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ABSTRACT

In a consideration of the development of referential communication performance, this paper describes three broad capacities that appear to underlie successful performance: the speaker's ability to analyze the persepective of the listener and formulate a message with this perspective in mind, the child's ability to meet the information processing demands of particular communication tasks, and the child's ability to analyze messages after they have been produced. After an introductory section, the paper first deals with listener analytic skills. Specifically it discusses adult performance and considers the egocentrism hypothesis with reference to age differences in communication accuracy, message contingency, self- versus other-communication, variation in listener attributes, correlation with perspective taking measures, and training studies. Some attention is also given to component skills. The next section of the paper presents a discussion of task analytic skills as they relate to both adult and children's performance. Training studies in this area are also examined. The following section details message analytic skills, with a consideration of both listener and appraisal ability, and includes an analysis of feedback utilization. The final topic of discussion is referential communication and ecological validity. (FL)

CENTER FOR THE STUDY OF READING

Technical Report No. 90

REFERENTIAL COMMUNICATION

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I. Introduction.

One of the most basic functions of language is to communicate information to other people about particular referents. A referent could be, for example, an object (e.g., the red ball), a location (e.g., the location of the post office), or an idea (e.g., the concept of gravity). In each case the speaker's goal is to ensure that the listener will be able to identify the referent from alternatives that might be mistaken for the referent. Referential communication, as it is termed, can be distinguished from other functions of communication. People also communicate to entertain, to persuade, to impress one another, and so on. The referential function of language has received the greatest research attention to date because of its relative simplicity and apparent pervasiveness, and also because it is probably a component of other, more complex types of communication functions.

One way that referential communication might be studied would be to observe people in their everyday environment as they go about the task of describing, explaining, giving directions, and so on. A serious obstacle to this sort of method is the fact that it is not usually possible to determine from observation of an ongoing interchange exactly what a speaker is intending to communicate (Rosenberg & Cohen, 1966). Another obstacle to naturalistic observation is the difficulty of determining the extent to which the listener has understood the speaker's intended message. Many years ago, Piaget expressed the problem with regard to the study of children's communication by noting that "It is impossible by direct observation to be sure whether they are understanding each other. The child has a hundred and one ways of pretending to understand and often

complicates things still further by pretending not to understand . . ." (Piaget, 1926, p. 76).

Piaget and other researchers have responded to these obstacles by conducting experiments which have two features. First, the speaker's intended message is specified by the experimenter; the speaker is told what to communicate to the listener. Second, the listener is asked to make some overt response such as trying to identify the correct referent. In this way a measure is obtained of how accurately the listener has understood the speaker. Piaget (1926) recognized the drawbacks of this methodology but saw no alternative. "This procedure will doubtless be criticized as being removed from everyday life, where the child speaks spontaneously, without being made to, and especially without having been told what to relate or explain to his listener. We can only reply that we found no other way of solving the problem" (Piaget, 1926, p. 79-80).

Other researchers have also come to the conclusion that "programming" speaker intent offers a promising way to study referential communication. One of the most widely used tasks (Glucksberg, Krauss, & Weisberg, 1966) presents the speaker and listener with a set of highly unusual shapes (see Figure 1). The forms are presented in a pre-arranged order to the speaker and arranged randomly in front of the listener. The speaker's task is to communicate a series of messages that will enable the listener to arrange the forms in the same order as the speaker.

Insert Figure 1 about here

Another frequently employed task is the word pair task developed by Rosenberg and Cohen (1966). Here the speaker and listener are given a

set of word pairs (see Figure 2). In each word pair, one word, the referent, is underlined for the speaker, but not for the listener, and the speaker's task is to communicate a single-word message that will help the listener to identify the referent in each pair. Yet another example of an experimental task is the one used by Flavell and his colleagues (Flavell, Botkin, Fry, Wright, & Jarvis, 1968) in which the speaker knows the rules of a game and must provide game directions for a naive listener.

Insert Figure 2 about here

Tasks such as these can be used to assess the adequacy of speakers' messages. These tasks also allow for the study of listeners' abilities to respond appropriately to informative messages from speakers, to recognize uninformative messages from speakers, and to give feedback to speakers when messages need clarification. Finally, speakers' ability to utilize feedback can be studied by examining whether speakers respond to listener feedback by modifying or improving subsequent messages.

Considerable research effort has been devoted to studying the development of referential communication performance and it is clear from a variety of studies that referential communication performance improves over age (Glucksberg, Krauss, & Higgins, 1975). However the specific skills that contribute to improvement over age are not well understood. This paper considers three broad capacities that appear to underlie successful communication performance. The first is the speaker's ability to analyze the perspective of his or her listener and formulate a message

with this perspective in mind. This ability to analyze the listener's perspective has received the greatest attention to date. The Piagetian hypothesis that young children are egocentric, and that their egocentrism leads to communication failure has generated considerable research.

Recent research has begun to focus on a second skill area: the child's ability to meet the information processing demands of particular communication tasks. For example, it appears that young children fail to communicate effectively when the task requires that they produce a message which distinguishes referents from similar nonreferents (Asher & Parke, 1975; Whitehurst, 1976).

A third skill area is the child's ability to analyze messages after they have been produced. Recent evidence suggests that young children often do not recognize when messages are incomplete (e.g., Asher, 1976; Markman, 1977). This failure to detect message ambiguity may relate to children's deficiencies in giving feedback when in the listener role (e.g., Meissner, 1975) and in using feedback when in the speaker role (e.g., Glucksberg & Krauss, 1967).

II. Listener Analytic Skills

A. Adult Performance

People usually vary in the amount of information they have about a topic, thus to communicate effectively speakers must adapt their messages to the informational needs of their listener. It is clear that mature communicators engage in an analysis of the listener's perspective. One source of evidence for this is that adults communicate differently when formulating a message for themselves versus another person. Krauss,

Vivekanathan, and Weinheimer (1968) gave adults a series of color chips, and asked them to name each of the colors one at a time. Half of the speakers were told that they were communicating for their own later identification of the color (non-Social Condition), and the other half were told that they were communicating for someone else's identification (Social Condition). Results indicated that speakers in the Social Condition generated longer messages and used more common vocabulary items. Furthermore, when adults were actually given messages generated under the different conditions they did better at identifying colors from messages generated by another person in the Social Condition than in the Non-Social Condition.

Another source of evidence about adult listener analytic ability comes from studies in which speakers have to communicate to listeners with different informational needs. For example, Kingsbury (1968; cited in Krauss & Glucksberg, 1970) had a person ask directions on a street in Boston. In one condition, the person seeking directions spoke with a Boston accent; in another condition the accent indicated the person was a non-resident. Results indicated that speakers gave more extensive directions in the "stranger" condition. Speakers were communicating according to the informational needs they ascribed to the listener.

B. The Egocentrism Hypothesis

Much of the research on the development of communication ability has been concerned with children's ability to engage in analysis of the listener's perspective. Piaget's work has been particularly influential here. Piaget (1926) viewed young children as trapped within their own

egocentric perspective and unable to accommodate to the perspective of their listener. The egocentrism construct as used by Piaget is a rich one that defies easy definition. According to Piaget (1926) the child is egocentric when:

> "... he does not bother to know to whom he is speaking nor whether he is being listened to. He talks either for himself or for the pleasure of associating anyone who happens to be there with the activity of the moment. The talk is ego-centric, partly because the child speaks only about himself, but chiefly because he does not attempt to place himself at the point of view of his hearer. Anyone who happens to be there will serve as an audience. The child asks for no more than an apparent interest, though he has the illusion (except perhaps in cases of pure soliloquy if even then) of being heard and understood. He feels no desire to influence his hearer nor to tell him anything; not unlike a certain type of drawing-room conversation where every one talks about himself and no one listens" (Piaget, 1926, p. 9).

Another index of childhood egocentrism according to Piaget is children's tendency to talk out loud, revealing their innermost thoughts without regard to who might be present: . . . "the child up to an age, as yet undetermined but probably somewhere about seven, is incapable of keeping to himself the thoughts that enter his mind. He says everything. He has no verbal continence" (Piaget, 1926, p. 38).

Piaget contrasts the egocentric speech of childhood with the adapted speech of the later years. Piaget contends that the adult thinks socially, that he or she always has an audience in mind even when working individually on a task. Piaget undoubtedly had his own profession in mind when he wrote that "The adult, even in his most personal and private occupation, . . . thinks socially, has continually in his mind's eye his collaborators or opponents, actual or eventual, to whom sooner or later he will announce the result of his labors. This mental picture pursues him through his task. The task is henceforth socialized at almost every stage of its development" (Piaget, 1926, p. 39).

To what extent is improvement in communication accuracy over age a function of the child's increasing ability to analyze the listener's perspective? At least six different research strategies have been employed to test the egocentrism explanation of young children's communication failures. Each test has focused on somewhat different aspects of the egocentrism construct. However, each test is predicated on the general assumption that egocentrism takes the form of insensitivity to the listener's perspective. Actually, the first two research strategies do not provide a strong test of the egocentric hypothesis. However, they are considered here because data produced by these strategies are often interpreted as evidence that young children are egocentric.

1. Age Differences in Communication Accuracy. One research strategy is simply to compare the performance of children at different ages on a referential communication task. The typical finding is that performance improves over age, and this finding is often interpreted as reflecting a decline in egocentricity. This inference is clearly unwarranted.

Improvement over age in communication accuracy could be due to a host of factors such as improved vocabulary, speaker appreciation of specific communication task demands, the ability to construct a sequence of logically connected sentences, etc.

This confusion of poor communication accuracy with egocentrism can be found in Piaget's writing. "The criterion of adapted information [a major sub-category of socialized speech], as opposed to pseudo-information . . . is that it is successful. The child actually makes his hearer listen, and contrives to influence him; i.e. to tell him something. This time the child speaks from the point of view of the audience" (Piaget, 1926, p. 19). Note that Piaget has two critical ingredients in this definition of adapted information. One is that the child intends to communicate socially, that is, communicate with a particular listener in mind. A second element is that the message should be informative, that is, that the child should succeed. Joining these two elements together in defining non-egocentric or socialized speech was unfortunate. The child might well intend to take the listener's perspective but not communicate successfully for a variety of other reasons.

2. Message Contingency. Another research strategy often viewed as testing the egocentric hypothesis is to assess the extent to which one child's message is responsive to the content of another child's message. Piaget (1926) employed this research strategy to estimate the degree of egocentrism in children's naturalistic conversations. Piaget found that children often spoke without regard to the theme or topic of the previous speaker's message. Later researchers have also coded children's speech as contingent or not on the previous speaker's utterance

(e.g. Garvey & Hogan, 1973; Mueller, 1972). Although the majority of even preschool children's speech is found to be contingent, much of it is not.

Observation of children's conversations provides valuable normative data about children's communicative styles. However, the temptation to view noncontingent speech as evidence of childhood egocentricity, and increases in contingent speech as evidence of the decline of egocentricity, should be resisted. In order to speak contingently children must be able to attend carefully to the speaker's message, identify the speaker's topic, and generate a message which is relevant to the same topic (Shatz, 1978). Clearly, speaking contingently requires information processing skills beyond analysis of the listener's perspective.

Thus, it is inappropriate to infer egocentrism from a sample of uninformative speech or non-contingent speech unless other operations are provided to eliminate alternative explanations of ineffective communication performance. Piaget, and many researchers since, have tended to assume an equivalence between egocentrism and poor communication performance. The concept of egocentrism has utility only if it refers to a particular skill deficiency that may underly the failure to communicate, namely the failure to analyze the listener's perspective. Once the concept becomes broadened to refer to communication failure, in general, it loses value.

3. Self- Versus Other-Communication. Four other research strategies do provide appropriate operations for examining the egocentrism hypothesis. One of these strategies is implied by Flavell et al.'s (1968) representation of the process of egocentric versus non-egocentric speech. In egocentric speech (Figure 3a) the speaker (S) recognizes certain information (X)

and overtly codes it so that the information is meaningful and communicable to self. Next, the speaker sends a message to the listener (L). This message is essentially an unmodified version of the speaker's private coding and can thus be defined as egocentric. In non-egocentric communication (Figure 3b) the speaker recodes the information with the listener's attributes in mind and thus sends a message which is responsive to the listener's informational needs.

Insert Figure 3a and 3b about here

This model suggests an interesting operational test of the egocentrism hypothesis. If children are poor communicators because they are egocentric then their messages should have self-communication value even though the messages are not informative to others. This issue has been examined by Glucksberg, Krauss, and Weisberg (1966). They tested kindergarten children on the novel forms task and found that four- and five-year-old children communicated inaccurately to another person. However, another group of children, when given back their own descriptions soon after generating them, were able to identify the correct forms from their own descriptions. This finding can be interpreted to mean that young children's messages had private but not public meaning. However, it is possible that children's recognition of referents from their own messages was based on paired associate learning between the children's messages and the referents and that children simply remembered which messages went with which referents (Cohen & Klein, 1968).

Another study on this issue (Asher & Oden, 1976) used the word pair task and examined the influence of memory. In this study children were

given their own clues either immediately after generating them, or two weeks later. In addition, a direct test of memory was made by having children attempt to identify the referent for half of the word pairs without a clue. The results indicated that children were able to identify the correct referents from memory alone in the Immediate Condition. In the Delay Condition memory effects dissipated and only those children whose clues had meaning to an adult listener were able to use their own messages to identify referents. Children whose messages had little public meaning derived little private meaning from their own messages. These results do not support an egocentric explanation of communication failure. Instead they imply that children who communicate poorly lack other types of skills.

4. Variation in Listener Attributes. Flavell et al. (1968) provided a second operational test of the egocentrism hypothesis. They suggested that the process of taking the perspective of the listener is a process of discriminating the role attributes of the listener. Once the relevant attributes (e.g., age, informational background, culture, etc.) are identified the speaker can formulate a more effective message. This process of discriminating the listener's role attributes, or role taking, is represented in Figure 3b. The model implies that an egocentric speaker will send similar messages regardless of the nature of the listener who is being addressed; the nature of the listener would not enter into the speaker's "communication equation." However, a speaker who engages in role taking activity would send different messages to different types of listeners.

A number of studies with preschool children have employed the "different listeners" test. These studies suggest that even young children are aware that messages must be modified to take listener characteristics into account. Preschool children communicate differently to a blindfolded versus sighted listener (Maratsos, 1973; Meissner & Apthorp, 1976), to a listener who is knowledgeable about a game versus a naive listener (Menig-Peterson, 1975), and to an adult versus a young child (Shatz & Gelman, 1973). The fact that children shift their message content as a function of the listener has been taken as evidence of communicative competence. However, the fact that children are shifting their messages does not mean that the messages are necessarily informative. In fact, when analyses are done of the informativeness of messages it appears that children's messages are only partially informative, particularly when the task of distinguishing the referent from the nonreferent is a challenging one (e.g. Maratsos, 1973). These findings suggest that children's communication deficiencies arise less from lack of awareness concerning the listener's needs and more from difficulty in coping with other cognitive requirements of the particular communication task.

This interpretation also applies to "different listener" studies conducted during the middle childhood years. Both Flavell et al. (1968, Task IA) and Higgins (1977) found large increases in communication accuracy across age but only modest evidence of greater responsivity to listener characteristics among older children. For example, in Higgins' (1977) study, children were told a story about an event in a town. They then had to relate this story to one listener who was a neighbor (i.e.,

had certain background information about the town and its inhabitants) and to another listener who was a "stranger." The speaker's task was to describe each scene in the story so that the listener could identify it from an array of similar pictures. The results for oral communication accuracy indicated strong age differences, however there was no interaction of age with type of listener. The analysis of message content did reveal some evidence of the development of role taking ability. Eighth-grade children varied their message content as a function of listener more than did fourth-graders. However, even the fourth-grade children's message content varied according to the listener's characteristics.

To summarize, studies employing the "different listeners" test indicate that even young children shift their messages as a function of the type of listener. Apparently young children are aware of the need to accommodate to the listener's perspective. However, analyses of communication accuracy indicate that the messages they send are often uninformative. Studies during the middle childhood years provide evidence of strong improvement over age in communication accuracy, but only modest evidence of the relevance of listener analytic ability to this improvement.

5. Correlation with Perspective Taking Measures. Another operational test of the egocentrism hypothesis has been to develop independent measures of perspective taking ability and to correlate performance on these measures with communication accuracy. This strategy has been employed in a large number of studies (e.g., Coie & Dorval, 1973; Johnson, 1977; Kingsley, 1971; Piché, Michlin, Rubin & Johnson, 1975;

Rubin, 1973, 1977; Shantz, 1975). Quite diverse measures of perspective taking have been employed. For example, Kingsley (1971) developed a Spatial Egocentrism Test in which a child is shown a picture of a person or animal looking at a scene. Below this picture are four pictures representing possible views that could be seen by the person or animal. One of the four is the correct perspective, one is a representation of the child's own view of the scene, and the other two are incorrect, but non-egocentric alternatives. Children receive scores based on the number of correct and egocentric responses they make.

Another example of a perspective taking measure is the Role Taking Test (Feffer, 1959) used with adults (e.g., Feffer & Suchotliff, 1966) and children (e.g. Piché et al., 1975). In this test, the subject is shown a T.A.T.-type card with three people on it and is asked to tell a story about the picture. Next, the subject is asked to re-tell the story from the vantage point of each of the participants. Scoring of this test is based on how well the subject shifts perspectives from one character to another while maintaining a common theme across stories.

In general, studies which test children on both perspective taking and communication accuracy tasks find that children improve over age on both types of measures but that the correlation between the two measures is typically modest or low. Furthermore, the correlation among different perspective taking measures is not very high nor is the correlation high among different communication accuracy tasks.

These data are open to two interpretations. One is that each perspective taking task and communication task has certain unique task demands which make it unlikely that strong correlations would be obtained,

across tasks. In this case more progress would be made by mapping the specific requirements of particular tasks than by throwing a general umbrella (e.g. "egocentrism" or "perspective taking") over all tasks. A psychometric interpretation of the results is also plausible. Research on social-cognitive development has been generally insensitive to the needs for reliable instrumentation. Many perspective taking and communication accuracy measures employ very few items (e.g. six novel forms) and internal reliability and test-retest reliability are rarely investigated. When such tests have been made both internal consistency and test-retest reliability are often found to be low (e.g., Kurdek, 1977; Rubin, 1977). It could be that the correlational strategy of assessing the contribution of perspective taking skills to communication failure will yield more promising findings when more reliable measures have been developed. However, given the unique features that characterize each task, it seems unlikely that very strong relationships between perspective taking tests and communication accuracy scores will be found.

6. Training Studies. Another line of research on listener analytic ability has investigated the effect of training role taking skills on children's referential communication performance. Two early studies of this type (Fry, 1966, 1969) found little positive effects of training but the studies are difficult to evaluate because the training procedures were rather unstructured. A study by Shantz and Wilson (1972) used a more specified curriculum and found mixed evidence of success (for a more complete review of these studies see Asher, 1972).

Perhaps the most suggestive findings are from a training study by Chandler, Greenspan, and Barenboim (1974). They identified a group of

children who were quite low on both a measure of role taking ability and a measure of referential communication performance. These children were then divided into three conditions: a role taking training group, a referential communication training group, and a nontreatment control group.

The role taking training consisted of working in a group with other children to produce video taped dramas. The rationale for this training procedure was that the production of dramas would provide children with practice in stepping outside their own role and in assuming different roles or perspectives. Children met weekly, for two hours, over a ten-week period. The referential communication training group met a similar amount of time but simply practiced and received feedback on a variety of referential communication games.

Results indicated that role taking training and referential communication training produced equal gains on the role taking measure. In both conditions gains exceeded those made in the control condition. However, only referential communication training led to sizable gains on the communication measure. Role taking training produced gains on the communication measure that were no different from the control condition.

Thus, training research does not give much support to the idea that listener analytic deficiences underlie communication failure. Clearly more adequate conceptualizations are needed of the listener analytic skills to be trained and better links need to be established between the training procedures and the training objectives. Specifically, do the procedures actually train role taking and if so, what is the mechanism by which this training is presumed to affect communication performance?

C. Attention to Component Skills

It seems, then, that despite the large number of studies stimulated by the egocentrism hypothesis little is understood about the contribution of listener analytic skills to communication performance. The evidence from four relevant lines of inquiry suggest: a) that when children's messages are publicly uninformative they also are privately uninformative, b) that even young children seem to appreciate the need to shift their messages as a function of their listener's perspective, yet still send messages which are often uninformative, c) that children who do poorly on direct tests of perspective taking ability seem to do no worse than good "perspective takers" on measures of communication accuracy, and d) that attempts to improve perspective taking do not result in improved communication performance.

These findings might lead researchers to abandon the study of children's listener analytic skills and to focus their energies on the more fruitful domain of children's task analytic skills (see the next section). However, abandoning the study of listener analytic skills may be premature. The failure to establish clearer relationships between listener analytic skills and communication effectiveness may result from a soluble conceptual problem. Research to date has proceeded without an adequate conceptualization of the component skills that constitute listener analytic ability. Clearly, the process of listener analysis or role taking involves more than simply being aware that listeners have different perspectives from one's own.

Flavell (Flavell, 1974; Flavell et al., 1968) has advanced thinking in this area by attempting to specify the component skills that constitute

role taking ability. He suggests that, first, the speaker must be aware that people have perspectives and other psychological attributes (e.g. feelings, abilities, etc.). Second, the speaker must appreciate that an analysis of the listener's perspective is, indeed, called for in the particular communication situation at hand. Third, the speaker must have the necessary inferential skills to make appropriate attributions about the other person's perspective. Finally, the speaker has to be able to translate what he or she infers about the listener's perspective into an effective message. These four components are referred to by Flavell as Existence, Need, Inference, and Application.

This model makes explicit the fact that communication failure can occur due to problems in inference or application even if speakers are aware of the existence of other perspectives and the need to consider those perspectives in a particular communication situation. As such, it provides a more analytic framework for designing future research as well as a model within which to interpret past findings.

It seems from the research reviewed in this section that children are aware of the existence of different perspectives and do appreciate the need to take the listener's perspective into account. For example, in the "different listeners" studies, even young children shift their message content as a function of the type of listener. However, in these same studies, accuracy measures reveal that children's messages are often uninformative. One possibility is that the breakdown is in the inference stage and that children appreciate that the listener has a distinctive perspective but fail to adequately conceptualize that perspective. This interpretation seems improbable given that the listener's

attributes are often made explicit to the speaker (e.g., by first blindfolding the speaker before the speaker addresses a "blind" listener). More likely, children's inaccurate communication results from deficiencies in "application;" that is, children fail to cope with the basic cognitive demands of the particular communication task.

Two different types of application skills can be distinguished. One is the ability to translate an inference about a particular listener into a message that is uniquely appropriate for that listener. This is the type of application skill that Flavell is concerned with. However, there is another, perhaps more basic, type of application skill, namely the ability to generate an effective message for any type of listener, even a listener who is quite similar to self. In order to attribute poor communication accuracy to deficiencies in the first type of application ability it is necessary to demonstrate that the speaker is capable of meeting the second type of application demand of the task.

The research on self- versus other-communication accuracy is relevant here. As we have seen, children who communicate inaccurately to another person do not utilize their own messages once controls for memory are introduced. Were this finding to be obtained consistently across tasks it would suggest that children's problems in application often are more fundamental than suggested by Flavell's model. Presumably, children in the self-communication situation know the perspective of their intended listener since that listener is themselves. Therefore, poor communication accuracy would seem to be due to failure to cope with more basic information processing demands of the task.

Flavell's model also has relevance to studies which correlate measures of perspective taking with measures of communication accuracy. Relationships between measures should be expected only when the two types of measures are assessing the same components of listener analytic ability. Most studies have correlated perspective taking measures with a measure of communication accuracy. However, children's ability to shift their message content as a function of listener type is probably a better index of children's recognition of the need to take the listener's perspective. Accordingly "message content shift" measures should correlate more highly than accuracy measures with direct tests of children's ability to "decenter" from their own perspective.

The component model also has relevance to the design and interpretation of communication training studies. Providing children with perspective taking experiences seems far less effective than giving practice in application (Chandler et al., 1974; Shantz & Wilson, 1972). This is not surprising in light of evidence, to be presented in the next section, that children seem to have difficulty in meeting the basic cognitive demands of many communication tasks.

Finally, the component model provides a basis for studying the development of listener analytic ability beyond childhood. One problem with viewing communication failure solely in terms of egocentrism is that it implies that children have "made it" once they appreciate that listeners have perspectives different from their own. Although adolescents and adults do typically appreciate that listeners have perspectives different from their own (Existence) and that communication tasks require

accommodating to these perspectives (Need), gaps remain in their knowledge of the content of particular listeners' perspectives. Such gaps could produce problems in Inference or Application.

Learning about particular listener characteristics is a life-long task and interesting research could be done on the development of such social knowledge. People learn about the content of particular perspectives from vicarious as well as personal experiences. For example; books such as Stud Terkel's (1972) Working may serve as "role taking manuals" by providing valuable information about the content of different occupational perspectives.

It should be stressed that this "knowledge of the world" component of listener analytic ability has probably played a minor part in studies to date given the tasks and types of listeners employed. However, in everyday adult life where people with quite different perspectives are encountered, listener analytic ability may depend heavily upon this type of world knowledge.

III. Task Analytic Skills

From our discussion thus far it seems clear that a task analytic perspective is needed to help account for change over age in communication performance. The assumption underlying this section is that an analysis of children's communication performance under different task conditions can suggest the specific skills that develop over age. Furthermore, it is possible to test inferences derived from descriptive studies by carefully training specific skills and observing the impact of training on communication performance. Whereas teaching role taking

skills has not been fruitful, it will be shown that the training of more task-specific skills has been more successful.

In discussing the relationship of task demands to communication performance it is best to return to a consideration of specific tasks and the types of skills these tasks might require. Research with the word pair task (Rosenberg & Cohen, 1966) can be used to illustrate the task analytic approach. Recall that in this task the speaker and listener are given a series of word pairs. The speaker's task is to provide a one-word clue that will help the listener identify the referent in each word pair.

Looking at the items in Figure 2, what types of demands are made by this task? First, the speaker must appreciate that an informative message is one that distinguishes the referent from its highly similar nonreferent. For example, it is insufficient to give a high-frequency associate such as "water" for the word pair "ocean-river." This message, although related to "ocean," is also highly related to "river" and will fail to inform the listener. Thus, the speaker must ensure that any message produced is more highly related to the referent than the nonreferent. Rosenberg and Cohen (1966) have proposed a comparison process to account for the activity of distinguishing the referent from the nonreferent. They contend that the speaker first samples an association to the referent from his or her repertoire of associative responses. The probability of sampling a word is said to be proportional to its occurrence as a word associate to the referent alone. Next, the speaker is said to compare the sampled response to both the referent and to the nonreferent. If the associative value to the referent is greater, the

word is likely to be emitted; if the value is smaller, the word likely will be rejected and another cycle of sampling-comparison activity begun.

One can, of course, accept the idea that successful communication on the word pair task requires comparison activity without assuming that the comparison stage inevitably follows a sampling stage. Indeed, it is possible that mature communicators first recognize the task demand for comparison activity and then sample from words which distinguish the referent from the nonreferent.

In addition to the task demand that the speaker engage in comparison activity, the speaker must have access to an adequate repertoire of words, labels, and concepts. It does the speaker little good to appreciate that the word pair task requires comparison activity if the speaker cannot generate appropriate messages. As is evident from Figure 2, many of the word pairs require considerable knowledge of the world. For example, for the word pair "ocean-river" the speaker should know that oceans are bigger than rivers, or that oceans have waves or salt, or that oceans are known by names such as "Atlantic," or "Pacific," etc. A speaker who has comparison skills but lacks the appropriate background knowledge demanded by a particular item likely will be groping for the right word.

A. Adult Performance

Research with adults provides data on the operation of sampling and comparison processes in mature communicators. These processes can be studied by systematically varying the demands of the communication task. Where the speaker's task is to discriminate a referent from a similar nonreferent, comparison activity is clearly required. Where the referent

and nonreferent are dissimilar (e.g. house-tomato) no comparison activity is required. Here, the speaker can probably disregard the nonreferent and simply produce a high-frequency associate to the referent.

A number of studies with adults have varied the degree of referent-nonreferent similarity and examined the content of speakers' messages. Rosenberg and Cohen (1966) had college students produce word associations to single words. A second group of college students served as speakers and were given these words as referents in similar (e.g. ocean-river) or dissimilar (e.g. ocean-dog) word pairs. The Rosenberg and Cohen hypothesis that sampling is based on the strength of word associations to the referent implies that a speaker's choice of clues in the dissimilar word pair condition can be predicted from word association data. Results showed good prediction of speakers' responses from word association data when the referent was dissimilar. The view that comparison activity leads to the rejection of high frequency associates suggests that word association data cannot be used to predict speakers' responses when the referent and nonreferent are similar. Results supported this prediction as well.

Other studies with adults also provide evidence of the operation of comparison activity among mature communicators. Smith (1970) varied whether the referent appeared with a similar or dissimilar nonreferent. He found that "normal" adults took longer to emit a clue for similar than dissimilar pairs; apparently sampling and comparison activities take longer than sampling activity alone. Krauss and Weinheimer (1967) used a task in which an adult speaker had to communicate one of four colors to a listener. In one experimental condition, the referent color was

similar to the other colors. In the other condition the referent was dissimilar from the other colors. Krauss and Weinheimer hypothesized that adults would give longer messages in the similar than dissimilar referent conditions. This prediction was based on the assumption that when the referent and nonreferent are unrelated, the speaker can select a popular single-word label (e.g. "red" or "green"). However, when the referent and nonreferent share similar clues, more complex compound phrase qualifiers and color combinations must be used. Data supported their hypothesis.

Although adults do engage in comparison activity they do not always do so in the most efficient manner. Olson (1970) hypothesized that "an utterance does not exhaust the potential features" of a referent and that instead it specified "the object to the level required by the listener to differentiate the intended referent from the alternatives" (Olson, 1970, p. 264-265). Freedle (1972) termed this the minimal redundancy hypothesis and examined the conditions under which it held. He found that in certain cases adult speakers were redundant rather than maximally efficient; that is, they described more features than were necessary for differentiating referents from nonreferents. Freedle found, for example, that as the number of dimensions (e.g., height, width, darkness) used to construct an array increased, and the number of nonreferents increased, adult communicators were more likely to give redundant messages. It should be noted that this experiment employed a written rather than oral communication task. It seems likely, however, that similar results would be obtained with an oral communication task since oral communication typically provides even less opportunity to reflect on an array and

identify the critical nonredundant features of the referent. A reasonable conclusion from Freedle's work is that adult, i.e. mature, communicators do engage in comparison activity but that one should not expect the processing of the information to be consistently performed in the most efficient manner.

B. Children's Performance

To what extent do children engage in comparison activity? A series of experiments by Asher and Parke (1975) addressed this question by testing second-, fourth-, and sixth-grade children on similar and dissimilar word pairs. Children of all ages were found to be almost perfect communicators on the dissimilar pairs. However, on the similar pairs there was clear improvement over age. Younger children did little better than chance in this condition. Older children did much better but still were far from perfect.

These data could be interpreted to mean that younger children are deficient in comparison ability; children communicate effectively when the task does not require comparison activity (i.e. dissimilar pairs) but do poorly when comparison activity is required (i.e. similar pairs). An alternative, and equally plausible explanation, is that the similar word pair task makes greater demands on children's vocabulary and background knowledge. Perhaps younger children are familiar with the high-frequency associates that will be effective on dissimilar pairs but lack the more sophisticated terminology required to make the subtle distinctions required by similar pairs.

It seems, then, that message production data alone cannot be used to infer that younger children are deficient in comparison ability. Stronger

inferences can be made by including a recognition task in which children evaluate a series of messages known to be effective or ineffective. If children engage in comparison activity then they ought to recognize, for example, that the clue "food" is a poor one for the item "bread-fruit." Asher (1976) employed this recognition procedure and found that second-grade children were poorer than sixth-grade children on this task as well as on a communication production task. The younger children were consistently misled by a clue which, although highly associated with the referent, was also highly associated to the nonreferent.

The studies discussed thus far strongly implicate comparison processing as an important component of children's increasing skill over age. Are there specific task conditions under which children will engage in comparison activity? Perhaps, for example, younger children can engage in comparison activity if the features of comparison are quite obvious, or if the same criterial attributes are employed from item to item. Indeed it could be argued that the word pair task is a particularly challenging referential task insofar as the criterial attributes are not always salient and the attributes shift from item to item.

A study by Ford and Olson (1975) suggests that young children do engage in comparison activity under simple task conditions. Ford and Olson used a task in which blocks varied on the dimensions of shape (circle or triangle), size (large and small), and brightness (white and black). Trials varied in terms of whether one, two, or three features were required to differentiate the referent from the alternatives. When only one feature was required, five year olds were found to vary their description of the referent as a function of the nonreferent. However,

this evidence of comparison processing did not appear on the more complex trials.

A series of studies by Whitehurst and his colleagues also have specified some of the conditions under which children are likely to engage in comparison activity. Their triangle communication task is similar to Ford and Olson's (1975) block task. By systematically varying the nature of the triangles, the number of critical features that must be described was controlled. Previous tasks such as the novel forms task (Figure 1) or the word pair task (Figure 2) do not lend themselves to this clear specification of critical attributes. Precise specification of the attributes that must be described on each item makes it possible to identify three types of messages: a) those that are incomplete because they fail to mention the critical attribute, b) those that are redundant in the sense that they mention the essential information, but also give non-essential information, and c) those that are truly contrastive in that only the critical attributes are mentioned.

In an initial experiment with this task, Whitehurst (1976) gave kindergarten, first-, second-, and fourth-grade children a series of communication items. Some of these items contained one referent and one nonreferent while others contained one referent and two nonreferents. The results indicated a decline over age in incomplete responses and that incomplete responses were more likely on the more challenging task involving two nonreferents. Contrastive responding, interestingly, showed no significant effect of age but again there was a significant effect of task difficulty. Redundant responding increased over age but the effect was not significant due to considerable variability in performance within each age group.

The results for task difficulty could easily be expected but the developmental data are somewhat surprising. Why is there a stronger increase over age in redundant than contrastive responding? Whitehurst proposes the "least effort hypothesis" to account for the findings. As the task becomes more difficult it takes considerable effort to produce a contrastive response. It is much easier to simply describe all of the referent's features than to perform the more precise analysis of the stimulus array and give just the critical attribute.

The least effort hypothesis gains support from a second experiment in the same report (Whitehurst, 1976). A third of the children were first put in the listener role and exposed to a speaker who produced contrastive responses. Another third of the children heard a speaker who produced incomplete messages, and another third were in a control condition. Children then served in the speaker role. The results are shown in Figure 4. Those who heard a contrastive model showed a stronger increase in redundant messages than in contrastive messages. The number of incomplete messages declined considerably. Apparently children learned from exposure to a "contrastive" model that messages must distinguish the referent from the nonreferent. However, unlike the model, they performed this task by using longer, less difficult to construct messages.

Insert Figure 4 about here

Whitehurst (1976) concludes that children may be like novice writers who use 500 words when 50 words will do. "To continue the analogy, redundant writers seldom become spontaneously efficient; a good editor must intervene. If the parallel is apt, there is little reason to expect

minimal redundancy to be a routine attribute of communication at any level of development. Unless there are specific reasons to behave differently, children seem to operate on the principle that words are cheap" (p. 482). The least effort hypothesis might be tested in future research by constraining children's performance by limiting them to the message length associated with a contrastive response. Older children, or children exposed to a contrastive model, should exhibit more contrastive responding under constraint conditions.

Two recent experiments by Whitehurst and Sonnenschein (in press) examined the degree to which children engage in comparison activity when the dimensions of comparison are varied versus held constant across trials. In Experiment 1, one group of children were shown items in which the same dimension (e.g., size or color) could be used from one trial to the next. Another group received items in which the critical attribute varied from one trial to the next. Kindergarten children produced informative messages in the "simple condition" with a fairly similar proportion of contrastive versus redundant messages. However, in the "complex condition" children's performance deteriorated; a much higher proportion of incomplete responses was produced. Experiment 2 was conducted to learn whether it was variation in the dimensions of the referent or the nonreferent that produced the communication breakdown in the complex condition. In this experiment, Whitehurst and Sonnenschein manipulated independently whether the referent or the nonreferent varied across trials. Both types of variation were found to disrupt kindergarten children's performance within a few trials.

A study by Sonnenschein, Whitehurst, and Marcantel (1978) suggests that kindergarten children's failure to engage in comparison activity

on the triangles task is not a function of limited vocabulary or inability to identify criterial attributes. Children were tested in a regular communication condition ("tell me about the one with the star above it so that [the listener] can pick it out"), and in a condition in which they were directed to identify criterial attributes ("tell me how the one with the star above it is different from the other one"). In the first condition children did poorly but in the second condition they produced good messages. Apparently on this task, children's communication problems lie in their failure to spontaneously appreciate that the communication task requires comparison processing.

C. Training Studies

It seems, then, that children often have difficulty with one of the fundamental task demands of referential tasks, namely the need to compare the relationship of potential messages to the referent and the nonreferent. If children are, indeed, deficient in comparison processing, then it should be possible to improve communication performance by training children to engage in comparison activity. Recent research by Asher (1977) examined this issue. Children were taught to engage in comparison activity by being exposed to a model who talked out loud while working on a communication task. This "modeling plus self-guidance statement" procedure was adapted from a similar procedure that was successful in teaching impulsive children to be more reflective on a scanning task (Meichenbaum & Goodman, 1971).

To illustrate, the model's script for the first word pair ("child-baby") was as follows:

"Let's see, there's 'children' and 'baby' and 'baby' has the line under it. How about play as a clue? A baby plays. No, that's no good, because a child plays too, and the person won't know which word has the line under it. How about mother, because a baby has a mother. No, a child has a mother, too. Oh, I've got one. Rattle. Because a baby plays with a rattle and a child doesn't. Rattle."

After the model communicated, the child was asked to give a clue for the first practice pair and the child was instructed to "think out loud just like the person on T.V." After the child gave a clue, the experimenter gave corrective feedback. This video modeling and practice continued in a similar fashion through seven word pairs for both the model and the ch[redacted]. On the eighth word pair, the model was seen thinking to himself/herself rather than out loud. The model said: "There's crayon and chalk and crayon has a line under it. A good clue is wax. Wax." Before the child gave a clue for the next practice pair, the experimenter said, "Now do it like the person on T.V. Think to yourself and come up with a good clue." After the child gave a clue, the experimenter again gave corrective feedback. This procedure continued until the model and child had each given clues for three more word pairs.

Since practice alone might facilitate performance, another group of children participated in a practice-only condition. These children practiced on an equal number of word pairs but received no instruction. Results indicated that children who received training did significantly better on a completely new set of items than did children who received practice only. Furthermore, these differences remained at one-month follow-up.

Although differences between conditions were significant, only about 40% of the clues of the trained children were effective. Does this indicate that children didn't fully learn the comparison concept or does it suggest that vocabulary and "knowledge of the world' factors were constraining their performance? To assess this, the training procedure was repeated in a second experiment. This time the poor clue versus good clue appraisal task (Asher, 1976) was employed as well as the message production task. As discussed earlier, the appraisal task minimizes the need for a sophisticated production vocabulary. Results showed that comparison training produced significant gains in message production, but the absolute level of performance was low once again. In contrast, when the task required only recognition of good and poor clues trained children did quite well in absolute terms as well as relative to the practice-only group.

It appears then, that younger children are deficient in comparison ability and that training comparison skill leads to improved communication performance. The fact, however, that performance on the production task remains relatively low after training suggests that the children are failing to meet some of the basic vocabulary and/or knowledge demands of the task as well. Future training research might examine the effects of comparison training on other, less verbally demanding, production tasks.

IV. Message Analytic Skills

Along with the ability to analyze the listener's perspective and the nature of communication task demands comes an increasing ability to engage in the analysis of messages. This ability is reflected in developmental

changes in children's accuracy in the listener role, in improvement in the accuracy with which children can directly evaluate or appraise message quality, and in increased ability to give feedback and to profit from feedback.

A. Listener Ability

A number of studies have had children serve as listeners and respond to experimentally controlled messages. Early studies using this procedure gave children messages which were known to be effective (e.g. Glucksberg et al., 1966). Results indicated that even young children were accurate in identifying referents when given adequate messages. From these studies, researchers generally concluded that the development of listener ability precedes speaker ability and that children can be competent listeners even though they are relatively ineffective as speakers.

Recent evidence indicates, however, the early studies created a misleading picture by providing listeners only with effective messages and that children are less adept when the message is unclear or ambiguous (Bearison & Levey, 1977; Ironsmith & Whitehurst, in press; Karabenick & Miller, 1977). For example, Ironsmith and Whitehurst (in press) had second-, fourth-, and sixth-grade children respond to either informative messages or ambiguous ones. Children could respond by making a choice or by asking a question if the message wasn't clear. Results showed good performance at all ages on the informative message trials but significant age differences on the uninformative message trials. Younger children were much less likely to question an inadequate message and even when they did question the speaker they tended to give general feedback

(e.g. "I don't know which one it is") rather than specific feedback (e.g. "Is it the big one?").

How are the results from these studies to be interpreted? The fact that listeners of all ages do relatively well when the message is effective suggests that some form of comparison activity is operating. However, the fact that children do poorly at detecting ambiguous messages suggests that the comparison process is incomplete. The listener's process of searching the alternatives may work as follows. Younger children may search through the alternatives for the first object that is highly associated with the message. In the case of a clearly informative message (e.g., "the big red triangle") children have a reasonable chance of making the correct referential choice particularly when the non-referents are not highly similar to the referent.

However, when the message is ambiguous, i.e., highly associated to more than one object (e.g., "the red triangle"), the young child is likely to conduct an incomplete search that ends with the identification of the first apparent "match." In contrast, older children are more likely to make a complete search that results in correct identification of the referent when the message is informative and in detection of ambiguity when the message is uninformative.

This description of the listener's behavior leads to the prediction that younger children's performance will be affected by the position of the referent in the stimulus array. A referent appearing where the child is first likely to look is more likely to be selected than a referent which appears later in an array of similar objects. A study by Dickson (1978) supported this prediction. Children ranging in age from four to

seven were given four objects that were often highly similar to one another. From left to right, the referent appeared in either the first, second, third, or fourth positions. Dickson found that younger children's performance was more affected than older children's performance by the position of the referent.

B. Appraisal Ability

Studies of children's listener performance suggest that young children are relatively poor at analyzing or appraising message quality. A direct test of message appraisal ability was made by Asher (1976). This study examined children's ability to evaluate either their own or another person's communication performance. Second-, fourth-, and sixth-grade children generated clues for a series of "similar referent" word pairs. After producing messages, half of the children were asked to indicate whether each of their messages would be effective or not. The other half of the children first produced messages and then evaluated the clues that had been generated by an age-mate. By "yoking" pairs of children together the study ensured that children evaluating their own clues (self-appraisal) and those evaluating another child's clues (other-appraisal) would be evaluating identical clues; i.e. clues of equal quality. Results indicated significant age differences in children's appraisal accuracy and no differences at any grade level between children's self-appraisal and other-appraisal accuracy. The latter finding is interesting because it suggests that children can be just as "objective" about their own performance as they are about another person's.

The representation described earlier of the search processes of young listeners leads to the prediction that it is possible to "fool" younger

children into thinking that an informative message is actually a poor one. If children's criterion for defining a message as an adequate message is simply that the message be strongly associated to the referent, then children may fail to appreciate that even a moderately associated message can be effective if it is completely unrelated to the nonreferent. Asher (1976) asked children to evaluate a series of adequate and inadequate clues. Good clues were only moderately associated to the referent but completely unassociated with the nonreferent (e.g., "think" for "head-stomach"). Poor clues were highly associated with the referent and the nonreferent (e.g., "food" for "bread-fruit"). The results were that second-grade children were poorer than fourth- and sixth-grade children on both the good clue and poor clue appraisal tasks. Thus, it is possible to arrange conditions such that young children will do poorly even in evaluating adequate clues.

C. Feedback Utilization

The ability to analyze messages accurately is undoubtedly related to the exchange of feedback between a speaker and a listener. Adults are likely as listeners to give feedback to the speaker when the message is ambiguous and are likely as speakers to make use of feedback from a listener. For example, Krauss and Weinheimer (1966) found that adults modified their messages over trials when allowed to see the listener's referent choices.

In contrast, studies with children indicate that they are less likely as listeners to give feedback to the speaker. Meissner (1975) found that kindergarten children questioned only 25% of the ambiguous messages they

received. Furthermore, when in the speaker role, children tend to be less responsive to the feedback they do receive. In an early study of this phenomenon, Krauss and Glucksberg (1969) had kindergarten, first-, third-, and fifth-grade children communicate about a series of novel forms for eight trials. Following each trial, children were shown the listener's arrangement of the forms. Results indicated that older children's performance improved over trials while younger children's did not.

Another study by Glucksberg and Krauss (1967) examined the content of children's communications in response to feedback. Kindergarten, first-, third-, and fifth-grade children communicated messages for novel forms to the experimenter who played the listener role. Following the speaker's communication of the first, third, and sixth forms, the experimenter said "OK" to indicate understanding. Following communication of the other three forms, the experimenter indicated lack of understanding. Children's responses to feedback were categorized; older children gave more modified descriptions or new descriptions, whereas younger children were more likely to repeat the same descriptions or remain silent. Rather similar findings have been reported in a study by Meissner (1975). She found that on those relatively infrequent occasions when listeners questioned the speaker's messages, only 20% of second-grade children and 40% of fourth-grade children improved their messages.

It is clear, then, that the ability to give and utilize feedback, like other measures of communication performance, increases over age. It is less clear, however, what skills underly changes over age. Most of the research here has been purely descriptive rather than aimed at understanding the particular skills that contribute to feedback

utilization under different conditions. One plausible interpretation is that children fail to utilize feedback for the same reasons that they communicate inaccurately in the first place, namely failure to cope with the basic demands of the particular communication tasks they are given.

The demand for an adequate vocabulary is clearly relevant. Might it not be that young children remain silent, or repeat their initial message, in part because they cannot think of a better way to describe their intended referent? A study by Peterson, Danner, and Flavell (1972) addressed the issue of vocabulary and feedback utilization. Four- and seven-year-old children were given feedback by an adult listener after they described a novel form referent. One type of feedback involved directly asking the child: "Can you tell me anything else about it?" Both age groups were able to supply more information when it was directly requested. This suggests that the younger children were not at "a loss for words." However, no measure of listener accuracy was employed. It is thus possible that children's post-feedback messages were no more effective than their prior messages.

The demand to engage in comparison activity that characterizes many referential communication tasks probably is a factor in a child's utilization of feedback. A child who fails to test potential messages against nonreferents as well as referents is not likely to engage in appropriate "remedial" activity following communication failure. One way to test the contribution of comparison activity to children's utilization of feedback would be to study the effects of teaching children to engage in comparison activity. As noted earlier, Asher (1977) found that training children to compare their messages to the nonreferent and

referent led to improvement not only in message production (i.e. communication accuracy) but in message appraisal as well. No test of children's ability to use feedback was made in this study. Such a test could shed light on the extent to which the processes that account for initial communication failure also account for failure to adequately utilize listener feedback.

It is also possible that an account of children's response to feedback may need to include "metacommunicative" skills. Flavell (1977) has recently suggested that as children grow older they become increasingly able to view messages as objects of analysis and to reflect upon both their own and other people's messages. Flavell develops the idea that the concept of "audience" has relevance across diverse cognitive activities. Even as speakers, we are our own audience. When we generate ideas we think about these ideas as though we were an external listener or audience. When we communicate messages we "listen" to them as though we were the audience. This ability to reflect upon messages and to analyze them could underly a child's ability to use feedback. Receiving information that one has been misunderstood will have impact to the extent that it leads to an evaluation of the message in light of the message's goal.

A question that can be usefully asked is whether the metacommunication concept has utility independent of the more basic listener analytic and task analytic skills that underlie successful communication performance. When children think about a message they need conceptual tools. Children need to know that different listeners have different informational needs and they need to know the nature of particular listeners' perspectives.

Children also need to know that particular tasks make particular task demands, such as the demand to contrast referents from similar nonreferents.

To think about messages, to view them as objects of analysis, requires that the child analyze messages along certain basic dimensions. One dimension is whether the message is adapted to the needs of the particular listener. Another dimension is whether the message is adapted to the requirements of the particular task. Are there children who understand and can employ these dimensions yet cannot think about messages or view them as objects of analysis? To make this operational, are there children who have listener analytic and task analytic skills yet do not respond appropriately when given feedback that they have been misunderstood? The concept of metacommunication ability would seem to imply the existence of such children. The existence of such children should be demonstrated if the concept is to be more than a shorthand way of saying that a person has good listener analytic and task analytic skills.

Finally, it should be noted that limited performance in evaluating messages and giving feedback can be due to the operation of certain social norms as well as to communication skill deficits. Children might hesitate to give feedback to a speaker because it violates a "politeness norm." If the speaker is an adult, giving feedback may be viewed as being disrespectful or challenging of authority. Cosgrove and Patterson (1977) present data relevant to this issue. They had preschool, kindergarten, second-grade and fourth-grade children serve in the listener role and had an experimenter give them either fully informative, partially informative, or uninformative messages. All children were told that they could talk to the experimenter as much as possible but half were

also told that if they weren't sure which response to make they could ask questions to help figure it out. This simple instruction, at all ages except preschool, dramatically increased the level of question asking and the number of correct referential choices children made. The fact that preschool children's performance did not improve suggests that their performance was limited by skill deficits. The improvement of the older children indicates the effectiveness of a simple normative intervention.

V. Referential Communication and Ecological Validity

The literature on referential communication performance is largely based on laboratory tasks, often of a highly artificial nature. A question might be raised about the relevance of a novel form task, word pair task, or geometric forms task to the referential communication lives of children. These structured tasks allow for more detailed inspection of specific skills than might be made were more naturalistic tasks to be used. Still, it could be that highly unfamiliar laboratory tasks are creating an exaggerated picture of childhood incompetence.

The role of the communication situation has been given insufficient attention in communication research with children (Cazden, 1970). Children might well exhibit competence in one situation and not in another. This variable may be particularly important for children who typically perform poorly in academic situations. It is possible, for example, that the social class differences commonly obtained in referential communication studies (Higgins, 1976) are at least partly attributable to issues of task relevance.

A recent study by Hall, Cole, Reder, and Dowley (1977) nicely illustrates the potential contribution of situational variables. Lower income, black preschool children, were brought two at a time to a supermarket. The experimenter put the children in the shopping cart and together the experimenter and children went up and down the aisles conversing about what they saw. A tape recorder in the cart recorded all conversation between the experimenter and the children. Content measures of children's speech (e.g. number of utterances, utterance length) indicated considerably more language output than observed in a more formal school situation. Although this study employed no measures of communication effectiveness (e.g., referential accuracy), the results are certainly suggestive of the impact of situational variables.

Wigfield and Asher (1978) recently assessed the extent to which age differences would be found in children's communication accuracy on a more ecologically representative task than typically employed. Third- and fifth-grade children from a middle-class school were asked to give a "newcomer" directions to five locations in the school. Results indicated that age differences were stronger on this task than on two more "traditional" laboratory measures (a word pair task and a picture description task). These data suggest that at least for middle-class children the more "artificial" communication tasks are not exaggerating age differences in children's communication performance.

Still, concerns about ecological validity remain. Why, for example, do children do rather poorly in experimental studies yet function rather well in their everyday transactions? One reason is that children spend much of their time talking to adults who, as relatively effective

communicators, compensate for some of the deficiencies of children as speakers and listeners. For example, adults are likely to modify their messages when talking to a younger versus older child (e.g., Snow, 1972). Another possibility is that many of the communication tasks of everyday life make fewer demands for comparison activity and world knowledge or vocabulary. As we have seen, children do rather well when the referent to be described is in the context of dissimilar nonreferents. Studies might investigate the degree to which children confront "similar referent" situations in their everyday social interactions. Such studies might also investigate the role of non-verbal gestures in children's referential communication. It is likely that children use pointing as an aide to verbal messages (e.g. "Hand me that book") and thereby compensate for verbal deficits. Wellman and Lempers (1977) recently observed two-year-old children's social interaction. In ten hours of "focal child" observations, 300 instances of referential communication occurred, and of these about half included pointing.

Finally, children live in a world of action that provides them with behavioral feedback that they have not understood others or have not been understood by others. For example, a common referential communication situation is one in which one child teaches another child the rules of a game. Children are generally successful at transmitting this type of information to one another even though the task is fairly challenging in the sense that subtle distinctions often must be made. The reason for children's success here may be that the game provides an action framework in which children can test out whether they understand the instructions.

A recent study by Markman (1977) suggests how this process might operate. First-, second-, and third-grade children were taught how to play an alphabet card game and a magic trick. In each case, the speaker left out critical information. For example, in the card game instructions the speaker referred to a "special card" but never said what this was. After giving the instructions the experimenter gave the following set of probes:

1. "That's it. Those are my instructions."
2. "What do you think?"
3. "Do you have any questions?"
4. "Did I tell you everything you need to know to play the game?"
5. "Did I forget to tell you anything?"
6. "Can you tell me how to play?" (The Experimenter prompts if necessary.
7. "Did I tell you everything you need to know to play the game?"
8. "Do you think you can play? Let's play; you go first."
9. "Did I forget to tell you anything?"
10. "Are you sure? Did I tell you everything you need to know?"

Children received scores based on how many probes it took before they indicated that the instructions given were incomplete. The youngest age group had to actually try to play the game before they realized that the referent "special card" had never been defined. Even the older children required a number of probes before recognizing the inadequacy of the instructions.

It is unlikely that these results were due to children's reluctance to criticize the experimenter since children were told that the experimenter

was interested in their feedback and in making sure that the game instructions were clear. The Markman study is important not only because it replicates earlier findings that children often fail to recognize when they are not understanding, but because it suggests a mechanism by which children can "get along" despite their communication skill deficits. The act of implementing instructions leads to recognition that the message has not been understood or was not clear.

VI. Conclusion

Literature on referential communication has grown considerably during the past decade. In addition, a shift has taken place in the type of research being pursued. Early studies were what Flavell et al. (1968) termed "developmental-descriptive" in character. That is, there was more interest in describing changes over age than in accounting for the specific skills that underlie developmental changes in communication performance. When explanations of change were offered they were based heavily on the Piagetian view that a single all-encompassing cognitive structure, egocentrism, could account for the diversity of experimental findings.

Recent research has tended to be more analytic; that is, the major goal is the analysis of specific skills that underlie developmental changes in communication performance. Findings from this type of inquiry make it clear that no single ability is all-determinate and that, instead, communication effectiveness involves a number of separate skills whose relevance to performance varies as a function of the nature of the listener and the nature of the task.

Increased attention to specific underlying processes will have a number of salutary effects. First, it will advance our understanding of

a variety of individual difference variables in addition to chronological age. For example, despite considerable research on social class differences much remains to be learned about the specific skills that contribute to them (Higgins, 1976). Here, as in research on age differences, it is clear that explanations based on the construct of "egocentrism" will not suffice. Rather, explanations must also take account of children's ability to fulfill the basic cognitive requirements of particular communication tasks.

Second, attention to underlying processes may lead to the discovery of relationships between referential communication performance and other seemingly different tasks which actually involve similar processes. For example, for children to do well on reading achievement tests they need an adequate vocabulary and knowledge about the world, and they need to engage in a certain type of comparison processing. The multiple-choice format commonly employed on achievement tests requires the reader to select the correct answer from among at least one or two similar "distractors."

Given these task demands, reading achievement test performance and referential communication accuracy should be related. Indeed it appears that referential communication performance on "similar referent" tasks is correlated with standardized reading achievement test scores. This is an intriguing finding in light of the lack of relationship in most studies between verbal IQ scores and referential communication accuracy (Glucksberg et al., 1975) and in light of the high correlation between IQ and achievement. A task analytic research perspective which focuses on specific processes might solve this puzzle.

Finally, attention to specific underlying processes will make possible the development of more effective procedures for teaching communication skills. As we have seen, the training studies with more specific objectives and controlled "curricula" have been most successful. The development of effective training procedures will have theoretical as well as practical import. For example, it will be possible to study experimentally an issue that has received little research attention thus far, namely the functions of referential communication. To what extent would training children to be more effective communicators on a variety of referential tasks affect other aspects of their functioning?

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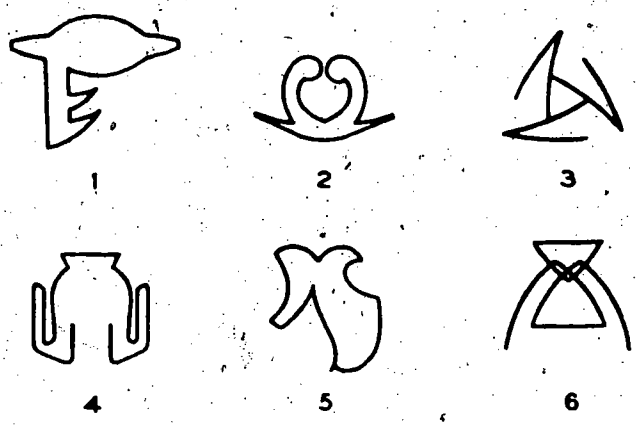
Figure Captions

Figure 1. Six novel form referents and the experimental arrangement. (Adapted from Glucksberg, Krauss and Weisberg, 1966, with permission of the authors and Academic Press, Inc.)

Figure 2. Word pairs with the referent in each pair underlined. (Adapted from Asher and Parke, 1975. Copyright by the American Psychological Association. Reprinted by permission.)

Figure 3. Representation of egocentric and nonegocentric communication. (Adapted from Flavell, Botkin, Fry, Wright and Jarvis, 1978, with permission of the authors and John Wiley & Sons, Inc.)

Figure 4. Mean obtained probability of three types of communicative responses in the control and modeling conditions. (Adapted from Whitehurst, 1976. Copyright by the Society for Research in Child Development. Reprinted by permission.)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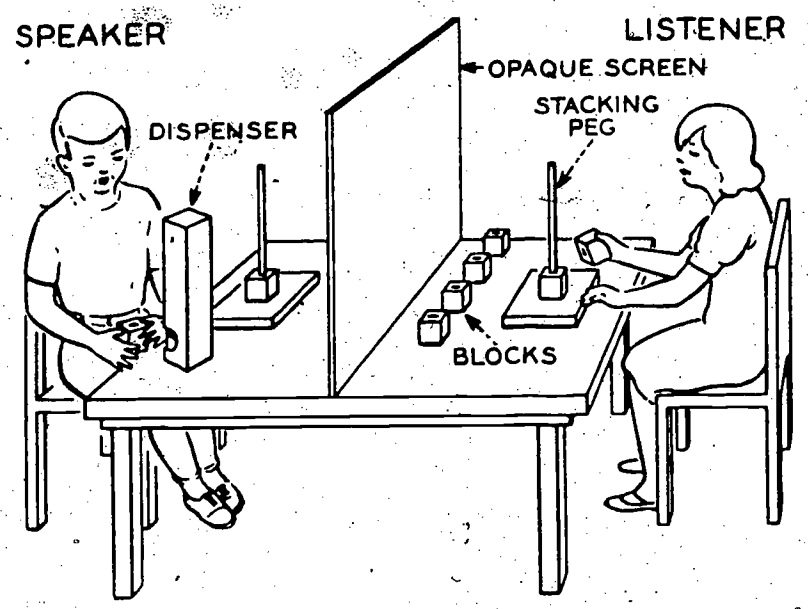
SPEAKER
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river—ocean

plant—flower

short—small

write—print

dish—plate

mitten—glove

world—earth

say—tell

rubbers—boots

dog—puppy

ship—boat

child—baby

crayon—chalk

road—street

sound—noise

wash—clean

fur—hair

big—large

sleep—rest

hill—mountain

city—town

mad—angry

hot—warm

glass—cup

watch—clock

bread—roll

music—song

cook—bake

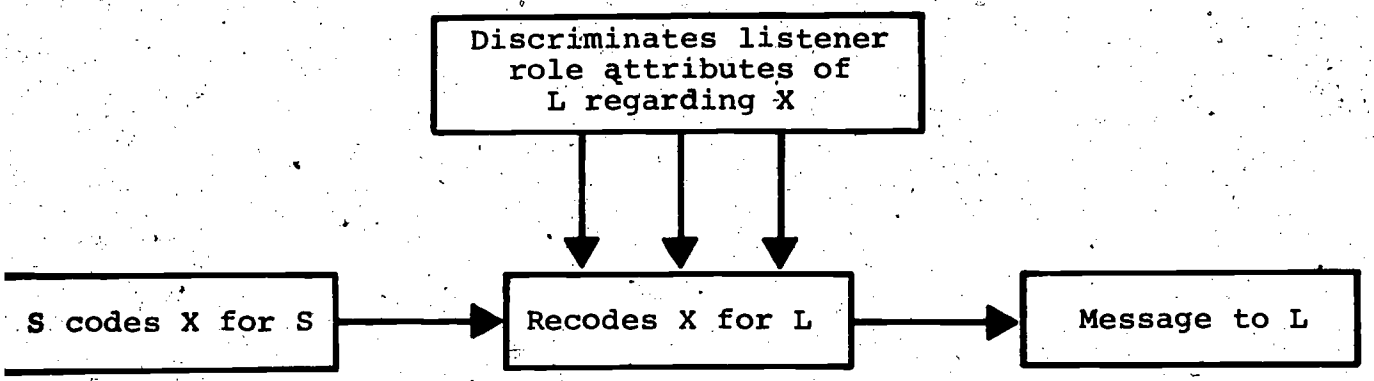
wheel—tire

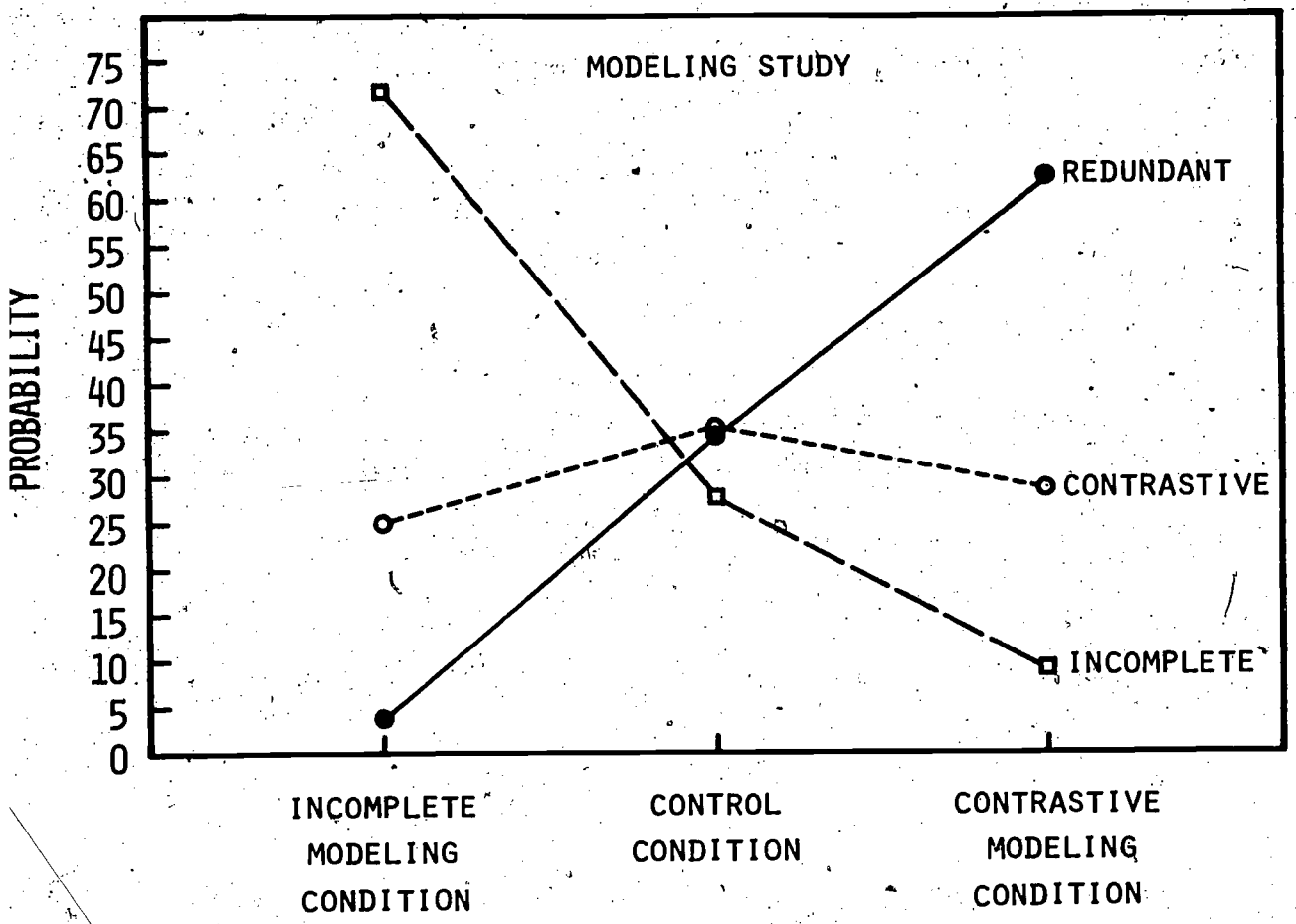
like—love

(A)


S codes X for S
Message to L

(B)


Discriminates listener role attributes of L regarding X
S codes X for S
Recodes X for L
Message to L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