

CREATING EARLY CHILDHOOD CURRICULUM FROM  
REFERENTIAL COMMUNICATION RESEARCH

by

KATHLEEN L. HURSH

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Approved by:

  
Major Professor

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## INTRODUCTION

Professional child development and psychology journals are filled with imaginative research methods exploring young children's development which, ideally, could be used in developing early childhood education curricula. However, this is usually not the case. Elkind (1981) suggested that although child development researchers and early childhood practitioners most often work independently, each group has much to learn from the other. Educators would have a rich methodological and data base on which to formulate their curricula, while researchers could find relevant research questions in the naturalistic setting of the classroom.

One area of research literature that could be of use to educators in developing curricula is referential communication. Referential communication is the process in which a listener selects an object (the referent) from a set of objects (non-referents) on the basis of a verbal message from the speaker. The inclusion of referential communication games and training procedures in early childhood curricula would promote the use and development of the speaking and listening skills of young children. Speaking and listening are essential components of communication between people and communication is an important skill in social interaction which is desirable for cognitive development since it is through the exchange of viewpoints that children develop their language and logic (Kamii, 1971). Thus the purpose of this report is to create a logical series of games and training procedures to fit into early childhood curricula using methodologies from referential communication research that allow children to develop and

practice the communication skills of speaking and listening.

The development of speaking and listening skills is considered an important component of children's elementary school education by the U.S. Office of Education. These skills have recently been added to the list of "Basic Skills" under Title II (Lieb-Brilhart, 1979). Thus the enhancement of speaking and listening skills in preschool children through the use of referential communication games would be useful when entering elementary school.

The development of referential communication skills in young children is also linked to the development of prosocial behaviors, such as cooperation, friendliness, helping, and kindness, which seem to emerge and are strengthened when children can take or understand the role of others (Shantz, 1975). In referential communication games children may take the role of the speaker and listener. A speaker who wishes to communicate effectively to a listener must adapt his/her message to the listener's information and vocabulary. Thus the message must be formed with the listener's perspective in mind. Likewise, to be a competent listener, one must take the role of the speaker to determine what (s)he is saying (Shantz, 1975). Piaget (1965) suggested that egocentric functioning decreases as children interact and deal with peers who differ in their wishes, perspectives, needs, and thoughts. Thus peer interaction and conflict (feedback) are necessary for role-taking skills to emerge and stabilize, which in turn enhances the child's ability to engage in reciprocal social behavior such as cooperation.

Through referential communication tasks, children's cognitive skills may also be enhanced due to the factors involved in the tasks. Referential

communication skills depend on the speaker's and listener's perceptual abilities to distinguish attributes of the referent and non-referents and their comparison activity of the similarities and differences between the referent and non-referents (Shantz, 1981). Developing a child's ability to perceive differences and to compare those differences in order to classify the objects along some quantifiable dimension is the foundation of the cognitive area of Montessori and Piagetian early childhood programs (Kammi, 1971; Lillard, 1972). The acquisition of these skills in young children will help them later in learning to read and understand math principles in elementary school (Lillard, 1972; Pulaski, 1971). Experience in comparing the attributes of referents and non-referents and considering, simultaneously, more than one relevant feature of the stimuli may also provide de-centration. While the utilization of referential communication tasks in early childhood curricula is potentially beneficial to the child's social, cognitive, and communication skills, this report will only focus on the latter skills.

Since 1966 when Glucksberg, Krauss, and Weisberg first looked at referential communication skills in young children three to five years of age, the various aspects of the development of referential communication in children have been extensively studied. Dickson and Moskoff (1980), in a search of major journals, found sixty-six publications dealing with referential communication research and involving eight separate experiments and 114 referential tasks. They found the typical study involved white English speaking middle class children five to six years of age. In most cases the children spoke or listened to adult experimenters. The most commonly used referents were line drawings or pictures that differed on fixed attributes

(color and size). The reviewers found that children's performance is strongly related to age, with success increasing with age (Dickson, 1981). Referential communication studies have also included a variety of listener-speaker training methods.

The methodology used to study referential communication skills in children has generally involved games played by dyads made up either of two children or a child and an adult. Referential communication games along with their training methods have been found to improve the communication skills (e.g., speaking and listening) of children (Dickson & Moskoff, 1980). To successfully complete the referential communication games, the dyads must work cooperatively encoding and decoding descriptions, processing information, and questioning incomplete messages.

Games are an important part of a preschool curriculum since they provide the opportunity for social interaction, verbalization, cognitive activity, and the use of perceptual-motor skills, the four broad objectives of most early childhood education programs (Kamii, 1971). Thus referential communication games fit particularly well into early childhood education programs, especially those based on Montessori and Piagetian principles that emphasize a child's active participation with classroom materials, limited teacher intervention, materials that are sequenced from simple to complex, cooperation between children, and repetition (Kamii & DeVries, 1976, 1978, 1980; Lillard, 1972).

Training children in specific aspects of referential communication has been found to enhance children's communication success. As mentioned previously, Shantz (1981) posited that referential communication skills depend on the children's perceptual abilities to distinguish attributes of the

referent and non-referent, comparison activity of the similarities and differences between the referent and non-referent, and linguistic abilities to encode the criterial differences. Researchers have been successful in teaching children the skills of comparing and using those comparisons to encode better messages (Whitehurst, 1976), describing differences (Whitehurst & Sonnenschein, 1978), and asking questions when faced with uncertainty (Cosgrove & Patterson, 1978). Training methods have also involved modeling complete messages, giving children a plan for effective listening (questioning incomplete messages), and having listeners and speakers both actively participate in referential communication games and observe other's participation (Lefebvre-Pinard & Reid, 1980; Patterson, Massad, & Cosgrove, 1978; Whitehurst & Merkur, 1977). Thus the use of a combination of research training methods in presenting the referential communication games should help increase the children's communication success.

In summary, tasks from research studies are a rich source for curriculum activities. The data from these studies provide valuable information in planning activities that are developmentally appropriate for young children. The referential communication literature provides us with a large set of games that are applicable in the preschool classroom and training methods for making those games effective tools in the development of children's communication skills.

## LITERATURE REVIEW

Research in children's referential communication has evolved over the past decade from studies of listener's and speaker's skills to the effects of various types of training on those skills. Glucksberg, Krauss, and Weisberg (1966) were among the first investigators to study referential communication skills in young children. Their study illustrates the importance of adequate messages to successfully complete referential communication tasks. In the first experiment, pairs of children 2;9 to 5;3 years of age successfully played a simple game of describing and building matching stacks of bicolored blocks. However, they were unsuccessful in describing and identifying abstract shapes in an array. In the second experiment, the children, as listeners, were paired with adult speakers who gave informative messages. This time the children could successfully identify the abstract shapes. Thus Glucksberg, et al. (1966) found that dyads of young children were able to give adequate messages when the referents were concrete objects varying in one familiar attribute (color). However, when the referents were difficult to describe abstract shapes, the children needed an adult's mature informative description to be successful. Recognizing the need for adequate messages, this review reports on the skills needed by speakers to form adequate messages, the skills needed by listeners to assess message adequacy, the effects of listener feedback on speakers, and training procedures designed to improve communication success in referential communication games.

### Skills Needed to Produce Informative Messages

In a review of referential communication literature, Glucksberg, Krauss, and Higgins (1975) suggested that to produce an informative message, a speaker must be able to compare the stimuli to determine which attributes distinguish the referent from the non-referent, take the listener's characteristics (capabilities) into account, and evaluate his/her message and reformulate it if it is uninformative. A speaker may fail at communication if (s)he lacks any one of these skills. Although a speaker may be able to take the listener's characteristics into account, if the ability to compare is lacking, (s)he will not be able to evaluate the quality of his/her message. This evaluation occurs by comparing stimuli to determine if the message accurately describes a differentiating attribute. Thus the ability to compare is a very important skill for success in referential communication tasks.

Whitehurst and Merkur (1977) found that children five to six years of age were unable to analyze a stimulus array of two or three triangles that varied in three two-valued attributes (e.g., large or small, red or black, or spotted or striped). These children often described the characteristics of the referents that were non-discriminating, for example calling a triangle, "a red one," when both triangles in the array were red, but one was large and the other small. This failure was named contrast failure to indicate the children's failure to contrast the referent with the non-referent.

Contrast failure in five year old children was examined by Whitehurst and Sonnenschein (1978). Arrays of two triangles varying in size, color, and pattern were divided into simple or complex groups. In the simple

group the relevant attribute in an array was fixed across the trials. For example, in trial 1 a big black spotted triangle was paired with a small black spotted triangle and in trial 2 a big black striped triangle with a small black striped triangle with size as the fixed relevant attribute. In the complex group the relevant attribute varied over the trials. For example in trial 1 a big black spotted triangle was paired with a small black spotted triangle and in trial 2 a big black striped triangle with a big red striped triangle. The relevant attribute in trial 1 was size while in trial 2 it was color. Children describing the target referents in the simple condition gave more contrastive messages than in the complex condition. Whitehurst and Sonnenschein concluded that young children do engage in the comparison process when variation of the stimulus is limited to one attribute, but fail to compare as variation increases, giving incomplete messages rather than contrastive messages.

Whitehurst and Sonnenschein (1981) studied young children's comparison skill to determine whether it is a novel skill, one which they do not know how to use, or an accustomed skill, one which they do not know when to use. Forty five-year-old children were divided into two groups. One group received communication instructions, "Tell me about the triangle with the star, so I will know which triangle you are talking about." The second group received perceptual instructions, "Tell me how the triangle with the star looks different from the other triangles." As in previous studies the arrays contained pairs of triangles that varied in size, color, and pattern. Each pair differed on only one attribute while sharing the values of the other two attributes. The target referent was indicated with a star. The children in the perceptual condition produced significantly more informative



messages than children in the communication condition (73% versus 50%). The children in the perceptual condition also produced more contrastive messages (70% versus 34%). Whitehurst and Sonnenschein concluded that comparison activity is largely an accustomed skill indicating young children do not know when to use comparison, although they do know how to compare. Thus young children are unaware that comparison is relevant to successful communication.

Glucksberg, Krauss, and Higgins (1975) suggested that the ability to compare is an important skill for speaker success in referential communication tasks. In a series of studies Whitehurst and Merkur (1977) and Whitehurst and Sonnenschein (1978, 1981) found young children can compare referent attributes when variation in the stimulus is limited to one attribute, but they do not know when to use this skill.

### Skills Needed for Effective Listening

Researchers of referential communication have found that communication between preschool children is often ineffective (Glucksberg, Krauss, & Higgins, 1975). This failure to communicate has been thought to lie in the inadequacies of the messages given by the speakers. However, Patterson and Kister (1981) indicate that a number of listener skills in preschool children are also poorly developed. To be an effective listener, one must assess the message as being ambiguous or informative. A listener must understand the need for an informative message and recognize it as such. If a message is recognized as ambiguous, the listener must inform the speaker by requesting more information (Glucksberg, et al., 1975). To assess message adequacy, the listener must compare message information with the attributes of the potential referent (Patterson & Kister, 1981). Thus the

listener's ability to compare is as important as the speaker's comparison ability for successful communication to occur.

Bearison and Levey (1977) assessed children's ability to judge message quality. Children five to nine years of age listened to a statement such as this, "Jane got a bicycle for Christmas and Mary got a new coat." This was followed by an ambiguous or unambiguous question about the statement. The ambiguous question was, "What did she get for Christmas, a bicycle or coat?" The unambiguous question was, "What did Jane get for Christmas, a bicycle or coat?" The children were asked to judge the question as "good" or "bad" and to explain what was wrong with it. All the children recognized the adequate messages. The younger children were less successful in identifying the ambiguous messages than the older children. Thus inadequate messages are more difficult for young children to recognize than adequate ones.

Robinson and Robinson (1977) found that most children blamed the listener for communication failure regardless of the degree of message inadequacy. The children were paired as listeners with adult speakers who varied the amount of necessary information in their messages. For example, one message referred to only one card in the array of six drawings, while another message referred to two, four, or all six of the cards in the array. Robinson and Robinson concluded that young children five to seven years do not have a rudimentary idea of the role of the message in communication failure.

In a study by Patterson, O'Brien, Kister, Carter, and Kotsonis (1980), adult speakers gave listeners, five to nine years of age, messages that referred to one, two or four potential referents. The children were asked if they knew which was the target referent or if they needed another clue to

make a correct choice. The children judged the messages as ambiguous when they were highly inadequate (referring to four referents in the array), but not when they were of low ambiguity (referring to one or two referents in the array). Thus messages must be highly ambiguous before young children recognize their inadequacies. Patterson, et al., (1980) varied the size of the arrays used and found the children as listeners performed more effectively with small arrays than with large ones. The successful use of simple arrays supports the findings of Whitehurst and Sonnenschein (1978) that increasing variation hinders young children's success in referential communication tasks.

Cosgrove and Patterson (1977) and Ironsmith and Whitehurst (1978) assessed listeners' requests for more information when messages were ambiguous. Adult speakers gave children five to nine years of age standardized messages that were either adequate or ambiguous. When informative messages were given, young children correctly chose the target referent. However, when messages were ambiguous, the young children failed to ask for additional information and thus failed to choose the target referent. The failure to request more information indicates an inability to assess message adequacy and recognize the need for an informative message or the failure to recognize that the solution to the problem of not knowing which referent to choose requires a simple request for more information.

#### The Effects of Listener Feedback on Speakers

Once a listener recognizes the need for an informative message and assesses a message as inadequate, (s)he must request more information to make a correct choice in a referential communication task. Several

researchers have studied the effects of listener feedback on the speaker. Peterson, Danner, and Flavell (1972) paired speakers four and seven years of age with adult listeners who gave one of three types of feedback when a speaker gave an ambiguous message. The three types of feedback included facial feedback (a puzzled look), general feedback ("I don't understand"), or specific feedback ("What else does it look like?"). Most children at both ages reformulated at least one message when given specific feedback. However, when given general feedback few young children clarified their messages, while most older children offered more information. Thus specific feedback from a listener results in more information given by the speaker.

Cosgrove and Patterson (1979) paired five-year-old children as speakers with adult listeners who gave either general or specific feedback when messages were ambiguous. The children reformulated their messages to include all the relevant attributes needed to make a correct choice when the listener gave specific feedback. General feedback elicited more information from the speakers than when no feedback was given. These results are similar to the results in the above study. Specific feedback elicits more information than general feedback which elicits more information than no feedback.

To investigate the effects of listener feedback on speakers, Karabenick and Miller (1977) paired five-to seven-year-old children in same-age dyads to play referential communication games. When messages were ambiguous and listeners requested more information, they found the speakers attempted to answer 91% of the questions. However, additional information was given only 41% of the time. Although the listener recognized the need for more information and the speaker recognized the need to answer, the listener either

failed to ask for specific information or the speaker failed to compare the attributes given in the first message with the attributes needed in an informative message.

Patterson and Massad (1980) paired seven-year-old speakers with nine-year-old listeners to play referential communication games that varied in complexity. The target referent had a range of two to four relevant attributes and the arrays included four to sixteen pictures. When the young children gave incomplete messages and the older children asked for more information, speakers provided relevant information 92% of the time. There was a cumulative impact on the adequacy of the speakers' messages over the sixteen trials due to listener feedback. The young children became more effective speakers in that more crucial attributes were given in initial messages. Thus listener feedback had a positive effect on speakers.

#### Training Procedures for Referential Communication Skills

Since ambiguous messages prevent success in referential communication tasks, several researchers have devised training procedures to help children become more effective speakers and listeners. Dickson (1974), in a five minute training session, directed children three and a half to eight years of age to look at all four referents in an array, to say at least two things about the target referent when they were the speaker, and to ask questions if needed when they were the listener. This limited amount of training proved unsuccessful. Dickson suggested modeling as a possible training procedure.

Whitehurst (1976) exposed six and a half year olds to models using contrastive messages or models using ambiguous messages. Contrastive

messages contain the minimal attributes necessary to be informative, e.g., saying "The large one" when the array contains one large red triangle and one small red triangle. Children observing an adult modeling contrastive messages imitated the adult's style and produced longer utterances while children exposed to ambiguous messages produced incomplete messages. Robinson and Robinson (1977) worked with five-year-olds to develop a general understanding that messages can be inadequate. A referential communication game using several pictures of men wearing black shoes was played. The adult speakers gave an ambiguous message such as, "A man with black shoes." The children as listeners were asked if there were any other men with black shoes. Thus it was pointed out that there were lots of men with black shoes and that this was a bad message. The adult then talked with the child about what could have been included to produce a clear message. The results indicate the training was successful in developing a general understanding in young children that messages can be inadequate.

Cosgrove and Patterson (1978) devised a plan for effective listening by training children to ask questions. Six- to seven-year-old children were told, "Whenever you are unsure what the right answer is, you can ask questions to help yourself figure it out." An adult model, while playing the game, noted out loud that she did not have enough information and then asked for more information. The trained group asked more questions when the message was ambiguous and selected more correct referents in delayed tests two to three days after the training. Up to this time researchers had worked predominantly with dyads of children and adults, most often with children as listeners and adults as speakers. Patterson and Massad (1980) used nine-year-old children as listeners to train seven-year-old children

to give information messages. The older children were trained with the Cosgrove/Patterson (1978) plan for effective listening, asking questions when needed. Although the stimuli used were complex with several attributes, over sixteen trials, listener feedback (questioning) by older children taught younger children to give more adequate initial messages than those who interacted with an untrained listener. Thus listener behavior can have a positive impact on both speaker performance and communication success among children.

Active participation and observation of peers' participation in referential communication tasks was a training procedure used by Lefebvre-Pinard and Reid (1980). Children five to nine years of age were divided into five treatment groups. Children in group 1 actively participated as both speakers and listeners in referential communication games with an adult providing feedback to help them modify their messages or to help identify contrastive attributes. Group 2 observed peers' participation (models), while children in group 3 both actively participated, themselves, and observed others. Children in the fourth group actively participated as both speaker and listener in referential communication games with an adult who provided no feedback, while the fifth group received no treatment. The children played three different games for thirty minutes a day over a three day period. One game was to train the children to shift away from a pre-existing perspective by using one referent over several trials contrasted with one or two non-referents. The purpose of the second game was for children to compare the referent with non-referents in order to isolate the differentiating attributes. In the third game the children were to adapt their messages to the listener's perspective. In this game



the speaker and listener each had a card with two pictures of an object. One picture on the speaker's and listener's cards was identical while the other picture was different on the two cards. For example, on the listener's card was a spotted teapot with a lid and a plain teapot with a lid, while on the speaker's card there was a plain teapot without a lid and a plain teapot with a lid. The speaker was to describe the object that appeared on both his/her card and the listener's. The communication effectiveness of the children in groups 1, 2, and 3 increased from the pretest to the posttest. These children also produced fewer incomplete, ambiguous messages than their peers. Thus didactic training of young children (Dickson, 1974) was found to be ineffective while a plan for effective listening, good models, and active participation with feedback (Whitehurst, 1976, Cosgrove & Patterson, 1978; Lefebvre-Pinard & Reid, 1980) has been shown to help children to be successful in referential communication tasks.

### Summary

In summary, results of research have indicated that informative messages are needed to successfully communicate in referential communication tasks. To produce informative messages, the speaker must be able to compare (Glucksberg, Krauss, & Higgins, 1975). Young children do engage in comparison when the number of attributes and objects in the array are limited (Whitehurst & Sonnenschein, 1978). Comparison activity is an accustomed skill indicating that although children do know how to compare, they do not know when to use comparison for successful communication (Whitehurst & Sonnenschein, 1981). To be an effective listener, one must be able to recognize inadequate messages and request more information



(Glucksberg, Krauss, & Higgins, 1975). Thus a listener must be able to compare the message information with the attributes of the referents in the array. Although young children can recognize highly ambiguous messages (Bearison & Levey, 1977; Patterson, O'Brien, Kister, Carter, & Kotsonis, 1980), they do not appear to understand that an inadequate message can cause communication failure (Robinson & Robinson, 1977). Thus young children fail to request more information when given an ambiguous message (Cosgrove & Patterson, 1977). When listeners do request additional information, specific questions elicit more information than general feedback such as, "I don't understand" (Cosgrove & Patterson, 1979). Listener feedback can improve speakers' messages over a series of trials (Patterson & Massad, 1980). To improve speaking and listening skills in young children, researchers have created a variety of training procedures. Children have been successfully trained to compare, using that skill to encode better messages (Whitehurst, 1976); to describe differences (Whitehurst & Sonnenschein, 1978); and to ask questions when faced with uncertainty (Cosgrove & Patterson, 1978). Training procedures have also involved modeling complete messages, giving children a plan for effective listening (questioning incomplete messages), and having both listeners and speakers actively participate in referential communication games and observe other's participation (Lefebvre-Pinard & Reid, 1980; Patterson, Massad & Cosgrove, 1978; Whitehurst & Merkur, 1977).

## PROJECT DESIGN

Following Montessori's philosophy (Montessori, 1967) that classroom materials be aesthetically pleasing, require active participation, have limits to their use or misuse, and have control of error (the material reveals the error and provides for the child to self correct), two referential communication games were designed for classroom use. The games were adapted from studies by Glucksberg, Krauss, and Weisberg (1966) and Whitehurst and Merkur (1977). The tasks progress from simple to complex, beginning by stacking three dimensional blocks with one attribute (color) and progressing to matching three dimensional blocks with four two-valued attributes (color, size, shape, and thickness). Aesthetically the games are related through the use of color (red and blue) and geometric shapes (square and triangle). Control of error is built into these games in that once the task is complete, the speaker and listener compare their stacks of blocks or the chosen block with the described block. Thus the children need not be told by an adult that they have erred, since they will be able to see their error and thus try again. The games are played by dyads, either child-child or child-adult, who sit on opposite sides of an 11" x 15" opaque screen. The screen hides the materials, but not the children's faces, thus allowing eye contact. This eye contact is useful in helping the children successfully communicate since a recurring pattern of eye contact occurs at the points where speaker and listener roles are exchanged (Kendon, 1967). The speaker tends to look at the listener when (s)he comes to the end of his/her utterance and continues to look until the listener

begins to speak or show some response. If the speaker did not look at the listener at the end of the message, the listener tended to delay his/her response or failed to respond. In each game one child is the speaker and the other listener. After completing the game, the children exchange places and roles. Thus each child plays the games as both a listener and a speaker with the same partner. The speaker describes a referent (block) and the listener chooses the referent from a group of non-referents (blocks).

### Subjects

The games were tested with thirty-nine predominantly white, middle class children attending Sunwheel Children's Center, a local preschool in Manhattan, Kansas. The morning class, twelve girls and eight boys ranging in age from 34 months to 64 months with a mean of 49 months, served as the control group by receiving a brief introduction to the games. The afternoon class, twelve girls and seven boys ranging in age from 42 months to 65 months with a mean of 56 months, were given a lengthy introduction to the games which included specific training procedures to be described later. For testing the games, the children were paired in same-age dyads by matching children whose birthdates were within a six month range. Due to the odd number of children in the afternoon class, one child was in two dyads (paired with a different child each time) in order to have an equal number of dyads. The experimenter was one of the two teachers in their classroom.

### Game I, Stack the Blocks

The speaker and listener construct matching stacks of blocks with the speaker describing his/her stack to the listener.

Referents - The referents were blocks that varied in color (red, blue,

and yellow).

Materials - Each child had an identical set of six wooden blocks two inches by two inches by two inches and a wooden nine and a half inch spindle. Three blocks were solid colors, single attributes. Three blocks were two colors (red and blue, blue and yellow, and yellow and red), binary attributes.

Procedures - Game I a. The speaker described and stacked just single color blocks. The listener stacked the blocks following the descriptions.

Game I b. The speaker described and stacked just the two color blocks. The listener stacked the blocks following the descriptions.

Game I c. The speaker described and stacked all six blocks. The listener stacked the blocks following the descriptions.

#### Game II, Choose the Shape

The listener chose one block from a set of four, eight, or sixteen that was described by the speaker.

Referents - The referents were sixteen blocks that varied in size (large or small), color (red or blue), shape (triangle or square), and thickness (thick or thin).

Materials - Each child had an identical set of wooden Judy<sup>®</sup> property blocks and a card outlining the block placement for each array. Eight of the blocks were red, eight were blue, eight were large, eight were small, eight were thick, eight were thin, eight were triangles, and eight were squares. The thick blocks in an array were designated on the cards by thick outlines and the thin blocks by thin outlines. The placement of the blocks on the speaker and listener cards varied. The speaker had four small (4" x 6") cards with a colored outline of one block (the target referent) on each

card. The listener had a blank 4" x 6" card.

Game II a. The array included a red triangle, a red square, a blue triangle, and blue square, all large and all thin. The arrangement of the blocks in the speaker's and listener's arrays were different to avoid the use of directional terms in the speaker's messages. All four blocks in the array were used as target referents by the speaker.

Game II b. The array included large and small blue triangles, large and small blue squares, large and small red triangles, and large and small red squares, all thin. The four target referents described by the speaker were a small red square, a large red triangle, a small blue triangle, and a large blue square.

Game II c. The array included thick and thin red triangles, thick and thin blue triangles, thick and thin red squares, and thick and thin blue squares, all large. The four target referents described by the speaker were a thin blue triangle, a thin red square, a thick blue square, and a thick red triangle.

Game II d. The array included all sixteen blocks. The four target referents described by the speaker were a large thick red square, a small thick blue square, a small thin red triangle, and a large thin blue triangle.

Procedures - The blocks were placed on corresponding colored outlines on the array cards. The arrangement of the blocks in the speaker's and listener's arrays were different to avoid the use of directional terms in the speaker's messages. The speaker chose a four by six inch card (target referent card), placed the block illustrated on the card, and described the block. The listener chose the block described and placed it on the blank four by six inch card.

## TRAINING PROCEDURES

To be successful in referential communication games, the chosen referent must match the described referent. Success depends upon the speaker giving a complete message by scanning the stimulus array and taking into account the attributes of the referent that distinguish it from the non-referents (Krauss and Glucksberg, 1969). The speaker must also take into account what attributes the listener needs to know to make the correct choice. Likewise, the listener must scan the stimulus array, take into account the attributes described, and distinguish the referent described from the non-referents. If an incomplete or inadequate message is given, the listener needs to ask for more information before a correct choice can be made. Thus the children must cooperate in order to be successful. They must help each other by giving complete messages and asking questions when needed. Whitehurst and Sonnenschein (1978) found that children under seven years of age often describe characteristics of referents that are nondiscriminating (e.g., calling a triangle a "red one" when there is another red object in the array). This is called contrast failure. A child has failed to contrast the referent with the non-referents and thus behaves as if each object has a unique label.

To help children become better speakers and listeners, researchers have designed various kinds of training procedures. A combination of these training procedures were used when presenting the referential communication games to one group of children in a classroom setting. The other group of children received no special training, only a brief explanation of how the

game was played. The following training procedure was used in all seven games. Classification was the first step in the training procedure when presenting these games, since young children have difficulty distinguishing relevant attributes (Whitehurst & Merkur, 1977; Whitehurst & Sonnenschein, 1978). Kamii and Radin (1970) define classification as the ability to group (without regard to how they are arranged) things according to their similarities and differences. For example, in Game II the blocks could be classified by size, color, thickness, or shape. Once the attributes had been fully discussed, the blocks were presented in pairs with the question, "How are these two blocks different?" Some pairs differed in only one attribute (size), some in two attributes (size and color), some in three attributes (size, color, and shape or thickness, color, and shape), and some in all four attributes (size, color, thickness, and shape). All of the children in the trained group observed the above classification activity and participated in the activity at least once during the seven sessions introducing each game. To accommodate the short attention span of young children, small groups (five to eight children) were used with short (ten-fifteen minute) presentation sessions.

Following the classification of the attributes, the objectives and materials of the referential communication game were explained. Next the roles of the speaker and listener were discussed. The teacher pointed out that the speaker must include all the attributes needed for a complete message as in the studies by Dickson (1974) and Robinson and Robinson (1977). For example, the children were told:

The speaker needs to say 'choose a blue triangle.' If (s)he just said, 'choose a triangle,' would the listener know which triangle to choose?

Following this discussion, sample game 1 was played with a child as listener and the teacher as speaker. The teacher modeled a complete message as done by Whitehurst (1976). Next the listener's need to ask questions if the message was incomplete was discussed and modeled in sample game 2. A simplification of Patterson, Massad, and Cosgrove's (1978) action plan, of identifying the possible need for questions, was used when discussing incomplete messages. For example, the children were told:

If you are playing this game and you do not know which block the speaker is talking about, you can ask her to tell you more about it. For example, if the speaker says 'choose a triangle,' the listener can ask, 'is it red or blue?'

This discussion was followed by sample game 2 played with a child as listener and the teacher, as speaker, modeling an incomplete message. This gave the teacher the opportunity to point out the insufficient information provided and what the child needed to do to receive more information as done by Robinson and Robinson (1977). In sample game 3, the teacher, as listener, modeled effective listening skills and good questioning with a child as speaker. Finally, two children played sample game 4 with the teacher as coach giving feedback as in the study by Lefebvre-Pinard and Reid (1980). This training procedure, using the four sample games described above, was repeated when each of the seven referential communication games was introduced to the children.

The group of children who did not experience the training procedures were given a brief explanation of how to play the game in small group presentations of five to eight children. An example of the instructions for Game I a. is given below. The instructions for the other six games were similar.



This is a new game. It is for two people. Each person has a spindle and three blocks, one blue, one red, and one yellow. This is a screen that goes between the people playing the game so they cannot see each other's work. To play the game, you each build a tower of blocks on the spindle with one person telling the other which one to put on first, second, and last. The person telling how to build the tower is called the speaker, the other person is a listener. When the towers are built, you check to see if they look the same.

Due to a limited time for testing, the introduction of the seven games took place within a five week period. Under normal classroom conditions, each game would be left on a shelf or table as regular classroom work for one to two weeks. It would then be replaced with the next referential communication game in the series. With this procedure, the series of games would be in the classroom for seven to fourteen weeks.

#### Dependent Measures

The children's success or failure in the referential communication games was scored by the experimenter during the open activity period of the three hour preschool session. Dyads were preselected by the experimenter by matching the children's birthdates. The two children were approached by the experimenter. They were asked if they would play the game so she could watch. The room used to test the games was part of the classroom environment, but set aside from the main activity space. However, at times the testing room was simultaneously used by other classmates looking at picture books or socializing on a platform area. The experimenter recorded the target referent card, the attributes given by the speaker, the block chosen by the speaker, the block chosen by the listener, feedback (questions) given by the listener, and the speaker's response to

the questions.

Dyad Success. A success for dyads in playing one trial of one of the referential communication games was determined by the listener's correct choice of the referent described. In Game II, although a speaker might choose and correctly describe a block different than the block illustrated on the target referent card, if the listener chose the described block, the trial was scored as a success. For example, if the target referent card was a thick blue triangle, but the speaker chose and correctly described a thin blue triangle and the listener chose a thin blue triangle, a success was scored. A failure was scored when the block chosen by the listener did not match the one described by the speaker. Each failure was judged to be the cause of the speaker or listener or in some cases both.

Speaker Adequacy. A failure was also scored when the speaker chose the correct target referent block, but described it incorrectly. For example, if the target referent was a blue triangle and the speaker placed that block on the target referent card, but described it as a blue square, a failure was recorded even though the listener might have followed the message. In this case the speaker failed to give a correct message. Speaker failure occurred when as above, the speaker failed to correctly describe the block chosen as the target reference or when the speaker gave an inadequate or incomplete message (e.g., "a red one" or "a red triangle" when there were two red triangles).

Listener Adequacy. Listener failure occurred when as above, the listener failed to choose the block described. The purpose of the scoring was to determine the success of the training procedure by tallying the

speakers' success in describing the target referent and the listeners' success in choosing the described referent or asking questions when given inadequate messages.

## RESULTS

The results of this project will be reported under five general topics as follows; dyad success, speaker adequacy, listener adequacy, the effect of listener feedback on speakers' reformulated messages, and anecdotal dialogues between speakers and listeners when playing referential communication games. For the purpose of this project, only descriptions of the data were given and no statistical tests are performed.

### Dyad Success in Referential Communication Tasks

The children exposed to the training procedures were generally more successful in encoding and decoding messages while playing the seven referential communication games than the children who received just a brief explanation of how the games were played, but no training. The percentage of successful trials in relation to the total number of trials for each group is shown in Figures 1 and 2 (see page 29). The number of successes decreased with the increased complexity of each game. The increased complexity of the games was due to the increase in the number of attributes needed to describe the target referent plus the increased number of objects in the array.

Both the trained and the untrained dyads were divided into the following three age groups, three-year-olds, four-year-olds, and five-year-olds. The number of successes was determined for each group. The four- and five-year-old dyads of both groups were generally more successful than the three-year-old dyads, as shown in Table 1 (see page 31).

FIGURE 1

Percentage of Dyad Success in Games Ia, Ib, and Ic

FIGURE 2

Percentage of Dyad Success in Games IIa, IIb, IIc, and IID

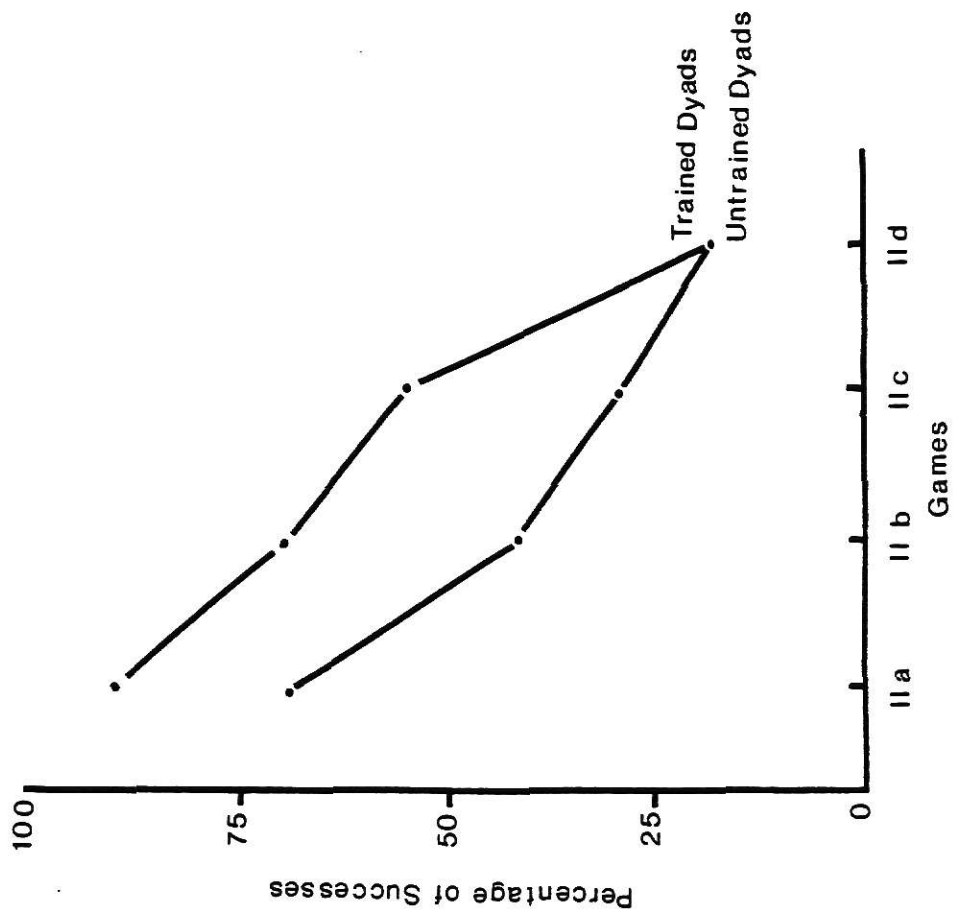
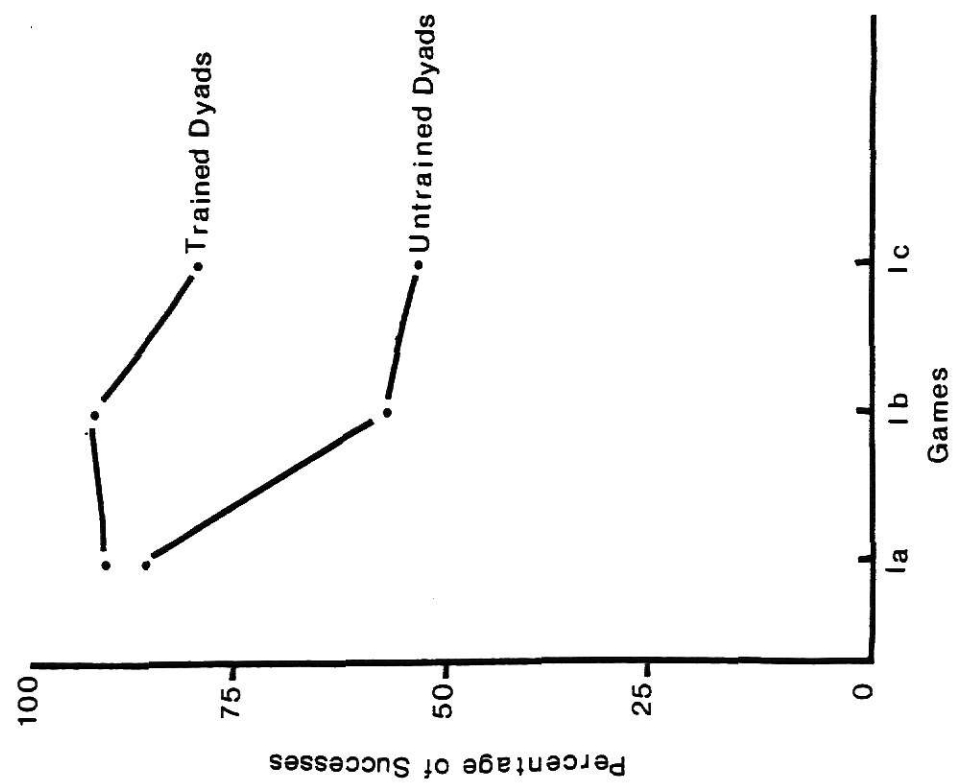


TABLE 1  
Percentage of Successful Trials in Referential Communication Games  
in Trained and Untrained Groups

	Games						
	Ia	Ib	Ic	IIa	IIb	IIc	IId
Untrained Dyads							
Three-Year-Olds	67	17	17	25	9	0	0
Four-Year-Olds	100	80	50	85	28	16	13
Five-Year-Olds	84	17	88	88	75	88	21
Total Group	87	59	55	70	40	31	21
Trained Dyads							
Three-Year-Olds	50	100	50	88	57	69	0
Four-Year-Olds	100	80	80	75	60	41	25
Five-Year-Olds	100	90	63	100	88	63	28
Total Group	91	92	68	88	70	51	21

### Speaker Adequacy

Both the trained and the untrained groups gave adequate messages 76% of the total number of trials in the seven games with the number of adequate messages increasing with increase in age. The majority of communication failures in games II a, II b, II c, and II d were the result of speaker failure as shown in Table 2 (see page 33). In the trials where speakers did give inadequate messages, speaker failure was due to misnamed shapes (games II a, II b, II c, and II d), misread target referent cards (games II c and II d), and omissions of relevant attributes when describing the target referent (games II b, II c, and II d).

In games II a, II b, II c, and II d speakers misnamed the shapes, square and triangle. For example, when a target referent was a triangle, a speaker described it as a square. The untrained speakers misnamed the shape on the target referent card 65 trials out of 320 or 20%, while the trained dyads misread the cards 32 out of 320 or 10%. In the untrained group, these failures were primarily due to the three- and four-year olds (38% and 28% respectively) with 29% due to the five-year-olds. These failures were more evenly distributed in the trained group over the three ages, three-year-olds, four-year-olds, and five-year-olds, (8%, 15%, and 6% respectively).

In games II c and II d when the attributes thick and thin were needed to correctly describe the target referent, several speakers misread the thick or thin lines drawn on the target referent card indicating the thickness of the block. For example, when the target referent was a thick blue triangle, the speaker placed a thin blue triangle on the drawing and described it as thin. The untrained dyads misread the thick or thin lines



TABLE 2  
Percentage of Speaker Failures in Referential Communication Games  
of Trained and Untrained Groups

	Games						
	Ia	Ib	Ic	IIa	IIb	IIc	IId
Untrained Dyads							
Three-Year-Olds	0	20	40	50	72	58	62
Four-Year-Olds	0	0	50	40	56	41	50
Five-Year-Olds	0	50	0	25	75	100	52
Total Group	0	22	67	44	66	49	62
Trained Dyads							
Three-Year-Olds	50	0	0	100	43	60	56
Four-Year-Olds	0	100	50	38	69	58	62
Five-Year-Olds	0	0	33	0	75	50	69
Total Group	50	67	29	50	62	53	57

36 out of 160 trials or 22%, while the trained dyads misread the cards 10 out of 160 trials or 6%. In the untrained group, these failures were primarily due to the three and four-year-olds (37% and 25% respectively) with 5% due to the five-year-olds. In the trained group, these failures were more evenly distributed over the three ages, three-year-olds, four-year-olds, five-year-olds (12%, 3%, and 6% respectively).

In games II b, II c, and II d when three to four attributes were needed to describe the target referent, several speakers omitted one to two relevant attributes from their descriptions (messages). For example, when the target referent was a large thick red triangle, a speaker described a large red triangle, omitting thickness. The untrained dyads omitted 156 attributes out of 800 or 19%, while the trained dyads omitted 52 out of 800 or 6%. In the untrained group, these omissions were primarily due to the three- and four-year-olds (34% and 18% respectively) with 7% due to the five-year-olds. In the trained group, these omissions were more evenly distributed over the three age groups, three-year-olds, four-year-olds, and five-year-olds (9%, 7% and 4% respectively). The untrained speakers most often omitted thickness, while the trained speakers often omitted size. The largest number of attributes was omitted by both groups while playing game II d which required four relevant attributes to form an adequate message. Of the 156 attributes omitted by the untrained speakers in games II b, II c, and II d, 51% (80 out of 156 omissions) were omitted while playing game II d, while 79% (41 out of 52 omissions) of the total omissions by the trained group occurred during game II d.

As noted above, the terms thick and thin in games II c and II d were confusing to several children in both groups. The trained speakers

substituted the terms large and small for thick and thin 37% of the trials in game II c (30 out of 80 trials), while the untrained speakers made the substitutions 24% of the trials in game II c (19 out of 80 trials). It was the three- and four-year-old speakers in both groups who made the largest percentage of substitutions (40% and 39% respectively). The substitution of large and small for thick and thin could not be used successfully in game II d since both large and small and thick and thin blocks were included in the array. Thus the number of successes in game II d was low for both groups (21% or 17 out of 80 trials in game II d).

While playing games I a, I b, and I c, children imitated the modeled inadequate messages requiring listener questioning used in the training procedure. Four five-year-olds out of twenty children in the trained group imitated the modeled omission by deliberately omitting one necessary attribute from their messages. For example, when describing a red cube to be placed on the spindle in game I a, an inadequate message imitated was, "put a block on." Although an inadequate message was modeled to indicate the need for feedback in all seven games, the five-year-old speakers imitated the modeling only in games I a, I b, and I c. In all cases of deliberate inadequate messages the listener gave the appropriate response, asking for the specific attribute and thus completed the task successfully.

#### Listener Adequacy

Listener failure was the main source of communication failure for both the trained and untrained dyads in games I a, I b, and I c as shown in Table 3 (see page 36). Although a speaker might give an adequate message, a listener could fail to choose the correct referent. In both the trained and untrained dyads, the listener successfully chose the referent when

TABLE 3  
Percentage of Listener Failures in Referential Communication Games  
of Trained and Untrained Groups

	Games						
	Ia	Ib	Ic	IIa	IIb	IIc	IIc
Untrained Dyads							
Three-Year-Olds	50	50	80	33	0	8	0
Four-Year-Olds	0	100	50	20	39	41	18
Five-Year-Olds	100	50	100	75	25	0	16
Total Group	66	66	66	37	20	15	14
Trained Dyads							
Three-Year-Olds	50	0	100	0	29	0	12
Four-Year-Olds	0	0	50	50	23	26	8
Five-Year-Olds	0	100	67	0	25	42	23
Total Group	50	33	71	40	25	28	14

given an adequate message in 90% of the trials or 502 out of 560 (for each of the groups). Listener failure when given an adequate message, was primarily due to misrecognized shapes in game II a and II b and failure to recognize thickness in games II c and II d.

When speaker messages were inadequate due to the omission of one or more relevant attributes, the trained listener gave more feedback (79 out of 133 trials or 59%) in the form of specific questions to the speaker than the untrained listeners (33 out of 140 trials or 24%). In both groups, it was the four-year-old listeners who gave the largest percentage of feedback (65%) and the three-year-old listeners the smallest percentage (11%).

When listeners did respond to inadequate messages with feedback, it contained either relevant or redundant questions. Relevant questions asked for the one or more attributes omitted by the speaker in his/her initial message. Redundant questions asked about attributes included in the initial messages. For example, if the speaker described a large red triangle as a red triangle, a redundant question would be, "a triangle?" A relevant question for the above example would be, "what size?" The trained listeners gave more relevant feedback when given inadequate messages (66 out of 79 or 83%) than the untrained listeners (21 out of 33 questions or 67%). Although the four-year-old listeners responded more often to inadequate messages with feedback, it was the five-year-old listeners who gave the largest percentage of relevant feedback (84%).

In games II c and II d when speakers substituted the terms large and small for thick and thin, it was the trained listeners who were more successful in decoding the messages. Without requesting additional

information, the trained listeners successfully chose the thick or thin target referent described as large or small 27 out of 30 trials or 90%, while the untrained listeners were successful 13 out of 19 trials or 68%.

#### The Effects of Listener Feedback on Speakers' Reformulated Messages

When messages are inadequate and listeners request and receive additional information, the speaker may or may not respond with additional information. The untrained speakers responded 93% of the time (31 responses to 33 questions) to listeners' request for information while the trained speakers responded 86% of the time (68 responses to 79 questions). However, the trained speakers responded with more relevant information (55 responses out of 68 or 81%) than the untrained speakers (16 out of 31 or 52%). A relevant response included the attributes requested by the listener. For example, when an initial message described a large red triangle as a red triangle and the listener asked, "what size?", a relevant response would be, "the large one." The trained three-, four-, and five-year-old speakers responded to listener questioning with generally more relevant information than the untrained speakers (89%, 79%, and 86% versus 0%, 32%, and 91% respectively).

The trained listeners more often requested additional information when given inadequate messages. Thus they made more correct choices based on speakers' reformulated messages than the untrained listeners, even though both groups were equally successful in choosing the correct referent when given adequate initial messages. The trained listeners made correct choices in 52 out of 55 trials in which speakers gave a relevant response to listener feedback (95%), while the untrained listeners made correct choices in

11 out of 16 trials (69%). The five-year-old listeners were more successful in their choices than the other two age groups (94% versus 63% and 68% for the three- and four-year olds respectively).

### Anecdotal Dialogues Between Speakers and Listeners

Several interesting discussions were recorded between the speaker and listener. The dialogues ranged from the listener simply repeating the speaker's message as (s)he scanned the array to specific questions asked by the listener to gain more information to correctly choose the referent. The simple repetition generally elicited an affirmative nod from the speaker, while the speaker tried to answer the specific questions. The following sample dialogues are included to give the reader an understanding of the communication that took place between children while playing the referential communication games.

The following three dialogues between five-year-olds in the untrained group shows listener confusion when the speaker's message contains three attributes.

1. Sp: Thick red square (target referent: large thick red square)  
L: Red?  
Sp: Yes  
L: Fat? (thick)  
Sp: Yes  
L: chose the correct referent even though size was omitted.
2. Sp: Large thick blue square (correct)  
L: What color?  
Sp: Blue

L: Skinny? (thin)

Sp: Yes

L: chose incorrectly the large thin blue square.

3. Sp: Thin red triangle (Target referent: small red thin triangle)

L: Red or blue?

Sp: Red

L: Triangle?

Sp: Yes

L: Skinny? (thin)

Sp: Yes

L: chose the large red thin triangle.

Several times a listener's questioning would attempt to get the speaker to give a complete message; sometimes with success and sometimes without success.

Group II b Five-Year-Old Dyad

Trial 1 Sp: Red triangle (Target referent: large red triangle)

L: What shape?

Sp: Big red triangle

L: chose the correct block.

Trial 2 Sp: Red triangle (Target: large red square)

L: You already did that one

Sp: Big red square

L: chose the correct block.



Game II b Four-Year-Old Dyad

Sp: Red thin triangle (Target: large red triangle)

L: Is it little?

Sp: No, thin

L: Everything's thin on my side

Sp: Triangle

L: A little one?

Sp: Thin

L: Big?

Sp: No response

L: chose a small red triangle.

Game II d Four-Year-Old Dyad

Sp: Blue triangle middlesized (Target: large blue thin triangle)

L: What size?

Sp: Middle-size

L: Triangle or square?

Sp: Triangle

L: Big or little?

Sp: Middle-size

L: chose small blue thin square.

The speaker chose the term middle-size to describe the large thin block. To her the block was not big as in thick nor small as in size, but middle-size. The discussion confused the listener and he erred in choosing the correct shape and decoded middle-size as small and thin.

Game II d      Four-Year-Old Dyad

Sp: Blue triangle (Target: large blue thin triangle)

L: Little big or large big? (asking about thickness)

Sp: I don't know

L: Is it little?

Sp: It's in the middle

L: chose the small blue thick triangle.

Neither speaker nor listener knew the terms thick or thin and thus failed to communicate successfully.

## DISCUSSION

The purpose of this project was to translate referential communication games and training procedures used in child research studies into curriculum materials and presentations for use in preschool programs. The overall results are encouraging in that the games were both interesting and challenging to three to five-year-old children. The children who were exposed to the training procedures, in most cases appeared to have more successes in communication than the untrained children in all games except II d which was highly complex with four relevant attributes per referent and sixteen blocks in the array. As expected, the number of successes decreased as the number of attributes of each target referent increased along with an increase of blocks in each array. These results parallel those of Whitehurst and Merkur (1977) and Whitehurst and Sonnenschein (1978, 1981), that young children are more successful in describing a target referent in a small array with limited variation. However, the above studies limited the array to two objects and attribute variation to one, while in the present study arrays varied from three to sixteen objects with attribute variation ranging from one to four. Thus while success decreased with increased attribute variation and array size, the young children in this study were generally successful with more complex games. This is congruent with the finding of Patterson and Massad (1980). In their study young children successfully played referential communication games using referents with two to four attributes and arrays of four to sixteen objects.

The children in the trained group were on the average seven months

older than the children in the untrained group. The trained children attended the afternoon session of the preschool, while the untrained children attended the morning session. Parents of young children tend to choose the morning session so their child can nap in the afternoon. The afternoon class was chosen for training since the experimenter was the classroom teacher for that session. Although in some cases the training procedures appeared to improve the children's speaking and listening skills, the results may have been partially due to the age differences of the two groups.

When communication failure did occur, it was due primarily to listener error in games I a, I b, and I c and speaker error in games II a, II b, II c, and II d. Speaker failures were due to inadequate messages. Speakers misnamed the shapes of the target referent, misread the target referent card, and/or omitted one to two relevant attributes from their messages. The speakers who compared and discussed the relevant attributes of the blocks in the games during the training sessions were more successful in correctly describing the target referent than the untrained speakers. As Whitehurst and Sonnenschein (1981) found while young children can compare, with training they learn when to compare.

Although the children exposed to training procedures generally had more success in communication than the untrained children, changes and additions to the games and procedures are needed to improve speakers' inadequate messages. Two sets of attributes (square and triangle; thick and thin) were confusing or unfamiliar to the children. The labels for square and triangle were often interchanged or omitted by the speaker, thus causing failure. More in depth classification and discussion of these labels is needed during the training session and circle blocks could initially be paired with square

blocks and then replaced by triangular blocks. This would be consistent with Piaget (1952, 1969), who contended that children can differentiate between curvilinear and straight-sided shapes before they can differentiate shapes according to their angles and dimensions. Children unfamiliar with the terms thick and thin substituted large and small when describing the blocks in game II c. More classification and discussion of these terms is needed for clarification. A game using eight referents with three different attributes (thickness, size, and shape) could be used to clarify these confusing properties. This additional game should be introduced before game II d which uses the complete set of sixteen referents.

Training the children to read the target referent cards should reduce the number of speaker failures. More time should be spent matching the cards and blocks. This activity could be presented as a separate game before introducing the series of choose the block games.

To correct the omission of attributes, more emphasis needs to be placed on the importance of including all relevant attributes in the speaker's messages, the number of attributes needed for a complete message, and the need for listeners to identify inadequate messages and to request more information. The training session used involved a one time discussion of the speaker and listener responsibilities before each game. To supplement this session, the classroom teacher could act as a coach while children play the games during the free activity period as in the study of Lefebvre-Pinard and Reid (1980).

The success of modeling incomplete messages by the teacher in the training session was apparent in the "games" the older children created as they played games I a, I b, and I c. Several speakers imitated the modeled

message by deliberately omitting a necessary attribute (color) as found in the study by Whitehurst (1976). The listeners also followed the modeled game by asking appropriate questions when given inadequate messages. This modeled game was not as apparent in games II a, II b, II c, and II d. The older children might have modeled the incomplete messages in the simple single attribute games to provide a challenge for the listener, whereas the more complex games with an increased number of attributes and objects in the array were challenging with adequate messages.

Both the trained and untrained speakers responded to listener questioning, as in the study by Karabenick and Miller (1977). However, the trained speakers responded with more relevant information than the untrained speakers. Since the trained listeners received more relevant information, they correctly chose the target referent more often than the untrained listeners when given a reformulated message.

To test the success of the games, the teacher preselected the dyads according to the children's birthdates. In some cases the dyads were composed of friends (play partners), while other dyads were composed of children who rarely interacted in a play situation. After playing one of the referential communication games successfully, some of the dyads who had not interacted with each other previously were observed playing other games or working together in cooperative activity (e.g., puzzles or play dough). Thus the opportunity to take the role of the speaker and listener in referential communication games in some cases had a positive effect on the children's prosocial behavior or cooperation and friendliness.

Due to test time limitations, the seven games were introduced over a five week period of time instead of the seven to fourteen week suggested

schedule (one to two weeks per game). The time limitations necessitated the teacher selection of dyads and choice of time for playing the games which conflicts with Piagetian and Montessori philosophy. This often resulted in a low level of interest in the games for some dyads, which could have caused failures due to the children's lack of concentration.

Despite the rigorous testing schedule followed to complete the project, several dyads spontaneously chose to play the games and were disappointed when they were removed from the classroom. The following suggested additions in the games and training procedures could be made:

- 1) the interjection of game matching referent blocks and target referent cards before the introduction of game II a, II b, II c, and II d;
- 2) the use of circle blocks with square blocks, followed by triangular blocks paired with square blocks;
- 3) the introduction of a fifth game in the choose the block series that includes eight referents varying in size, thickness, and shape; and
- 4) the classroom teacher as coach, while children play the referential communication games.

With these additions, this series of games could become a valuable asset to early childhood education programs to enhance speaking and listening skills in young children.

## REFERENCES

- Bearison, D., & Levey, L. Children's comprehension of referential communication: Decoding ambiguous messages. Child Development, 1977, 48, 716-720.
- Cosgrove, J., & Patterson, C. Adequacy of young speakers' encoding in response to listener feedback. Psychological Reports, 1979, 45, 15-18.
- Cosgrove, J., & Patterson, C. Plans and the development of listener skills. Developmental Psychology, 1977, 13, 557-564.
- Cosgrove, J., & Patterson, C. Generalization of training for children's listener skills. Child Development, 1978, 49, 513-516.
- Dickson, W. P. The development of interpersonal referential communication skills in young children using an interactional game device (Doctoral dissertation, Stanford University, 1974). Dissertation Abstracts International, 1974, 35, 3511-A.
- Dickson, W. P. Referential communication activities in research and in the curriculum: A meta-analysis. In W. P. Dickson (Ed.), Children's Oral Communication Skills. New York: Academic Press, 1981.
- Dickson, W.P., & Moskoff, M. A. A Computer Readable Literature Review of Studies of Referential Communication: A Meta-Analysis (Technical Report). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1980.
- Dickson, W. P., & Patterson, J. Criteria for Evaluating Curriculum Material Which Use Referential Communication Activities to Teach Speaking and Listening Skills (Working Paper No. 273). Madison: Wisconsin Research and Development Center for Individualized Schooling, 1979.
- Elkind, D. Child development and early childhood education: Where do we start today? Young Children, 1981, 36, No. 5, 2-9.
- Glucksberg, S., Krauss, R., & Higgins, E. The development of referential communication skills. In F. D. Horowitz (Ed.), Review of Child Development Research (Vol. 4). Chicago: University of Chicago Press, 1975.
- Glucksberg, S., Krauss, R., & Weisberg, R. Referential communication in nursery school children: Method and some preliminary findings. Journal of Experimental Child Psychology, 1966, 3, 333-342.



- Inhelder, B., & Piaget, J. The Early Growth of Logic in the Child. New York: W. W. Norton, 1969.
- Ironsmith, M., & Whitehurst, G. The development of listener abilities in communication: How children deal with ambiguous information. Child Development, 1978, 49, 348-352.
- Kamii, C. Evaluation of learning in preschool education: Socio-emotional, perceptual-motor, cognitive development. In B. Bloom, J. Hastings, & G. Madaus (Ed.), Handbook on Formative and Summative Evaluation of Student Learning. New York: McGraw-Hill, 1971.
- Kamii, C., & DeVries, R. Piaget, Children and Numbers. Washington, D.C.: National Association for the Education of Young Children, 1976.
- Kamii, C., & DeVries, R. Physical Knowledge in Preschool Education: Implications of Piaget's Theory. Englewood Cliffs, New Jersey: Prentice Hall, 1978.
- Kamii, C., & DeVries, R. Group Games in Early Education: Implications of Piaget's Theory. Washington, D.C.: National Association for the Education of Young Children, 1980.
- Kamii, D., & Radin, N. A framework for a preschool curriculum based on some Piagetian concepts. In I. J. Athey & D. O. Rubadeau (Eds.), Educational Implications of Piaget's Theory, Waltham, Mass.: Eerox College Publishers, 1970.
- Karabenick, J., & Miller, S. The effects of age, sex, and listener feedback on grade school children's referential communication. Child Development, 1977, 48, 678-683.
- Kendon, A. Some functions of gaze direction in social interaction. Acta Psychologica, 1967, 26, 22-63.
- Krauss, R. M., & Glucksberg, S. The development of communication: Competence as a function of age. Child Development, 1969, 40, 255-266.
- Lefebvre-Pinard, M., & Reid, L. A comparison of three methods of training communication skills: Social conflict, modeling, and conflict-modeling. Child Development, 1980, 51, 179-187.
- Lieb-Brilhart, B. Update on basic skills legislation. Spectra: A Bi-monthly Publication of the Speech Communication Association, February 1979, 11-12.
- Lillard, P. P. Montessori: A Modern Approach. New York: Schocken Books, 1972.
- Montessori, M. The Discovery of the Child. New York: Ballentine, 1967.

- Patterson, C., & Kister, M. The development of listener skills for referential communication. In W. P. Dickson (Ed.), Children's Oral Communication. New York: Academic Press, 1981.
- Patterson, C., & Massad, C. Facilitating referential communication among children: The listener as teacher. Journal of Experimental Child Psychology, 1980, 29, 357-370.
- Patterson, C., Massad, C., & Cosgrove, J. Children's referential communication: Components of plans for effective listening. Child Development, 1978, 49, 401-406.
- Patterson, C., O'Brien, C., Kister, M., Carter, D., & Kotsonis, M. Stimulus Complexity, Message Ambiguity, and the Development of Comprehension Monitoring. Unpublished Manuscript, University of Virginia, 1980.
- Peterson, C., Danner, F., & Flavell, J. Development changes in children's response to three indications of communication failure. Child Development, 1972, 43, 1463-1468.
- Piaget, J. The Child's Conception of Number. London: Routledge Kegan Paul Ltd.; New York: Humanities Press, Inc., 1952.
- Piaget, J. The Moral Judgement of the Child. New York: Free Press, 1965.
- Pulaski, M. Understanding Piaget: An Introduction to Children's Cognitive Development. New York: Harper & Row, 1971.
- Robinson, E., & Robinson, W. Children's explanations of communication failure and the inadequacy of the misunderstood message. Developmental Psychology, 1977, 13, 156-161.
- Shantz, C. The development of social cognition. In E. M. Hetherington (Ed.), Review of Child Development Research (Vol. 5). Chicago: University of Chicago Press, 1975.
- Shantz, C. The role of role-taking in children's referential communication. In W. P. Dickson (Ed.), Children's Oral Communication Skills. New York: Academic Press, 1981.
- Whitehurst, G. The development of communication: Changes with age and modeling. Child Development, 1976, 47, 473-482.
- Whitehurst, G., & Merkur, A. The development of communication: Modeling and contrast failure. Child Development, 1977, 48, 993-1001.
- Whitehurst, G., & Sonnenschein, S. The development of communication: Attribute variation leads to contrast failure. Journal of Experimental Child Psychology, 1978, 25, 490-504.

Whitehurst, G., & Sonnenschein, S. The development of informative messages in referential communication: Knowing when versus knowing how. In W. P. Dickson (Ed.), Children's Oral Communication Skills. New York: Academic Press, 1981.

APPENDIX A  
Project Subjects

		Trained		Untrained	
Three Year Old Dyads		Birthdates		Birthdates	
	March	3	1978	September	20 1978
	April	11	1978	November	11 1978
	May	20	1978	January	12 1979
	August	21	1978	January	20 1979
				March	19 1979
				April	27 1979
Four Year Old Dyads					
	April	30	1977	June	30 1977
	June	1	1977	July	11 1977
	May	7	1977	September	11 1977
	May	7	1977	December	3 1977
	June	1	1977	January	7 1978
	July	2	1977	February	12 1978
	September	14	1977	February	4 1978
	October	4	1977	March	11 1978
Five Year Old Dyads					
	September	8	1976	October	2 1976
	September	8	1976	December	7 1976
	September	13	1976	December	15 1976
	September	20	1976	December	28 1976
	October	7	1976	January	22 1977
	November	7	1976	July	31 1977
	March	14	1976		
	November	7	1976		

## APPENDIX B

### Score Sheet Used For Referential Communication Games

SCORE SHEET FOR GAME \_\_\_\_\_

DATE \_\_\_\_\_

SPEAKER \_\_\_\_\_ BIRTH DATE \_\_\_\_\_

LISTENER \_\_\_\_\_ BIRTH DATE \_\_\_\_\_

PART	TRIAL NUMBER AND TARGET REFERENT	SPEAKER: ATTRIBUTES GIVEN  (circle and number)	LISTENER: FEEDBACK GIVEN	SUCCESS	FAILURE (which one chosen)
		red      blue      yellow r/b      b/y      y/r large      small square      triangle thick      thin			
		red      blue      yellow r/b      b/y      y/r large      small square      triangle thick      thin			
		red      blue      yellow r/b      b/y      y/r large      small square      triangle thick      thin			
		red      blue      yellow r/b      b/y      y/r large      small square      triangle thick      thin			
		red      blue      yellow r/b      b/y      y/r large      small square      triangle thick      thin			

CREATING EARLY CHILDHOOD CURRICULUM  
FROM REFERENTIAL COMMUNICATION RESEARCH

by

KATHLEEN L. HURSH

B.S., Kansas State University, 1972

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AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements of the degree

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KANSAS STATE UNIVERSITY  
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## ABSTRACT

A series of games and training procedures applicable to early childhood curricula were designed using methodologies from referential communication research. Two groups of three to five year old children were shown how to play the games. One group (control) was given a brief explanation of how the game was played. Children in the other group (experimental) were trained as speakers to name all relevant attributes of each target referent and as listeners to request more information when given an incomplete message. All children were observed playing the games in child-child dyads and scored for success or failure. The training procedures increased the number of successes in communication when playing the games, with the exception of the final, most complex game. The failures in communication resulted from speakers' incorrect naming of shapes, misreading target referent cards, and omitting attributes from messages. Additions to the games and training procedures are discussed.