DIMENSIONS OF COMMUNICATION IN THREE - AND FOUR - YEAR OLD CHILDREN'S PEER INTERACTIONS

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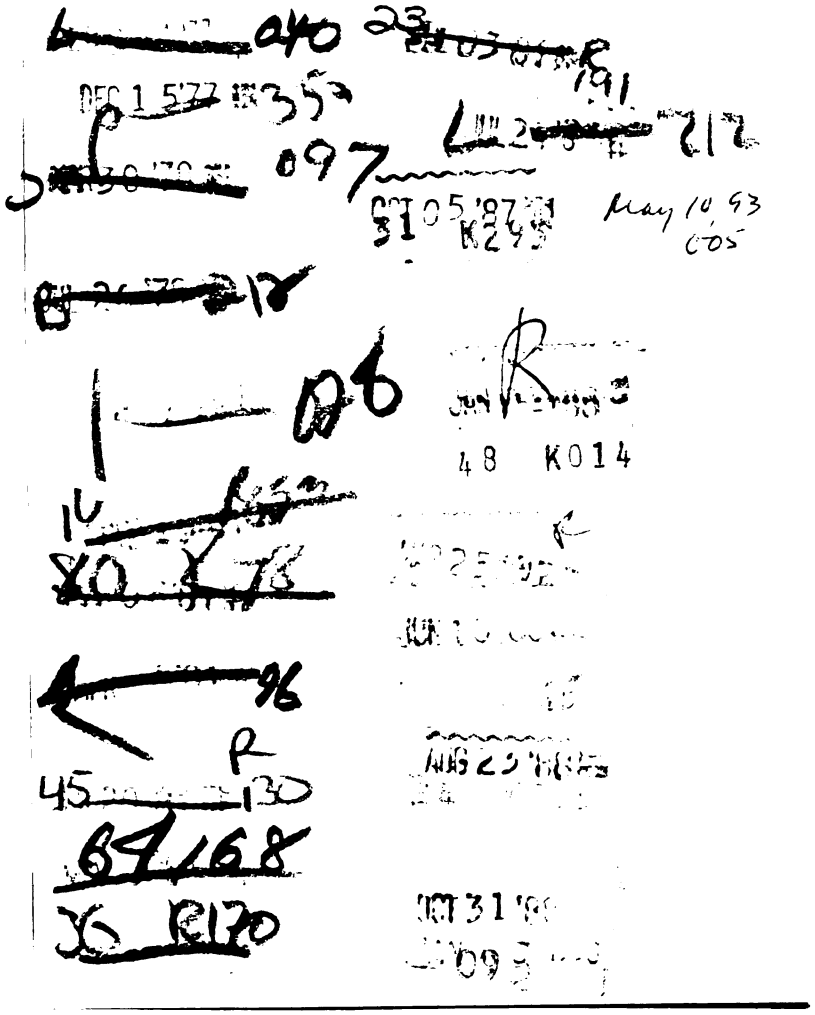
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ABSTRACT

DIMENSIONS OF COMMUNICATION IN THREE- AND FOUR-YEAR-OLD CHILDREN'S PEER INTERACTIONS

By

Mary Louise Pass Andrews

This study was designed to describe communication among three- and four-year-old children in a naturalistic peer interaction setting. An objective was to identify factors that are related to children's communicative competence and the differential incidence of communication in the play group. In so doing, the information transmission potential of young children's peer interactions was assessed.

A small group social-interaction methodology was used. The sample consisted of 139 three- and four-year-old children enrolled in eight urban day care centers. The children were randomly assigned to participate in play groups. Ten minutes of the children's play was video-taped and subsequently rated using a time-sampling observational procedure, the revised Observation of Socialization Behavior instrument (Boger, Cunningham, & Andrews, 1973). At 20 second intervals the first play behavior was characterized by 14 behavioral categories.

Communication was determined by an analysis of the actions and contingent reactions of children in the group. If a child's behavior produced a reciprocal response from at least one other peer, communication was said to have occurred. Communication was viewed as an element of the ecosystem that linked individual systems to each other and to the environment. A primary dimension of communication operationalized in this study was communicative competence, an attribute of the child system. It reflected the relative degree to which a child impacts on the social environment.

Analysis of variance and multiple regression analyses were implemented to explore the relationships between children's communicative competence scores and other dimensions of social interaction behavior and selected demographic characteristics. Communicative competence was found to be positively related to the relative proportion of the time that children initiated to others and the quality of their play involvement. Age and experience in group care were also significant predictors of communicative competence. The older and more experienced children exhibited higher communicative competence scores. Male children also had higher communicative competence scores than females. However, socioeconomic group membership, ethnicity, the number of children in the family or even the presence of siblings in the family were not related to differential communicative competence.

An analysis of the overall incidence of communication in the play groups revealed that much of children's play behavior was communicated to others. Communication occurred in 65% of all

time-sampled intervals. Even when behavior was not directed to other peers, it often communicated.

The probability of communication increased when behaviors were accompanied by a verbalization, when initiations were directed to individual peers rather than the generalized group or physical environment, and when behaviors were elicited with negative rather than neutral or positive affect. It appeared that these young children noticed dissonant or anti-social events rather than neutral or pro-social events, more so than would be expected by chance.

The generalizability of these findings to other social settings needs to be determined before implications can be drawn. However, a step has been taken, through this study, to objectively quantify an illusive element of children's social interactions--communication. It is hoped this and other methodological approaches can be used to further an understanding of the ontogeny and role of communication in human development.

DIMENSIONS OF COMMUNICATION IN THREE- AND FOUR-YEAR-OLD CHILDREN'S PEER INTERACTIONS

By

Mary Louise Pass Andrews

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A dissertation is but one of many products representing the pursuits of one's graduate program. But to me it is significant, in that it stands at the apex of a long and diverse path of professional development. Many people and events have contributed to shaping the course and perhaps the ultimate outcome of that experience. Looking back to analyze it is like trying to unravel the complexities of the socialization process, a phenomenon I am only beginning to understand and appreciate.

I have been fortunate in being able to pursue a breadth and depth of experiences and associations while studying at Michigan State University. It is to those friends, colleagues, and associates to whom I have made contact along the way that I offer my gratitude and blessings.

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CHAPTER I

INTRODUCTION

The child, as a social being, learns to behave in a manner that shows consideration of how one's behavior is interpreted by others. This "social" awareness or ability to understand (1) that one is responsible for and can regulate one's behavior, and (2) that one's behavior makes an impact on others who initiate reciprocal acts is a basic association learned early in a child's life. How the child then expresses this understanding in developing increasingly more complex and meaningful patterns of interacting with the social environment is a subject of interest to those studying the socialization process.

Studies of early parent-child interaction have substantially increased understanding of the inputs into this process from the family system. The pervasive nature of the substance and manner in which parents communicate to their children seems to mediate the child's cognitive, social, and emotional development (Hess & Shipman, 1965; Cunningham, 1972). But the child is also an active participant in this process. Earliest and expanding communication patterns influence the child's relationships with parents and the course of subsequent experiences with the social environment (Lewis & Rosenblum, 1974).

As one expands the sphere of one's interactions during childhood, new encounters provide necessary feedback about the utility of one's behavior in eliciting desirable responses from others. Thus the child builds a systematic perspective toward social exchange that is used in meeting new experiences, being generalized from one experience to another so that appropriate communication patterns can be differentially selected from a repertoire of possible lines of action. The level of the child's communication skill mediates the success of experiences in social interaction and thus colors social development.

Basically, the study of the ontogeny of communication skill has only recently attracted research interest. Parallel areas of inquiry into the social and language activity of children date back to the early 1930's. But each discipline studying these phenomena investigated different components of this more complex process; hence integration and comparability of data are lacking.

One of the major difficulties hindering research in communication has been the lack of adequate instrumentation to capture the holistic dimensions of what may be communicative behavior. Ethologists have begun to explore this problem by reducing complex behavior to basic units (Brazelton, Koslowski, & Main, 1974; Brannigan & Humphries, 1972; Smith & Connolly, 1972). Observational techniques have been developed to measure individual behavior and even dyadic interaction, but methods of describing communication among more than two individuals are not readily available in the literature.

Thus, the present study explores a specific methodological approach to assessing the impact of children's behavior on others in a play setting. Descriptive and comparative information derived from this study can make a contribution to understanding the social communication skill of young children and therefore the potential for information transmission among peers. Such data are necessary to identify the potentially complex social forces that influence children's social behavior and development.

Statement of the Problem

The primary purpose of this study is to describe communication among three- and four-year-old children in a naturalistic peer interaction setting. Two aspects of children's communication are investigated: (1) children's communicative competence and (2) modes of communicative exchange.

In the first instance, a communicative competence score is derived, which denotes the extent to which a child's behavior is received as communication by his peers. This variable represents the degree to which a child impacts on his environment and thus actively shapes his social experiences. The relationships between this variable and other social interaction variables and selected demographic characteristics of the children are explored.

A second focus of this study is on describing a cross-sectional representation of the communication flow that results from children's spontaneous play behavior. Modes of exchange are investigated to determine resultant differential incidences of communication.

Such an analysis of the information flow contributes to understanding children's attending and responding patterns during peer interaction.

Overview of the Study

The data for this study are part of the data collected for a larger study that investigated the relative effects of short-term supplemental parent and classroom programs on the self-concept and social involvement of children in day care settings (Boger & Andrews, 1975). The observational data collected from the larger project before the implementation of treatment conditions are used in this study.

A small group social interaction methodology is used. This methodology was developed by Boger and Cunningham (1969) to provide the setting in which to observe children's socialization behavior during spontaneous free play. Videotapes of children's play behavior are subsequently rated, using a time- and event-sampling observational procedure, The Observation of Socialization Behavior (OSB). Categories of both verbal and nonverbal behavior as well as the affective and play context of such behaviors are observed. This original observational procedure was adapted for the present study. The observational unit was redefined so that all categories of behavior refer to the same behavioral phenomenon. Also, a procedure was added to observe the consequence of actions on all members of the group, whether or not such individuals were the object of the interaction. By effecting these changes, the observational procedure

facilitates an analysis of the dimensions of communication of interest in this study.

Elements of the Multiperson Interaction to Be Studied

Three elements of the social milieu can be investigated during multiperson interaction (Golembiewski, 1962): (1) the characteristics, attributes, or behaviors of individual subsystems; (2) the nature and direction of the communication; and (3) the character and setting of the system itself. These elements are illustrated in Figure 1.

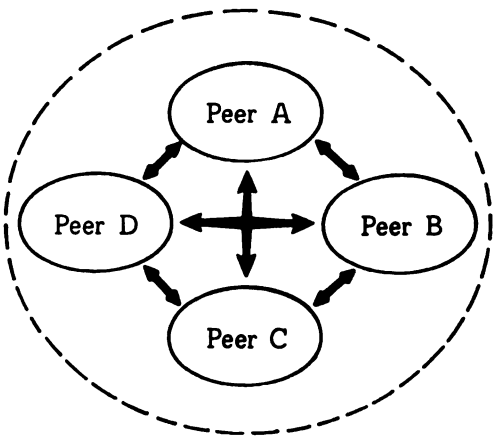

Figure 1. Elements of the multiperson interaction.

Dimensions of two of these elements are operationalized in this study.

1. The attributes and characteristics of the children are defined by:

Ethnicity, sex, socioeconomic status, age, experience with siblings and peers, and the following social interaction variables: social behavior, responsivity, initiative, activity level, and communicative competence.

2. The following dimensions of the communication flow are operationalized:

channel of exchange--verbal and nonverbal
affective connotation--positive, neutral, negative
directionality--individual peer, group, environment

3. Characteristics of the group and setting are controlled to the greatest degree possible. The setting or environment, the composition of the group to represent one low- and one mid-SES male and female, and the nature of the experience in terms of its novelty value are similar across groups. Although the course and content of the interactions differ from group to group, it is assumed that individuals have an equal opportunity to interact and express their own style of behavior. As these group members are chosen at random on an ad hoc basis, no group expectations nor proscriptions of roles should be operative (Larson & Hill, 1958).

Conceptualization of Communication

To identify the communication that occurs as children interact in a small group, a descriptive communication model developed by Nan Lin (1973) is operationalized. This conceptual model is based on a functional view of human communication. With this model, communication can be viewed as occurring in a number of phases. These phases overlap, but each has distinctive characteristics that contribute to the structure and process of communication. These

phases can be identified as: (1) encounter, (2) exchange, (3) influence, and (4) adaptation/control. The model is illustrated in Figure 2.

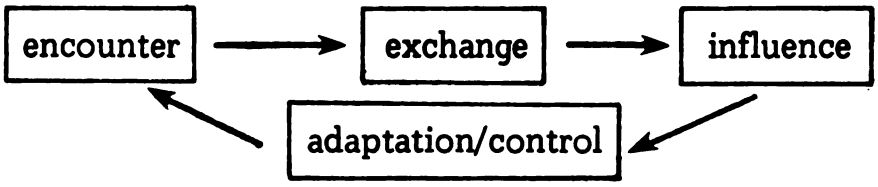

Figure 2. Model of Communication (Lin, 1973).

During the first phase, encounter, the initial linkage between the information and the receiver is established through a specific medium. In the second phase, exchange, a flow of shared meaning occurs. The third phase, influence, then verifies the communication; it is defined as the discrepancy between a person's behavior or attitudes before the encounter or exchange and his behavior or attitudes after the encounter and exchange. Influence therefore represents the psychological or behavioral impact of the information flow. Finally, the effectiveness of communication over time depends on the control-adaptation process, whereby the fidelity of information flow is maintained through feedback and adapted transmission.

The influence phase of Lin's model is operationalized in this study to identify when and if communication occurs. Any behavioral interaction is considered communication if a behavior

elicited by one peer influences a receiver who attends or reacts in some manner as a result of the original behavior. Thus the communication is inferred from the analysis of actions and contingent reactions of others in the play group.

Because of the nature of time-sampling observations, only the linear flow of information from encounter to influence is observed. Thus an interaction is identified, not a communication transaction, which would involve the adaptation/control phase.

Objectives

The primary objectives of the study are:

1. To determine if the following demographic factors predict or differentiate degrees of communicative competence:

   Sex
   Socioeconomic status
   Age
   Ethnicity
   Number of siblings
   Number of months since entering center
   Number of months in group care

2. To determine the relationship between communicative competence and the following social interaction variables:

   Level of social behavior
   Activity level
   Responsivity
   Initiative

3. To identify the use of the following differential modes of communicative exchange and the resultant differences in the incidence of communication:

channel of exchange--verbal vs. nonverbal
affective connotation of physical behavior--negative vs. positive or neutral
directionality--initiations directed to individual peers vs. the group or the materials and environment

Assumptions

1. The ability to effect an impact on one's social environment is a communication skill that develops through the interaction of expanding cognitive structures and experiences with the social environment. Therefore, a communicative competence score that measures this skill will vary across a sample of three- and four-year-old children.

2. Spontaneous play behavior among like-aged peers offers an opportunity to assess an individual's skill in communication.

3. In a play situation in which the grouping of children is random, the setting is equally novel for all participants and the opportunity is provided for everyone to participate as he wishes; the resulting play behavior observed can be attributed to internal factors within the child.

Definitions

Communication: Information flow, in the form of the behavior of an individual, that influences a receiver who attends to the initiator and/or reacts in some manner as a result of the original behavior. No intent to communicate is necessarily inferred.

Interaction: An initiation-response sequence between two or more individuals.

Initiation: An overt muscular or verbal activity of an individual, which involves a change from the immediately preceding activity.

Response: Change in muscular activity of an individual as a result of stimuli that are manifested by another individual.

Transaction: Reciprocating patterns of interactions; one's response contributing to another's initiation, which is responded to by the original participant in a continuous fashion.

Communicative Competence: The relative ability of an individual to impact upon or initiate communication with the social environment.

"Bit of Interaction": A stretch of play behavior that includes an initiation, response, or ongoing action (terminated by another initiation or response) directed to the self or the environment.

CHAPTER II

RELATED LITERATURE

Theoretical Perspective: The Child as an Open System

The theoretical perspective upon which this study is founded is an integration of a variety of theories of human development and conceptual frameworks related to human activity. It is primarily an application of a human ecological (ecosystems) approach (Auserwald, 1968; Hook & Paolucci, 1970), drawing heavily from general systems theory (Buckley, 1967; Laszlo, 1972; Bertalanffy, 1968), communication theories (Miller, 1965; Mead, 1934; Theyer, 1968), and developmental interaction theories of human development (Piaget, 1950; Brunner, 1965). The application of an ecosystem perspective to human development, although relatively new and still lacking unity, offers exciting possibilities for investigating the complex interactions of the organism with the environment. The reader is directed to Gardner (1971) and Sims, Paolucci, and Morris (1972) for further information about this approach.

At a very basic level, human organisms can be viewed as systems, sets of interdependent components in dynamic interaction that metabolize matter-energy and information (Thayer, 1968). Information can be defined as matter-energy in a patterned flow that conveys meaning. The intake of food, water, air, and sensory

stimulation from the environment is processed within the system to maintain life. The output from the body is human activity, along with waste products. Although the metabolism of food or fuel to maintain the physical machinery of the body may be easier to conceptualize, information exchange is just as critical to sustaining life. The exchange of information with the environment is a basic activity of all living systems. The internal processing of stimulus inputs from the environment organizes human behavior and relates the organism to the environment (Thayer, 1968). As human systems usually exist in larger suprasystems such as the child in a family, the exchange of information across system boundaries links individual systems to one another and provides the building blocks for establishing human relationships.

A characteristic of open systems, as contrasted to closed mechanical systems, is the ability to exchange information with the environment. All living systems are somewhat open, but the degree of openness varies considerably. The environment can be viewed as all other factors outside of the system that impinge on the system (Chin, 1969). The environments of the child system are other human and socio-cultural systems, as well as physical and material aspects of the setting. Information exchange with the environment not only helps to maintain the system but also allows it to change or evolve to new organizational levels. Buckley (1967) referred to these processes as morphostatis and morphogenesis, respectively. The implication in terms of the child is that active information

exchange with the environment produces changes within the information-processing structures of the organism itself. Thus development occurs, and the organism moves to higher levels of organizational structure and functioning. Thayer (1968) noted this complex process:

> The way the child perceives, processes, and gives meaning to life experiences involves information flow. Man creates the reality and environment he knows and at the same time, probably, the mind by which he knows it and therefore himself (p. 138).

A feature that distinguishes human systems from other living systems is the information-processing capability that guides creative action. The child is not only an open system but also a self-governing system (Gardner, 1971). The dynamic control processes that regulate behavior require that the effect of the system's activity enter the system to provide information relevant to future activity. These are often referred to as cybernetic control processes (Bertalanffy, 1968). Feedback is information about system output that reenters the system to help the system regulate and adapt to the newly created environment. Communication or interaction across system boundaries provides the vehicle by which informational output not only impacts on the environment and changes the system because of its release, but also is fed back or recycled to the system as environmental input. This array of information enters the system's internal processes. It is within the control processes that input is integrated with dynamically stored material (memory) and choices are made directing human behavior. All transactions of the organism with the environment provide input that helps the child organize his world into predictable patterns and relationships

necessary for what is often termed learning. Gardner (1971) noted:

> The child actively filters his perceptual world. He actively integrates the stored materials with whatever he pulls in from that world. And he actively decides on the basis of this integration the course of action to follow from among the alternatives available to him (p. 64).

At least two dimensions of the system determine its capacity for communication: the level of development of internal information-processing structures and the openness of the system. The internal structures limit the kinds of perceptions, discriminations, and integrations possible. The openness of the system determines the amount and type of information exchanged across system boundaries.

Human systems usually exist in a variety of larger systems, groupings of significant people and institutions; these are multi-person systems. The individual system at this level is a component of the larger system. As parts are interdependent and rule governed in a system's framework, the child and the larger system are intimately linked.

> The raw data with which the individual organizes himself and his concept of reality are products of interactions with the various multiperson systems in which he exists. The inputs to the individual system are the outputs of the multiperson system and conversely . . . (Thayer, 1968, p. 140).

These intimate, interdependent transactions are the components of the socialization process.

Socialization

Socialization can be defined as the adaptation of the organism to a social environment. Both the organism and the environment shape the process.

> A child is born with a biological structure that allows behavior to be patterned and adapted to the surroundings. Growth and adaptation take place in a social world. A mother is much more than a caretaker; she can and does structure the infant's environment. She and the other people that surround the infant relate their actions to his and so provide him with a means of building connections with their world and an entry to their social culture. They also act as mediators for him of the wider social order and it is through them that the child begins to learn about his place in the world (Richards, 1974, p. 7).

The human infant in entirely dependent on his social environment for survival. Communication initiated by the infant activates caregiving and reciprocal need-satisfying interactions of infants with caregivers. The infant's cry, the parent's contingent physical contact, and the infant's quiescence is an example of earliest signaling systems reciprocally interacting. This interaction lays the foundation for forming a series of interpersonal relationships that insure the emotional interdependence of the participants (Bowlby, 1969). Such relationships further motivate individuals to be sensitive to each other's signals, and, in the case of children, to imitate behaviors of significant others. This is a primary mode of social learning (Bandura, 1967; Weinstein, 1969). These complex processes (often referred to as attachment), common to all human groups, serve survival and adaptation functions and insure the child's gradual integration into the social complex of the larger suprasystem.

Vickers (1967) aptly described the socialization phenomenon: "In-so-far as I can be regarded as human, it is because I was claimed at birth as a member of a communication network, which programmed me for participation in itself."

As patterns of communication evolve and relationships based on expectations and need satisfaction develop with primary caregivers, the child uses these experiences to relate to an increasingly wider array of social contacts. The child actively explores his world, selectively interacting with other systems and uniquely assimilating information from the environment. Internal representations of functional behavior guide future interactions with the social environment.

Two forces, therefore, converge: the individual's developmental strivings and the social system's organizational and normative influences that are reflected in the attitudes, beliefs, and skills of the child that comprise the child's social development at any one point in time.

Communication

Communication is the mechanism that links living systems to one another and to their environments. Through the exchange of signs and symbolic activity, meaning is shared, uncertainty is reduced, and understanding and action are facilitated. Depending on how one defines the system of interest, one can think of communication as the process of sense receptors feeding impulses to the nervous system, or at a macro level, international treaties binding nations of people together. Communication serves an organizing function among interdependent parts, coordinating activity so that the system can maintain itself (Thayer, 1968). In the case of the human system, the flow of information within the system and between

the organism and the environment helps to move the system to greater elaboration of structure for higher-order functioning. This role of communication is critical in the elaboration of the human system during development.

Various definitions and conceptualizations exist relative to human communication. Basically, all approaches include elements of participants (source and receiver) linked by a message or a symbolic exchange of information that reduces uncertainty (Berlo, 1960; Cherry, 1961). Communication can further be classified by intent. Intentional communication is that which participants initiate to establish some shared meaning or influence over each other. Unintentional communication refers to stimulus output that is received as communication, with no conscious intent to be communicated. The diagram in Figure 3 illustrates how both intentional and unintentional communication can occur simultaneously within the same event.

Most definitions of communication refer to intentional communication. This is reflected in Miller and Steinberg's statment of the purpose of communication: "The basic function of all communication is to control the environment so as to realize certain physical, economic, or social rewards from it" (1975, p. 71). This perspective is consistent with the active nature of the human system seeking to interact with the environment through communication.

However, ethologists and psychologists studying human interactions have suggested that much of human behavior is communicated and often without conscious, purposeful intent (Blurton Jones, 1972;

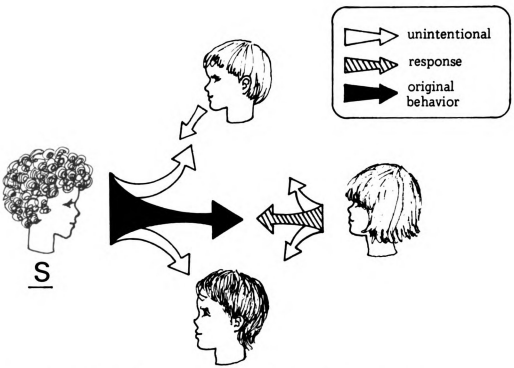

Figure 3. Intentional and unintentional communication.

Richards, 1974; Bandura, 1969). The informal nature by which children "pick up" adult mannerisms and speech patterns is an example of this phenomenon.

Watzlawick, Beavins, and Jackson (1967) suggested that all behavior communicates. One cannot not communicate. In such a conceptualization the delimiting concept of intent is not necessary; all behavior has the potential to communicate. What is actually communicated depends on the attributes of the individual participants and the nature of the message. The sender and receiver bring to the encounter characteristics and experiences that influence their interpretation of the meaning of messages, both intentionally and unintentionally sent by others.

Nan Lin's (1973) descriptive model of communication can apply to both intentional and unintentional communication. As described in Chapter I, Lin suggested that communication be viewed as consisting of four phases: encounter, exchange, influence, and adaptation/control. Within any one communicative act, influence can result even if intent to communicate is not present. However, over time, or in any communication "transaction," intent would probably exist as a motivating force to proceed in the communication process. With this model, the measurement of influence, in either an interaction or a transaction, would reflect the effectiveness of the communication act.

One factor contributing to effective transmission is communication skill. Habermas (1970) defined communicative competence as the mastery of skills that establish intersubjectivity of meaning. The communication act is then seen as the vehicle whereby skillful communicators establish shared meaning. In this regard, both receptive and expressive functions are important.

The neonate has well-developed receptive abilities to assimilate stimuli from the environment, but limited information-processing and expressive capabilities. Thus the infant's communicative ability is limited, but is definitely present (Brazelton et al., 1974; Richards, 1974).

Studies of earliest mother-infant interaction have provided evidence that children as young as 2 to 3 weeks intentionally modify their behavior based on feedback from the environment (Brazelton et al., 1974). Experimental manipulations of maternal behavior

have produced expectancy behaviors and modifications in children's responses to dissonant events during the first five months of life. These studies verify the child's active participation in communication transactions with the social environment during early infancy. And yet the literature on the ontogeny of communication skill of children barely recognizes the ability of children to respond to and initiate appropriate signals in light of environmental feedback.

Review of Research on Children's Peer Communication

The research literature available on the young child's development of communication skill is fragmented. This may be a result of the failure of many researchers to distinguish between the linguistic and communicative ability of the developing child (Krauss & Glucksberg, 1970). Much attention has been focused on the development of language in children, especially as a result of the work of Piaget (1926), Vygotsky (1962), Bernstein (1968), and others who have emphasized the critical role of language in cognitive development. The development of communicative effectiveness, however, is even more comprehensive than the development of linguistic skills. Ryan (1974) noted:

> The so-called "one-word stage" cannot be regarded as simply the mere accumulation of a vocabulary, in preparation for its incorporation in later sentences. Rather, during this time, a child is learning a lot about how to talk, how to do many different things with words . . . and to participate in mutual dialogues with others. Further, the use and understanding of standard words develops at a time when the ability to communicate non-verbally is well established, in the sense of being able to influence the behavior of others, and of indulging in reciprocal interchanges of various kinds (p. 186).

Thus communication skill precedes the use of language and continues to develop simultaneously with linguistic skills throughout the child's early years and even throughout the life span.

Another force that has limited the scope of communication research has been reliance on operationalizing the cognitive role-taking skills underlying intentional communication. Communication studies during childhood have focused primarily on verbal information exchanges wherein role taking is required as a prerequisite for communication. This perspective follows from Piaget's (1926) writings.

Piaget (1926) propounded a view that the young preschool child is egocentric. He suggested that young children lack the ability to perceive a point of view other than their own. It has been thought that this egocentrism limits interpersonal communication, as speakers fail to provide the necessary information the listeners need in order to effect a sharing of meaning (Flavel, 1968). Piaget (1926) wrote:

> Before the age of 7 or 8 . . . understanding between children occurs only in so far as there is contact between two identical mental schemes already existing in each child . . . . In all other cases the explainer talks to empty air. He has not, like the adult, the art of seeking and finding in the other's mind some basis on which to build a-new (p. 133).

Vygotsky (1962) further characterized young children's verbal exchanges as representing "inner speech," which is the abbreviated, condensed verbal coding used to communicate internally or mentally. Young children often fail to differentiate this form

of speech from public speech, which needs to convey meaning to others. Thus young children's communications are inappropriate in the social context, reflecting an egocentric perspective that only the speaker understands.

Based on these theoretical perspectives, investigators have examined communication skill in terms of children's ability to take the perspective of another and to use this information in creating messages to inform another person about a specific topic (Flavel, 1968; Glucksberg & Krauss, 1967; Shantz, 1969). An example of this type of study is the experimental research of Krauss and Glucksberg (1970) concerning the adequacy of communication between two like-aged children.

As reported in that study, a two-person communication task was developed. The children were separated by a barrier and given similar sets of blocks with novel graphic designs. One child's blocks were stacked in a specific order, which he was requested to communicate to the other child so that that child could stack his blocks similarly. Training trials were given using blocks with familiar objects to check on the children's ability to comprehend the task, so that defective performance in the experimental task could be attributed to communication rather than understanding the rules of the game. Only the older children, 52 to 63 months, were able to perform the training task. Of the seven pairs who were given the experimental task, none could complete the task.

To determine whether the difficulty lay in formulating the messages or in the listening skills of the children, a second task

was introduced with an experimenter playing the role of speaker. Eight of the twelve children at this age (46 to 63 months) were able to perform satisfactorily as listeners.

Similar studies with experimental tasks have been conducted to see if the children could modify their directions based on the listener's feedback (Glucksburg & Krauss, 1967). Children were scored for modifying messages as a result of feedback requesting more information. Younger children failed to modify their original messages and often repeated the initial message. Skill in changing one's message to fit the needs of the listener increased considerably at the third and fifth grades and among adults.

Although the results of these and similar studies have been offered as evidence in support of the notion of egocentrism, it is questionable whether it can be concluded that children fail to take another's perspective into account in such communication. It is possible that children performed poorly because of the complex nature of the cognitive and linguistic skills required in the tasks. To describe distinctive features of objects requires considerable classification and vocabulary skill. The level of difficulty of the cognitive processing required rather than the child's role-taking skill may be the factor limiting successful communication.

Observational studies of children's language suggest that four-year-old children can take the perspective of another in communication. Shatz and Gilman (1973) reported significant differences in the message content observed in a series of studies comparing

the communication of four-year-olds when speaking to adults, peers, and two-year-olds. In the first study, 16 four-year-olds were asked to tell an adult and then a two-year-old about a toy. The specific topic was given to control somewhat for message content. Later a similar request was made without specifying the topic. Under both conditions content analysis of the conversations revealed significant differences in the length and complexity of sentence utterances when children spoke to the two-year-olds compared to when they spoke to adults.

Another study compared eight four-year-olds' speech in spontaneous conversations with their mothers and then with peers. In this case, with respect to utterance length, the use of various constructions, and attentional utterances, peers were treated like adults.

These results suggest that in verbal communication four-year-olds do make allowances for the characteristics of the listener. In both structured and spontaneous situations, children adjusted their speech to younger listeners, whether or not the speaker had a sibling. The investigators reported that children seemed to be able to respond to cues from the listeners as well as to perceive differing comprehension abilities of various listeners. Since the speech directed to both like-aged peers and adults was the same, it may be that children communicate with peers at their most developed level of ability.

Although the studies described above stressed the content of messages, observations of the social consequences of children's

verbal communication also support the notion that children orient their communication to listeners and do not merely talk "to empty air," as Piaget (1926) noted.

Mueller (1972) observed 24 pairs of children 3 1/2 to 5 years of age in a videotaped 20-minute free play session. Children were matched by age (within eight months of each other) and sex. None of the children were acquainted with each other. Descriptions of the frequency and social consequence of the verbal behavior of the children were reported. Mueller found that 94% of all utterances showed intent to communicate; i.e., the speaker looked at the listener, talked about things of interest to the listener, or used attention-getting techniques. Further, 85% of the utterances received replies or at least attracted the listener's attention. These results suggest that children do not just egocentrically speak in monologues, but do communicate with each other. Although three-year-olds talked less than the older children and boys talked more than girls, there were no differences across age and sex groups concerning the number of communications that received attention or replies.

The probability that an utterance would be communicated was .89 if the speaker attracted the listener's attention and only .78 if the content was of mutual interest. In total, only 5% of the utterances were so unclear as to be incoherent. The social skills of looking at a listener and getting his attention increased the chances that one's messages would be received.

Garvey and Hogan (1973) further investigated dyadic play behaviors of children 3 1/2 to 5 years of age to determine the degree to which utterances were used to facilitate social interaction. These utterances were termed social speech, defined as speech that is strictly adapted to the behavior of the partner. Eighteen white middle-class dyads were formed, and 15 minutes of their spontaneous free-play behavior was recorded on videotape. The transcripts of their verbal behavior were subsequently analyzed to determine the frequency, length, context, and consequence of utterance units (stretches of speech separated by pauses greater than one second or interrupted by another person's speech). Agreements by three independent judges determined whether or not a mutual engagement occurred. The consequences of utterances were coded in one of five categories: no consequence, unrelated speech, attending behavior, appropriate nonspeech behavior, and appropriate speech.

The mean rate of utterance units was one every 4.6 seconds. Younger children had fewer utterances and the number of words per utterance was less than with older children. Dyads were considered to be mutually engaged on an average of 66% of the time. These engagements included games and activities with objects as well as verbal interactions. The mean percentage of utterances that entered into communicative exchange was 59% (s.d.=13.2%). Older children communicated more often than younger children, and did so through more lengthy exchanges. But even the youngest dyads were capable of conversations that included more than three components (initiation-response-initiation).

These results suggest that during the majority of their play-time children participate in mutual social engagements using speech as a way to achieve and maintain contact with each other. Although instances of private speech (Vygotsky, 1962) and monologuing (Piaget, 1926) existed, even the youngest children were able to initiate verbal messages in a manner that involved the other person and contributed to the social nature of the play activities. Hence even 3 1/2-year-olds communicated successfully with peers.

Two similarities of all of these studies are their reliance on verbal exchange as the mode of communication and their focus on dyadic interaction. Observations of social interactions in a natural setting, such as the nursery school classroom, provide further support that in a social context young children communicate intent as well as information that elicits responses from others.

Honig, Caldwell, and Tannenbaum (1970) reported on the use of continuous recordings to describe the social interactions of children in a natural classroom setting. They focused on information-processing behaviors--i.e., categories such as: confirms, shows to, converses, writes or draws, reads to, corrects or disconfirms, inquiries, informs or teaches, informs about culture, and role plays with. Both verbal and nonverbal modes of communication were included. The frequency and distribution of these behaviors were examined as a function of age.

The sample consisted of eight children in each of four age groups: one-, two-, three-, and four-year-olds. Significant differences were observed among age groups on total number of

information-processing behaviors emitted. The total number of information-processing behaviors increased with age, but the percentage emitted by children to adults declined with age, as did the percentage that were self-directed. Communication to other children increased with age, especially from two years onward.

The authors reported that showing or demonstrating behavior was a primary mode of communication for the preverbal and minimally verbal child, but was replaced with verbal exchanges in older children. They noted a positive relationship between age and the frequency with which behavior was accompanied by verbalizations. Also, with age, children's information-processing behaviors were increasingly directed to other children rather than to adults. These results support the notion that even three-year-olds elicit an exchange of information with the peer social environment.

Reuter and Yunik (1972) reported that 30 to 40% of a nursery school child's free-choice time is spent in social interaction with children or adults, 20 to 30% with peers. Hence the peer social environment of young children from two years onward becomes an important arena for using and developing communication skills. Communication with a shared meaning does occur among peers of this age, and verbal communication is increasingly used to initiate and maintain social contact.

Consequences of Peer Communication

In terms of both children's cognitive development (Piaget, 1926) and the learning of socially acceptable behaviors (Kohlberg,

1969; Clausen, 1968), peer interactions during the preschool years are critical influences on children's development. Piaget (1926) suggested that during peer interactions the young child receives information dissonant from his own, thus creating a conflict whereby he is forced to accommodate another point of view or another state of reality. Proponents of social learning theories also recognize the importance of peer interactions as incidental learning experiences (Bandura, 1969).

William Hartup (1970) provided a comprehensive review of the literature concerning the research on peer interactions in childhood. He noted: "It is both challenging and difficult to isolate the variance in children's socialization that derives from contact with peers" (Hartup, 1970, p. 361). However, he did conclude that the type, length, and onset of experiences with peers do contribute significantly to the social development of the human child.

The present study focuses on the degree to which peers are both responsive to and elicit responses from each other during play. As much of young children's learning is incidental, the nature of the child's social contacts has the potential to influence the child's developing repertoire of social behaviors. Hartup (1970) concurred, stating that "much of children's learning is the outcome of social interaction, interaction that may not have been initiated with the intent of evoking behavior change" (p. 405).

Much of the social learning literature examines the effects on children's behavior of exposure to various models and reinforcers.

Bandura (1969) discussed the theoretical foundations and research support for this type of learning. In general, contingent reinforcement by both adults and peers can affect the type of social behavior displayed. Since even attending behaviors of peers may be reinforcing, much of a child's social behavior may be shaped during peer interactions.

Experimental manipulations of peer reinforcements have been found to affect behavior. Levison (1971) paired socially active and socially isolated children during a dramatic play session. As the isolated children became recipients of positive reinforcement in the form of positive peer interaction, their classroom behavior also changed. They showed an increase in both verbal interaction and cooperative play. In this instance, children's own limitations in rewarding peers also influenced the frequency with which they were recipients of positive social exchange. To generalize to communication behavior, it may be that children who are responsive to peer initiations in turn produce more behaviors that are responded to by peers.

Another mode of learning social behavior is through imitations of models. Both altruistic behaviors (Hartup & Coates, 1967) and aggressive behaviors (Hicks, 1965) have been noted to increase in children's play after exposure to models. Mowrer (1950) suggested that rewarded models would be imitated to a greater extent than nonrewarded models. However, Hartup and Coates (1967) found that this depended on the child's own experiences with peer reinforcement. Those children who received little reinforcement from their

peers imitated the nonrewarded model. Other discrepancies in the listerature exist, suggesting that there are no easily describable relationships by which to explain imitation behavior.

The fact is that children do imitate both adult and peer models. The ability to assess what behaviors are attracting children's attention in everyday environments is critical to begin to understand the complex incidental learning that occurs during social development.

One of the focuses of the present study is on describing the social aspects of communication, including both verbal and nonverbal behavior. How do individuals impact on one another? Considering all behavior as having information value in a social exchange is only one perspective in the field of communication. Yet it is a most appropriate framework for unraveling the complexities of social interaction and social influence in human groups.

Review of Methodological Approaches to Studying Children's Peer Interaction

To study how one child interacts with another, most investigators have chosen to use a systematic observational procedure. Elements of the environment and the behaviors of the participants are usually operationalized and observed. Although verbal interactions can be analyzed from audio recordings, any definition of behavior that includes nonverbal actions requires a live or mechanically recorded observation.

A number of observational techniques have been employed to investigate children's social interactions through the years.

Although these methodologies may not identify communication as a behavior of interest, they all refer to communication through a form of interaction behavior.

Earliest observational studies of peer interactions identified rather molar behavioral events (Berne, 1930). They did, however, serve a useful function in noting children's increasing attempts to initiate peer contact and response with age (Maudry & Nukula, 1939; Bridges, 1933). Buhler (1933) used running accounts of behavior to describe six-month-old infants' reactions to the presence of other infants. Olson and Cunningham (1934) described in detail the use of a time-sampling framework as a methodological approach to describe normative social behavior. Ruth Arrington (1943) further elaborated on this and other approaches, and noted the difficulties of comparing research when observational units and behavioral categories vary. Her review of the research to that date concerning childrens' social behavior could have been written in 1963, as few changes in methodology and scope were forthcoming during the interim. Boyde and DeVault (1966) reviewed the variety of observational techniques employed during the 1960's and the corresponding breadth of subject matter studied. An element of sophistication and rigor appeared to surround observational methodologies by this time, suggesting that these techniques had "come of age," so to speak.

However, a radical improvement in the quality and complexity of observational data resulted when video-recording equipment began

to be used extensively to record behavior. The capacity to play back and reanalyze behavioral sequences aided immensely in studying complex interpersonal interactions. Paulson (1972) compared the quality of ratings derived from videotape and live observations. Basically, the only limiting factor with video-recordings is the placement of the camera to achieve maximum coverage. Similar problems exist, however, when observers need to remain out of sight of the objects of the observation.

Wright (1960) described a variety of observational techniques for use with young children. He listed diary descriptions, specimen descriptions, time sampling, event sampling, field unit analysis, and trait rating. Some of these techniques are more appropriate for research purposes than are others. Those that include predetermined behavioral categories to be observed provide more structure and objectivity to the observational data than mere running accounts or retrospective descriptions of behavior. The trait rating technique has advantages in describing children's general social tendencies, but lacks precision when studying actual behavior or behavioral interaction.

The most appropriate techniques for observing overt behavior are time- and event-sampling techniques (Smith & Connolly, 1972). Instruments exemplifying each of these techniques and combinations of them are discussed in the following sections. An additional technique that is described is a specimen-description technique combined with event sampling. The procedure was used in a study discussed

earlier concerning children's information-processing behavior in the classroom (Honig et al., 1970).

Time Sampling

Goodenough (1928) described time sampling as

> the observation of the behavior of an individual or a group of individuals for definite short periods of time and the recording of the occurrence or non-occurrence of certain specified and objectively defined forms of behavior during each of these periods (p. 230).

The information derived from this procedure is usually the proportion of time intervals in which the behavior occurs relative to total time. Over repeated observational periods, descriptions represent normative behavioral tendencies of individuals. Of importance to this technique is the length of the observational time unit relative to the definitions of behavioral categories. A balance must be achieved so that a behavioral event can be adequately observed in one time frame. Time sampling is best suited to studying behaviors that occur frequently.

Smith and Connolly (1972), in a study of children's peer interactions, described the use of a time-sampling procedure to obtain an overall picture of the behavior of preschool children with differing age, sex, and background characteristics. Based on an ethological approach, molecular behaviors are considered. In this procedure, over 60 categories of facial expressions, vocalizations, bodily postures, and motor patterns are observed. The observational unit is a 10-second interval rated continuously for five minutes.

The children were observed in a nursery classroom during two times of the day for 12 separate five-minute records. Examples of the behavioral categories are: facial expressions--smile, pucker; vocalization--talk, laugh, scream; motor activity--climb, run, point; antagonistic behaviors--threat, hit, flight; and social interactions--walks to, helps, and cooperates with.

In this study, behavioral frequencies relative to total time were factor analyzed to describe molar patterns of social behavior. Three principle components were derived, reflecting social maturity, play with or without materials, and an age-related construct. Other analysis strategies can also be used with this procedure. This particular example of a time-sampling technique uses rather discrete behavioral events as the objects of observation. Others have used broad composite categories of behavior to assess children's play participation. Parten (1932) used the technique with one-minute observation intervals. Her six categories of play are frequently used in child development texts.

Event Sampling

Event sampling is a slight modification of time sampling. A time period is required as a reference point, but the frequency or sequence of behavioral events is examined.

The Appalachia Education Laboratory developed a categorical rating system as a continuous event-sampling observational procedure (Pena, 1971; Pena and Miller, 1971). Occurrences of specific categories of behavior were recorded. Categories concerned such

behaviors as vocalizations, peer interactions, attention to tasks, and affective acts. A pair sequence analysis procedure was developed to note the sequence as well as the quantity of activity.

Event samples usually allow greater breadth in defining types of behaviors that are possible to rate. As each category needs to be noted only when it occurs, observers can be trained to look for a variety of possible events. Also, an advantage is the ability to note the sequence and context of behavioral events as well as their frequency. The event-sampling procedure is most advantageous for observing behaviors that occur infrequently or sporadically.

Specimen Description

Specimen descriptions are usually written records of short behavioral episodes. Their objectivity and precision usually depend on the skill and effort expended by the observer. Although specimen description is less appealing for research purposes than other methods, Caldwell (1969) described the application of this technique in a research instrument. It was developed by Caldwell, Honig, and Wynn and is called APPROACH--A Procedure for Patterning Responses of Adults and Children.

A trained observer walks through the classroom or place in which a child is playing and whispers a running account of the child's behavior into a portable audio tape-recorder. Later these recordings are analyzed using a system that describes "behavioral clauses." These units are running records that contain a verb.

Each clause is further divided into subject, predicate, object, and action qualifiers. The subject is usually the central figure. Predicates can take on a variety of categories such as environmental action--ignors, attends; information processing--converses, writes; negative reinforcement--resists, rejects; and body activity--increases or accelerates. Nine different predicate categories are available, plus behaviors within each grouping. The object of the behavior can be other children, adults, or the environment. Qualifiers note the intensity, quality, or motivational basis for the behavior. Last, the setting is noted in terms of the child's play activity, geographic location, or social milieu.

Since behavioral clauses vary in length and sequence, a wide variety of variables can be derived. Caldwell (1969) suggested that the main advantage of this format is that the setting of the behavior, in terms of time and space, is observed in as much detail as is the actual behavior. Thus an ecological perspective can be derived.

Time and Event Sampling

The last observational methodology to be discussed in this section is a combination time- and event-sampling procedure developed by Boger and Cunningham (1971) to describe the socialization behavior of children in peer interaction. It is called the Observation of Socialization Behavior (OSB).

A basic time-sampling frame of 20-second intervals was established so that a systematic profile of children's typical

behavior could be derived. However, in addition, behavioral categories were designed with subcategories to describe a variety of possible behavioral events. Such categories are mutually exclusive and exhaustive. Rating scales are also incorporated to note intensities of activity and affect. Therefore, both quantitative and qualitative data can be derived.

Ten separate scales are included, eight based on observed behavior and two based on situational inference. The scales are: social behavior, involvement, verbalization, physical behavior, play context, peer interaction, group interaction, adult interaction, inferred motivation, and emotionality. Each of the scales focuses on aspects of children's play involvement with the environment.

The social behavior scale was developed by Mildren Parten (1932) to measure children's social participation in play. Categories are ordinal, and are labeled as follows: unoccupied behavior, solitary play, onlooker behavior, parallel play, associative play, and cooperative play. The involvement factor refers to the nature and intensity of children's activity. Categories are initiation; response with three qualifiers, accept, reject, or ingore; and ongoing activity. Each category of involvement is also rated according to intensity-passivity, moderation, and intensity. The object of one's involvement is coded as either a specific individual, a pair of individuals, the group, or an adult.

Dimensions of children's verbal and nonverbal communication behavior are also included in the rating instrument. The verbalization codes are those developed by Robert Bales (1951) in the Bales

Interaction Process Analysis instrument. Twelve categories of verbalizations are available, including task-oriented and socio-emotional affectual verbalizations. Fantasy verbalizations are also noted. Nonverbal communication was recognized through a physical behavior category, which refers to the social-affective nature of the physical activity.

The setting of the interaction is coded as large or small muscle, dramatic play, cognitive activity, or routine. The two inferred behavioral states are emotionality--the degree of happiness or sadness displayed--and inferred motivation. The latter category contains 14 behavioral states that could be identified if inferred from behavioral cues. Examples of these states are empathy, independence, imitation, and attention seeking.

The function of the OSB instrument is to describe characteristics of children as derived from both proportional data and average ratings. Contextual dimensions of the interaction can also be studied. The directionality of behavior, the child's play context, his verbal and nonverbal communication, and his inferred motivational states can be determined. This diversity of data provides an opportunity to investigate a number of research questions through a variety of analysis strategies.

The OSB offers more standardization of behavioral descriptions than does the specimen record, because the time-sampling framework does not allow children's rate of activity to influence the results. The OSB offers the same versatility in describing

interactions in terms of the social and play context, but is limited in describing the environmental context of behavior. Likewise, it offers similar scope in noting qualitative dimensions of behavior as the specimen description and more than the time- or event-sampling methodologies. Last, the objectivity and precision of observing overt behavior directly are retained, with the same investment in time and observer effort as with the specimen description.

Thus, in many ways, the time- and event-sampling procedure has advantages over other techniques. Its main disadvantage is that the sequence of behavior cannot be determined because of the cross-sectional nature of the data-collection procedure. This is a limitation of all time-sampling procedures. In addition, however, a limitation of this and other methodologies discussed is that they only focus on one subject of interest at a time. Although the object of the subject's behavior is defined, the reciprocal actions of others in the environment in response to the subject's behavior are not determined. Interaction is viewed from only one participant's point of view at a time; hence the total impact of an individual's behavior on the social environment is not observed. This specific dimension of behavior becomes critical when analyzing children's communication. Since any behavior has the potential to influence any receiver in proximity, a more holistic view of social exchange is required.

The revised version of OSB (Boger, Cunningham, & Andrews, 1973) used in the present study includes this dimension of group

response. However, in operationalizing this procedure, children are observed while playing in small groups. Implementing this additional procedure in a natural classroom has not been explored. All of the observational procedures discussed in this section can be used in the natural classroom setting or in any smaller social grouping. The classroom offers the advantage of observing naturally occurring behavior in an everyday setting. However, the controlled small group methodology has advantages, too.

Small Group Social-Interaction Methodology.--Small group social-interaction studies are predicated on an assumption that the elements of behavior exhibited by individuals in small groups would be similar if observed in other social units. Thus patterns of behavior or tendencies to behave in specific ways are being derived as enduring personality characteristics (Hare, 1962).

If such an assumption can be accepted, the standardization of environmental conditions offered by a controlled setting has a substantial impact on the quality of data received and the potential for deriving relational propositions. Although new confounding effects may be introduced, as critics have suggested (Golembiewski, 1962) (i.e., individuals' reactions to novelty, or a decreased field of choice of playmates), these effects can be systematically manipulated and studied once the environment is standardized. Naturally occurring variation in even the physical environment is difficult to assess and control in natural settings (Arrington, 1943). In classroom settings an indirect influence on social behavior is the nature

of the cognitive and normative set associated with teacher and class expectations (Emmerich, 1973). No such normative control is operative in a nonacademic setting. Therefore such a setting hypothetically provides an opportunity for children to elicit spontaneous behavior.

Hence, small group controlled settings may offer advantages over natural settings when one wishes to derive comparable data across children, groups, or time. Small groups are also more amenable to video recordings, because all of the children can be observed simultaneously by a single observer.

Review of Systematic Differences in Children's Peer Interactions

An objective of the present study is to determine if communicative competence differs among children from various demographic groups. The primary independent variables are sex, socioeconomic class, ethnicity, age, and past experience with siblings or peers in group settings.

Extensive research exists on age, socioeconomic status (SES), and experiential influences on children's behavior and development (Clausen, 1966; Hess, 1970; Hartup, 1970). However, in screening this literature for propositions concerning effects on children's social behavior or even more specifically, communication behavior, one derives few definitive links. The discussion that follows is based on observational research of social interaction or communication behavior.

Sex

In the Appalachia Preschool Study, Pena (1971) reported significant sex differences in the social behavior exhibited in a structured play setting. Boys talked more, initiated to others more, and stayed at tasks longer than girls. Jersild and Markey (1935) reported that boys of the preschool age engaged in more conflicts during free play than did girls. They also reported this relationship for lower-SES children over middle-SES peers. Smith and Connolly (1972) similarly noted that boys engage in more rough-and-tumble play than do girls.

In a longitudinal study of children's socialization behavior, Boger and Cunningham (1972) noted a sex-by-social-class interaction ($P < .05$) on the amount of time children were engaged in adult interaction in a controlled play setting. In this study, the original OSB instrument was used to describe children's social interactions. More child-initiated adult interaction occurred for lower-class subjects than for their middle-class peers, and this behavior was more pronounced for females than for males.

In general, then, one would expect males to have higher communicative competence scores than females.

Socioeconomic Status

The literature on social class differences is more explicit in regard to cognitive behaviors than it is for social behavior. However, a great deal of research has focused on children's language development relative to social class. This interest has been based

on Whorf (1956) and Bernstein's (1964) view that different linguistic codes prevail in the communication among different social groups and influence the way individuals perceive, process, and transmit information. The child's own linguistic and cognitive development is influenced by these pervasive styles of communication.

Hess and Shipman (1965), Brophy (1970), and Cunningham (1972) found support for Bernstein's proposition in noting different patterns of interaction between lower-class parent-child dyads and middle-class dyads. Generalizing from these studies, one would expect that lower-class children communicate less precisely than do middle-class children.

This hypothesis was supported by Krauss and Rotter (1968) and Baldwin, McFarlane, and Garvey (1971) in experimental communication studies with older children, and by Bearison and Cassel (1975) with six-year-olds. However, these communication studies reflect cognitive skills, and whether this relationship would be supported with measures of social communication is presently unknown.

In respect to different modes of exchange, Miller and Swanson (1960) suggested that lower-class individuals express themselves more effectively through nonverbal means, whereas middle-class persons express themselves best verbally, through the manipulation of ideas. Schachter and others (1970) reported that low-SES and black children exhibited more frustration talk, for example the expression "Stop!" White and middle-SES children were able to verbalize more detail and were thus more explicit in their conversations.

As the operationalization of communication in this study includes both verbal and nonverbal behavior, SES effects are difficult to predict.

Race or Ethnicity

Race and social class variables are often confounded in social interaction research. A longitudinal study conducted by Boger and Cunningham (1972), however, did include race as an independent variable. In a completely crossed and balanced design, race, sex, and SES were the three independent variables. In their study, during classroom observations, black children exhibited significantly higher average levels of social behavior than did their white peers. Because the social behavior variable reflects quality of interaction, communication scores may also vary across ethnic groups.

Age

A number of studies have demonstrated that during the preschool years children play with peers, in lieu of playing with objects or adults, increasingly with age (Blurton Jones, 1972; Honig et al., 1970; Adams, 1967). Blurton Jones (1972) reported that age differences in some social behaviors are more persistent than experience with peers or siblings. Among younger children, those who had siblings showed more social interaction behavior, but by the time they were four years old, children with or without siblings behaved similarly.

Experiences with Siblings and Peers

Blurton Jones (1972) further reported a slight but nonsignificant tendency for children without siblings to exhibit less aggressive behavior.

Although siblings can have a significant effect on children's sex-role attributes (Clausen, 1966), little evidence is available to describe the impact of siblings on communication or social interaction variables. A study of fifth and sixth graders' answers to questions about how they influence their brothers or sisters led Sutton-Smith and Rosenberg (1970) to suggest that sex and birth-order effects present rather stable influences on children's social interactions. Males were reported to use more physical techniques, as compared to females' use of symbolic or psychological techniques to receive compliance from siblings. Sutton-Smith and Rosenberg concluded that children who are larger or older usually dominate social interactions.

Ralph and her associates (1968) found that the number of child-child negative interactions at age five was highest in children with one year of nursery experience, lower in children with two years of nursery experience, and lowest in children with three years of nursery experience. In the study by Smith and Connolly (1972), length of nursery school experience was more highly correlated with the following variables than was age: sociability in play, rough-and-tumble play, laughing, and smiling. Thus, experiences with other children can impact on children's patterns of social interaction.

In a discussion of the contributions of parents and peers to children's development of interpersonal skill, Weinstein (1969) noted a basic "division of labor" between parents and peers in the early socialization process. He wrote:

> Basic capacities like empathy and personality orientations conducive to effective interpersonal control are seen as coming primarily from parents. But the refinement of these orientations and their impact on the acquisition and utilization of lines of action seem to be more heavily molded by peer interaction (p. 773).

Since the primary variable of interest in this study is a measure of overt social influence, communicative competence may be less sensitive to demographic characteristics of families than to experiences with peers. However, as measures of both of these factors are included, this study provides an opportunity to explore these potential relationships.

CHAPTER III

METHODOLOGY

In the preceding chapters, an overview of the research project was provided and the study was given perspective through an identification of a theoretical orientation and a review of relevant research. The task in this chapter is to describe the research design and hypotheses, sampling procedures, and resulting sample, and to examine in detail the observational instrumentation, the operationalization of specific variables, and the data reduction and analysis strategies implemented to test the research hypotheses.

Research Design

This is a descriptive, correlational study. Therefore the data contained herein reflect children's behavior and demographic status at one point in time. The focus of inquiry in the study is on communication, a measure of system openness.

The communication flow among the children was inferred from observations of individuals' actions and the subsequent responses of others in the play group. The degree to which each child impacted on the social environment was considered a dimension of openness within the individual child system and was termed communicative competence.

The relative incidence of communication across time-sampled intervals represents a measure of openness in children's play groups and was analyzed to describe normative patterns of social communication among three- and four-year-old children.

The relationships that were investigated in the study are illustrated in Figure 4.

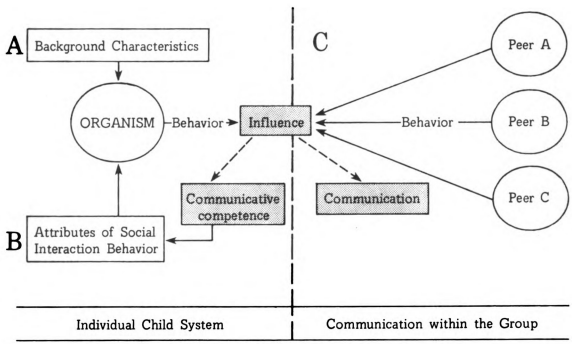

Figure 4. Schemata for data analyses[a]

The following variables were operationalized:

A. Background Characteristics

Sex
Social Economic Status

[a]Letters designate categories of hypotheses.

Ethnicity
Age
Number of siblings
Number of months since entering center
Number of months in group care

B. Attributes of Social Interaction

Level of Social Behavior
Activity Level
Responsivity
Initiative

C. Modes of Communicative Exchange

Channel of Exchange
  Verbal
  Nonverbal
Affective Connotation of Physical Behavior
  Negative
  Neutral or positive
Directionality of Initiations
  Individual peer
  Group
  Materials or environment

Hypotheses

The research hypotheses explored in this study were organized around the following three basic research questions:

A. What are the relationships between children's background characteristics and communicative competence scores derived from observations of children's small group peer interaction?

H1. The number of children in the family is a predictor of communicative competence.

H2. The length of time in group care and the length of time enrolled in the present day care center are predictors of communicative competence.

H3. The age of the child is a predictor of communicative competence.

H4. Children from middle-SES homes have higher communicative competence scores than children from low-SES homes.

H5. Males exhibit higher communicative competence scores than females.

H6. There are no differences in anglo and black children's communicative competence.

B. What are the relationships between characteristics of children's social interaction behavior and communicative competence?

H7. Children's social behavior and communicative competence scores are positively related.

H8. Children's initiative scores are more highly related to communicative competence scores than to responsivity scores.

H9. Responsivity scores and communicative competence scores are positively related among children with similar activity patterns.

C. What is the effect of the mode of communicative exchange on the incidence of communication?

H10. More communication is elicited in intervals with verbalizations than in intervals without verbalizations.

H11. More communication is elicited in intervals with negative interactions than in intervals with positive or neutral interactions.

H12. More communication is elicited in intervals with initiations directed to individual peers than in intervals with initiations directed to the group or the materials and environment.

Sampling Procedures

The present study is part of a larger research endeavor sponsored by the Office of Child Development and implemented through the Institute for Family and Child Study, Michigan State University (contract number OCD-CB-485). The larger study, entitled "Early Social Development: Parent and Child Programs," was an evaluation

of the relative effectiveness of short-term parent and classroom programs on day care children's self-concept and social involvement with peers (Boger & Andrews, 1975). As a quasi-experimental design, eight day care centers were sampled and randomly assigned to one of four treatment conditions. Data were collected before and after the program implementation period during the fall of 1973 and spring of 1974. Part of the first wave of data collected for the larger study was used in this study.

Sample Selection

Initial information concerning potential cooperating centers was secured through the State Department of Social Services Day Care Licensing Division and area 4-C coordinators. After screening lists of potential centers against basic criteria, staff contacts and visits ensued. The original criteria for center eligibility included the following:

1. Distance from MSU--maximum 70 miles
2. Listing with the licensing division of the State Department of Social Services
3. Offering a full-day program
4. Comparable philosophy, program, and staff qualifications
5. No simultaneous participation in other research or program obligations
6. Heterogeneous enrollment of children to meet the following needs:
    a. age range--3 1/2 to 5 years
    b. enrolled for four half-days per week

c. minimum of eight children in each of four groups (excluding kindergarteners): low- and mid-SES males and females[1]
d. racial balance across SES groups or all one race

To secure an adequate number of children within the age and enrollment range, medium- to large-sized centers were approached. All centers considered met the first five criteria. The distribution of children across sex, SES, and ethnic groups was the most difficult sampling criterion to satisfy. The centers selected offered the best balance in enrollment of those centers available and willing to participate. The eight centers selected were located in four large cities in lower Michigan. Their enrollments ranged from 70 to 166 children per center. The characteristics of the children enrolled in these eight centers varied somewhat. All children within the age range of 3 1/2 through 5 years (as of January 1, 1974) who were enrolled for at least four days per week at each center were considered eligible to be included in the sample.

Parents were notified of the research project and their cooperation in permitting their children to be tested was solicited. Parents were also asked to sign a permission form and complete a general information sheet that requested facts about the child's family and the child's past experiences in group care.[2]

The information needed to determine socioeconomic group membership was secured from the parents through this general

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[1]SES membership was initially determined by eligibility for Social Service assistance.

[2]Copies of these forms are presented in the Appendix.

information sheet. The criteria for delineating social economic group membership were adopted from the short form of the McQuire and White (1955) research tool, The Measurement of Social Status. Weighted scales composed of the social status components for occupation, source of income, and education were evaluated for the principal wage earner of the family. In cases in which both parents were fully employed, the father's index score was used. If there were extreme variances between maternal and paternal SES index scores, a subjective evaluation employing the median or the mother's index score was selected as the characteristic for the child's SES value.

When determining SES groups, low or middle, an index score value of 51 (±3) was considered the critical cut-off point between middle- and low-SES groups. Scores from 48 to 54 were considered flexible and could be placed in either group, based on other idiosyncratic information.

All of the children who satisfied the basic age and enrollment criteria and whose parents consented to their participation were subsequently tested using a battery of four instruments. As only the observational data from the controlled play setting would be used in the present study, the total sample of children was further screened to select a subset of only those children who appeared in play groups in which all four children were of the same ethnic identity and whose ages ranged between 36 to 60 months. As a result, the present sample consisted of 139 children enrolled in eight different day care centers in lower Michigan.

Description of the Sample

The distribution of children by sex, social economic status, ethnicity, and age is described in Table 1.

Table 1

Characteristics of the Sample[a]

Characteristic	N	%
SEX		
Male	68	49
Female	71	51
Socioeconomic Status		
Low	72	52
Middle	67	48
Ethnicity		
Black	33	24
Anglo	106	76
Age		
Three-year-olds	32	23
Four-year-olds	107	77

[a]N = 139

The sample was rather evenly divided by sex and SES. However, larger numbers of anglo children than black children were included in the sample. Also, about one-fourth of the sample were three-year-olds, whereas three-fourths were four-year-olds. The average age of the children in the sample was 53.14 months (s.d.= 5.26 months).

Most of the children were enrolled full time in the day care programs. The average enrollment was 9.5 half days per week (s.d.= 1.45). A wide variation existed in the length of time these children had been attending the day care centers. On the average, children had been enrolled for 7.77 months prior to September 1, 1973. However, the standard deviation was 7.24 months, suggesting wide variation in enrollment patterns. Variation was also evident in the children's previous experience in group care (Mean=18.00 months; s.d.=15.6 months).

The average number of children in these families was 2.01 (s.d.=1.46). Of the total sample, 65 or 47% of the children were the only child in the family, whereas 74 or 53% of the children had siblings. The number of siblings per family ranged from 1 to 9.

Approximately 63% of the children lived in single-parent families and 37% lived in two-parent families; a larger proportion of low-SES than middle-SES children lived in single-parent families. The ethnic distribution by family status was approximately equal.

The children comprising the sample could be considered typical of most urban day care populations. About 90% of the mothers of these children worked while the child was at the center; 67% of the mothers were employed full time.

Instrumentation

A small group social-interaction methodology was operationalized in this study developed by Boger and Cunningham (1969). The method consisted of videotaped observations of peer interaction

in a naturalistic setting. The situation for gathering the observational data was a ten-minute unstructured play session in which four children (one male and one famale from each socioeconomic group --low or middle) were randomly selected and asked to play in a mobile playroom. The only play materials were cardboard cartons.

This playroom was an interior space of a travel trailer, approximately 11 feet by 8 feet. It was completely carpeted, lighted, and heated similar to any indoor space. A portable wooden expanding gate extended across the room at the point marking the limit of the lower visual field of the camera. A space behind the expanding gate was provided for the examiner to sit outside of the children's interaction range. A diagram of the mobile unit is shown in Figure 5.

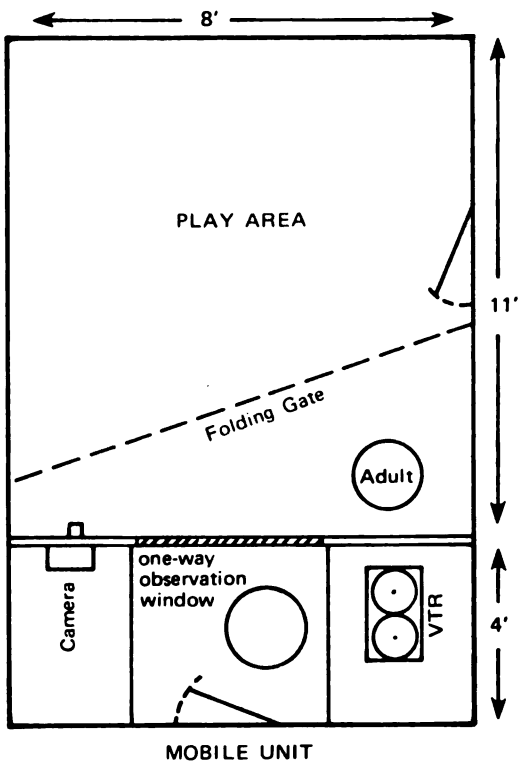

Figure 5. Diagram of mobile unit.

The observation in the mobile playroom provided a sample of children's behavior in an open-field standardized setting. The situation was designed to allow an opportunity for the children to manifest preferred modes of behavior or behavioral "styles." The children were not directed in their play, and the materials (boxes) presented no inherent play mode. "There is no overt indication of behavior expectations, and there is no attempt to guide, limit, or structure behavior" (Boger & Cunningham, 1971).

All of the children were brought into the mobile classroom before data collection to become familiar with the setting and equipment. Then, upon entering the room for the play session, the children were read a brief statement. It explained that they could play in any way they wished so long as they did not hurt each other. They were also reminded to remain behind the expandable gate. The adult observer was present but outside of their play range. The observer remained in the room working on papers so that it did not appear that the children were being watched! The ten-minute play session was videotaped for subsequent rating and coding using the revised version of the Observation of Socialization Behavior instrument (Boger, Cunningham, & Andrews, 1974).

The observational rating procedure was an adaptation of the original Observation of Socialization Behavior instrument (Boger & Cunningham, 1969). Many of the procedures and measurement scales of the original instrument were preserved. However, the method of sampling behaviors and the perspective toward "interaction" were

changed considerably. These changes are discussed in the following section, along with a description of the instrument.

The revised Observation of Socialization Behavior (OSB) instrument is an observational technique using a combination time- and event-sampling procedure.[3] At 20-second intervals, a mechanical beep is superimposed on the audio portion of the tape. Raters record the first play behavior at each 20-second mark, thus securing a time sampling of behaviors across the ten-minute play session for each child.

The observation interval chosen for this study was 20 seconds. This time span was selected as sufficient to record a meaningful sequence of behavior in a manageable and recordable manner. The video medium, however, was necessary to encode the total complexity of the behavioral interaction as proscribed by the rating procedure. Three and up to four playbacks were usually required to complete the rating process.

Content

Based on an ethological approach, more global styles of behavior are produced from the analysis of more molecular behavioral units. At each 20-second mark, various behavioral dimensions of the play involvement of each child are recorded. Fourteen behavioral dimensions were chosen as mutually exclusive, objectively describable categories of behavior:

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[3]Only the time sampled data are used in this study. See the description of the instrument in the Appendix for a discussion of the time and event sampling procedure.

1. Interaction (responses, ongoing play, initiations)
2. Object of interaction
3. Level of involvement
4. Peer impact
5. Verbalization
6. Verbal fantasy
7. Voice tone
8. Physical behavior
9. Physical tone
10. Social behavior
11. Autonomy
12. Leadership
13. Social competency
14. Emotionality

— Socio-emotional Scales

The unit of observation is a "bit" of play behavior or sequence of interaction. This "bit" is defined as a stretch of play behavior that includes an involvement code of either response, ongoing activity, or initiation that is terminated by another response or initiation. All 14 categories of behavior are rated in reference to this single stretch of behavior. Because of this behavioral contingency, patterns or styles of interaction can be analyzed. This contingency dimension is a unique feature of this adapted version of the OSB. The original version of the instrument sampled each behavioral category separately whenever it first occurred in each 20-second interval. Thus, an advantage of this adapted version is that tallies of behavioral categories can be compared to each other as well as to total time. Thus more versatility is available in terms of analysis strategies.

Measures

Interaction and Involvement.--The form, sequence, intensity, and object of the play involvement are recorded. Since an interaction sequence is of interest, response and initiation categories

were established. Responses include acceptance of another's initiation (A), rejection of another's initiation (R), no acknowledgment or awareness of another's initiation (N), ongoing interaction (O), and behavioral transition or eminent initiation (X). Following a response, an initiation may or may not occur. Initiation (I) is defined as an introduction of self or change in activity. Each of these two major categories is rated on degree or intensity of involvement. Three levels range from intense to passive. The object of the involvement is also recorded as group (undifferentiated), adult, individual or pair of individuals, materials, or environment.

Impact.--Another major change in the revised OSB is that a new level of interaction is observed. Responses, initiations, and consequences can all be derived from each "bit" of interaction. The system of observation in the original OSB is illustrated in Figure 6.

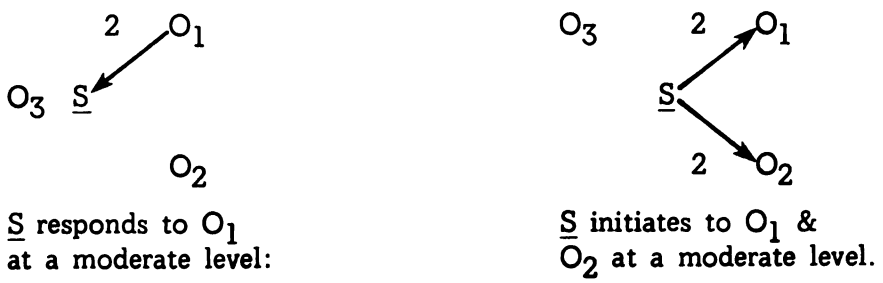
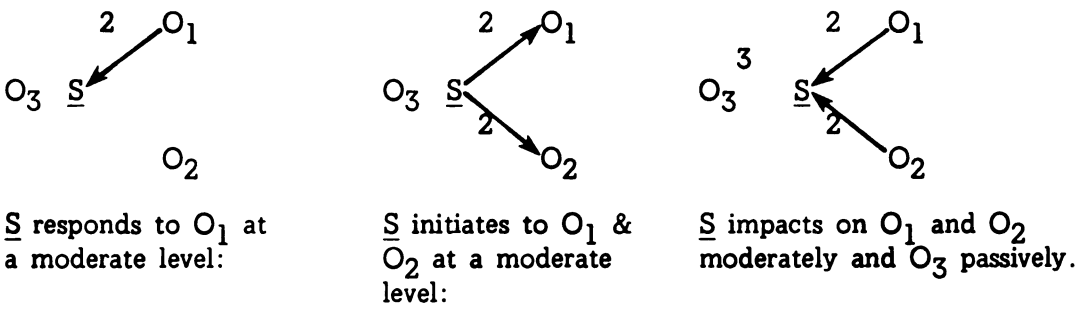


Figure 6. Interaction as observed in the original OSB.

In the revised OSB, the following is observed (see Figure 7);



S responds to O_1 at a moderate level:

S initiates to O_1 & O_2 at a moderate level:

S impacts on O_1 and O_2 moderately and O_3 passively.

Figure 7. Interaction and impact as observed in the revised OSB.

The impact codes were developed specifically to note the impact of a subject's behavior on others in the environment. Based on communication theory, it reflects a measure of environmental control or the influence stage of communication (Lin, 1973). In operationalizing communication, the consequences of the subject's involvement are recorded as reflected in the immediate behavior of the other three peers. Three response categories are available: acceptance, rejection, or no acknowledgment. Three levels of intensity of response are also rated if a response is noted: intense, moderate or average, and passive. This behavioral dimension of the interaction measures the environmental impact of children's behavior and is useful in determining differential communication patterns and the behavioral context of various communication acts.

Verbalization.--The time-sampling procedure allows for a measure of the frequency of occurrence of various types of verbalizations, and the behavioral context permits analysis of the relationship between verbalizations and other behaviors. The Bales Interaction Process Analysis (1951) provides the basis for coding verbalizations. Twelve categories plus mumbling (unintelligible) are included. These categories are mutually exclusive and exhaustive; a complete verbal interaction is considered the unit. A more affective dimension of voice tone is also rated. It is a three-point scale--positive, negative, or neutral. The voice tone refers to the delivery, not the content, of the verbalization. In addition, each verbalization is rated in terms of fantasy or nonfantasy. The incorporation of the voice tone and fantasy codes is a change in the revised OSB.

Physical Behavior.--The physical behavior codes were also changed in the revised OSB. As much of the young child's behavior is nonverbal in nature, a physical behavior rating is included. One aspect, physical contact, is rated in respect to the object of the interaction. When both materials and people are objects of interaction, the human interaction is considered first. Contact then refers to physical touching of another peer directly or indirectly through the medium of the play materials (boxes). When no human interaction is involved, the contact may be with materials.

Another aspect of physical behavior is its positive or negative quality. As with voice tone, a physical behavior tone is

rated in reference to the affective nature and social acceptability of the behavior. Hitting, pushing, and kicking are considered negative qualities. Tapping, patting, and caressing are considered positive qualities. Neutral behaviors refer to nonaffective activities such as building or running.

Social Behavior.--The ordinal scale developed by Parten (1932) was adopted as a measure of the child's social behavior. The categories include unoccupied play, solitary play, onlooker behavior, parallel play, associative play, and cooperative play in order of increasing sociability and maturity. The criteria for the various categories include spatial proximity to other children, similarity of materials being used, degree of reciprocity of interaction, and goal-directedness of the play. The social behavior dimension provides a measure of quality of social interaction as well as an overall measure of social maturity.

Socio-emotional Dimensions.--The general tone of the child's social and emotional behavior is also rated, but admittedly is based on more subjective judgments on the part of the raters. Specific behavioral cues help define the dimensions, and a five-point scale based on the observability of the behaviors helps to objectify the rating procedure.

The 14 inferred motivational states of the original OSB were modified and included in the present version as three new socio-emotional scales. The emotionality scale remains from the original instrument.

Thus four dimensions of the child's inferred socio-emotional state are rated: autonomy, social leadership, social competency, and emotionality. As defined, these dimensions are mutually exclusive. A five-point bipolar ordinal scale is used to rate them. The extreme positions, both positive (5) and negative (1), are designated for overt behaviors representative of the dimension. The central position (3) is a neutral, nonobservable indicator. The two intermediate positions (4) and (2) represent covert behavioral cues or mild overt behavioral indications of the dimension.

These ratings provide an indication of the general social and emotional nature of the behavioral interactions and are rated contingent upon the other categories of behavior encoded.

Data-Gathering Procedures

All of the play sessions were organized and supervised by trained members of the research staff of the Institute for Family and Child Study, who were graduate students from the Department of Family and Child Sciences, Michigan State University. Their activities were coordinated by the present investigator.

The responsibility of this field staff was to select the groups of four children, accompany them from the classroom to the mobile playroom located on the school property, and implement the standardized procedures described earlier. A media technician operated the video-recording equipment during the play sessions.

Undergraduate students were trained to rate the videotapes using the OSB rating procedure. These students were pursuing

degrees in the social sciences and had had previous experience working with young children. The training period lasted approximately two to four weeks. Discussions, practice sessions, and simultaneous ratings by more than one rater, accompanied by discussions, were the format of the training experience. As more than one rater was involved in this data-processing procedure, an inter-rater agreement of 85% on total recordable positions was required. Once raters established reliability they proceeded to rate the tapes independently. An additional problem with observational ratings, however, is "instrument decay"--a gradual drift away from consensus. To counteract this phenomenon, periodic group discussions and inter-observer checks were conducted.

The videotaped play session and subsequent rating procedure are illustrated in Figure 8.

Reliability and Validity

Reliability

The measure of reliability derived for this rating procedure is inter-rater reliability--an indication of how consistently behaviors are identified by more than one person. To maintain high inter-rater agreement, behavioral units must be recognizable and objectively defined, therefore, also reflecting the validity of the categories of behavior.

All raters needed to establish a minimum level of inter-rater agreement of 85% on total recordable positions with the present investigator. The actual percentages of agreement achieved

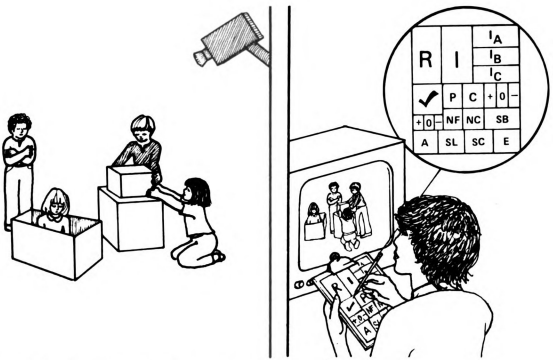


Figure 8. Data gathering procedure.

ranged from 86% to 98% between two raters over a ten-minute sequence of play activity.

Validity

The validity of observational measures derived by time sampling can be assessed by examining three factors: the naturalness of the behavior observed, the accuracy with which it was recorded, and the adequacy with which it was sampled (Arrington, 1943). Each of these factors contributes to understanding the type and quality of the data derived and thus the limitations of the data in making generalizations.

Inter-rater reliability measures offer some basis on which to judge the accuracy of the recording process. Assessments of the content of behavioral events can also contribute to understanding the nature of the behavioral units, and thus the degree to which inference and observer bias may mediate the accuracy and objectivity of the observational data. The other two factors, however, refer to the representativeness of the observed behavior.

In regard to the issue of the naturalness of behavior, the small group setting provides a sample of behavior that is considered representative of spontaneous social behavior. This issue was explored in an earlier discussion of the advantages and disadvantages of the small group setting versus the natural classroom. In the larger study, from which these data were derived, children's social behavior scores measured in the small group correlated moderately ($r=.208$) with social behavior scores derived from classroom observations (Boger & Andrews, 1975). Thus the behavior observed in the controlled setting would appear to be similar but not identical to naturally occurring behavior in the classroom. Results of this study, therefore, must be interpreted in light of the observational setting.

The second issue of representativeness refers to the adequacy of the sample of behavior. One method of assessing adequacy is through tests of concurrent validity with other instruments (Gellert, 1955) or with the same instrument under differing observational time periods. Another approach is through analysis of the internal

consistency of the behaviors observed across time intervals within one observational period. Such inter-item analysis across time intervals was implemented with the data derived from this study.

With tests of internal consistency, both the adequacy of the sample of behaviors and the intrinsic stability of the occurrence of behavioral events influence the results. Therefore, only those behavioral categories that required a rating during each interval were analyzed, using an analysis of variance technique (Kerlinger, 1963).

The reliability coefficient is derived from the following formula:

$$r = \underset{A}{\frac{V\ (true)}{V_{ind.}}} = \underset{B}{\frac{V_{ind.} - V_{error}}{V_{ind.}}} = 1 - \underset{C}{\frac{V_{error}}{V_{ind.}}}$$

The total variance in the analysis of variance model is divided into three terms: variance associated with items, individuals, and residual. The variance term associated with individual differences less error of measurement or residual derived from the analysis of variance test is used in the reliability formula as a substitute for true variance (see B above). Thus, the reliability coefficient reflects the degree of stability expected in responses across observational intervals after errors of measurement are deleted. The results of these analyses for the observational data derived from this study are reported in Table 2.

Table 2

Results of Tests for Internal Consistency of Behavioral Categories: Revised Observation of Socialization Behavior Instrument

Behavioral Category	Reliability Coefficient	Standard Error of Measurement
Level of Response	.80	.38
Level of Initiation	.84	.39
Level of Impact on Peer A	.85	.49
Level of Impact on Peer B	.86	.48
Level of Impact on Peer C	.86	.47
Social Behavior	.92	.33
Physical Behavioral Tone	.87	.17

In a study using a similar time-sampling observational procedure, Smith and Connolly (1972) reported that only behavioral categories displaying a consistency of .50 or better were included in data analyses. All of the categories of the OSB exhibited a consistency well above that level, suggesting that in fact the behavior displayed in the small group was rather constant throughout the length of the play session.

Operationalization of Variables

The task in this section is to describe the operationalization of the variables used in subsequent analyses.

Three lines of research inquiry were combined in this study. Two of the foci were concerned with a measure of the child's communicative competence. The relationships between this variable and

the child's demographic group membership and background characteristics were explored. In addition, as this variable reflects a feature of the child's overt behavior in a small play group, the relationship between communicative competence and other social interaction variables were determined.

The third line of inquiry moved away from the individual child and focused on the interactions that occur when four children meet in a specific setting. The focus here was on determining differential incidences of communication elicited through various modes of communicative exchange. The variables used in each of these lines of inquiry are described in the following section. But first the operationalization of communication is discussed, since it was the primary focus of interest in all analyses.

Communication

"Interaction is made up of single actions manifested by individuals in propinquity or contact to one another" (Chapple, 1940). By analyzing the sequence, content, and consequence of these single actions, the information flow among individuals can be examined.

Communication can be viewed as behavior that elicits a response in a potential receiver. In this study, any behavior was considered communication if it influenced a receiver who attended to the initiator and/or reacted in some manner as a result of the original behavior. Operationalized, this means if an impact code of acceptance or rejection was recorded for any one of the three peers during an interval, communication had occurred.

Operationalization of Demographic Characteristics and Background Variables

The primary independent variables in this study are described below. The information from which these variables were derived was provided by the children's parents on a general information sheet. The relationships between these variables and children's communicative competence were determined.

Sex.--Both male and female children were included in the sample. Sex differences in communicative competence were explored.

Socioeconomic Group Membership.--The socioeconomic status of each child was determined by using the McQuire and White Socioeconomic Status Index (1955). This procedure was described earlier under sampling procedures. Children were categorized as middle or low SES. A continuous score value was also available from the index used in regression and correlation analyses. The higher the score, the lower the child's status.

Age.--Children's age was available in the form of months. A standardized reference point of January 1, 1974, was used in determining the child's age in months.

Ethnicity.--Although a variety of ethnic groups were represented in the sample of children, the only distinction made for this study was between anglo and black. A very small minority of children was Indian and Chicano. Since the number of children in each of

these groups was insufficient to be included as a design factor, these children were eliminated from the sample. The term "anglo" was ascribed to any child whose parents were both caucasian and of European heritage. The term "black" was ascribed when either or both parents were Negro.

Number of Children in the Family.--On the general information sheet, parents noted the number of children in the family and their ages. This variable was a summary of the number of children in the family who were less than 18 years of age. If the child was an only child, the number of children in the family was one.

Number of Months since Entering Center.--Two experience variables were available in this study. The first variable represented the number of months the child had been enrolled in the particular day care center included in the study. A reference point of September 1, 1973, was used to standardize this figure. Thus the month in which the child entered was subtracted from the September date to determine this figure. This variable also represented the potential degree of familiarity with the children present in the play setting.

Number of Months in Group Care.--The second experience variable represented the number of months the child had been in any form of group care previous to and including the present day care attendance. Part-week and part-day attendance were included on an equal par with full-time attendance.

Operationalization of Social Interaction Variables

The following variables were derived from the observation in the naturalistic small group play setting. Each variable corresponded to a characteristic style of behavior of a child.

Communicative Competence.--Communicative competence was the primary dependent variable in this study and was derived from the impact codes of the OSB. The variable is a measure of children's relative ability to influence their environment. Its conceptual formula is: the average over all peers and all intervals of the occurrence of an impact (acceptance or rejection) times its level of impact. The potential range of this variable is zero to nine. Higher scores represent more intense and diverse influence over others. Communicative competence is an attribute of individual systems. It reflects "openness" to the extent that it represents the system's ability to influence the social environment.

Responsivity.--The relationship of responsivity to communicative competence was also determined. Responsivity also reflects "openness" in the system as it measures the relative degree to which the child responds to others in the environment. Its conceptual formula is the logit[4] of the proportion of intervals with response versus the proportion of intervals with ongoing activity. Responsivity was derived from the involvement codes.

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[4]To stabilize proportional data for use in parametric analytic models, the logit of the proportion is formed and this new figure is used in the analyses.

Activity Level.--The average intensity with which the child interacts is measured by activity level. It is the combined average intensity of initiations and responses. The relationship between this variable and communicative competence was determined.

Initiative.--The initiative variable represents the degree to which the child purposefully places himself in interaction with the physical or social environment. In contrast to communicative competence, initiative measures the relative frequency with which the child initiates interaction, regardless of whether or not that behavior elicits a response from others. Its conceptual formula is the logit of the proportion of intervals with initiations versus the proportion of intervals without initiations.

Social Behavior.--The last variable reflecting the child's characteristic behavior in social interaction was social behavior. This variable is the average rating over all intervals of the child's level of play involvement. This scale includes six levels of play, from unoccupied to cooperative play. The average score denotes the relative social maturity or sociability of the child. Its relationship to communicative competence was also determined.

Operationalization of Modes of Communication

Much of young children's play is rather random--explorations of the body, materials, and enviornment with or without accompanying intent to communicate with others. Thus, an objective of this

study was to determine what characteristics of children's play behavior in groups communicates more than others. Thus, the modes of communication within the small group were examined.

Whenever an activity of the subject could be classified as communication, i.e., when some impact was noted, the characteristics of the interaction were examined. The various codes used in this analysis were: verbal, physical behavioral tone, object of initiations, object of responses, and contact. The following characteristics of the information flow were used to determine which aspects of children's interactions elicited greater communication.

Channel of Exchange.--Each bit of interaction was categorized as verbal or nonverbal based on the occurrence or nonoccurrence of a verbalization. The relative differences in incidences of communication through these two channels were determined.

Affective Connotation.--Each bit of interaction was rated according to the affective connotation of the behavioral delivery. Whether a verbalization or a physical behavior elicited the communication, the nonverbal physical behavioral tone of the interaction was noted. This affective code had three levels: positive, neutral, and negative. The degree to which children responded differentially in intervals with negative versus neutral or positive behavior was determined. Additionally, the object of either the initiation or response was noted to determine to whom the behavior was directed and whether or not physical contact occurred.

Directionality of Communication.--Whenever an interaction was classified as communication, the initiation code was examined to determine to whom the child directed his initiation. The possible codes were: individual peer, pair of peers, the entire group, the materials, or the environment. These objects of the initiation were examined to determine if different incidences of communication occurred when initiations were directed to specific individuals versus when they were directed to the more generalized group, or the nonhuman setting of materials or environment.

Data Reduction and Analysis

Data Reduction Procedures

All observational ratings and demographic information were encoded to numerical codes and recorded on computer coding forms. This coding was then quality checked by the investigator before punching the codes on computer cards. As a second form of quality checking, the computer cards were subsequently verified mechanically.

Two frequency count programs were created to direct the computer to perform the initial mathematical computations needed to form the individual variables. One of these programs, written in Fortran, focused on the entire 30-interval sequence for each subject. Through it the frequencies and average ratings necessary to compute the variables related to dimensions of the child's behavior were calculated.

For those variables that were average ratings, the variable was formed during the first transformation; i.e., individual ratings

for each interval were summed across intervals and divided by the number of intervals. Variables in the form of proportions, however, required two or more transformations. This process consisted of:

1. summing across intervals to determine the frequency of the occurrence of an event
2. forming a proportion, the numerator being the frequency of the occurrence of an event and the denominator being either the frequency of nonoccurrence of that same event or the frequency of the occurrence of another event
3. calculating the logit of the proportion

The second program focused on each interval separately, computing frequencies and cross-tabulations of the occurrence of two or more simultaneous events. It was with this SPSS program that each interval was checked to determine the incidence of communication and the conditions surrounding the occurrence of communication. The variables formed during these computations and transformations were subsequently punched onto a new data deck and also stored on magnetic tape.

The computer program used in data analyses were those available through the 5.8 version of the Statistical Package for Social Sciences (Wie, Bent, & Hyll, 1970) and the adapted version of Finn's Multivariance program (Schmidt & Schiefley, 1972). All analyses were implemented on the Control Data Corporation 6500 computer at the Michigan State University Computer Laboratory.

Both descriptive and inferential statistics were used in the analyses of these data. The descriptive statistics were primarily percentages and probabilities of the occurrence of behavioral

events. The inferential statistics included both parametric and nonparametric techniques used in hypothesis testing. All statistical tests were two-tailed. An alpha level of .05 was used in determining the probability of a type one error; i.e., the null hypothesis was rejected when in fact it was true.

Analyses Concerning Attributes of the Child

The two research questions concerning the attributes of the children and asked of the data in this study were: (1) What are the relationships between children's background characteristics and communicative competence scores derived from the small group play observation? and (2) What are the relationships between characteristics of children's social interaction behavior and communicative competence?

The analysis strategies needed to test the hypotheses of interest relative to the above research questions concerned both associations and differences between groups. Thus, correlation, multiple regression, and analysis of variance models were required. However, either parametric or nonparametric statistical models could be chosen. The underlying assumptions of the parametric models were scrutinized first, as they offered more versatility in investigating complex relationships and would, therefore, be favored if the data were appropriate to satisfy their assumptions.

Two basic assumptions of most parametric tests are: (1) normality--the samples have been drawn from populations that are

normally distributed, and (2) measures are continuous with equal-appearing intervals so that mathematical computations such as addition, subtraction, and division can be implemented.

In response to the second assumption, all of the dependent variables in this study could be considered continuous and of an interval scale. The social interaction variables were either means or logs of proportions, both based on intervals derived by a divisor. Many of the independent variables were also continuous and interval, although their metric varied. In some cases, the metric was months; in others, it was number of people, or in the case of SES value, a specially derived index. Thus, all of these variables had equal-appearing interval metrics and satisfied the measurement criteria of parametric tests.

In regard to the assumption of normality, the primary dependent variable, communicative competence, approached normality but was slightly positively skewed in this sample.

Characteristics of the Sampling Distribution of the Communicative Competence Variable.--The following is a description of the sampling distribution of the communicative competence variable derived from the 139 three- and four-year-old children included in the sample.

Central Tendency	Variability	Symmetry
Mean--1.747	Variance--.984	Skewness--.588
Median--1.625	Standard Deviation--.992	Kurtosis-- -.14
Mode--1.367	Range--4.467	
	Minimum--.100 Maximum--4.567	

The distribution of the variable as observed in these data approached a normal distribution, but was slightly flatter and more skewed than the normal curve. The communicative competence scores had a restricted range. Greater numbers of children exhibited low scores than would be expected with a normal distribution. This may be a result of the time-sampling framework, wherein communication is measured whether or not eliciting behavior occurs. If an event-sampling procedure were implemented with the same operationalization of communication, perhaps higher scores would be derived. However, in spite of the limited range, the observed distribution was more nearly normal than any other shape.

With a normal distribution, the mean and median would be the same. A slight difference between the mean (1.747) and the median (1.625) in the observed distribution indicated a slight asymmetry. This distribution was slightly positively skewed, having more values to the right of the center of the curve than extending to the left. This is reflected in the measure of skewness (.588). A perfectly symmetric normal curve would have a skewness measure of zero. Kurtosis is a measure of the peakedness of the curve. In this sample, the kurtosis was -.14. Thus, this curve was flatter than the normal curve, which has a kurtosis of three.

A Kolmogorov-Smirnov Goodness of Fit test was implemented to test the degree of similarity between this distribution and the theoretical normal distribution. The results of this test are reported in Table 3.

Table 3

Results of Kolmogorov-Smirnov Test of Goodness of Fit on the Distribution of the Communicative Competence Variable

N=139			
Max. + Difference	Max. - Difference	K-S Statistic	Probability
.078	-.042	.913	.375

The null hypothesis is rejected if the K-S statistic is too large. In this case, the statistic was small and the decision was to accept the null hypothesis that this distribution came from the normal distribution.

Therefore, it can be assumed that the communicative competence scores were noramlly distributed. An additional safeguard, however, is that most parametric tests are robust in regard to this assumption of normality. Thus, it is safe to assume that these data are appropriate for parametric tests. However, each statistical model will be reviewed individually. Such a discussion follows:

Measures of Association.--

Correlation: The relationship between two variables can be determined by computing a correlation coefficient. Such a coefficient represents the degree to which two variables vary together. When both variables are measured on a linear interval scale, the Pearson product-moment correlation coefficient can be computed. The conceptual formula for this correlation coefficient is $r_{xy} = \frac{Sxy}{S_x S_y}$.

The correlation coefficient is the quotient when the covariance of x and y is divided by the square root of each individual variance (Glass and Stanley, 1970). Correlation coefficients can range in value from -1 to +1. The sign indicates the direction of the relationship, either inverse (-) or direct (+), and the value indicates the strength of the relationship, from no relationship (0) to a perfect relationship (1).

The two assumptions underlying the use and interpretation of this statistical tool are:

1. The predicted relationship is linear.

2. The measurement scales are of equal-appearing intervals.

Both of these assumptions can be satisfied based on the nature of the variables and an understanding of the proposed hypotheses in relation to their foundations in past research. However, a third factor influencing the interpretation of the correlation coefficient is awareness of the possibility that a third variable related to the two under investigation is responsible for the observed relationship. To explore these potential spurious relationships, a variety of partial correlations will be computed when appropriate.

Regression: An extended use of the coefficient of correlation to answer research questions posed in the predictive mode is regression analysis. The regression line or equation is used to predict one variable based upon its relationship to another variable. A test of the accuracy of the prediction can also be made, giving the regression analysis an additional advantage over correlations

(Armore, 1966). The primary task in regression analysis is to derive a regression line that minimizes the deviations between observed and predicted values of the dependent variable for each specified value of the independent variable. A least square method is implemented. The basic equation for the regression line is:

$$Y_e = a + bX$$

The expected value of Y (dependent variable) is the sum of a (the Y intercept) plus b times X (the beta weight or constant representing the slope of the line times the observed value of the independent variable). This equation can be extended to include multiple independent or dependent variables.

In a multiple regression analysis the task is to produce a linear combination of independent variables that will correlate as highly as possible with the dependent variable. The prediction equation in multiple regression is:

$$Y_e = b_1X_1 + b_2X_2 + b_3X_3 \ldots + a + R$$

The beta coefficients are chosen to make R (residual or error) as small as possible.

A variation of multiple regression is stepwise regression, a procedure that provides a means of choosing independent variables in an order that gives the best prediction possible with the smallest number of independent variables. The factor that can determine whether or not an independent variable is included in the F statistic

associated with the significance of beta, and, in some programs, the degree to which a new independent variable is a linear combination of existing variables.

A limitation of this procedure, however, is that the results of the regression analyses are dependent on the specific ordering of the independent variables. Other orderings may produce slightly different results.

In all of these procedures, the statistic that indicates how closely the two or more variables are associated is R^2, the coefficient of determination. Its conceptual formula is:

$$R^2 = \frac{\text{SS linear regression}}{\text{SS total}}$$

Thus, R^2 is the proportion of the total variation in Y associated with X. This term is often converted into the percentage of the variation in Y associated with or explained by knowledge of X.

Measures of the accuracy of the prediction are the standard error of estimate and the F statistic. In the former case, the standard error represents the extent to which, on the average, the observed values of Y are dispersed around the line of regression. The second measure refers to testing the null hypothesis with the proportion of the variation accounted for by the regression equation ($F = \frac{\text{MS regression}}{\text{MS residual}}$). When the F statistic is large enough to reject this hypothesis, it can be accepted that the specified equation is better than a chance predictor of Y given X.

The assumptions of the simple and extended regression analyses are:

1. Normality.
2. Homoscedasticity--the variation in Y is constant for all changes in the value of X.
3. Linearity--the relationship between the independent and dependent variables is linear.

These assumptions can be assumed to be satisfied because there is no evidence to suspect the contrary. Since no such procedures are available in nonparametric tests,the stepwise regression procedure was implemented in this study to determine which of the independent variables were the strongest predictors of communicative competence. As an extension of correlations and partial correlations, the regression analysis provided a means to differentiate among independent variables.

Measures of Group Differences.--The analysis of variance model (ANOVA) is the most versatile in exploring group differences. Such a model allows for tests of interactions as well as main effects in a variety of factorial designs with extensions for multiple dependent variables, analysis of covariance, and repeated measures models. Therefore, if the assumptions of this model can be satisfied, it is the best strategy to implement. The assumptions of the analysis of variance model are:

1. Measures are continuous with equal-appearing intervals.
2. Normality--the samples have been drawn from populations that are normally distributed.

3. Homogeneity of variance--the variances within groups are statistically alike.

4. Independence--observations are independent of one another both within and between groups.

The first two assumptions can be considered satisfied, as discussed earlier. In the case of the third assumption, Levine's test of equality of dispersion was implemented to test for the equality of variances across groups. With this test, the absolute amount of variance in each observation relative to the group mean is entered as the score value into the analysis of variance computations. The nonrejection of the null hypothesis of no differences between groups was sought. The results of these tests are summarized in Table 4.

Table 4

Results of Levine's Test of Equality of Dispersion

Factor	F-Statistic	Level of Probability	Decision
Sex: male, female	2.5420	.113	Do not reject
SES: low, middle	1.0263	.313	Do not reject
Ethnicity: black, anglo	6.0077	.016	Reject

Note: Dependent Variable--communicative competence
Independent Variables--sex, SES, ethnicity

These results indicated that the variance in the two levels of the independent factors within sex and SES were similar. However, with ethnicity, the variance across levels was not similar. Therefore, the assumption of equal variance was not satisfied for ethnicity but was satisfied for sex and SES.

The consequence of violating this assumption when cell sizes are unequal is that it becomes more difficult to find significant differences between groups. The ANOVA is robust in regard to this assumption with equal cell sizes. However, since the cell sizes in this study were unequal, a nonparametric analysis of variance test, the Kruskal-Wallis test, was used to test for ethnic group differences.

A fourth assumption of independence of observations can be satisfied, based on the fact that children were randomly selected to participate in the play groups. Subjects were not matched or paired in any systematic manner. Although the children were randomly selected based on their demographic group identity, this procedure did not violate the independent sampling criteria of this assumption.

A factor that is of concern relative to this assumption is that the data were collected when children of mixed group identity (sex and SES) were interacting together. Methodologically, the sampling procedures satisfied the assumption of independence but the data collection procedures presented some ambiguity.

A primary assumption of this and other small group social-interaction methodologies is that the observed behavior of an

individual is independent of others' behavior and representative of the individual's behavior as it would be exhibited in any group setting. Underlying the statistical assumption of independence is the knowledge that the unit of analysis is the unit that was randomly sampled. In this study, that unit was the individual. If this assumption of independence is violated and a different unit of analysis is used or deemed more appropriate, the lack of independence may effect an increase in the within-group variance. If this occurred, the F statistic would be reduced and it would become more difficult to find significant group differences.

In this study, this assumption of independence was assumed to be satisfied and the analysis of variance model was implemented whenever its other assumptions were satisfied. Thus, to determine sex and SES group differences, ANOVA's were applied. To test for ethnic group differences, the nonparametric Kruskal-Wallis Test was implemented.

Analysis of Variance: The simplest form of the analysis of variance test is a one-way ANOVA with two levels of the independent variable. Two sets of scores exist, one for each level of the independent variable. The analysis of variance model can be represented as:

$$X = \mu + \alpha + \varepsilon$$

The observed score is a linear combination of the population mean + group differences + error. The question asked in implementing this

model is: Is the variance attributed to group membership (α) greater than the error or within-group variance (ε)? If this proportion ($F = \frac{MS_b}{MS_w}$) is large enough to be significant, the question is answered in the affirmative. The two populations can thus be considered different. However, if the within-group variance is large enough to cause the proportion to be smaller than can be expected by chance, the two sets of scores must be considered as representing only one population and thus no group differences exist.

Extensions of this model can be implemented to note the interaction and main effects of more than one independent variable on one or more dependent variables.

Kruskal-Wallis One-Way Analysis of Variance: The nonparametric ANOVA uses data in the form of ranks. All observations are ranked, and the sums of the ranks for each group are tested using a chi square statistic. When this statistic is so large as to be unlikely to occur by chance, the null hypothesis of no group differences is rejected. A correction for tied ranks is also available.

Analyses Concerning Attributes of the Communication

The research question related to the communication that occurs when groups of four children play together was: What is the effect of the mode of communicative exchange on the incidence of communication?

In testing the hypotheses related to this question, frequency data were used, i.e., the frequency of the occurrence of

communication. Each interval for each child was the unit of analysis. This amounted to 4,830 intervals in which descriptive information concerning the play behavior of children was observed and encoded. To prepare for the analyses of the frequency of the occurrence of communication, each interval was checked to determine whether or not communication had occurred. If an impact code was recorded for any one of the peers, communication was considered to have occurred. Contingency tables were formed with one variable representing the occurrence or nonoccurrence of communication and the other variable representing another behavior elicited during the interval. For example, a table may consist of the frequency of communication by the frequency of verbalizations (see Figure 10).

	Verbalizations	
Communication	Yes	No
Yes		
No		

Figure 10. Example of a contingency table.

Analyses of Crossbreaks.--Once the crossbreaks are determined, a nonparametric chi square test can be implemented to determine whether the frequencies observed in the sample deviate significantly from some theoretical or expected frequency distribution. The expected distribution in this case is the chance distribution.

The conditions under which the chi square test of independence can be applied are (Isaac and Michael, 1971);

1. Data must be in the form of frequencies.
2. Individual events or measures are independent of other events.
3. Each event category must have a theoretical frequency of ≥ 5.
4. There must be a logical or empirical basis for the way the data are categorized.
5. Each observation occurs in one and only one cell of the contingency table.

All of these conditions could be satisfied with the frequency data from this study. In regard to the independence condition, the behavioral categories of the OSB were mutually exclusive. Thus the occurrence of an event in one category was not contingent upon the occurrence of an event in another category. Each was a separate event although they all referred to the same behavioral phenomenon. If the null hypothesis is rejected when using a chi square test of independence, the behavioral events are not independent but vary in some systematic manner. A coefficient of contingency is also available to represent the degree of association among variables. This value, although in the range of zero to one, is not as precise as the Pearson product moment correlation coefficient. When tables greater than 2 x 2 are formed, post hoc comparisons can also be implemented.

CHAPTER IV

RESULTS OF DATA ANALYSES

The results of the data analyses are reported in three sections of this chapter, based on the three areas of inquiry identified in the study. Each research hypothesis is stated and discussed relative to its corresponding statistical test. In conclusion, a summary of the results is presented.

Relationships Between Communicative Competence and Background Characteristics of Children

The first three research hypotheses are discussed together, as they were simultaneously investigated using a multiple regression technique. As stated, they are:

H_1: The number of children in the family is a predictor of communicative competence.

H_2: The length of time in group care and the length of time enrolled at the present day care center are predictors of communicative competence.

H_3: The age of the child is a predictor of communicative competence.

These four variables plus the continuous variable, SES value, were entered as independent variables into a stepwise regression procedure to predict communicative competence. The results of this analysis are reported in Table 5.

Table 5

Results of Multiple Regression Analysis Predicting Communicative Competence From Selected Background Characteristics

Multiple R = .3546 R^2 = .1257 F-Statistic = 4.0259 P < .002

Degrees of Freedom: 5 and 134

Stepwise Regression Procedure				
Variable	Beta	Standard Error of Beta	F-Statistic (probability)	Additive R^2
Age	.004	.001	11.441 (.000)	.074
Experience	.001	.000	6.927 (.010)	.043
Months Entered	.001	.001	1.125 (.219)	.007
Number of Children	.003	.006	.139 (.710)	.009
SES Value	.000	.000	.339 (.626)	.002

Age and experience were the only variables that were significant predictors of communicative competence. They accounted for 12% of the variance in communicative competence. Age contributed more to the prediction than experience in group care, but both were highly related to communicative competence.

The correlation coefficients representing the relationship between these variables and communicative competence are reported in Table 6.

The magnitude of these correlation coefficients and the results of the regression analysis suggest that there was no relationship between communicative competence and the number of children in the family. Thus, H_1 was not supported.

Table 6

Pearson Product-Moment Correlation Coefficients for Background Characteristics With Communicative Competence

Background Variables	Correlation Coefficient With Communicative Competence	Level of Probability
SES Value	-.029	.370
Months Entered	.184	.015
Number of Children in Family	-.075	.189
Experience	.237	.005
Age	.340	.001

The length of time in group care (experience) was positively related to communicative competence, as was months since the child entered the day care center. Both of these experience variables, however, were only slightly related to communicative competence as reflected in the magnitude of the correlations (r=.24 and .18, respectively). Only prior experience in group care was predictive of communicative competence. Therefore, only part of H_2 was supported.

H_3 was definitely supported. Age contributed more to the regression equation than did any other variable and was moderately correlated with communicative competence (r=.34).

To explore further the relationship between age and communicative competence, an analysis of variance test was implemented. The sample was divided into two groups: three- and four-year-olds. The results of this analysis are reported in Table 7.

Table 7

Results of a One-Way Analysis of Variance Test for Age Effects on Communicative Competence Scores

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F-Statistic	Level of Probability
Between Groups	12.533	1	12.533	13.931	.0003
Within Groups	123.252	137	.899		
TOTAL	135.785				

The null hypothesis of no differences in communicative competence scores between three- and four-year-olds was rejected. Four-year-olds exhibited higher communicative competence scores than did three-year-olds. These means are presented in Table 8.

Table 8

Means and Standard Deviations of Communicative Competence Scores Based on Age

Group	Mean	Standard Deviation	N
Three-Year-Olds	1.198	.716	32
Four-Year-Olds	1.911	1.006	107

As both age and experience were found to be predictors of communicative competence, a series of partial correlations was computed to note the magnitude of the relationship of these

variables with communicative competence when the other was controlled. These results are reported in Table 9.

Table 9

Partial Correlation Coefficients

Variable	Control Variable	Correlation With Communicative Competence	Level of Probability
Age	--	.340	.001
Age	Experience	.315	.001
Experience	--	.237	.005
Experience	Age	.197	.021

Although age was more highly related to communicative competence than was experience (r=.34 and .24, respectively), the change in the magnitude of the relationship when the effects of the third variable were controlled remained about the same for each pair of variables. Thus, age and experience contributed about equally to the nature of each other's relationship with communicative competence.

When all experience variables--experience, months entered, and number of children in the family--were controlled, the relationship between age and communicative competence was r=.295 ($p < .001$). When age, months entered, and number of children in the family were controlled, the relationship between experience and communicative competence was r=.174 ($p < .043$). Thus, the relationship between age and communicative competence was only slightly influenced by

simultaneous associations with experience factors. Experience, however, exhibited more variation when other factors were controlled.

Hypotheses 4, 5, and 6 were investigated using tests of group differences. Since the independent variables, sex and SES, satisfied the assumptions of the parametric analysis of variance model, these two variables were investigated together using a two-way analysis of variance test. The third independent variable, ethnicity, did not satisfy these assumptions and, therefore, Hypothesis 6 was tested using a nonparametric analysis of variance model, the Kruskal-Wallis test. The results of testing Hypotheses 4 and 5 are discussed below.

H_4: Children from middle-SES homes have higher communicative competence scores than children from low-SES homes.

HO: There are no differences in the communicative competence scores of low- and middle-SES peers.

H_5: Males exhibit higher communicative competence scores than females.

HO: There are no differences in the communicative competence scores of males and females.

As no interaction effects were noted, a clear test of main effects was possible. As noted in Table 10, the null hypothesis for sex effects was rejected but the null hypothesis for SES effects was not rejected. No differences between low- and middle-SES peers exist. Therefore research hypothesis 4 was not supported. The means and standard deviations for these two groups are presented in Table 11.

Table 10

Results of the Two-Way Analysis of Variance Test for Sex and SES Effects on Communicative Competence Scores

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F-Statistic	Level of Probability
Sex by SES Interaction	.446	1	.446	.446	.999
Sex Main Effect	7.063	1	7.063	7.433	.007
SES Main Effect	.000	1	.000	.000	.999
Residual	128.268	135	.950		
TOTAL	135.785	138	.984		

Table 11

Means and Standard Deviations for Communicative Competence Scores Based on SES Group Membership

Group	Mean	Standard Deviation	N
Low SES	1.739	1.027	72
Middle SES	1.755	.961	67

Sex differences, however, were noted. Thus, Research hypothesis 5 was supported. Males exhibited higher communicative competence scores than did females. The means and standard deviations are presented in Table 12.

Table 12

Means and Standard Deviations for Communicative Competence Scores Based on Sex

Group	Mean	Standard Deviation	N
Male	1.977	1.054	68
Female	1.526	.881	71

Research Hypothesis 6 was presented in the null form, as no differences were expected. Since the ethnicity variable did not satisfy the ANOVA assumption of equal variances, the nonparametric Kruskal-Wallis test was implemented to test for the effects of ethnicity.

H_6: There are no differences in anglo and black children's communicative competence scores.

The results of this test are reported in Table 13.

Table 13

Kruskal-Wallis One-Way Analysis of Variance Test for Ethnic Group Differences in Communicative Competence Scores

Group	Sum of Ranks	Mean Rank	N	Chi Square	Probability
Black	2.557.5	77.5	33	1.501	.221
Anglo	7171.5	67.67	106		

The null hypothesis was not rejected. No ethnic group differences were observed; thus Research Hypothesis 6 was supported.

Although no significant differences were noted between the communicative competence scores of anglo and black children, the mean rank for black children was higher than the mean rank for anglo children. Thus the actual means and standard deviations were computed and are presented in Table 14. Black children's communicative competence scores were higher but also exhibited more variation than those of anglo children.

Table 14

Means and Standard Deviations of Communicative Competence Scores Based on Ethnicity

Group	Mean	Standard Deviation	N
Black	2.016	1.259	33
Anglo	1.663	.883	106

As significant differences in communicative competence scores were observed based on the child's age, the subsamples within the sex, SES, and ethnic groups were tested to see if they varied significantly in their age distribution. One-way analysis of variance tests were implemented with age as the dependent variable. A summary of these results is reported in Table 15.

As noted in Table 15, none of these groups varied significantly in their age distributions. Thus, age could not be considered an influence in interpreting the results of the tests of Hypotheses 4, 5, and 6.

Table 15

Results of Analysis of Variance Tests for Age Differences in Sex, SES, and Ethnic Groups

Independent Variable	F-Statistic	Probability
Sex	2.05737	.1541
SES	1.1125	.2934
Ethnicity	.6482	.4222

Similar tests were implemented with expereince as the dependent variable. Again, no differences were observed in the past experiences in group care of the children in the various sex, SES, and ethnic groups.

Relationships Between Communicative Competence and Other Social Interaction Variables

Both Pearson product-moment correlation coefficients and regression analyses were computed to test the research hypotheses concerning the interrelationships among the social interaction variables derived from the observation in the small group play session.

Hypotheses 7, 8, and 9 are discussed together. As stated, they are:

H_7: Children's social behavior and communicative competence scores are positively related.

H_8: Children's initiative scores are more highly related to communicative competence than to responsivity scores.

H_9: Responsivity scores and communicative competence scores are positively related among children with similar activity patterns.

To explore the basic degree of association among these five variables, simple Pearson product-moment correlation coefficients were derived. They are presented in Table 16.

Table 16

Pearson Product Moment Correlation Coefficients Representing the Interrelationships Among the Social Interaction Variables Derived From the OSB

	Communicative Competence	Social Behavior	Responsivity	Initiative	Activity Level
Communicative Competence	1.00	.76***	.27***	.52***	-.56***
Social Behavior		1.00	.15*	.38***	-.61***
Responsivity			1.00	.74***	.12
Initiative				1.00	-.22**
Activity Level					1.00

*p < .05
**p < .01
***p < .001

In response to H_7, children's communicative competence scores were highly correlated with average level of social behavior (r=.76). Children who were more socially oriented and interacted with peers at more involved levels of play had a greater impact on their social environment through communication.

Observation of the simple correlation coefficients also suggested that H_8 could be supported. Children's initiative scores were more highly related to communicative competence than were their responsivity scores (r=.52 and .27, respectively).

However, when activity level or the average intensity of interaction was controlled, the partial correlation coefficients suggested a different interpretation (see Table 17). The actual frequency with which children responded was more highly related to communicative competence than the frequency with which they initiated. It appeared that children's responsivity and initiation patterns were highly associated with each other and with communicative competence scores, therefore suggesting that children who respond to peers tend also to initiate interaction with them and thus affect communication.

Table 17

Partial Correlation Coefficients Holding Activity Level Constant

N = 136		
	Initiative	Responsivity
Communicative Competence	.49*	.58*

*p < .001

H_9, referring to the relationship between responsivity and communicative competence scores, was supported. Children's

responsivity patterns were highly related to communicative competence when the effects of activity level were removed (r=.58).

A multiple regression analysis with a stepwise procedure was also implemented to determine the relative contribution of the various social interaction variables in predicting communicative competence. Four independent variables were entered into the regression equation: social behavior, responsivity, initiative, and activity level.

The overall equation accounted for 65% of the variation in communicative competence scores. The results of this analysis are reported in Table 18.

Table 18

Results of Multiple Regression Analysis Predicting Communicative Competence From Social Interaction Variables

Multiple R = .808 R^2 = .652 F-Statistic = 66.128 P<.000

Degrees of Freedom: 4 and 135

Stepwise Regression Procedure

Variable	Beta	Standard Error of Beta	F-Statistic (Probability)	Additive R^2
Social Behavior	.886	.102	197.515 (.000)	.58
Initiative	.202	.068	23.884 (.000)	.06
Activity Level	-.607	.271	5.509 (.020)	.01
Responsivity	.012	.059	.043 (.837)	.00

The results of this regression analysis suggested that social behavior and initiative scores were most predictive of communicative competence, accounting for 64% of the variance. Activity level, although a significant predictor, only accounted for another 1% of the variation. Given the knowledge of the child's social behavior and initiation patterns, responsivity patterns did not contribute to the predictive equation for communicative competence.

Thus, even though responsivity scores may be more highly related to communicative competence when activity level is held constant, knowledge of the child's initiation patterns is more important when predicting communicative competence scores. This information lends further support to H_8.

Table 19

Results of Multiple Regression Analysis Predicting Communicative Competence From Both Background Characteristics and Social Interaction Variables

Multiple R = .8124 R^2 = .6601 F-Statistic = 29.34 P<.000

Degrees of Freedom: 9 and 130

Stepwise Regression Procedure

Variable	Beta	Standard Error of Beta	F-Statistic (Probability)	Additive R^2
Social Behavior	.863	.107	197.515 (.000)	.58
Initiative	.192	.070	23.883 (.000)	.06
Activity Level	-.599	.281	5.508 (.020)	.01
Experience	.003	.003	1.612 (.206)	.00
Age	.004	.009	.174 (.677)	.00
Responsivity	.026	.061	.215 (.644)	.00
Months Entered	.001	.007	.073 (.787)	.00
Number of Children	.026	.038	.143 (.706)	.00
SES Value	-.004	.004	.984 (.323)	.00

Knowledge of both a child's background variables and social interaction variables provided a regression equation that accounted for 66% of the variation in communicative competence scores. The social interaction variables contributed more to the equation than did the background information. Social behavior and initiative were the most highly predictive variables, accounting for 64% of the variance. Given information about the child's social interaction behavior, age and experience did not aid in predicting communicative competence.

Differential Incidence of Communication

In the following section, the discussion focuses on the analyses undertaken to determine the differential incidence of communication through various modes of exchange. Chi square tests of independence were implemented, with the unit of analysis being the interval.

H_{10}: More communication is elicited in intervals with verbalizations than in intervals without verbalizations.

The statistical hypothesis presented to test this relationship was:

HO: The occurrence of communication is independent of the occurrence of a verbalization.

This null hypothesis was rejected. The results of the chi square test are reported in Table 20.

More communication occurred in the verbal mode, whereas less communication than expected by chance occurred in the nonverbal mode. Thus, Research Hypothesis 10 was supported.

Table 20

Chi Square Test of Relationship Between Communication and Verbalizations

χ^2 Value = 889.45	df = 1		P < .000
Communication	Verbalizations		
	Nonverbal	Verbal	
No Communication	1357	163	observed
	895	625	expected
Communication	1221	1639	observed
	1683	1177	expected
Contingency Coefficient = .41			

Communication occurred through the verbal mode 57% of the time and through the nonverbal mode 43% of the time. However, as also noted in Table 20, a number of intervals in which verbalizations occurred were not accompanied by communication (N=163). This frequency represented 9% of the intervals in which verbalizations occurred or 4% of the total intervals.

H_{11}: More communication is elicited in intervals with negative interactions than in intervals with positive or neutral interactions.

Ho: The occurrence of communication is independent of the type of behavioral affect observed.

The null hypothesis associated with Hypothesis 11 was rejected. Results of this test are reported in Table 21.

More communication occurred in intervals with negative behavioral affect; less communication than would be expected by

Table 21

Chi Square Test of Relationship Between Communication and Behavioral Affect

χ^2	df = 1		P < .000
Communication	Behavioral Tone		
	Negative	Neutral or Positive	
No Communication	50	1470	observed
	284	1236	expected
Communication	769	2091	observed
	535	2325	expected
Contingency Coefficient = .28			

chance occurred in intervals with neutral or positive affect. Thus Research Hypothesis 11 was supported.

To investigate further the context of behaviors eliciting communication, the following probabilities were computed. These probabilities describe the relationship between behavioral affect and the object of the interaction when physical contact occurs and when it does not occur.

Children responded more to negative behavioral affect when the object of the interaction was a peer than if it was the materials and environment. This relationship held both with and without physical contact being established. However, when the object of the interaction was the materials or environment children responded more to negative behavior only when contact was established.

Table 22

Probabilities of Communication Based on Behavioral Affect, Object of Interaction, and Physical Contact

Object of Interactions	Behavioral Affect			
	Negative		Neutral or Positive	
	Contact	No Contact	Contact	No Contact
Peer	.98	.95	.93	.63
Materials or Environment	.84	.38	.37	.39

On the other hand, when direct physical contact was made with a peer, the probability that the behavior would be communicated was very high, whether it was negative (.98) or neutral/positive (.93).

H_{12}: More communication is elicited in intervals with initiations directed to individual peers than in intervals with initiations directed to the group or the materials and environment.

Ho: The occurrence of communication is independent of the nature of the object of the initiation.

The null hypothesis associated with Hypothesis 12 was also rejected. These results are reported in Table 23.

More communication occurred when the object of the initiation was an individual peer; less communication than would be expected by chance occurred when the object of the initiation was the generalized group or materials and environment. Thus Research Hypothesis 12 was supported.

Table 23

Chi Square Test of Relationship Between Communication and the Object of the Initiation

χ^2 = 116.36	df = 2		P < .001
Communication	Object of Initiation		
	Materials or Environment	Group	Individual
No Communication	36	31	20 observed
	10	16	61 expected
Communication	121	212	929 observed
	147	227	888 expected

In general, children's play behavior was communicated to at least one other peer 65% of the time. For three-year-olds, communication occurred 54% of the time and for four-year-olds, 68% of the time. The probability that communication would occur increased if a verbalization occurred (.91), or if an initiation was intentionally directed at another peer (.98).

Summary of the Results

The results of the data analyses can be summarized as follows:

1. Relationships between communicative competence and background characteristics of children.

    a. The number of children in the family was not related to children's communicative competence scores.

b. The child's previous experience with peers, as measured by total length of time in group care, was positively related to and a significant predictor of communicative competence.

c. The length of time the child had been enrolled in the present day care center, a measure of familiarity as well as experience with peers, was only mildly related to and not predictive of a communicative competence score.

d. The child's age in months was positively related to communicative competence. Four-year-old children had higher communicative competence scores than did three-year-olds.

e. There was no relationship between a child's social economic status and his communicative competence.

f. There was no relationship between a child's ethnicity and his communicative competence.

g. Males exhibited higher communicative competence scores than did females.

2. Relationships between communicative competence and other social interaction variables.

   a. A measure of the child's average level of social participation, social behavior, was the best predictor of communicative competence.

   b. In comparison to responsivity scores, initiative scores were more highly related to and accounted for more of the variation in communicative competence.

   c. When a measure of the intensity of interaction was held constant, responsivity scores were related strongly and in a positive direction to communicative competence.

3. Relationships between communication and mode of exchange.

   a. Three- and four-year-old children's play behavior communicated 65% of the time.

   b. The three- and four-year-old children in this sample communicated with fellow peers through the verbal mode slightly more frequently (57%) than

through the nonverbal mode (43%). The probability of communication when a verbalization occurred was .91. The probability of communication occurring for a nonverbal behavior was .47.

c. Behaviors with a negative physical affect communicated more than behaviors with a neutral or positive affect. This relationship held whether the object of the interaction was the physical or the social environment, and whether or not contact was made with that object.

d. More communication occurred when children directed their initiations to indiviual peers than when initiations were directed to the generalized group or the materials and environment.

CHAPTER V

DISCUSSION

This study was designed to investigate the relationships between three- and four-year-old children's background characteristics and social interaction behavior and the degree to which they communicate to peers in a small group play setting. A small group social-interaction methodology and time-sampling observational rating procedure was utilized to identify and measure communication.

A discussion of the results of the data analyses is organized around the three thrusts of these analyses: (1) the relationships between background characteristics and communicative competence, (2) the relationships between selected social interaction variables and communicative competence, and (3) the incidence of communication.

The Relationships Between Background Characteristics and Communicative Competence

A measure of the child's communication skill was developed as the average intensity times frequency of behavioral impact on peers. This variable was called communicative competence. Children's background characteristics were examined in relation to differential distributions of communicative competence scores.

The results of these analyses suggested that age, experience in group care, and sex had the most differential influence on communicative competence. Older children and children with greater experience in group settings had higher communicative competence scores. Males also had higher scores than females. No significant differences were evident based on number of children in the family, months since child entered the day care center, socioeconomic group membership, or ethnicity.

Most studies have reported age-related increments in the amount of peer communication observed (Garvey & Hogan, 1973; Honig, et al., 1970; Smith & Connolly, 1972). Mueller (1972), Smith and Connolly (1972), and Blurton Jones (1972) also reported significant sex differences. Males exhibit more verbalizations than females and interact in more socially involved play, therefore establishing greater opportunity for communication. Hence, the result of the present study confirm the results reported in similar studies of children's social interactions.

Although age and experience factors are often difficult to separate, in this study age appeared to have a greater influence on communicative competence when experience was held constant than did experience when age was held constant. Smith and Connolly (1972) reported the opposite conclusion, using a social participation index as the dependent variable. The nature of the measure of children's experiences in these two studies may have contributed to these differing results.

The results of no relationship between communicative competence and socioeconomic group membership, number of children in the family, and ethnicity are difficult to discuss in relation to prior research, as these relationships have not been specifically investigated in the literature. A large body of research exists relative to language differences among socioeconomic classes (Ervin-Tripp, 1966). However, when communication is defined as both verbal and nonverbal behavior, as it is in this study, communication advantages that middle-SES children may have in the verbal mode may be compensated for by low-SES children's potential superiority in the nonverbal mode (Miller & Swanson, 1960). Thus SES differences would not be evidenced. Therefore, the finding of no SES group differences was not surprising.

However, the socialization literature would seem to suggest that the number of children in the family would be related to children's skills in interpersonal relationships (Clausen, 1968). Thus, it was expected that the number of siblings in the family would be related to communicative competence. This was not the case.

One problem could be that this sample was largely composed of children who were only children or the oldest child in the family. Less than one-sixth of the sample of children had older siblings. Thus, a restricted range of values existed on this variable. When the sample was divided by only child vs. child with siblings, still no significant differences were noted in children's communicative competence scores.

Another factor perhaps confounding this relationship was the fact that all of these children were presently in day care settings and already had widespread contact with peers. Thus, even the children without siblings had numerous opportunities to gain skill in social interaction through their peer contacts.

Based on the fact that black children have been reported to have higher activity levels and social behavior scores (Boger & Cunningham, 1972), it was expected that black children would also exhibit higher communicative competence scores. However, in this study, although black children's communicative competence scores were higher than anglo children's, these differences were not significant.

The relatively small number of black children included in this sample (N=33) compared to the total sample size (N=139), and the unequal cell variances observed between black and anglo children both contributed to decreasing the chances of noting significant differences. When the more powerful parametric ANOVA was implemented to test for ethnic group differences, the F-statistic approached significance at $P < .07$. Thus, a trend may be revealed in future investigations.

Relationships Between Social Interaction Variables and Communicative Competence

The focus of this aspect of the study had two purposes: (1) to determine what dimensions of children's social interaction behavior may be related to communication behavior, and (2) to explore the

utility of the observational procedure in measuring unique dimensions of behavior.

If similar relationships exist between offering and receiving, as would be expected from the literature on peer reinformcement and modeling (Mowrer, 1950; Hartup & Coates, 1967) children's frequency of response to others may be related to the degree to which they in turn receive responses from others. In this study, communicative competence was a measure of behavioral impact on the social environment, thus reflecting the degree to which others responded to the subject's behavior. However, either responses or initiations could elicit communication. As initiations were present in the data in only 31% of the intervals that elicited communication, and since communication occurred in 65% of the intervals, much of the communication that occurred resulted from peer observations of the subject's responses to stimuli elicited elsewhere or to ongoing activity. Thus, it would appear that children's responsivity patterns may be as highly related to communicative competence as to initiation patterns.

As a result of the various analyses, it can be said that initiation and responsivity patterns are in themselves highly related ($r=.74$) but are not similarly related to communicative competence. Although when the intensity of the information flow is controlled, responsivity is more highly related to communicative competence than to initiative scores, this relationship merely confirms the fact that a large number of responses elicited communication.

Initiation patterns are definitely more salient than response patterns in producing communication. The more frequently and more intensely one initiates interaction with either the social or physical environment, the more likely one is to impact on others in proximity and thus complete an act of communication. Further, specific initiations to peers are most likely to be communicated.

The other finding of interest in these analyses is that one's level of social behavior is more predictive of and more strongly related to communicative competence than either responsivity or initiative scores. Parten (1932), developed this ordinal scale to represent a measure of children's social involvement in a play setting. It has weathered time and methodological advances in social interaction research and still provides the most precise measure of the quality of children's social involvement.

As would be expected, the more proximal and more intimately involved peers are, the more likely it is that communication will transpire. A review of the frequency data confirmed this relationship. When children were engaged in unoccupied, solitary, or onlooker behavior, the probability that communication would occur was .24. When children were engaged in parallel play, the probability was .37. This probability of communication increased considerably when children were interacting at the associative or cooperative levels of play. At these more involved levels, the probability of communication was .95.

However, an interesting contribution of this study is the fact that children are extremely aware of each other's behavior.

Even when children were in the socially inactive levels of play, 24% of their behaviors were communicated!

Description of the Incidence of Communication

A task in this investigation was to describe the frequency with which children's play behavior communicated, whether or not the intent to communicate was present. Hence, a time-sampling framework was chosen. The resulting measures of frequency of communication represented a cross-sectional view of children's behavior in a small group setting. Considering this methodology, these frequency data may be conservative compared to other studies that use event-sampling procedures and hence specifically observe interaction or intentional exchange.

In this study, communication occurred in 65% of all intervals. This figure was comparable to the 66% of the time that 3 1/2 to 5-year-old dyads were reported in "mutual engagements" by Garvey and Hogan (1973).

Communication occurred more frequently with age. Whereas communication occurred in 54% of all intervals for three-year-olds, it occurred 68% of the time for four-year-olds. These age trends were similar to those reported by Honig et al. (1970) and Garvey and Hogan (1973).

Of the time-sampled behaviors that communicated, 57% were accompanied by a verbalization. In 43% of the intervals communication occurred through the nonverbal mode. No other studies have similarly noted the incidence of communication among children through

these two modes of exchange. However, Honig et al. (1970) reported that more behavior was directed through the verbal mode with three- and four-year-olds than with two-year-olds. In this study, three- and four-year-old children communicated about equally through the verbal mode and only slightly more through the verbal mode than through the nonverbal mode.

Although Mueller (1972) only investigated verbal communication, he observed that 85% of all utterances were communicated. In the present study, 91% of all sampled behaviors with verbalizations were communicated. Although the probability was much greater that a verbal behavior would communicate, much nonverbal behavior was also communicated. The probability of communication for a nonverbal behavior was .47.

The affective nature of the observed behavior also affected the probability of communication. When a negative affect was expressed, the probability that the behavior would communicate was .94. In contrast, when neutral or positive affect was expressed, the probability of communication was .59, only slightly greater than chance. When the behavior was directed to a peer and contact was established, the probability of communication was high for both negative (.98) or neutral/positive behavior (.93). However, when no contact was established or if the object of the behavior was the materials or environment, behaviors associated with negative affect communicated significantly more frequently than did behaviors associated with neutral/positive affect.

Thus, these children were more sensitive to behaviors associated with negative affect. Although no empirical evidence is available to collaborate these findings, Piaget (1926) suggested that a contribution of peer interaction to cognitive development was the presentation of information dissonant from the child's experience. It would appear from these results that children are more attentive to dissonant events, i.e., events considered less socially appropriate.

The fact that three- and four-year-old children are egocentric by nature may account for the finding that they are most responsive to dissonant events--events that strongly impact on their attention. However, an equally salient explanation may be that children at this age are generally less able to exercise control over others' behavior. Young children may be limited in their interpersonal integrating skills (Goffman in Sutton-Smith, 1971). Thus aggressive behavior exhibited in the small group play session may be more threatening and therefore more noticeable to these children than such behavior may be in other settings or for older children. This potential role of communication skills in both facilitating and coordinating peer social interaction has important implications for the socialization process and hence deserves further research attention. But, likewise, the generalizability of this finding of selective attention must be explored to see if it holds in other settings. Its generalizability to children's television viewing habits is a timely issue to explore.

Finally, a social skill developed with experience is the ability to attract the receiver's attention before a communicative exchange. The initiation codes of these observational data were analyzed to determine the differential distribution of communication based on the directionality of the initiations. The observers looked for attention-getting gestures or verbalizations as well as eye or body contact when determining the object of the initiation. Eighty-eight percent of the initiations were directed to the social environment. As would be expected, generalizing from Mueller's (1972) results, more communication occurred when the initiations were purposefully directed to a specific peer rather than the generalized group or the materials and environment.

Summary

Three- and four-year-old children were found to be very sensitive to and aware of each other's behavior. Their behavior communicated frequently, although this depended on the attributes of the communicative exchange.

As would be expected by nature of the precision with which verbal information can be transmitted, behavior accompanied by a verbalization communicated more often than did nonverbal behavior. Likewise, initiations directed to specific peers communicated more than did behaviors directed to the generalized physical and social environment.

However, interestingly, much generalized behavior was also communicated. It would appear that children attend to a wide variety of behavior elicited by others in the social environment, whether or

not such behavior is directed at peers or even intended to be communicated. In fact, 39% of all behaviors directed to the physical environment when no peer was interacting with the subject were in fact communicated to others in proximity. Thus, it would appear that children are very open to receive information from their environment.

Further, these findings suggest that children are more likely to attend to behaviors associated with negative affect than behaviors associated with neutral or positive affect. Children are, it seems, selective in their attending and responding patterns. They do in fact notice dissonant events more frequently than would be expected by chance.

Children's communicative competence scores, reflecting the degree to which they impact on the social environment, are strongly related to the relative proportion of the time they initiate to others and the quality of their play involvement. More active, socially involved children make a stronger impact on others.

Communicative competence scores are also related to children's age, experience in group care, and sex. Communicative competence increases with age and experience. Male children appear to have higher communicative competence scores than females. However, socioeconomic group membership, ethnicity, and the number of children in the family are not related to the incidence of differential communicative competence.

CHAPTER VI

CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FUTURE RESEARCH

Conclusions

The primary contributions of this study are: (1) the objectively derived descriptions of children's play group communications, (2) the identification of the conditions associated with the occurrence of communication, and (3) the identification of factors associated with the relative magnitude of communicative competence scores. These descriptive and comparative data aid in understanding the information-transmission potential of peer contact. A secondary contribution of this study is an examination of a time-sampling methodology that was adapted to assess multiperson communication.

Children's Play Group Communicative Competence

1. The data from this study show that three- and four-year-old children are very open to elicit information and to receive information from the social environment. Young children attend to a wide variety of stimuli emitted from the environment. Even when children are not socially involved with others, much of their behavior is being observed. Thus, young children appear to be extremely attentive and responsive to each other.

At age three and four, most of the children's initiations (88%) are directed to the social rather than the physical environment. When these initiations are directed to specific peers rather than the generalized group, the probability of communication increases. Likewise, behaviors accompanied by verbalizations communicate more than do nonverbal behaviors. However, a sobering finding of this study is that behaviors associated with negative affect communicate more than behaviors associated with neutral or postive affect. Such negative affect would be attributed to disruptive or anti-social behaviors.

These results naturally lead to the question of the potential effects of selective attention. How do these response patterns affect children's own behavioral repertoire? If children who produce negative behaviors are reinforced by peer attention, what effect does this have on their social development? These questions need to be answered before the impact of the present findings can be known. But at least the knowledge of such selective attention can alert educators and parents to be more aware of children's interactions during unstructured play.

2. In this study, children's communicative competence scores were found to be positively related to age and experience in group care. This finding supports the proposition that communication is a learned skill. Communication can be viewed as requiring social experiences for expansion and successful application. Hence, children's peer interactions are important in developing the social skills necessary to increase the efficiency of communication.

Peer contact provides a unique type of interaction and thus a unique opportunity for developing social and communication skills. When interacting with adults, children's communications can be less precise and still convey meaning. But when children interact with like-skilled peers, their communication skills are challenged. They cannot rely on others to aid in making themselves and their needs known. And since they must communicate in order to influence the sequence of activity, children's peer interactions are important arenas for experimenting with a variety of ways to initiate and maintain social exchange.

In the larger study from which these data were derived, children who received a short-term treatment condition, including systemic guidance for initiation and cooperation behavior, exhibited greater environmental control (a variable similar to communicative competence) than did children in the control condition (Boger & Andrews, 1975). Through specific social experiences children's social communication skill improved. The trial-and-error learning and the irregular reinforcement that occurs in the natural environment of peer interaction may be less efficient than more controlled peer interaction experiences within a classroom or curricular unit. Thus, experimental treatments may be more effective than mere experiences with peers in influencing children's communicative competence. Nevertheless, the trend of these results confirms the fact that communication as a social skill is learned and is influenced by social experiences.

3. Children's social interaction skills aid social exchange. Social interaction measures are most predictive of communication scores. Regardless of the kinds of experiences that lead to the development of basic social interaction skills, these skills in themselves are critical in determining the success of children's interactions with peers.

Three- and four-year-old children, being egocentric and socially naive, may therefore be most responsive to dissonant events --events that strongly impact on their attention. However, the underlying social skills associated with successful communication are perhaps of more importance and perhaps have a greater impact on children's participation in social groups with increasing age. The social skills associated with gaining the attention of peers, of facilitating common play objectives, and especially of transmitting information through the verbal mode may become increasingly critical to success in peer interaction as the child moves into later stages of development. At this age such behaviors are already recognized as being strongly related to communicative competence and the incidence of social exchange. Hence, educators should be sensitive to diagnosing and helping children expand these communication and social interaction skills as early as possible.

Methodological Contributions

1. A strength as well as a weakness of this study concerns the use of the time-sampling observational methodology. Communication is a process; it is made up of linear actions and reactions,

but the essence of communiction lies with the consequences of a multitude of these linear transactions. Therefore, observing continuous behavior to detect the consequences of communication transactions would be most desirable. Furthering an understanding of how individuals change and are influenced by sharing information with others is the ultimate goal of communication/socialization research. The present study can be seen to contribute in some important ways to that goal, but as operationalized, it deals with influence at a much more basic level.

The strength and a contribution of this study is the objectively observed representative description of children's multiperson communication behavior. The time-sampling framework provides a description of spontaneous behavior not limited by instances of intentional communication nor interactions that are strictly contained between and among individuals. The operationalization of communication with this time-sampling rating procedure produces a representative cross-section of behavior and then asks: How much of this behavior is communication? Thus, these data provide a normative backdrop for future investigations that can ask more specific questions about the conditions and consequences of specific actions.

2. Additionally, in regard to the measure of children's skill in impacting on others--communicative competence--the time-sampling framework, if anything, could have neutralized the distribution of this variable. Since communication was being assessed whether or not initiations occurred, peer responsivity patterns might have influenced communicative competence scores and thus reduced

their differential distribution. However, this did not appear to happen. Communicative competence was strongly related to the subject's active participation in the play group, providing evidence that as a variable it did measure internal attributes of the child rather than dimensions of the responsivity of peers. Likewise, the ability of this variable to detect demographic group differences provides further evidence that its operationalization was sound.

Communicative competence, although highly related to measures of social involvement and elements of interaction, measures a dimension of the play group behavior that is greater than either of these more traditional measures. Communicative competence is a more precise measure of openness in the human system.

Perhaps the most important contribution of this study is the operational definition of communicative competence: a means to assess how children impact on others. This variable can then be placed in a variety of event-sampling frameworks and continuous recording systems to note the sequential impact of children's behavior on others.

Limitations of the Study

The limitations of this study and suggestions for future improvements are listed in the following section.

1. Sample--A purposeful sample of three- and four-year-olds representing children from urban day care centers was observed in this study. Thus, although this sample included children with a variety of demographic characteristics, the population to which

these results can be generalized is restricted. As an initial investigation using a specific methodology to assess communication, this sample provided adequate opportunity to test the methodological operationalization of variables and to provide normative descriptive and comparative data to investigate relevant research hypotheses. The reader is cautioned, however, to be aware of the sampling limitations of this study when generalizing these results.

2. Control over Independent Variables--The sample was primarily selected because of sex and SES distributions. Other independent variables identified for investigation in this study were, therefore, limited to the range of values and subsample size that already existed in the sample. The three factors whose relationships to communicative competence may have been most adversely affected by these limitations were experience in group care, ethnicity, and number of children in the family. Further investigations using random samples or samples with more equal distributions across levels of these factors are recommended to provide a more precise test of these relationships.

3. Nonverbal Codes--The Observation of Socialization Behavior instrument includes only two scales to assess nonverbal behavior --contact and behavioral tone. Although these two scales can cover all possible events, they provide little specific information to identify the behavior or even the context of the action. Other scales including action verbs such as runs, hits, and offers could be included to provide a means of determining patterns of responses to specific behaviors as well as to specific peers.

Blurton Jones (1972) suggested that children may develop patterns of interacting with others and then replace specific behaviors with other behaviors that hold the same symbolic meaning or produce the same results. For example, young two-year-olds who bite others in frustration may replace biting behavior with snatching or hitting behaviors at age three and later develop verbal patterns --all aimed at satisfying the same interpersonal objective. By observing these specific behavioral events and the context of their occurrence, such patterns may be identified. Such diagnostic facility would aid in behavioral therapy and increase the ability to predict later behavior from knowledge of present behavioral tendencies.

4. Reciprocity--A next step in social communication research should be the observation of continuous behavior so that the sequence of a communication transaction can be analyzed. Rating scales similar to the OSB can be used, but the sampling framework and the unit of analysis would need to be redefined. An event sampling of interaction behavior of interest to the observer, accompanied by rapidly sequenced time-sampling intervals, is one alternative. Such a system would identify specific events and then continuously record short intervals to note the sequence of behavior that occurs.

5. Small Group Setting--The relationships derived from this study must be generalized based on the fact that the data were collected while children were playing in a novel, open field setting. Whether these same relationships would be detected with data derived from natural classroom settings or other small group settings is

difficult to project. It would appear that the nature of this setting in terms of children's prior experiences may have a specific effect on children's behavior and perhaps even a differential psychological impact on children. These potential effects of the setting on children's behavior need to be explored more fully and will aid in moving toward more ecologically oriented inquiry. For the present study, the results must be generalized in light of the nature of the composition of the small group and the fact that the setting was novel.

6. Assumption of Independence--Although the possibility of violating the assumption of independence of observations did not jeopardize the statistical results of this study, the question remains in terms of the validity of the results. As discussed earlier, the assumption that these measures were unaffected by the specific peers who were in interaction needs to be investigated. The children in the small group were the environment in this situation, and the effect of this specific environment on children's behavior needs to be explored before these observational measures can be considered representative of the child's behavior in general. Presently, there is no reason to suspect that these behaviors are not representative. In fact, earlier investigations using the same methodology have noted trends in behaviors that could not have been noted if behaviors varied greatly during individual observations. Thus, these results can be accepted with confidence. Yet the development of empirical estimates of the potential variability in measures resulting from environmental influences is also imperative.

7. Costs-Benefits--The observational methodology implemented in this study is extremely costly in terms of human and material resources. To observe, rate, and encode ten minutes of observational data for each child requires approximately one hour. When considering the time consumed in setting up and taping the play sessions and subsequently in processing the data, a large amount of human time is involved. Equally costly are the videotape supplies and equipment and the computer programming services required to analyze observational data. Hence the costs are great.

The benefits of this methodology although difficult to quantify, are also substantial. Briefly, such a methodology provides a natural, unobtrusive assessment of children's behavior. The objectivity and validity of such data are, therefore, more credible than interview data or retrospective reports or ratings that may introduce instrumentation and observer biases.

Likewise, an important feature of this methodology is that the actual behavior is recorded permanently. Errors of measurement connected with the ratings can be systematically evaluated with this ability to recycle processes. A variety of different observational procedures can be implemented and their comparability determined. A variety of types of behaviors can be observed for various purposes. Thus, the versatility in investigating a variety of methodological and substantive questions is great.

This methodology also has the potential to be used for clinical diagnosis of behavioral problems and for pedological purposes in developing strategies to modify behavior. Such an

observational procedure can alert teachers to the social feedback that handicapped children may be receiving in unstructured times with peers. Likewise, systematic observations over a period of the school year could provide evidence of the child's adjustment and progress in developing social relationships.

The costs appear to be fixed compared to the diversity of benefits potentially available through such a methodology. However, the cost-benefit issue is real and is an important consideration in determining the utility of this methodology.

Implications and Suggestions for Future Research

The results of this study illustrate that three- and four-year-old children are extremely socially oriented. Even during this more self-centered, egocentric stage of development, children are very responsive to each other. It would appear that because of children's social orientation and extended contact, the peer group may be a significant influence on children's developing social attitudes, skills, and feelings toward themselves and others. Children model, imitate, and reinforce each other's behavior by their attending and responding patterns. Much incidental learning, therefore, may be occurring during peer interactions. Hence, parents and educators should be concerned about the kinds of behaviors that are being expressed and accepted in their children's interactions. These are important opportunities for children to try out new behaviors and explore new and old patterns for achieving social influence. Thus some deviant behavior should be expected.

But the general tone and substance of play situations can provide important cues about what types of behaviors, in general, children may be reinforcing for each other.

Peer contact may be especially useful in the child's development of communication strategies. These early preschool years provide important experiences in social confrontation and coordination necessary in learning the underlying skills of effective interpersonal communication. Play provides numerous occasions for preschoolers to practice persuasive communication transactions. These early communicative transactions may be short and even blunt, but they are the precursors of the more elaborate verbal and subtle nonverbal exchanges that become commonplace in adult social behavior.

Complex human social interaction behaviors need to be broken down into components and their early identification and evolution traced to provide more definitive information about the ontogeny of communication skill. The present data illustrate that basic interpersonal skills of gaining the receiver's attention, of coordinating activity with others, and of using verbal exchanges to establish contact are present and functional in young children's behavioral repertoire even at the age of three or four years. How did these skills develop and what conditions favor their expansion? Is there a relationship between early parent-child patterns of reciprocity and children's skills in interacting with peers? These questions need to be explored with younger children. But, likewise, these interpersonal interaction skills need to be followed into later

stages of development. Are children's early communicative competence scores related to later skill in interpersonal communication?

In this study, social communication skill has been identified and measured. An important question, therefore, is: How are these measures related to the measure of role taking common in experimental communication research? This investigator has been concerned with the dearth of research in the whole area of communications with children. Perhaps the methodology implemented in this study and especially the operationalization of communication can provide a model for further investigations in this area. This study has shown that children's communications can be identified and the consequences of actions can be measured. Thus, the tools are becoming available with which to explore complex social exchanges. It is hoped communication research can be intensified with such methodological advances, and the development of communication skills in young children can become a more focused area of concern for early childhood educators.

APPENDIX

INSTRUMENTS

INSTITUTE FOR FAMILY AND CHILD STUDY
MICHIGAN STATE UNIVERSITY

Project Agreement Form

I, the undersigned, as parent or guardian of _____,

a child in attendance at the _____day care center,

by my signature agree:

(1) that my child may participate in the Social Development project approved and administered by the professional staff of the Institute for Family and Child Study at Michigan State University;

(2) that I understand that the Social Development project has been judged by the professional staff to be in no way harmful to the children involved and in no way an invasion of the privacy of the families;

(3) that I understand that participation in this program will not interfere with the regular program in which my child is enrolled and that no additional benefits or effects are guaranteed;

(4) that it is my understanding that each research project in which my child might be asked to participate will be explained to me and that I may withdraw my child from participation at any time if such involvement is unacceptable to me without in any way affecting his enrollment in the preschool program in which he is enrolled;

(5) that all results will be treated with strick confidence, that all individual children will remain anonymous in reporting any results, and that all results will be handled in a professional manner.

By my signature I indicate that the research has been explained to me in detail and that I understand that any further questions that I may have about the research project will be answered by the teacher, the research coordinator, or the director of the Institute for Family and Child Study.

Date: _____ Signed: _____

Witness: _____

GENERAL INFORMATION SHEET

Child's Name _____ Sex: ___Male ___Female

Birthdate _____ ___ ____ Ethnic Background: _____ Black
Month Day Year _____ White
_____ Biracial
_____ Chicano
_____ Indian
_____ Other

FAMILY INFORMATION

Family Status: Two parents together _____ Separated _____

Single parent _____ How many years has child lived in a single parent home? _____

Please list all brothers, sisters, or other children living in household:

First Name	Age	Sex	Relationship to child	Does this child attend school or day care Yes	No

Please list all other adults living in household:

Approximate Age	Sex	Number of years residing in household

Please fill in the following information about the child's father, stepfather or male in the household acting as a father figure. If no father figure is present, leave this section blank.

Father's Age: _____under 20
_____20-29
_____30-39
_____40-49
_____ over 50

Father's Educational Background to present:

_____less than 12 years of school
_____less than 12 years and some occupational training
_____High School
_____High School and some occupational training
_____Some college
_____College degree
_____Advanced degree

Father's Present Occupation _____

Employer _____

If a student, Name of School and Major: _____

_____

Number of hours worked outside of the home per week _____

Please fill in the following information about the child's mother, stepmother or female in the household acting as a mother figure. If no mother figure is present, leave this section blank.

Mother's Age: _____under 20
_____20-29
_____30-39
_____40-49
_____over 50

Mother's Educational Background to present:

_____less than 12 years of school
_____less than 12 years and some occupational training
_____High School
_____High School and some occupational training
_____Some college
_____College degree
_____Advanced degree

Mother's Present Occupation _____

Employer _____

If a student, Name of School and Major: _____

_____

Number of hours worked outside of the home per week _____

Approximate FAMILY Income per week (take home pay of both parents--include both assistance and salaries):

_____ less than $50
_____ $50 - $75
_____ $101 - $125
_____ $126 - $150
_____ $151 - $175
_____ $176 - $200
_____ $200

Type of Family Dwelling: Single family house____ Apartment____
Duplex____ Trailer____ With Relatives____

Type of Transportation to Center (usually): Walk____ Family Car____
Public Transport____ Day Care Center Transport____ With friend____

Approximate time needed to travel from home to the center (circle one):

5 10 15 20 25 30 35 40 45 50 55 60 minutes.

CHILD'S SOCIAL EXPERIENCES

Present Day Care Enrollment:

1. How many hours per day does your child attend the center? ___
2. How many days per week does your child attend the center? ___
3. How many months per year will your child attend the center? ___

Past Day Care or Nursery School Experience:

1. How many months has your child been enrolled in Day Care for the full day before September 1, 1973? _____

2. How many months has your child been enrolled in Day Care for part of the day before September 1, 1973? _____

3. How many months has your child been enrolled in Day Care or Nursery School 2 or 3 days per week before September 1, 1973? _____

4. How many months has your child been cared for in a home situation with a Sitter or Relative during the day before September 1, 1973? _____

Does your child participate with other children in a group outside of School? Check (✓) those activities that he/she participates in.

_____ Sunday School
_____ YMCA
_____ Lessons (swim, dance, music, etc.)
_____ Story Hour
_____ Recreation Program
_____ Other

The child meets in such groups as above _____ hours(s) per week.

Most of the child's playmates at home are:
____ brothers and sisters
____ other relatives
____ friends/neighbors

Most often the children that my child plays with at home are:
____ older
____ younger
____ agemates

When not at school my child spends approximately (circle one)

½ 1 1½ 2 3 4 5 6 7 8 hours playing with other children per weekday.

OBSERVATION AND SOCIALIZATION BEHAVIOR (REVISED)

The present instrument is an adapted version of the original Observation of Socialization Behavior (OSB), an observational rating technique for videotape observation. The original version was developed by Robert P. Boger and Jo Lynn Cunningham, Head Start Research Center, Michigan State University (Boger & Cunningham, 1969). The present version was developed by Robert P. Boger, Jo Lynn Cunningham, and Mary Andrews, Institute for Family and Child Study, Michigan State University.

General Procedure

This observational rating procedure was designed for use in small group free-play (unstructured) situations only. It may be used either with or without a teacher present in the situation.

Behavioral ratings of an individual child are made each 20 seconds during the observation. Each frame (representing 20 seconds) is rated as an individual unit. Therefore, the child's behavior at a previous time should not influence the ratings made for any subsequent interval, except insofar as the context of a preceding interval must be considered for adequate interpretation of a unit of behavior (primarily verbalization or inferred motivation).

Rating of videotaped situations is facilitated if the videotape unit has an automatic signal tone attachment for recording purposes. Such an attachment may be used to provide an audio signal at the designated 20-second intervals.

Form

The form developed for use with the videotaped interaction situations contains two rating frames per 20-second interval. The first frame must be completed as a time sampling of behavior at the signal tone each 20 seconds. The second frame is only completed if no peer interaction occurs in the first frame but subsequently occurs during the 20-second interval. This second frame is therefore reserved for the first observed peer interaction each 20 seconds. If a level 5 or 6 of social behavior with peers occurs during the first frame--no further observational rating is required during the 20 second interval (frame 2 will be crossed out). Likewise if no peer interaction occurs during the interval, the second frame will remain blank (crossed out).

The information included in each frame consists of:

1. Interaction
   - Responses
   - Initiations
2. Object of interaction
3. Level of involvement
4. Peer impact
5. Verbalization
6. Verbal fantasy
7. Voice tone
8. Physical behavior
9. Physical tone
10. Social behavior
11. Autonomy
12. Leadership
13. Social Competency
14. Emotionality

The format for recording an observational segment is shown in Figure A-1.

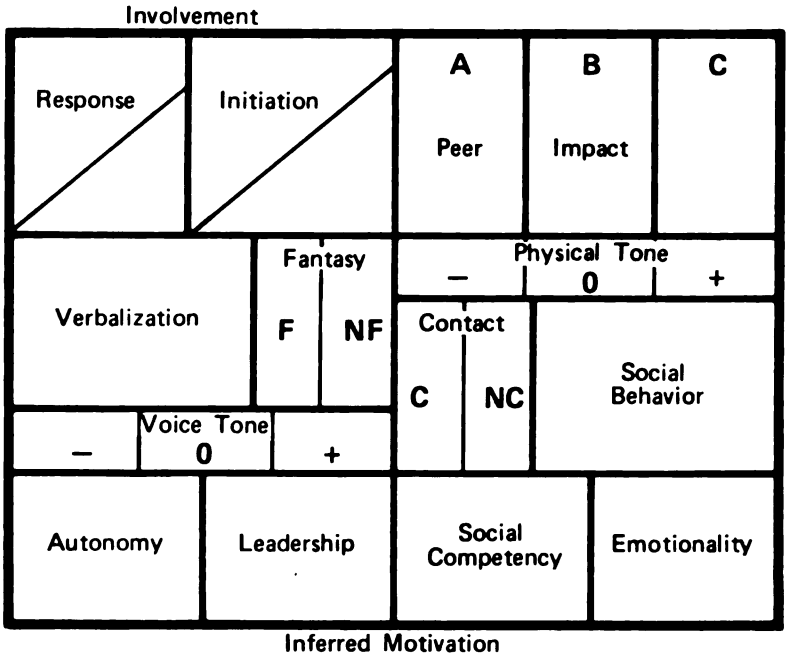

Figure A-1. An example of one observational frame.

Codes

The categories and descriptions for each code follows. One and only one coding category can be ascribed unless otherwise noted. All behavioral events must be classified by one of the available mutually exclusive classifications.

Interaction and Involvement

Response

A - acceptance: covert or overt awareness and acceptance of another's initiation

1 - intense overt acceptance
2 - moderate acceptance
3 - covert or weak acceptance

R - rejection: covert or overt awareness and rejection of another's initiation

1 - intense overt rejection
2 - moderate rejection--withdrawal submission
3 - covert or weak rejection

N - no awareness of another's initiation, no acknowledgment

0 - ongoing behavior (behavior continues for at least 5 seconds with no apparent initiation or response to an initiation)

1 - intense overt behavior
2 - moderate behavior
3 - covert or weak behavior

X - behavioral transition--initiation imminent

Initiation - introduction of self or change in activity prompted by self

1 - intense overt initiation
2 - moderate (normal level) initiation
3 - passive initiation, covert or tentative attempt to initiate

Object of Interaction (up to three separate codes may be recorded)

A-N = letter code of each peer with whom S is involved (two peers may be recorded)

G = group involvement with all three other peers: initiation or response not directed to any specific individual

T = adult

M = materials. The objects provided specifically for play purposes (including personal articles of apparel on self)

E = environment, objects not intended for play but present in the setting (walls, light switches, gate, door, etc.)

Impact Codes: The consequence of S's behavior as reflected in the behavior of other peers

Impact recorded separately for each peer in the group

A - acceptance of S's behavior

1 - intense overt acceptance
2 - moderate (normal level) of acceptance
3 - covert or hesitant acceptance

N - no impact, no acknowledgment or awareness of S's behavior

R - rejection of S's behavior

1 - intense overt rejection
2 - moderate (normal level) of rejection
3 - covert, mild, or hesitant rejection

Verbalizations: The entire verbalization accompanying the behavior being observed should be categorized as a unit.

SL = Shows solidarity: raises another's status; gives help or reward

TR = Tension release: jokes, laughs: squeals, shows satisfaction

AG = Agrees: shows passive acceptance: understands, concurs; compiles

SU = Gives suggestions or directions, implies autonomy for others

OP = Gives opinion, evaluation, or analyses: expresses feeling or wish

OR = Gives orientation or information: repeats, clarifies, confirms

AR = Asks for orientation: information, repetition, confirmation

AP = Asks of opinion, evaluation, analyses, expressions of feelings

AS = Asks for suggestions, direction, possible ways of acting

DS = Disagrees: shows passive rejection or formality: withholds help

ST = Shows tension: asks for help: withdraws "out of field" (swearing)

AN = Antagonism: deflates other's status: defends or asserts self: name calling: (swearing at someone)

MM = Mumbling (unintelligible)

X = No verbalization

Fantasy: Each verbalization is classified as fantasy or nonfantasy based on the use of imaginary representations.

F = Fantasy verbalization

NF = Nonfantasy verbalization

Voice Tone: The rating refers to the delivery, not the content, of the verbalization

+ = positive affect conveyed by voice

0 = neutral voice: no affect conveyed

- = negative affect conveyed by voice

Social Behavior: The social nature of the play involvement

1 = Unoccupied behavior: The child apparently is not playing at all, at least not in the usual sense, but occupies himself with watching anything which happens to be of momentary interest. When there is nothing exciting taking place, he plays with his own body, gets on and off chairs, just stands around, follows the teacher, or sits in one spot glancing around the room.

2 = Solitary play: The child plays alone and independently with toys that are different from those used by the children within speaking distance and makes no effort to get close to or speak to the other children. His interest is centered upon his own activity, and he pursues it without reference to what others are doing.

3 = Onlooker behavior: The child spends most of his time watching the others play. He often talks to the playing children, asks questions, or gives suggestions, but does not enter into the play himself. He stands or sits within speaking distance of the group so he can see and hear all that is taking place. Thus, he differs from the unoccupied child, who notices anything that happens to be exciting and is not especially interested in groups of children.

4 = Parallel play: The child plays independently, but the activity he chooses naturally brings him among other children. He plays with toys which are like those which the children around him are using, but he plays with toys as he sees fit, without trying to influence the activity of the children near him. Thus, he plays beside, rather than with, other children. This activity is characterized by physical proximity and similarity of activity with reference to other children.

5 = Associative play: The child plays with other children. They may be borrowing and lending play materials or following one another with trains or wagons. There are mild attempts to control which children may or may not play in the group. All are engaged in similar, if not identical, activity. There is no division of labor and no organization of activity. Each child acts as he wishes and does not subordinate his interest to the group. There is interaction between children, but no common goal.

6 = Cooperative play: The child plays within a group that is organized for the purpose of making some material product, of striving to attain some competitive goal, of dramatizing situations of adult or group life, or of playing formal games. There is a marked sense of belonging or not belonging to the group. The control of the group situation is in the hands of one or two members who direct the activity of others. The goal and the method of attaining it necessitates a division of labor, the taking of different roles by various group members, and the organization of activity so that the efforts of one child are supplemented by those of another. The critical distinction is the goal-directedness of the group.

Physical Behavior: The nonverbal aspect of the initiation, response, or ongoing activity

Contact: (coded in relation to the object of the interaction. Peer interaction takes precedence over involvement with materials or environment)

C = Contact: physical contact between subject and object or another peer

NC = No physical contact with other peers or objects

Behavioral Tone

\+ = behavior which is socially acceptable or positive in connotation (holding hands, patting, sitting side by side)

0 = neutral motion: physical behavior which does not convey either positive or negative connotations (building, running)

\- = behavior which is not socially acceptable or is negative in connotation (pushing, hitting)

Inferred Motivation: The following four categories of inferred socio-emotional state are rated on a 5 point bipolar scale as illustrated below.

1	2	3	4	5
positive overt/intense	covert/mild	neutral	covert/mild	negative overt/intense

Autonomy (psychological independence)

self directed	
independent	dependent
patient	impatient
persistent	non-persistent
tolerant	vulnerable to frustration
integrated	submissive

Social Leadership

original activity	imitation
initiates to others	follows
dominant	compliant

Social Competency

other directed	self centered
friendly, open	withdrawn
empathetic	rejecting
helpful	aggressive
affectionate	disregards others
constructive	boasting
	attention-seeking
	jealous
	destructive

Emotionality

happy, confident	anxious
eager	fearful
	angry
	hesitant (rejecting)

Recording Observations

For each frame a code must be applied to each available space. If no verbalization or initiation is observable, an "X" is coded in that

position. All other spaces require an observational interpretation of the behavior occurring. The only exception to this rule is the rare case in which the person being observed leaves the scene (is out of camera range). In such cases, "X" for the entire frame or any part thereof is permissible.

Coding of each category is done by writing in the appropriate code (for responses, level of involvement, object of interaction, impact, autonomy, leadership, social competence, emotionality, verbalization, social behavior) or by circling the appropriate code symbols (for fantasy, voice tone, physical behavior, and behavioral tone). The rating should commence on the first signal after all of the children are in the visual field and the door has been closed. Each subsequent child's ratings should commence in the same interval.

Frame 1 (required)

When the signal tone is heard marking a 20 second interval, the behavior occurring immediately after the tone is observed. All observations within a single frame refer to this one "bit" of peer behavior. A "bit" of play behavior is defined as a stretch of play behavior that includes an involvement code of either response, initiation, or ongoing activity that is terminated by another response or initiation. Frame 1 must be completed each 20 seconds for the entire play session.

Frame 2 (optional depending on interaction)

If Frame 1 does not contain a 5 or 6 level of social behavior, then prepare to record the first peer interaction that occurs in the 20 second interval.

Frame 2 is only completed if a peer interaction occurs during the interval, otherwise, an "X" is placed through the entire frame.

If a peer interaction occurs, record the behavior as a single interaction with all codes applying to that "bit" of interaction. (The verbalization, physical behavior, social behavior, inferred motivation and impact are all contingent on the interaction sequence.)

Whether the interaction begins as a response or an initiation, it is the total sequence of interaction that is observed and rated.

R ---------- I ---------- Impact
O ---------- I ---------- Impact
X ---------- I ---------- Impact
R ---------- X ---------- Impact

Reliability

Interobserver reliability is established by two independent observers simultaneously recording the behaviors of the same child in the same intervals on their respective recording forms. Intra-observer reliability is established by a single observer rerating a previously observed tape.

Two methods of computing reliability are used, one based on total blanks and the other based on total recorded positions. Each type of reliability should be computed for the entire instrument and also for each separate scale. Minimum suggested reliability indices are given in Table A-1.

Points for figuring total instrument reliability are assigned as shown in Figure A-2. Procedures for computation of interobserver reliability are as follows:

Total Blanks

Count and evaluate the total number of possible codes, regardless of whether anything was recorded within that area for that time interval or not. This method credits the observers with agreements for those instances on which they agree that no record-aboe behavior occurred, i.e., both recorded an "X" for that category of that interval. Formulas used for figuring reliability by this method are as follows:

$$\% \text{ reliability} = \frac{\text{Agreements (Number of points)}}{\text{Number of frames x 23}}$$

Total Recorded Positions

Count and evaluate only those positions in which one or both observers recorded something other than "X." The formula for figuring reliability by this method is as follows:

$$\% \text{ reliability} = \frac{\text{Agreements (Number of points)}}{\text{Agreements plus disagreements (Number of points possible for positions in which either observer recorded any code)}}$$

Table A-1

Minimum Suggested Rater Reliability Indices for Observation of Socialization Behavior

Method	Type of Reliability	
	Inter-	Intra-
	Entire Instrument	
Total Blanks	.85	.90
Total Recorded Positions	.65	.75
	Individual Scales	
Total Blanks	.80	.85
Total Recorded Positions	.60	.70

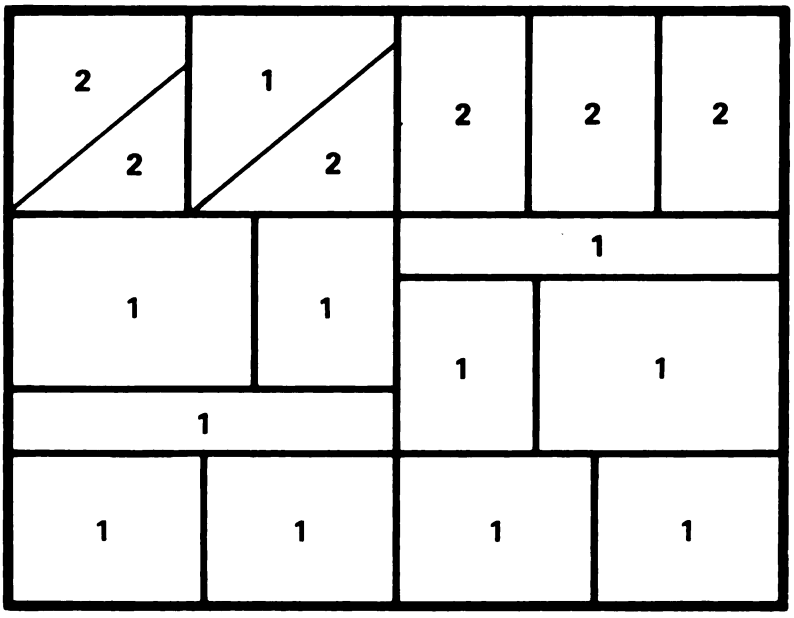

Figure A-2. Assignment of points for OSB rater reliability.

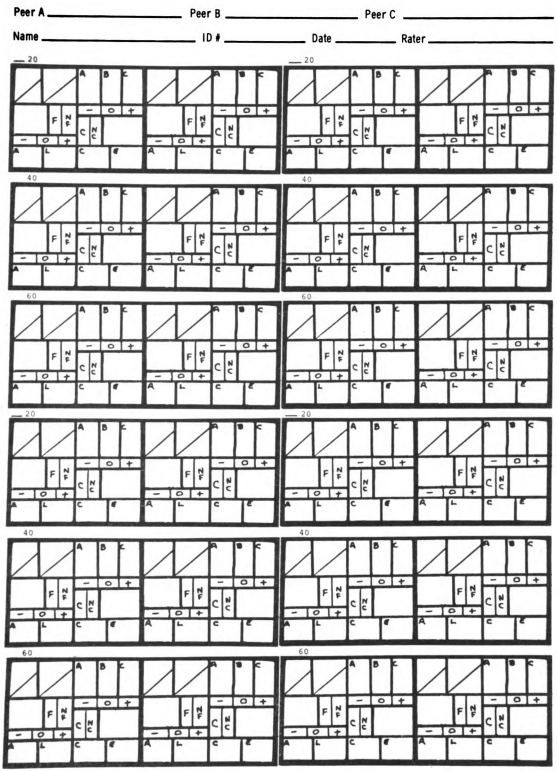

Figure A-3. Observation of socialization behavior rating protocol.

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