knowledge of that child's communicative competence.

Longitudinal studies of the long-term impact of interventions on the communications of children who have severe, multiple disabilities are missing from the current literature. Short-term interventions which were directed toward the caregivers of children with mild to moderate disabilities have changed the ways in which they responded to child communications. Focus on increasing or altering the behaviors of adult communication partners of children with disabilities have proven to be effective in increasing adult support for child communications (Brown-Gorton & Wolery, 1988; Mahoney & Powell, 1988). Continued research in applied settings may perhaps produce data to support the effectiveness of new interventions, and support the critical nature of early adult-child interactions with children who have severe, multiple disabilities.

Future studies designed to investigate interventions should explore communication training which would be effective with young children who have severe, multiple disabilities. Studies could focus on the relationship between a child's age, disabilities, and communicative competence levels. Interventions should be continued and evaluated over time to determine their effectiveness for increasing a child's communicative means and functions. Studies could explore the results found when efforts are directed toward generalization of a communication skill from one setting to another (home and school).

Challenging child behaviors may be a result of earlier, thwarted, more appropriate communication efforts of some children who have severe disabilities. These behaviors are usually negative (behavior regulating) communications which have proved to be effective for the child, as the behaviors elicit the desired responses from others in the environment, and have developed over time.

Similarly, children whose communications generate inconsistent or infrequent responses from others in the environment their communicative behaviors may be extinguished. For example, two mothers in this study described their children as "shutting down" when the child was bored or uninterested; teachers perceived this nonresponsive behavior as a medical problem (too much medication), and reportedly did not attempt to engage the child in classroom activities. The nonawake, nonalert behaviors seen in individuals with profound disabilities have been reported in a recent series of behavioral state studies (Green, Gardner,

Canipe, & Reid, 1994; Guess, Mulligan-Ault, Roberts, Struth, Siegel-Causey, Thompson, Bronicki, & Guy, 1988). This line of research was limited to the recording of behavior states and appears to have limited application to the study of effective communication interventions. As Green, Gardner, Canipe, & Reid (1994) pointed out, interventions should not be withheld from individuals who appear to be in a nonalert biobehavioral state. Their study of women (ages 22 to 29 years) with profound, multiple disabilities living in a residential setting, indicated that alertness actually increased during training sessions, regardless of the individual's biobehavioral state when the session began. An appropriate special education classroom strategy would be to engage the children in activities, track and document the children's responses, and make decisions based on each child's progress. Children who are engaged with others around them may reject sleep and participate activity.

Challenging behaviors and low incidence behaviors of children who have severe, multiple disabilities are areas for further investigation. Implementation of appropriate and consistent adult responses to the communications of children who have severe, multiple disabilities may serve to impede the future development of socially unacceptable communication behaviors, and/or circumvent the eventual extinction of some children's communicative efforts.

Summary

In most circumstances, mothers are the primary partners for infant interactions. Infants who have severe, multiple disabilities are often deprived of those opportunities by the

circumstances surrounding their birth. Their frequent life-threatening medical problems; the limited contact allowed with a single primary caregiver, and severe neurological insults impact their first interactions with others, and often result in a continuing pattern of disrupted communication development.

Children who have severe disabilities develop communication skills slowly, and they do not achieve the same developmental levels as other children of the same chronological age. However, all children, regardless of the severity of their disabilities, can communicate with others. The primary responsibility for maintaining their communications and supporting each child's efforts remains with the primary caregivers, members of the family, child peers, and service providers.

This study elicited some of the perceptions held by mothers and preschool special education teachers surrounding the communications of young children who have severe, multiple disabilities. Results of the study indicate that two adults who were knowledgeable about a selected child's functioning in many areas, did not agree at more than a chance level on the behaviors recognized as communications. These varying degrees of agreement seemed to be related to the perceptions participants held of the child. Further studies of the perceptions of other adult pairs in different locations may support these findings.

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Appendix A

Permission Forms

Agency/School Consent Form

University of Oklahoma, Norman Campus

Permission to Conduct a Research Project

Agency/School _____

Administrator _____ Date _____

I understand that this study, "Primary Caregiver and Direct Service Provider Perceptions of the Communicative Competence of Young Children with Significant Disabilities" is sponsored by the University of Oklahoma, Norman Campus, Educational Psychology Department, Special Education Program. It is directed by an doctoral advisory committee (Kathryn Haring, Ph.D, Chairperson), and the primary investigator, June Maddox, ABD. This document serves as permission to conduct this research project in the following location(s)

The purpose of the research is to find out how children with significant disabilities served in this program communicate wants and needs to staff. The information obtained be used to help document the ways in which children with significant disabilities communicate when they do not develop spoken language. Primary caregivers (parents) and one special education teacher will be contacted and asked to:

1. sign a written consent to participate form
2. complete an information form
3. complete the Student Descriptor Scale II
4. complete the Initial Communication Survey
5. participate in a short interview about the identified child's communication development. The study will require approximately one hour of each participant's time on two

separate occasions. The principal investigator will meet at the convenience of the participant, and will not disrupt employees in the conduct of their duties.

Agency participation in this study is limited to the initial contact with the parent, and the voluntary participation of direct service staff. This study holds no known risks to participants in the study, nor is there any special benefit. There is no compensation for participating. Agency participation in this study is voluntary and may be withdrawn at any time. All records of the study will be kept confidential. The agency will not be named, the program location will not be identified and the names of the participants will not appear in any reports or publications about the study. Other data collected in this study may be used in publications or presentations concerning this project. The names of study participants, and the children they serve will never be released in publications or presentations.

If I have any questions about this study, I will contact June Maddox, ABD at (405) 721-5271, or Kathryn Haring, Ph.D at (405) 325-6542. If there are questions about this research, the OU Office of Research will be contacted.

I have read this consent document. I understand its contents and I permit participation in this study under the conditions described here. I will receive a copy of this consent form.

Agency Representative's

Name: _____ Date _____

Researcher _____ Date _____

Special Education Teacher Informed Consent
University of Oklahoma, Norman Campus

Consent To Voluntary Participation in a Research Project

I understand that this study, "Primary Caregiver and Direct Service Provider Perceptions of the Communicative Competence of Young Children with Significant Disabilities" is sponsored by the University of Oklahoma, Norman Campus, Educational Psychology Department, Special Education Program. It is directed by an doctoral advisory committee (Kathryn Haring, Ph.D, Chairperson), and the primary investigator, June Maddox, ABD. This document serves as consent to participate in this research project.

The purpose of the research is to find out how a child for whom I provide direct service communicates his wants and needs to me and to primary caregivers. The information I give will be used to help document the ways in which children with significant disabilities communicate when they do not develop spoken language. As a direct service provider, I will be asked to:

1. complete an information form
2. complete the Student Descriptor Scale II
3. complete the Initial Communication Survey
4. participate in a short interview about the identified child's communication development. The study will require approximately one hour of my time on two separate occasions. Ms. Maddox will meet with me at my convenience.

I understand that participation in this study holds no known risks to me or the child, nor is there any special

benefit. There is no compensation for my participation. My participation in this study is voluntary and I may withdraw at any time, if I wish. I understand that records of the study will be kept confidential. I will not be identified by name, and the name of the child and the program location will not appear in any reports or publications about the study. I understand that data collected in this study may be used in publications or presentations concerning this project. I also understand that names of study participants will never be released in publications or presentations.

If I have any questions about this study, I will contact June Maddox, ABD at (405) 721-5271, or Kathryn Haring, Ph.D at (405) 325-6542. If I have questions about my rights as a research subject, I will contact the OU Office of Research.

I have read this consent document. I understand its contents and I freely consent to participate in this study under the conditions described here. I will receive a copy of this consent form.

Research Participant's

Name: _____ Date _____

Researcher _____ Date _____

Primary Caregiver Informed Consent
University of Oklahoma, Norman Campus
Consent To Voluntary Participation in a Research Project

I understand that this study, "Primary Caregiver and Direct Service Provider Perceptions of the Communicative Competence of Young Children with Significant Disabilities" is sponsored by the University of Oklahoma, Norman Campus, Educational Psychology Department, Special Education Program. It is directed by an doctoral advisory committee (Kathryn Haring, Ph.D, Chairperson), and the primary investigator, June Maddox, ABD. This document serves as consent to participate in this research project.

The purpose of the research is to find out how my child communicates his wants and needs to me and to direct service providers. The information I give will be used to help document the ways in which children with significant disabilities communicate when they do not develop spoken language. The researcher will also obtain the same information from one of my child's direct service providers. The direct service provider and I will be asked to:

1. complete an information form
2. complete the Student Descriptor Scale II
3. complete an Initial Communication Survey
4. participate in a short interview about my child's communication development. The study will require approximately one hour of my time on two separate occasions. Ms. Maddox will meet with me at my convenience.

I will sign a school/agency release form so June Maddox, the principal investigator can review my child's records. I understand that Ms. Maddox will look at the following

information: date of birth, sex, ethnic origin; communication levels assessed in the most recent evaluation; and the communication goals/ objectives from my child's Individualized Education Program (IEP) The review will be limited to Individualized Family Service Plan(s) and Individualized Education Plan(s) in my child's cumulative folder.

I understand that participation in this study holds no known risks to me or my child, nor is there any special benefit. There is no compensation for my participation. My participation in this study is voluntary and I may withdraw at any time, if I wish. I understand that records of the study will be kept confidential. I will not be identified by name, and the name of my child and the program location will not appear in any reports or publications about the study. I understand that data collected in this study may be used in publications or presentations concerning this project. I also understand that names of study participants will never be released in publications or presentations.

If I have any questions about this study, I will contact June Maddox at (405) 721-5271, or Kathryn Haring, Ph.D at (405) 325-6542. If I have questions about my rights as a research subject, I will contact the OU Office of Research.

I have read this consent document. I understand its contents and I freely consent to participate in this study under the conditions described here. I will receive a copy of this consent form.

Participant's Name: _____ Date _____

Researcher _____ Date _____

Appendix B

Instruments

STUDENT DESCRIPTOR SCALE MANUAL II

Kathryn Haring

June Maddox

July, 1996

The Student Descriptor Scale II Manual

The Student Descriptor Scale II (SDS II) is a modification of the Student Descriptor Scale developed by Goetz, Haring, and Gee (1991). The original scale was developed to describe the population of students with the most severe disabilities. The SDS II consists of nine characteristics: intellectual disability, health impairment, physical difficulties with food ingestion, unable to walk, limited control over upper body movement, communication disorder, environmental responsiveness, sensory impairment, and behavior disorder. Based upon the rater's knowledge of the child, each characteristic is checked as present or absent. Those characteristics that are present are rated on a 1- 6 Likert scale according to the degree of the characteristic, with 1 = moderate and 6 = profound. Four standardized questions are asked to further define some characteristics.

Raters are asked to use their best judgment in assigning the degree of severity, based on their personal experiences.

Student Descriptor Scale II

Date_____

Rater's Name_____ Relationship to Child_____

Child's Name_____ Date of Birth_____

Please check all of the characteristics that apply to this child. For each item checked, circle the number that indicates the degree of his/her disability.

1 = a moderate disability, with 6 = a profound disability

Mod. Prof.

- ___ 1 2 3 4 5 6 (a) intellectually disabled
- ___ 1 2 3 4 5 6 (b) presence of a health condition requiring care/attention during the day, such as a gastrostomy tube, seizures (medications or management), catheter, suctioning, etc.
- ___ 1 2 3 4 5 6 (c) physical difficulties with food ingestion.
- ___ 1 2 3 4 5 6 (d) unable to walk (may use a walker or wheel chair). Has limited control over upper body movement.
- ___ 1 2 3 4 5 6 (e) communication disorder.
- ___ 1 2 3 4 5 6 (f) dependence in performing self-care routines.
- ___ 1 2 3 4 5 6 (g) impairment in responding to environmental stimuli (such as sound, movement, light).
- ___ 1 2 3 4 5 6 (h) sensory impairment (vision or hearing problems; may wear glasses or hearing aids).
- ___ 1 2 3 4 5 6 (i) behavior disorder (has behavior problems which require systematic intervention techniques for their reduction). 2

SDS II Questions

Please answer the following questions.

1) Does this child have a health condition? Briefly list all health problems such as seizures, feeding problems, breathing difficulties, etc.

2) Briefly describe how this child's feeding/toileting needs are met.

3) Does this child have a documented vision or hearing problem? Please describe it.

4) Does this child have any behavior problems that require systematic intervention techniques?

Demographic Data Form

Date _____

1. Participant's Name _____ M F

2. Participant's Age _____

3. Child's name _____ 4. Child's Birth Date _____

5. Diagnosis _____

6. What is your relationship to this child? (Check One)

___ parent

___ teacher

___ grandparent

___ foster parent

___ step parent

___ other(please specify)

7. How long have you known/worked with this child?

___ less than 6 months

___ less than 1 year

___ 1 to 2 years

___ 2 to 4 years

___ all of his/her life

8. Approximately when was the latest IEP written? _____

9. If you are the special education teacher, please complete the following:

a. How many years have you taught children with significant disabilities? _____

b. How long have you been certified? _____

c. How long have you been in your current position? _____

d. How much time do you spend working with this child?

daily _____ weekly _____

INITIAL COMMUNICATION SURVEY

Children with significant disabilities communicate in many different ways. Some use words, other use sounds, movements and facial expressions to tell us what they want and need. Please review the following list of communicative behaviors. Check each behavior the identified child uses to communicate. Please check only those behaviors that serve as communications. and write in the meaning of each behavior. The last page of this survey may be of help, as it lists some possible child communications. Please list every meaning, even if it is not on the list

BEHAVIORS

MEANINGS

EXAMPLE:

a. Follows toy with eyes Wants toy to play with

A. VOCALIZATIONS/NOISES

- 1. Voice _____
- 2. Hums or sings _____
- 3. Cry _____
- 4. Mouth noises _____
- 5. Other noises _____

B. HEAD MOVEMENT

- 6. Turns head away _____
- 7. Raises or lowers head _____
- 8. Shakes head yes/no _____
- 9. Turns to look _____
- 10. Bangs head _____
- 11. Other head moves _____

C. MOUTH AND FACE MOVEMENTS

- 12. Clenching teeth _____
- 13. Grinding teeth _____
- 14. Thrusts tongue _____

- ___ 15. Spits out food or drink _____
- ___ 16. Bites self/other _____
- ___ 17. Sucks, chews or smacks _____
- ___ 18. Grimace _____
- ___ 19. Frown _____
- ___ 20. Smile _____
- ___ 21. Other mouth or face movement _____

D. EYES

- ___ 22. Looks at you _____
- ___ 23. Looks at another adult _____
- ___ 24. Looks at brother or sister _____
- ___ 25. Looks at another child _____
- ___ 26. Looks at food or drink _____
- ___ 27. Looks at toy or object _____
- ___ 28. Closes eyes (not sleeping
or seizuring) _____
- ___ 29. Follows desired object, food,
person, etc. with eyes _____
- ___ 30. Looks away (averts eyes) _____
- ___ 31. Other eye movement _____

E. HANDS, LEGS AND ARMS

- ___ 32. Pushes/pulls another _____
- ___ 33. Scratches _____
- ___ 34. Grabs/reaches _____
- ___ 35. Points arm, hand or leg _____
- ___ 36. Waves arm _____
- ___ 37. Swipes arm _____
- ___ 38. Fists hands _____

- ___ 39. Hits self or other _____
- ___ 40. Touches the face of someone else _____
- ___ 41. Throws objects _____
- ___ 42. Holds up arms _____
- ___ 43. Sign language. Please specify the signs he or she uses (if less than 5) _____
- ___ 44. Uses objects or communication board _____
- ___ 45. Uses a switch or communicator (please specify the name or type used) _____
- ___ 46. Kicks/stomps _____
- ___ 47. Uses leg as pointer _____
- ___ 48. Other hand, leg, or arm movement _____

G. GENERAL BODY MOVEMENT

- ___ 49. Quiet, alert, not sleeping _____
- ___ 50. Moves whole body (not a seizure) _____
- ___ 51. Tenses muscles _____
- ___ 52. Moves to be near someone _____
- ___ 53. Reaches for object, but does not look at it _____
- ___ 54. Stops all movement _____
- ___ 55. Pretends or pantomimes activity _____
- ___ 56. Please check here if there are any other behaviors this child uses to communicate. Please list the behaviors and explain their meaning(s) _____

Use the back of the page as needed.

=====

Date Survey Completed _____ Name of Child _____

_____ DOB _____

Name of person completing survey _____

Relationship to child: Caregiver _____

Special Education Teacher _____

POSSIBLE COMMUNICATIONS

Hunger	Come here	Go to
Ice cream (or any special food)		Special person
greeting		
Stranger greeting	Angry	Bring
Give	Thirsty	Goodbye
Play with me	Want	Tickle me
I love you	Don't like	Want drink
Open	Go home	Go school
Go bus	Sleepy	Peek-a-boo
Bye Bye	Go to toilet	Unhappy
Full (of food)	Sick	Hot
Cold	Move me	Stop
Don't want	Hello	I see
Go bye bye	Scared	Done
Enjoy	Hurt	Go away
Happy	Where is (person, object)?	
Tired	More	Mad
Go out	Protest	Change diaper
Not that	Hi	Want food
Yes	My turn	Swing
Excited	Turn on (music, TV, etc.)	
No	Turn off (TV, music, etc.)	

Modified Structured Interview (MSI)

Prior to asking questions, ensure the interviewee is clear about the meaning of the terms "communicative behaviors" and "communicative functions." Ask questions to find if the context described is applicable to the child, and if so, which behaviors would be demonstrated in this context. The interviewer may rephrase the question(s) so that only a yes or no answer is required, but one of the specific behaviors is to be used, i.e., "Does S bite him/herself when you take away something s/he wants."

1. Requests for affection or interaction: What if S wants?
 - adult to sit near?
 - peer to sit near?
 - to be held?
 - to be soothed/rocked/patted?

2. Requests for adult action: What if S wants
 - someone to play with him/her?
 - to go to school?
 - a radio, tape player or TV turned on?
 - be picked up?
 - to go home?

3. Requests for object, food or things: What if S wants
 - to eat?
 - a certain food, like ice cream?
 - a drink?
 - more food/drink?

4. Protest: What if
 - a common routine is dropped?
 - favorite toy/food is taken away?
 - adult terminates action?
 - required to do something doesn't want to do?

5. Declaration/Comment: What if S wants
to show you something?
you to look at something?

6. Refusal: What if S doesn't want to
eat the food offered?
be placed in a chair/bed/stroller?
take medication?

7. Reject: What if
you offer an object that S does not want?
S does not like someone?

8. Request Permission: What if S wants
permission from you to eat a cookie when told to wait?

9. Greet: How does S greet
favorite people?
strangers?
other children?

10. Show off: What does S do to make others
laugh?

11. Call: How does S get attention from
caregiver?
direct service provider?
other children?
other adults?
pets?
12. Request information: How does S ask
where someone is?
where something is?
when lunch/mealtime is?
13. Expression/intonations: How does S show
confusion?
frightened?
excitement?
frustration?
unhappy?
anger?
14. Other communication behaviors and the function of each.

Individualized Education Program Checklist

Date _____

Child _____ Date of IEP _____

IEP Goal/Objective	Mean	Function	Level
--------------------	------	----------	-------

1.

2.

3.

Appendix C

Definitions

Definitions

Caregiver

The terms mother, caretaker, caregiver, and parent are used interchangeably in the literature, but all terms signify the individual who is chiefly responsible for the child's care.

Children with Severe Multiple Disabilities

Children with severe multiple disabilities constitute a small population of individuals who have severe mental retardation combined with profound physical impairments (Reid, Phillips, & Green, 1991). Although other terms are used to describe this level of disability, i.e. profound, the phrase, severe multiple disability is used in this proposal. Children with severe multiple disabilities are those who: (a) are untestable on intelligence tests because they cannot perform the tasks required; (b) exhibit obvious signs of very serious neuromuscular dysfunction (severe spasticity, lack of muscle tone); (c) are nonambulatory and have little or no control over their movements; (d) have minimal or no physical potential to allow for independence in performing self-care routines; (e) have frequent medical complications relating to, for example seizure disorders; and (f) have physical difficulties with food ingestion. These individuals are totally dependent on caregivers for their survival (Reid et al., 1991).

Communication

Any act by which one person gives to or receives from another person information about that person's needs, desires, perceptions, knowledge or affective states.

Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or nonlinguistic forms and may occur through spoken or other modes (National Joint Committee for the Communicative Needs of Persons with Severe Disabilities, 1992, p.2).

Communicative Competence

The ability to affect the behavior of another person: the person understands the communication, and responds to the message in a manner that results in the outcome desired by the communicator (Dunst & Lowe, 1986).

Communicative Function

The message. The purpose of the communicative behavior (communicative mean).

Communicative Means

The behaviors used to send a message to another. They may be verbal or nonverbal, sign language, augmentative device, etc.

Dandy-Walker Syndrome

Dandy-Walker syndrome is a congenital brain malformation involving the fourth ventricle and cerebellum. It is defined as an enlargement of the fourth ventricle, an absence (partial or complete) of the cerebellar vermis (the narrow middle area between the two cerebral hemispheres), and cyst formation in the posterior fossa (the internal base of the skull). Hydrocephalus may also be present. Symptoms which often occur in early infancy include slow motor development and progressive macrocrania (National Institutes of Health, May, 1996).

Klonopin and Depakote

Brand names of medications used for seizure control.

Lissencephaly

Lissencephaly is a malformation of the brain in which the brain surface is smooth rather than convoluted. The word comes from the Greek words "lissos" which means smooth and "enkephalos" which means brain. It is usually diagnosed based on the interpretation of either a CT or MRI scan of the brain. It is caused by any of the following: (1) viral infection of baby during the first trimester, (2) insufficient blood supply to the brain in the first trimester, (3) genetic disorder with recessive inheritance, and (4) damage or mutation to a specific genetic region, chromosome 17 (Dobyns, 1996).

Nonsymbolic Communication

The transmission of a message without the use of symbols, i.e., words, signs, graphics. Body movements, facial expression, eyegaze, vocal sound, etc. may be used to convey a nonsymbolic message. The term nonsymbolic is used rather than presymbolic or prelinguistic, since these latter terms imply a later development of symbolic communication (Siegel-Causey & Downing, 1987).

Appendix D

IEP Communication Statements

Individualized Education Program Communication Statements

Children are listed by participant-pair number. The IEP statements were copied verbatim. Spelling, symbols, punctuation, and capitalization reflect those used in the original documents. Three changes were used, none of which altered the context of the statements: (1) for purposes of confidentiality, the names of the children were replaced by "child," and (2) the format was standardized for ease in reading, and (3) all letters and words added by the investigator are underlined. Each statement is followed by the means and/or function code number or letter. All codes were assigned by the investigator.

Child #1.

- A. Child will demonstrate a variety of vocalizations
- B. will vocally interact with caregiver an average of at least 8 times per 10 min session
- C. will vocalize to demonstrate the desire for more of an activity an average of at least 8 times per 10 min session
- D. will use appropriate behaviors to demonstrate understanding of an increased number of words and phrases.

Child #2.

- A. Child will maintain current levels of performance in communication.
- B. Strengths shows pleasure and discomfort
- C. Weaknesses lang/communication

Child 3.

- A. weakness communication development 3 - 6 mo
- B. when presented with two toys or items & request (sic) to make a choice, Child will activate a variety of switches to make his wants known w/80% success
- C. when provided with stimulation (visual, auditory, tactile) & encouraged to vocalize, Child will increase the number of vocalization (sic) he makes in order to make his needs & wants known with 80% success.

Child # 4.

- A. communication skill 2 mo level
- B. Goal IV To improve communication skills
 - 1. when provided with the appropriate stimuli, Child will turn eyes & head toward sound 4 out of 5 trials
 - 2. Child will be able to show facial expressions and/or vocalize when activating a switch with 80% success
 - 3. speech consult model

Child # 5.

- A. communication 3.5 mo level
- B. Goal II to improve communication skills
 - 1. Child will be able to respond to sounds by vocalizing using body movements &/or facial expressions with 80% success

2. when activating a switch to get a response, Child will be able to show facial expression & vocalize with 80% success.

C. Child will be monitored in her pre-school class with her pre-school teacher to discuss her speech/language development

Child #6.

A. Develop 2 imitative behaviors: ex hitting drum w/hand clapping touching nose moving feet, other finger plays

Child # 7.

A. Improve communication skills

1. child will activate a switch with assistance to initiate a response from a desired object 50% of the time

2. Child will call attention to himself by utilizing vocalizations and or gestures 50% of time.

3. Child will respond to social greetings and simple commands 50% of the time by either waving hi/bye, raise hands, clap hands or babbling.

Appendix E

Response Coding

ICS & MSI Coding Process

1. Find the Case# and place on each coding sheet. Assign yourself a coder#, using any single digit except #1.
2. Coding ICS
 - a. From the completed ICS forms, extract three coding sheets;
 - (1) for the PC,
 - (2) the SET, and
 - (3) make a combined ICS (write Combined on an ICS Coding Sheet).
 - b. Use ICS Coding Key to assign numbers for each communication behavior checked by the participant. Descriptions can be found on the sheets titled, "Communication Means Defined."
 - c. Assign a meaning (function) code letter for each communication behavior checked by a participant. Use an MSI coding key.
 - d. Fill in the Combined ICS sheet with the answers from both PC and SET ICS Coding Sheets.
3. Coding MSI
 - a. From the MSI forms, extract three coding sheets;
 - (1) for the PC,
 - (2) SET, and
 - (3) make a combined MSI (write Combined on an MSI Coding Sheet).
 - b. Use a check mark (✓) for each reported meaning. Letters which designate meanings are listed on the MSI form. Examples are listed on the coding key.
 - c. Use ICS Coding Key to assign numbers for each

communication behavior reported by the participant. Descriptions can be found on the sheets titled, "Communication Means Defined"

d. If more than one behavior is listed for a meaning, enter all behaviors under one check mark (√) (i.e., **H** meaning may be perceived when the child uses behaviors **8, 3. & 6.** May be dependent upon context).

e. Fill in the Combined MSI sheet with the answers from both PC and SET MSI Coding Sheets.

4. Scoring

a. On each combined ICS and MSI form, mark a plus (+) when the PC and the SET agree on a behavior or a meaning. Use a minus sign (-) when the PC and SET do not agree upon a behavior or a meaning.

b. At the bottom of each combined ICS and MSI form, count the

- (1) number of responses,
- (2) number of agreements (calculate %) between the PC and the SET on behaviors,
- (3) number of disagreements (calculate %) between the PC and the SET on behaviors,
- (4) number of agreements (calculate %) between the PC and SET on meanings, and
- (5) the number of times the PC and the SET agreed on both the behavior and meaning on a single item. These are shared perceptions.

INITIAL COMMUNICATION SURVEY
CODING KEY

Means	Code Number	
<u>A. VOCALIZATIONS/NOISES</u>		
1. Uses voice	8	look also for intonation #33
2. Hums or sings	8	look also for intonation #33
3. Cry	8	
4. Mouth noises	8	
5. Other noises	8	
B. HEAD MOVEMENT		
6. Turns head away	18	
7. Raises or lowers head	19	
8. Shakes head yes/no	12	
9. Turns to look	3	
10. Head bang	1	
11. Other head moves	34	
C. MOUTH AND FACE MOVEMENTS		
12. Clenching teeth	21	
13. Grinding teeth	21	
14. Thrusts tongue	22	
15. Spits out food/drink	23	place vomiting under #1 aggression
16. Bites self/other	1	
17. Sucks, chews or smacks	8	
18. Grimace	11	
19. Frown	11	
20. Smile	11	
21. Other mouth		

Means	Code Number	
or face movement	34	
<u>D. EYES</u>		
22.Looks at you	9	
23.Looks at another adult	9	
24.Looks at brother or sister	9	
25.Looks at another child	9	
26.Looks at food or drink	9	
27.Looks at toy or object	9	
28.Closes eyes (not sleeping or seizuring)	24	
29.Follows desired object, food, person, etc. with eyes	26	
30.Looks away (averts eyes)	26	
31.Other eye movement	34	
<u>E. HANDS, LEGS AND ARMS</u>		
32.Pushes/pulls another	4	if meaning is aggressive code #1
33.Scratches	1	if nonaggressive, code #8
34.Grabs/reaches	6	
35.Points arm, hand or leg	10	
36.Waves arm	27	
37.Swipes arm	28	if meaning is aggressive code #1
38.Fists hands	10	
39.Hits self or other	1	
	191	

Means	Code Number	
40.Touches the face of someone else	5	if meaning is aggressive code #1
41.Throws objects	1	if meaning is not aggressive code #6
42.Holds up arms	17	
43.Sign language	13	
44.Uses objects or communication board	32	
45. Uses a switch or communicator	29	
46.Kicks/stomps	30	if meaning is aggressive code #1
47.Uses leg as pointer	31	
48.Other hand, leg,or arm movement	34	
<u>G. GENERAL BODY MOVEMENT</u>		
49.Quiet, alert, not asleep	3	
50.Moving whole body (not a seizure)	14	
51.Tenses muscles	15	
52.Moves to be near someone	2	
53.Reaches for object, but does not look at it	20	
54.Stops all movement	16	

Means	Code Number
55.Pretends or pantomimes activity	7
56.Other behaviors used to communicate.	34

List any means coded #34 on the ICS or MSI coding sheet.

COMMUNICATION MEANS DEFINED

CODE	MEAN	DESCRIPTION OF BEHAVIOR
1.	<u>aggression</u>	Scratches, bites, hits, or spits at adult. Throws or destroys objects. Bites, pinches, hits self.
2.	<u>proximity</u>	Moves near to person, location, or objects. Goes to door to request to go outside.
3.	<u>passive gaze</u>	In the context of a request, passive gaze often occurs in conjunction with proximity. the individual concerned positions close to a person or object of interest and stares. Passive gaze does not mean looking without purpose; it must be communicative.
4.	<u>pulling</u> <u>other's hands</u>	Directs an adult's hand to object. Touches or pulls on other's hands, clothes, or body.
5.	<u>touch/move</u> <u>other's face</u>	Touches or moves other's face to direct attention to wanted object or activity. May be an attention-getting behavior.

6. grabs/reaches Gets object and activates it or pushes it away to indicate interest or disinterest. Shows or touches an object to request attention or action. Extends hand to take an offered object.
7. enactment Communication through ritualized sequences of behavior. Memorization of sequences of behavior that have consistently preceded a particular event and the reenactment of those behaviors in anticipation of that particular outcome. The literalness of the behavior and the insistence on its reoccurrence in strictly the same fashion clearly address the fact that this behavior is presymbolic.
8. vocalizations
/noise Laugh, cries, sounds. Includes "raspberry" or other lip and mouth noises, i.e., suck, smack, bubble blowing, etc.
Bangs object on furniture to make noise.
9. active gaze Active use of gaze refers to attempts to direct and redirect the attention of others. Individual will typically shift his or her gaze back and forth between the desired object and the person to whom the request is directed.

10. gestures
/points Not recognized as "formal" signing.
11. facial
expression Includes smiles, frowns, grimaces.
12. shakes "no"
nods "yes" Either head movement is coded here, even if child only uses one or the other.
13. one-word signs Any consistent sign is coded here.
Approximations (baby signs) are included
14. generalized
body movement Calms down and relaxes in response to being comforted. Moves excitedly in response to stimulation. Quiets or stills in response to sound in the environment.
15. muscle tone
change Tightens muscles, rocks, etc. as a request for being picked up, held, put down, etc.
16. pause Stops movement in anticipation that something is going to happen. Waits for adult to take turn.
17. orientation Looks toward or turns toward from person, object, or event
18. averts head Away from person, object, etc.
19. raises or
lowers head One or the other. Is not a 'yes" nod
20. turns head,
raises arm As in reflex (TNR)

21. clenches teeth
22. thrusts tongue
23. spits out
food/drink Purposeful behavior. If vomiting is the communicative behavior, code as aggression #1,
24. closes eyes
25. averts eyes Away from person or activity
26. tracks
object/person Follows object or person with eyes
27. waves hand as in "bye-bye" or "here"
28. swipes arm movement from body outward or a gathering movement across table or w/c tray. If the meaning is interpreted as aggression, code as #1.
29. uses electronic
signals or switches
30. kicks/stomps Not as aggression. May communicate excitement or anticipation. However, if the meaning is interpreted as aggressive, code as #1.
31. uses leg as
pointer As an alternative to hand or finger pointing.
32. uses objects or
communication board
33. intonation Changes in voice inflection which approximate intonations found in verbal questions and statements. Words are not

used. Code here only if the respondent perceives varying voice intonations which have unique communicative meanings, i.e., questions, exclamations, etc.

34. other*

Any behaviors reported by adult which are unique to the child, and which cannot be placed into existing codes.

*Keep a list of these responses.

ICS CODING SHEET

PAIR ___ CODER ___

___ PC ___ SET ___ COMBINED

PC SET PC SET PC SET PC SET

No	Mean	Mean +/-	Func	Func +/-	No.	Mean	Mean +/-	Func	Func +/-
1.					26.				
2.					27.				
3.					28.				
4.					29.				
5.					30.				
6.					31.				
7.					32.				
8.					33.				
9.					34.				
10.					35.				
11.					36.				
12.					37.				
13.					38.				
14.					39.				
15.					40.				
16.					41.				
17.					42.				
18.					43.				
19.					44.				
20.					45.				
21.					46.				
22.					47.				
23.					48.				
24.					49.				
25.					50.				

___ PC ___ SET ___ COMBINED

PC SET PC SET

No	Mean	Mean	+/-	Func	Func	+/-
51.						
52.						
53.						
54.						
55.						
56.						

Responses ___ n/c ___

Means ___ A ___ D

Functs ___ A ___ D

Mean & Function ___ A ___ D

MODIFIED STRUCTURED INTERVIEW

CODING KEY

Function	Examples
A. Requests for Affection or Interaction	snuggles to adult's chest while being held orients body towards an adult to get comfort, initiates, responds to pleasant social interactions
B. Requests for adult action	moves body back and forth to indicate "more" indicates need for adult assistance may include repositioning, changing diaper, move to different location, feeding time, etc.
C. Request for object, desired food or things	stares at or follows movement of object cries to be fed behavior signals "more" points to or holds out hand for object
D. Protest	throws or drops disliked object pushes adult hand away resists touch or activity cries in response to object being removed expresses dislike of person animal, activity or object does not like to be placed in or removed from bed, chair, stroller, etc.
E. Declaration/ comment	shows or gives toy to adult points or taps object as if to

	show
	uses naming intonation
F. Refusal	turns away from person to avoid interaction spits out unliked or unwanted food/drink pushes adult/peer hand away clamps teeth to prevent food or medicine being placed in mouth
G. Reject	throws/drops toy when finished turns away from stranger will not participate in activity doesn't want to go to bed, leave home
H. Request Permission	waits to eat cookie until permission is granted
I. Greet	smiles, waves, attends when adult or peer enters situation when entering a new or familiar situation, initiates contact with others in room. May wave, yell, smile, etc.
J. Show Off	makes a silly sound or laughs to elicit adult reaction repeats a behavior that elicits laughter from others
K. Call, get attention	tugs on adult to get attention vocalizes to get another's attention

	waves, makes noises, hits, knocks to get attention from others
L. Request Information	sounds, body movement, eye movement, questioning inflections; behaviors which may elicit answers to questions "are we going home?" "Is it time to play?"
M. Expression/Intonation	sound inflections which approximate the intonations found in speech.
N. Other	Any functions reported by participants which are unique to the child, and cannot be placed into existing codes

MSI CODING SHEET

PAIR ___ CODER ___

___ PC ___ SET ___ COMBINED

PC SET PC SET PC SET PC SET

No Mean Mean +/- Beh Beh +/- No. Mean Mean +/- Beh Beh +/-

No	Mean	Mean +/-	Beh	Beh +/-	No.	Mean	Mean +/-	Beh	Beh +/-
A.						I.			
B.						J.			
C.						K.			
D.						L.			
E.						M.			
F.						N.			
G.									
H.									

Responses ___ n/c ___
Means ___ A ___ D
Functions ___ A ___ D
Mean & Function ___ A ___ D
List #34 "other" on back

Matrix of Participant-Pair Shared Perceptions Pair__ Coder__

Means	Functions	A	B	C	D	E	F	G	H	I	J	K	L	M	Level
1															V
2															V
3															I
4															V
5															III
6															III
7															V
8															II/III
9															II
10															IV/V
11															II
12															II/IV
13															V
14															II
15															II
16															I
17															II
18															II
19															III
20															I
21															III
22															II
23															I
24															III
25															III
26															III
27															III
28															IV
29															III
30															IV
31															II
32															III
33															V
34															V

I = ICS M = MCI P = IEP Communicative Level Assigned__