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AN EVALUATION OF VARIABLES AFFECTING THE COMMUNICATION PERFORMANCE OF PRESCHOOL CHILDREN.

LARRY WILLIAM. WATERMAN
University of Windsor

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AN EVALUATION OF VARIABLES AFFECTING THE COMMUNICATION PERFORMANCE OF PRESCHOOL CHILDREN

by

Larry W. Waterman

A Dissertation
Submitted to the Faculty of Graduate Studies
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ABSTRACT

The study was designed to evaluate the importance of a number of variables, outlined in the literature, to the development of effective verbal communication skills. Sixty preschool children were evaluated on a number of different variables, including language tasks, visual tasks, roletaking tasks and a variety of other tasks. Demographic variables were taken into consideration when the children were screened for the study. The results indicated two separate aspects of verbal communication performance were related to similar, yet different predictor variables. The estimate of length or quantity of response was influenced more by both verbal and visual processes. In contrast, the qualitative component of the response was related to verbal and social development-popularity processes. Clear differences were found between what is significant for preschool verbal communication performance, and what would be expected on the basis of the literature. The results are discussed in relation to the work of the existing research in the area.

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CHAPTER I

INTRODUCTION

The purpose of the present study was to evaluate several processes which might influence the communication performance of preschool children. More specifically, an attempt was made to demonstrate that effective communication is dependent upon more than strictly linguistic processes, such as vocabulary and grammatical acquisition. The effect of several relatively independent processes was evaluated in relation to their individual and combined effects on communication performance. Although communication not involving a verbal response was considered to a lesser extent, the primary focus was upon verbal communication performance.

While there has been a marked increase in the literature related to the psychology of language, a large number of studies have focused on how children acquire language, rather than on how they learn to use language for effective communication (Glucksberg, Krauss & Higgins, 1975). Within the present study, it was assumed that effective verbal communication was dependent upon both linguistic competence and communicative competence (Flavell, Botkin, Fry, Wright & Jarvis, 1968; Glucksberg, et al., 1975; Mehrabian & Reed, 1968; Piaget, 1951; 1959; 1969; Rosenberg, 1972). While linguistic competence is undeniably necessary, it

was the question of how children become able to use language effectively in a communication situation that was the primary concern of this study.

In addition to the purpose described above, several secondary questions were also considered. These will be outlined briefly below, and considered in more detail later. The first aspect to be considered was whether each of the tasks used within the present study provided an accurate estimate of the particular ability or skill which it was designed to assess. Secondly, a task to measure cognitive-perceptual ability was included in order to help determine if the tasks used were evaluating variables which were specific to communication performance, or whether they were related to a cognitive-perceptual ability factor. A third component of the study included a comparison of preschool children's ability to communicate using verbal messages or references, as opposed to their ability to use nonverbal references, such as pictures. Finally, two different explanations which attempt to explain why preschool children appear limited in their ability to successfully perform a communication task were considered. Each of the secondary questions and their relationship to the central purpose of the study will be explained in more detail later.

Communication Research

The research related to the development of children's ability to communicate effectively is found under a variety of

terms and labels. As a result, certain words have come to have a variety of meanings or implications due to a variety of reasons, such as the way in which they are used, the type of process being described, the task being used, and/or the particular theoretical orientation of the person conducting the research. In an attempt to decrease such confusion, terms which were particularly relevant to developing an understanding of the present study were operationally defined whenever possible. For example, the term communication, for the purposes of this study, referred to the exchange of information from one person to another person. Effective communication was further defined as the successful exchange of information which allowed some predetermined task requirement to be achieved.

It should be noted that a wide variety of definitions for effective communication have been used throughout the literature. They have ranged from very general, rather vague explanations, to more sophisticated, precise definitions. The work of Higgins (1976; 1977) is exemplatory of the latter, and will be presented as a contrast. Higgins defined communication accuracy as being the degree of correspondence or agreement between the reference stimulus which the speaker must encode, and the reference stimulus which the listener actually chooses based on the information presented by the speaker. He argued that effective communication was the result of a number of skills and processes, each of which contributed to effective, or accurate, communication.

One further distinction which was made by Higgins was the difference between the needs related to the listener within the context of the task, and the needs which were more clearly task related. The first requires the speaker to take into account information related to the listener's situation. The second requires the speaker to try and use a high number of discriminating verbal units, as compared to nondiscriminating verbal units, in relation to the referent stimulus. In the present study, a wide variety of variables were included, some of which were relevant to both of the needs described by Higgins (1977). The major focus, however, was on the ability of the speaker to meet those needs within the context of the task.

Many of the tasks commonly used in communication studies are based on relatively simple situations. A basic task generally consists of two people, a speaker and a listener, who are participating in a joint task, such as matching two sets of identical pictures (Glucksberg, Krauss & Weisberg, 1966). The task of the speaker in such a situation is to provide information to the listener which allows that person to choose the correct picture, from several alternatives, which corresponds to the one being described by the speaker. By using such a limited task and varying different components within the task situation, investigators have attempted to determine particular component processes

which are necessary for effective communication performance (Glucksberg, et al., 1975). While some success has been obtained using this method with school-aged children, the results based on the performance of preschool children have been less clearly defined. Despite the variety of processes which have been considered, the specific factors or component processes which are responsible for, or at least contribute to, effective early communicative performance have not yet been defined. One of the only consistent results which has been found to date is that children's communicative performance improves with age. Before considering some of the other processes which have been examined, two theoretical explanations for the age-related improvement reported in children's communicative performances will be examined.

One of the major influences in research related to children's communication performance is derived from the theories of cognitive development of Piaget (1951, 1959, 1970), and to a lesser extent, Werner (1948, 1957). The central focus of these theoretical explanations has revolved around the concept of egocentrism (Elkind, 1967; Flavell, 1963; 1967; 1974; Flavell, et al., 1968; Glucksberg,

et al., 1966; Glucksberg & Krauss, 1967; Glucksberg, et. al., 1975; Looft, 1972; Piaget, 1926; 1951; 1969; 1970; Rubin, 1973; 1974). The term egocentrism refers to an inability to realize that there is any other viewpoint other than one's own. The completely egocentric child is described as being totally embedded in his/her own point of view. As a result, the only reality for the egocentric child is that which is being immediately experienced by that child, whether it be a particular perspective, a particular role, or a particular affective state. It should be clarified that the egocentric stage of development is not due to selfishness or any other kind of conscious process. Rather, such children are simply unaware that any reality other than their own exists, due to their particular level of cognitive development (Flavell, 1963; Looft, 1972; Piaget, 1959).

During the egocentric period, the child's attention is described as being centered. The concept of centration is particularly important in understanding how children become less egocentric, and more socialized, in their outlook. The social child is described as being able to decenter from a particular point of view and to realize that other aspects of reality or viewpoints may also exist and must be considered. The more cognitively advanced child is capable of realizing that different people may experience different viewpoints, as well as

understanding how those viewpoints differ, and how to act upon that knowledge.

The concept of centration-decentration can be found in a number of theories. For example, Werner (1948, 1957) relies heavily on such a concept in his orthogenetic principle which he uses to explain children's cognitive development. According to that theory, children are initially unable to cognitively differentiate among various aspects of a particular situation and the different viewpoints. The final stage which is achieved is characterized by the child being able to cognitively integrate both the global perspective and several different partial perspectives at the same time. Similarly, Langer (1969) described the child as being initially unable to differentiate on a cognitive basis. According to that explanation, the child learns how to differentiate and integrate the observed differences into a personal theory of how to relate to other situations as well as to people.

It is generally accepted that one of the major characteristics of the young preoperational child is the egocentric quality of their interactions. Since such children are unable to decenter, it is not surprising that their verbal communication reflects this egocentric quality. As described by Piaget (1959), the young child who participates in a verbal communication task seems to believe that the person receiving the information is already

in possession of all of the information that the child knows who is communicating the message. Since the young child does not seem to take the needs of the person receiving the message into account (Krauss & Glucksberg, 1970; Glucksberg, et al. 1975), the resulting verbal messages are typically meaningful only to the child who sends the message. In contrast, adults tend to construct verbal messages based on information which is commonly known or shared, and which is relevant to the task. Therefore, instead of describing something as looking "like a hat" (Glucksberg & Krauss, 1967), the adult speaker would use more commonly shared information such as "a tall black hat with a green stripe around the bottom." The latter message reflects the realization of the adult that the person receiving the information needs specific information in order to understand and use the information being communicated. The difference between the communication performance of children and adults is attributed to a large extent, by the supporters of the cognitive developmental position, as being due to the young child's inability to decenter due to the egocentric stage of development. This has had a number of implications for the kinds of necessary processes which are posited to account for effective communication. These will be considered in detail in a later section.

A second theoretical explanation of young children's poor communication is based on a two-stage stochastic, or

probabalistic choice, process model developed by Rosenberg and Cohen (1964; 1966). This model demonstrates the influence of psycholinguistic research more than has been evident in the cognitive developmental theory just described. The major components of the speaker process within the model are a sampling stage and a comparison process stage. In the sampling stage, it is argued that the speaker chooses a particular piece of information, such as a word, phrase or sentence, from a pool of possible alternatives. After making a choice, the speaker then moves to the comparison process stage of the model. The chosen information is compared to the target or referent information, and a decision is made about the meaningfulness of the sample's information. If the sample's information is judged to be appropriate, it is transmitted to the listener. If it is judged to be inadequate, it is rejected and the process is repeated with another choice from the sample pool. The communication situation commonly used to demonstrate this model is a word pairing task in which the speaker must identify a target word by giving the listener a one word clue. For example, if the word pair is "water-ice" with ice being the target or referent word, a possible message might be "cold" to differentiate between the two alternatives.

Rosenberg and Cohen (1966) argued that the probability of a word being sampled is a function of the strength of its association with the target or referent word. In

contrast, the probability of the selected word being accepted in the comparison stage is dependent upon the strength of its association to the second or nonreferent word. If there is a large difference between the closeness of the chosen association to the target word, and the lack of association to the nontarget word, there is a higher probability of the chosen word being used than if the difference is small.

The model outlined above has three possible implications for communication performance, especially for young children (Glucksberg, et al. 1975). First, the young child may have a limited pool of possible choices in the sampling stage. In fact, if the referent word is too difficult, the child may not have any choices available. Secondly, an inadequate message may be due to inadequate comparisons of the chosen word to both the referent and the nonreferent words. Third, an inadequate message will occasionally be given even by competent speakers, since the model is probabilistic rather than perfect. While there has been less research with preschool children based on this model, it is a viable alternative explanation, and an attempt was made within the present study to obtain an estimate of its potential validity. A review of the relevant research will be provided before the task which was used, based on the above model, is described.

To date, there have been few attempts to compare the

two theoretical positions outlined above. One noteable exception was a study by Robinson and Robinson (1978) which specifically examined the applicability of each explanation in relation to the way in which children explained communication task failures. This study, as well as several others, will be examined in more detail after earlier relevant research has been discussed.

Higgins (1976; 1977) and Higgins, Fondacaro and McCann (in press) have also examined several of the theories presented to explain why young children do not perform more successfully on verbal communication tasks. Higgins (1977) has argued, for example, that egocentrism may involve two very different factors. One factor involves taking into consideration both the individual-related needs and the task-related needs of the listener. Similarly, Higgins and Akst (1975) argued that children do in fact use comparison processes on communication tasks, but that these were related to feature comparisons of the referents, rather than verbal comparisons, contrary to the explanation of others (Glucksberg & Krauss, 1967; Flavell, et al., 1968; Aloy, 1968).

Since the primary focus of the present study was the development of effective communication performance in children, the results of the relevant research conducted to date will be presented. The research will be outlined within one of the two major theoretical orientations. For the sake of

clarity, the cognitive-developmental position based on the work of Piaget and others was termed the "egocentric" position. The probabilistic position advocated by Rosenberg and Cohen and others was designated as the "sampling and comparison" position. Before beginning, however, there is one point which must be clarified.

The research to be discussed was separated according to the egocentrism, and the sampling and comparison orientation of each study, for the sake of presentation only. The two positions are not mutually exclusive, but simply reflect two different primary explanations for limited preschool communication performance. Despite their differences, adherents of both approaches readily acknowledge the importance of the other position. For example, Glucksberg and Krauss (1967) clearly stated the importance of the social editing process which changes and develops with age. Similarly, Rosenberg (1972) openly acknowledged the importance of role-taking skills in effective communication. The most important point is that all of the research to be discussed is related to the process of communication, and therefore must be presented if an understanding of the research related to effective communication performance is to be achieved.

Egocentrism Research

A number of studies conducted within the egocentrism framework have been based on the paradigm described by Glucksberg, Krauss and Weisberg (1966). Using novel, abstract, low-encodable figures (Krauss & Weinheimer, 1964), they have demonstrated that preschool children are unable to communicate effective verbal messages to a second person which allow a matching task to be successfully performed. However, when older children attempt the task, more effective verbal messages are obtained which allow the matching task to be successfully completed (Glucksberg, et al. 1966; Glucksberg & Krauss, 1967; Krauss & Glucksberg, 1969; 1970; Glucksberg, et al. 1975). On the basis of these reports, young children's communications have been described as being egocentric, and as such, were considered to be of little use to the listener attempting to complete the task since the messages were not based on shared information. As the ages of the children increased, their verbal messages became more socially based, and the amount of relevant and specific information increased accordingly.

As a result of these studies, a number of variables have been shown to effect communicative performance. For example, whether the message is provided for the use of a second person, or for the use of the speaker at a later time, was shown to result in significant lexical differences (Glucksberg, et al. 1975). The effect of varying the

characteristics of the listener receiving the message has also been shown to have significant effect on the resulting verbal message (Glucksberg, et al. 1975). Flavell et al. (1968) found that young children were not as effective at adapting their messages to meet particular listener needs as were older children. In contrast, Maratsos (1973) found preschool children made very clear changes based on specific listener characteristics. The kind of feedback received by a speaker from a listener can also affect the verbal message (Maclay & Newman, 1960; Krauss & Weinheimer, 1964; Peterson, Danner & Flavell, 1972; Waterman & Orr, 1978). However, not all such studies agree upon the particular age at which such effects can be observed, or even if they exist at all (Glucksberg & Krauss, 1967; Higgins, 1977; Krauss & Rotter, 1968). Another variable found to significantly affect communicative performance, especially by young children, is the familiarity of the child with the material used in the communication task. If the material appears to be familiar, young children seem to be able to provide less egocentric information about it than if the material appears to be new and/or abstract (Glucksberg et al., 1975; Goldstein & Kose, 1978; Gruschcow & Gauthier, 1972; Waterman & Orr, 1978). There is also some evidence that the complexity of the task material, as well as the complexity of the task itself, can result in greater egocentric responses, especially with young children (Higgins & Akst, 1975; Higgins, 1976; Hoy, 1975; Karabencik & Miller, 1977; Maratsos, 1973;

Waterman & Orr, 1978).

A number of other studies have also been conducted within the egocentrism framework which have used different methodologies than the one described earlier. While the focus of the following studies may not be as purely concerned with the development of effective communication as the studies outlined above, they are still relevant to the present study. Therefore, those aspects which are of particular interest will be presented below.

A common theme throughout most of these studies is the role of decentration ability in effective communication performance. Feffer and Suchotliff (1966) used a word-matching task in which the speaker had to supply a one-word association clue for a second person. They found that young adults who performed better on a role taking task were able to complete the communication task more quickly, accurately, and with fewer clues than those who scored lower on the role-taking task. Similarly, Piche, Michlin, Rubin and Johnson (1975) used fourth-grade children to investigate the relationship between accuracy on communication tasks and various role-taking tasks. The results indicated that two principle factors were involved in effective communication. The first factor was a visual-recoding factor which will be discussed later. The second factor was a social role-taking factor. The role-taking factor in particular appeared to be composed of a combination

of subskills which appeared to develop differentially.

The concept of roletaking has been examined by Higgins (1980) who cautioned that previous perspectives may not have been explicit enough. He suggests that the ability to consider more factors, and the ability to keep oneself separate when taking another person's perspective may not be sufficient to explain the process. Such explanations result in explanations based on a series of levels in which each level differs from the previous one along one or both of the dimensions described above. In doing so, the distinct and continuous nature of these two processes is often lost or confused.

In contrast, Higgins argues for a clear distinction between the ability to interrelate multiple factors, and the ability to control the self. The first refers to the ability to cognitively manipulate elements (pieces of information) and the relations between each of the elements. The second ability refers to being able to maintain control over your own viewpoint at the same time as you are making judgements of others. Both of these abilities improve with age and experience. Finally, Higgins discriminates between roletaking and the acquisition of social category knowledge which he calls information which is related to one's increasing knowledge about the social world. It may be that much of the literature related to roletaking is in fact confounded by social category knowledge.

A study by Rubin (1973) attempted to determine whether egocentrism was a single construct. Rubin factor analyzed a

variety of different tasks involving communication, roletaking, spatial egocentrism, and other abilities. He reported that two factors emerged: a relatively minor factor, popularity, and a more robust factor which he termed a decentration factor. All but one of the tasks which he used loaded on this one particular factor. Based on those results, it is difficult to determine if development in each of the abilities or skills tapped in that study results in improved general decentration, or whether an increase in the ability to decenter allows improved performance in each of the areas assessed. However, there definitely appears to be a significant relationship between the ability to decenter, based on various decentration tasks, and the ability to perform various kinds of cognitive tasks which are related to communication performance.

The relevance of socialization should also be noted before other kinds of variables are considered. The popularity factor reported by Rubin (1973) is supported by other literature which suggests that the socialization process may be important not only for effective communication ability, but also more general kinds of cognitive development. A study by Hollos and Cowan (1973) demonstrated that there was an inverse relationships between social isolation and various aspects of cognitive development. More specifically, the results suggested that

more isolated children tend to obtain lower scores on roletaking tasks involving perspective-taking and communication skills. In a second study dealing with the importance of environmental factors on cognitive development, Bearison and Cassell (1975) evaluated the effect of two kinds of parental regulatory techniques. They compared parents who regulated their children according to their position in the family (e.g., a parent-child authority model), and parents who regulated according to more person-oriented aspects (e.g., needs, intents, motives, etc.). They reported that children from person-oriented families demonstrated more accommodation to the listener's perspective in their communication task performance than did children obtained from more position-oriented families. Such studies suggest that the environment can have a significant effect on cognitive development, which sometimes tends to be forgotten within the cognitive-developmental framework.

Other variables have been implicated in children's communication development. Since they will be considered in detail later, they will only be briefly mentioned here. One such variable is related to visual perceptual performance. In a comparison of children's egocentric and cooperative communications, Alvy B1968) reported that good visual scanning ability was related to more effective communication

performance in primary grade-school children. This is consistent with the results that Piche et al. (1975) reported which showed that a visual-recoding factor was significant in the communication accuracy of fourth-grade children. In a study by Rubin (1974), spatial egocentrism, as measured by a visual perspective-taking task, was shown to be significantly related to the communication performance of grade six children and college students, but not to the performance of grade two children and elderly people. Garmiza and Anisfeld (1976), also concluded on the basis of their results, that concrete visual cues may interfere with children's ability to perform perspective-taking tasks. They suggested that children find it difficult to decenter from the immediate concrete contextual perspective and consider an internal representation which is not concretely supported. Finally, Mueller (1972) found that the visual attention of the listener was one of the best predictors of whether a reply would be made in verbal interactions between four year old children.

A second variable which has been implicated in effective communication is an impulsivity variable. Alvy (1968) noted that younger children tended to respond impulsively on the communication task which was used. Instead of scanning all of the alternatives before making a choice, the younger children appeared to be concerned only with one

alternative at a time. The implications of this kind of conceptual style will also be considered later in this section.

Two general conclusions can be drawn based on the evidence outlined above. First, there is little doubt that there are a number of concrete variables which can be manipulated in order to increase children's communication performance. These include such aspects as the familiarity of the task material, the kind of feedback which is given to the speaker, and the age of the speaker, among others. Secondly, there are a number of internal variables which appear to also have an effect on effective communication, and about which we have far less information. Some of the more cognitive kinds of variables will be considered in detail further on. However, before focusing more specifically on some of the potentially relevant processes, the research related to the sample and comparison approach to children's communication performance will be reviewed.

Sample and Comparison Research

As was stated earlier, this approach tends not to attribute young children's limited communicative performances to their egocentric cognitive stage of development. Rather, it is argued that poor performance on verbal communication tasks can be due to an inadequate pool of possible verbal referents or messages, a poor choice of a message due to inadequate comparison processes, or a combination of both

(Rosenberg & Cohen, 1964; 1966; Rosenberg, 1972). Using a word matching communication task in which the speaker has to supply a clue word to a listener, Cohen and Klein (1968) found communication accuracy increased with grade level. They argued that the youngest children, who were from the third grade, had limited repetoires of possible clue words compared to the seventh grade children. However, the young children were able to choose the correct word when supplied with the clues given by the oldest children, which indicated that they could recognize associations even if they did not generate them during the task. These results correspond to results reported by Glucksberg et al. (1966), which indicated that young children could correctly identify complex abstract figures if supplied with adult descriptions, rather than peer descriptions, of the stimulus materials.

The sampling and comparison orientation to explaining children's early communication performance has produced three main proponents in addition to the original researchers cited above. The work of each will be considered separately before the overall significance of the research for the present study is evaluated. Asher has conducted three studies in which the role of sampling and comparison processes have been evaluated. In the first (Asher & Parke, 1976), an attempt was made to determine whether it was the sampling process or the comparison process which was most important for explaining young children's apparent

communication performance deficit. One task which was used required the speaker to have an adequate vocabulary for successful completion of the task, while a second task required the speaker to engage in comparison activity in order to select the appropriate message. The results demonstrated that second, fourth and sixth grade children were equally effective on the task requiring vocabulary alone, but that second grade children were less successful on the task requiring comparison activity. The authors argued that the results indicated that the improvement in communication performance which is found as children grow older, is significantly related to their increased ability to engage in comparison activities.

In a second study, Asher (1976) evaluated children's ability to appraise both their own and another person's communicative ability. He found that the second grade children were less accurate in their ability to judge correctly if a message was effective than older children. Whether the message was their own or had been produced by a peer did not significantly effect the judgements. Asher argued that younger children were less successful at making the judgements because they did not compare the message being appraised to both the target and the non-target words.

Finally, Asher and Oden (1976) attempted to determine if children who typically provide egocentric messages on communication tasks, do engage in private or idiosyncratic

comparison activity which is meaningful for themselves, even if it is not for anyone else. If they did, it was argued that they should be able to successfully use their own messages at a later time to select the correct alternative, since the message will be meaningful to them. To control for the influence of memory, children were given their own messages either immediately after responding, or after a two-week waiting period. The results indicated that children who produced poor or egocentric communications were not able to make correct choices, which was taken to indicate that they did not engage in comparison activity even for their own private message construction.

In a second series of studies, the development of effective communication has been investigated by Whitehurst. The effect of redundant and contrastive modeling on five, seven and nine-year old children's communication performance was evaluated by Whitehurst and Merkur (1977). The results demonstrated that any kind of modeling increased communication in the five-year-old group, but it was primarily of a redundant type. This was consistent with results obtained by Whitehurst (1976). Older children were first able to produce incomplete messages more effectively following the redundant modeling only, but not after the contrastive modeling. After additional exposure, either type of modeling produced increases in communication of the type modeled. The improved performance was credited to the ability of older children to analyze and compare the

available information before deciding on what was the most relevant information to communicate. In a similar study of listener abilities, Ironsmith and Whitehurst (1978) found that kindergarten children responded to both informative and ambiguous information without attempting to clarify the information being provided. Older children, in contrast, began asking for more relevant information or clarification by grade two, and very specific information by grades four and six. These results were interpreted as indicating that parallel processes are required by both listeners and speakers on communication tasks. Once again, comparative activity was argued as being necessary for successful performance in either communication task position.

A fourth study (Whitehurst & Sonnenschein, 1978) investigated how the complexity of the materials used in the communication task effected task performance. Two experiments were conducted with five-year-olds. They were able to demonstrate that kindergarten children definitely engage in a simple form of comparative process on a communication task which required single comparison activity. However, any variation introduced into the task itself which increased its complexity, tended to negate the comparative process. The results were interpreted as demonstrating that young children communicate in a qualitatively different way than do adults. First, children did not seem to be able to analyze a stimulus array in order to differentiate

the distinguishing features except in very simple situations. Secondly, the young child responded to any communicated message with little or no regard for its usefulness, completedness, or relevance to the task being performed.

Robinson and Robinson (1976a; 1976b; 1977a; 1977b; 1978) have investigated children's perceptions of where blame should be assigned for communicative failure. They have found that blame was primarily assigned by kindergarten children to the listener. In comparison, children who were about eight years old tended to reverse the process and almost totally blame the speaker. They concluded that children focused on the message as a cause of task failure more often when they were listeners than when they were speakers. They suggested that this might indicate that children learn first about communication through listening, rather than through speaking. This is clearly contrary to Piaget's view that children learn about communication through speaking messages which others don't understand (Piaget, 1959). Because of the repeated lack of comprehension, the child gradually learns to modify the message to fit the situation before verbalizing, rather than afterwards (Piaget, 1959). They suggested that in order to successfully communicate, the child must learn to engage in comparative activity to determine the appropriateness of the message. Further research also indicated that older children tended to blame the speaker consistently for inadequate messages,

even when the communication was successful. This seemed to indicate that they changed from a nonjudgemental phase, to a very critical judgemental phase, before finally adopting a more moderate position similar to that of adults.

Robinson and Robinson (1978) attempted to compare the roles of egocentrism and poor comparison activity in relation to children's communicative failures. Based on the results, they suggested that if communication messages were either too general, or too ideosyncratic or specific, that the listener would not be able to complete the task. They argued that part of the confusion between the egocentrism position and the comparitive activity position might be due to the assumption that the two processes were independent, which might not be true. They investigated the possibility that young children did not realize that what was required for effective communication was a realization of the listener's needs. As a result, such children did not give any thought to whether the message produced was adequate, since the basic understanding of the need to adopt the message to fit the situation was not yet recognized. This position received support in an initial experiment in which kindergarten and first grade children had to judge what was responsible for a series of observed communication failures. In a second experiment, evidence was obtained to support the position that an awareness of the need to take the listener's requirements into account preceeded the ability to engage

in the necessary comparison process. As a result, they suggested that arguments suggesting that poor communication performance was due to poor comparison activity might only be valid when it was certain that the child recognized the need for such a process.

The evidence presented above would seem to clearly support the importance of sampling and comparison activity in the communication process. However, there are certain limitations which are alluded to by Robinson and Robinson (1978) which should be made explicit. There has been a tendency in communication research to obtain empirical evidence from elementary or primary school children, and then apply the results to the communication processes of preschool children. The investigations of Flavell, et al. (1968), and a handful of others to be considered later, are notable exceptions to this trend. Theoretical extrapolations would seem, given our limited knowledge at this point in time, to be somewhat premature.

One of the basic problems which occurs when attempts are made to apply results obtained from older school-aged children to preschool children, is the inability to demonstrate that parallel processes are in fact taking place in the younger population. The results of the work of Elkind (1967; 1969; 1974), Flavell (1963; 1967), Flavell, et al. (1968), Kohlberg (1968), Piaget (1951; 1956; 1969; 1970) and others in the area of cognitive development clearly argue against such an assumption. In fact, based on the

evidence to date, it would appear that exactly the opposite assumption should be made until evidence to the contrary is demonstrated.

From the available evidence on the ability of preschool children to successfully perform communication tasks, it would appear that very few assumptions can be made. The only result which is consistently reported is that preschool children do not perform well on communication tasks while older children are more successful (Glucksberg, et al. 1975). Whether this is because the younger children do not understand the task, or do understand the task but are unable to perform the requirements, or any variation between these two possibilities, has not yet been clearly demonstrated. Some recent attempts to clarify this situation have been made which will be considered in detail later, but even those results are still more speculative than conclusive.

Naturalistic Studies

A major difficulty in evaluating how preschool children learn to communicate effectively, or the reasons underlying their early limited capabilities, is that little is known about their cognitive development in those areas which have been shown to be important for successful performance in older children. Theoretically, certain hypotheses can be constructed, but there is not yet a body of empirical data against which the validity of such hypotheses can be

measured. Hopefully, the present study will add to the work of those who have begun to gather such a set of data (Flavell, 1968; Fishbein, Lewis & Keiffer, 1972; Kurdek & Rogdon, 1975; Piaget, 1951, 1959).

In order for such a set of language data to be maximally useful, a comprehensive sample of normal, age-appropriate speech is a necessity. Such data acts as a criterion control against which new information can be evaluated. Normative data in child development research of the kind gathered by Gessell and Amatruda (1952), is analogous to the control groups used in more strictly experimental paradigms. In studies of children's communication performance, such control data is difficult to obtain since any intervention into the child's ongoing activities may have an effect on the communication data obtained. Therefore, the most reasonable method to obtain a communication control group would seem to be to obtain samples of the speech of young children in naturally occurring situations. By studying such samples, some practical conclusions and tentative hypotheses can be constructed about the extent of the communicative abilities of the children evaluated. Despite the potential usefulness of such data, few naturalistic observation studies have been conducted of young children's communicative ability.

One possible explanation for the lack of such studies might be the original estimate made by Piaget of the

prevalence of egocentric speech in preschool children. Piaget (1959) estimated that children five to six years of age used forty to seventy percent egocentric speech productions. Despite the controversy which has surrounded that estimate (Looft, 1972), it may have acted as a deterrent to further investigations of the natural language capabilities of younger children.

Despite the limited evidence which is available, several studies have emerged which have argued that young children are capable of more effective communication than is typically reported, based on the usual communication tasks. For example, Maratsos (1973), using a simplified task format of two listeners, one with sight and one without sight, obtained significant differences in communication effectiveness based on the messages of preschool speakers. The children were far more explicit with the apparently-blind listener, than with the listener who could see. The results of several naturalistic-observational studies tend to support the existence of such communicative abilities in preschool children.

Garvey and Hogan (1973) used videotaped play sessions to get speech samples of eighteen pairs of preschool children. Their results indicated a high degree of social interaction ability. Social speech, defined as speech which was adapted to the speech or behaviour of the other child, was common. All of the dyads were able to sustain

verbal interactions beyond simple one or two sentence exchanges. The authors suggested that such spontaneous speech might be a reflection of the social understandings which start to emerge during the preschool period. In a similar study using two-year-olds, Wellman and Lempers (1977) analyzed the natural communications which occurred in response to specific situational material. The messages were analyzed in relation to the situation in which they occurred, the communicative behaviours which were used, the response obtained from the listener, and the reaction to the response by the speaker. The data indicated that the two-year-olds entered freely into verbal interactions eighty percent of the time, adapted their messages according to the situational needs and the needs of the listener, and were responsive to feedback indicating understanding, attention but a lack of understanding, and a lack of attention and interest.

Despite the apparent communicative abilities of young children outlined above, certain limitations do exist, such as those summarized by Wellman and Lempers (1977). They found communication was best in relation to concrete objects or situations. Communicative effectiveness decreased rapidly when the focus of the message was not immediately present, when internal states such as feelings were described, and when interrelationships were discussed. Similarly, Spilton and Lee (1977) reported that when four-

year-old children had difficulty communicating, they tended to adapt subsequent responses to the feedback obtained from the listener. However, the potential for successfully clarifying the communication appeared to be directly related to how explicitly the listener questioned the speaker for more information. Whether the more explicit questions simply elicited more explicit answers, or whether they served to remind the speaker that the perspective of another person existed which was different, could not be determined. However, the responsiveness of the speakers to feedback from the listener was clearly supported. This result received further support from an intensive examination of how young children modify their speech as a function of listener responses (Shatz & Gelman, 1973). They found that four-year-olds made significant changes in their communications to two-year-old children as compared to their communications constructed for older listeners.

There seems to be little doubt, based on the studies described above, that young children of preschool age are capable of relatively effective communication within rather specific conditions. When provided with simple, familiar, and/or nonthreatening situations, preschool children are capable of engaging in verbal interactions in which they can demonstrate social responsiveness to the person with whom they are interacting. Even more surprisingly, such social-communicative skills are demonstrable,

in at least a simple form, in children as young as two years of age. This would seem to indicate that there is a discrepancy between the communication abilities of young children in natural situations, and (a) their theoretical capabilities, and (b) their measured capabilities in specific communication task situations.

Based on the results of the naturalistic observations reviewed above, it appeared that relatively young children were capable of more effective communication than the experimental literature indicated. Therefore, it seemed reasonable to assume that the necessary cognitive prerequisites for such an activity were present, at least in a rudimentary form, at an early age. If this was true, then the particular subset of cognitive skills which were necessary for effective communication performance should be measurable, given that they can be separated, identified, and an appropriate task designed to tap each of the particular skills. It was in the identification of each of the particular skills which were required for effective communication that the research results based on other populations, and the theoretical explanations which were generated, provided some guidance. An evaluation of both groups of information gave some indication of the particular variables which were potentially important, as well as some methods which could be used to evaluate each particular variable.

The remainder of this section will be used to summarize the relevant literature in each of the areas to be included in the present study. Where possible, a summary of the research related to a particular variable will be followed by a brief description of the particular task used to determine an estimate of the development of that variable.

Role Taking Ability

One of the major areas of development which was evaluated in relation to its importance to preschool children's communication performance is known by a variety of labels in the literature, such as roletaking, perspective-taking, social cognition, empathy and others (Flavell, et al. 1968; Glucksberg, et al. 1975; Higgins, 1980; Shantz, 1975). The basic definition of what was included in this section was based on the original discussion presented by Flavell, et al. (1968). While the term "roletaking" was used in the particular description being considered, the process was defined as one in which an individual was somehow able to recognize, apprehend, grasp, or somehow understand certain attributes of another individual. Attributes were broadly defined to include needs, intentions, opinions and beliefs, in addition to emotional, perceptual and intellectual capacities and limitations. Given such a definition, it seemed likely that anything which one person could know about another person's state which was not directly communicated,

would seem to be derived from what Flavell, et al. (1968) have referred to as the roletaking process.

Given that the above description was valid, the role-taking process according to Flavell, et al. (1968) depended upon a combination of both a knowledge of people and behaviour, which could be either specific or general, and perceptual information which was obtained from the overt behaviour of others or from similarly obvious cues. Such a description strongly suggested that effective roletaking ability was dependent upon two aspects: a primarily cognitive component, such as general information based primarily on past experience, and a more purely perceptual component which allowed the ongoing immediate information to be obtained. The interaction process between each of these two aspects could be deliberate and conscious, but did not necessarily need to be. In addition, the process could either be brief or extended in time. Flavell, et al. (1968) provided a more in-depth theoretical analysis of the total process, but the framework provided above seemed sufficient for the purposes of this discussion.

Flavell, et al. (1968), pointed out that the extent to which the child successfully identified the attributes of the other person which were relevant to the fulfillment of the task demands, then the more chance there was that the child would be able to adequately fulfill the requirements which were

necessary to complete the task. This concept is very similar to Higgins' (1980) concept of the ability to interrelate multiple factors described earlier, but is not as specific. In addition, the necessity of controlling the influence of one's own perspective is not made as clearly.

The implications of the above discussion for evaluating roletaking performances by preschool children could be derived from the research presented earlier, and what was known about children's cognitive development. For example, preschool children have a very limited pool of general information available to them due to such realistic aspects as their limited life experience, and more subtle aspects such as their limited cognitive development. The first aspect limits their potential fund of available information, while the second aspect limits the amount of information obtained from the experiences which have occurred. Therefore, it seemed reasonable to conclude that any attempt to measure roletaking ability should ensure that the method used was appropriate to the capabilities of the child. If this was not done, failure at a particular task could not be successfully argued as being due to a lack of adequate ability or the lack of the necessary prerequisite cognitive abilities, since the charge could always be made that the task was simply too advanced for the child's present level of development. If such a possibility was reasonable, it could

have an effect on the credibility of the results obtained by using such a task. Therefore, it seemed to be extremely important to be able to demonstrate that the children assessed could achieve some success at each of the tasks administered, but that none were able to complete all of the demands within each of the particular tasks.

Within the present study, three kinds of roletaking tasks were included which fit the general definition and criteria provided above. However, each of the tasks was chosen to represent a particular kind of roletaking. Therefore, before describing each of the tasks, a brief description is provided as well as a review of some of the literature which is related to each of the three kinds of roletaking tasks.

The first kind of task was designated as a general cognitive roletaking task. The child was asked to demonstrate that the role of another person could be assumed or inferred to such a degree that information based on that role could be accurately predicted. Such a task differed from the other two tasks to be described in that it attempted to assess a more general roletaking ability than the two more specific tasks. Shantz (1975), for example, has defined such a task as measuring what another knows about something.

Secondly, an affective roletaking task was used which assessed the child's ability to determine the affective

response of someone in a particular situation, based on various kinds of cues or information.

The third task was termed a visual roletaking (or perspective roletaking) task. Such tasks focus on a specific kind of information which could only be obtained visually. Therefore, the child was asked to provide specific information from the visual perspective of another person.

A fourth task was also included which was based on the concept of decentration as described by Looft (1972) and others. According to that position, decentration ability underlies all of the roletaking skills being assessed. Therefore, a measure of decentration ability was included in the study in order to demonstrate its possible relationship with communication performance and roletaking ability.

To some extent, the division of the literature in this section into each of the roletaking categories outlined above was influenced by a similar division used by Shantz (1975). Since any division is necessarily arbitrary, a division on the basis of cognitive, affective, and visual roletaking, and decentration ability seemed to be reasonable.

Cognitive Roletaking

The concept of a cognitive roletaking variable which represented a child's ability to know something that another person knows, could by definition include all other aspects of roletaking. However, for the purposes of this discussion, it was used to refer to the child's ability to infer

what another knows, rather than what the other might see or feel. A variety of tasks have been used to measure this particular aspect of roletaking which could be divided into three different categories based on the particular focus of the research (Shantz, 1975). The first category includes the communication studies and is based on the belief that the ability to take the role of the listener facilitates effective communication (Flavell, 1968; Glucksberg, et al. 1975). Since this research was reviewed in detail earlier, it was not included in this section.

The second category is based on the use of game-like tasks in which successful completion of the task is dependent upon accurately assessing an opponent's strategy, and the construction of a counter-strategy based on the inferred information. Several studies of this type have suggested that roletaking ability can be subdivided into a number of levels. For example, DeVries (1970) used a game situation with children between the ages of three and seven years. The game required the children to guess which hand an opponent would use to hide a penny. His results suggested that at the first level, children had no awareness of individual perspective, while at the fifth level, children demonstrated that a strategy based on inferences about the opponent's strategy, as well as a strategy of their own, was being used. In a similar study, Selman (1971) used a task which required the child to make inferences and

predictions based on visual information about what an opponent would guess if given a choice. His results indicated a four level progression of roletaking ability in which the child gradually becomes able to separate his own thoughts and perceptions from those of another.

Both of the above studies indicated that some roletaking ability developed much earlier than had been originally suggested by Flavell, et al. (1968). The discrepancies are difficult to explain since there did not seem to be a great deal of difference in the difficulty of the requirements in each of the tasks. Flavell's task required the children to guess which cup would be chosen by an opponent. One cup contained five cents, and the second cup, ten cents. The lowest level of roletaking ability was found at all age levels, including the sixteen-year-old children. It may be that the introduction of a two level choice, five and ten cents, had a multiplicative effect on the roletaking process which could not be foreseen. Whatever the reason, there were some unresolved differences based on the results obtained using this particular method. For that reason, it was decided to use the methodology of the third category, which was based on the telling of a story by the child.

Three variations of the story technique have been used and each will be described briefly before presenting a description of the particular task used in the present study. The first variation involves having the child tell

a story based on several stimuli supplied by the experimenter. The child is then asked to retell the story from the viewpoint of each of the story characters. As the role of each new character is assumed, the perspective of that character within the context of the stories of the previous characters must be differentiated as well as integrated within the context of the story being presently told (Feffer & Gourevitch, 1960; Feffer & Suchotliff, 1966; Shantz, 1975). A second method is based on presenting the child with a story about a social situation which requires a decision to be made by the child. The stories used allow a variety of decisions depending upon the particular perspective chosen. The child is questioned about the various viewpoints in order to determine how well the different perspectives are understood. Based on such methods, Selman (1971a; 1971b) and others have developed stage models of how children develop interpersonal inferential abilities which correspond well with the results of other studies (Feffer, 1970; Flavell, et al. 1968; Flavell, 1974). The third method involves varying the amount of information which is available to either different characters within the story, or the perspectives of different people telling the story (Chandler & Greenspoon, 1972; Chandler, 1973; Flavell, et al. 1968). Since the task used in the present study is of this type, it will be used to demonstrate the method involved.

Flavell, et al. (1968) developed a method based on a seven part picture story which shows a boy who is chased up an apple tree by a fierce dog. By removing three of the pictures, all references to the fierce dog are deleted. The child is asked to tell the story using both the seven and the four picture perspectives, and answer two questions about the last story. In order to make the procedure for each story even more alike, two similar questions were also included after the first story in the present study. The child's roletaking development is measured by the extent to which the child's first story based on the seven cards intrudes on the second four card story.

This particular task was chosen rather than some of the others which have been described because of several reasons. First, it seemed to fulfill the general requirements of a cognitive roletaking task as they were outlined earlier. Secondly, concrete picture references to the task demands were used and were always present. Other tasks seemed to depend more upon verbal references, or stories which required more of a memory component, than did the chosen task. While it is true that memory does play a role in this kind of successful roletaking performance, the purpose of the task within the present study was to demonstrate that preschool children were able to perform a cognitive roletaking task, and that this was related to communication performance. Therefore, level of performance

was of secondary interest in comparison to demonstrating that the child was able to perform the task at all. A final reason was based on the popularity of this particular task. It has been shown to be appropriate for a wide variety of age groups, including kindergarten children (Kurdek & Rodgon, 1975). Therefore, there was a considerable body of literature with which the results obtained in the present study could be compared.

Affective Roletaking

Within the present study, affective roletaking referred to a child's ability to correctly identify an appropriate emotional response when given a particular set of information. The literature related to this concept was found under two separate, but closely related labels, empathy and social understanding (Shantz, 1975). The basic differences which exist within the literature are related to the kind of response which is obtained (Deutsch & Madle, 1976). In some cases, a cognitive response is requested, based on the child's understanding of what another person is feeling. In other cases, an affective response is sought which assumes the child will be experiencing the same emotion as the person being presented. It is also possible to request both kinds of responses and compare the results. Various studies have attempted to determine the consequences of defining empathy as either

a cognitive, or an affective response. These studies will be reviewed before discussing the revised task which was used in the present study to obtain an estimate of affective roletaking ability.

Borke (1971) developed an Interpersonal Perception Test which consisted of twenty-three stories, each of which was accompanied by a picture. The face in each picture was left blank and the child was asked to make a nonverbal cognitive response by choosing the facial expression which best represented how the person in the picture was feeling. Borke reported that children as young as three years of age were able to identify the kinds of affective responses that different situations elicited. In particular, young children were able to identify happiness and fear consistently, but had more difficulty in identifying when sadness and anger were appropriate. In a second study, Borke (1973) compared American and Chinese three-year-olds and found that only happiness could be consistently identified. Borke (1972) suggested that empathy developed in a series of hierarchical stages which were closely related to cognitive development. In a later study, Kurdek and Rodgon (1975) provide further support for this position by reporting that the ability to know another's affective viewpoint improved with age up to grade three at which time it was essentially perfect. However, they also reported some results which suggested that children tended to

focus more on verbal information than on visual information when both were available, especially at older age levels.

A second approach to the study of affective roletaking ability is typified by the work of Feshbach and Roe (1968). In their study, stories and slides were combined to measure social understanding. The results suggested that cognitive empathy, or the ability to identify what another is feeling, is a necessary but not a sufficient condition for affective empathy or social understanding. The results of such studies suggest that preschool children can identify simple emotions when familiar situations are used to elicit the response. However, an accurate understanding of these same emotions is not usually found using situations and/or people who vary widely from the child's experience, at least up until middle childhood. This conclusion is supportive of the position of Chandler and Greenspoon (1972), Flavell et al. (1968) and others who argue that a successful performance which is based on a familiar situation is basically simply self-description, rather than affective roletaking.

Another aspect related to affective roletaking performance is the kind of information upon which the actual choice decision is based. As Shantz (1975) concluded, performance could be affected by the kinds of information available, such as facial or situational cues, or whether

verbal or visual cues were provided. Even the effect of varying the language which was used to question the child could produce different results. Therefore, it appeared that any attempt to decide whether preschool children were actually able to perform an affective roletaking task would be premature on the basis of the existing evidence. Therefore, for the purposes of this study, it was assumed that children who can correctly identify an appropriate affective expression on a task designed to measure such an ability, are more advanced than children who cannot correctly identify the necessary expression. It was also hypothesized that children who were successful would perform better on communication tasks. The rationale for such an assumption will be discussed in detail later and was based on the theoretical arguments of Flavell (1974).

The affective roletaking task used in this study was based primarily on the Interpersonal Perception Test designed by Borke (1971). However, some significant changes were made in both the design and the methodology which are worthwhile mentioning here. First, the pictures used by Borke were very simple and had very little detail. New pictures were constructed based on eight of the stories described by Borke. Eight of the stories constructed by Borke were expanded to provide slightly more explicit detail than in the original versions. Four of the expanded stories were constructed to be used with four of the redrawn

pictures. The other four stories and the last four pictures were designed to be used by themselves. Therefore, three kinds of information were available in the affective roletaking task. The first kind involved combined visual and auditory information, while the second and third kinds were visual alone or auditory alone. By using different kinds of sensory modalities, it was hoped that it might help to clarify both the capabilities and the limitations of preschool children on a task involving the identification of affective expression.

Visual Roletaking

The term, visual roletaking, was used above largely for the sake of continuity. While it is technically correct, the process referred to is also referred to as taking the visual perspective of others, spatial relationships, spatial perspective-taking, and other combinations of similar ideas. The process referred to is that of being able to identify how a particular stimulus array would look from a perspective which is different from that which is immediately available to the child. In other words, how would an object look from the side opposite to, or at right angles to, the child's position, relative to the stimulus.

The best known visual perspective task is the three-mountain task used by Piaget and Inhelder (1956). Basically,

the child is presented with three different-sized mountains which have a number of distinguishing characteristics. The child is asked to identify different perspectives by a variety of methods: by constructing from identical materials what would be seen in different positions, by selecting a photograph which corresponds to the view requested, and/or by placing a doll in a position which matches a particular perspective. Using this method, Piaget developed a three-stage model of visual perspective development. The first stage, for children under six years of age, is represented by an inability to take another person's perspective. Typically, the child responds according to the viewpoint which is identical to that seen by the child. In the next two stages, the child becomes increasingly able to take the perspective of another person consistently, which is fully achieved by about nine years of age.

Despite this rather conclusive early evidence, other studies have demonstrated that preschool children may have more visual perspective-taking ability than originally believed based on the results of the three-mountain task. Flavell (1974) reviewed a number of studies concerned with visual perspective-taking ability, and concluded at that time that the evidence was not clear about what skills were necessary and when they developed. However, he did hypothesize a developmental model, based on a number of constructs, which has been mentioned either directly, or alluded to,

earlier in this section. One of the major distinctions made by Flavell is the difference between the competence of the child and the performance of the child. While Flavell uses the terms Existence and Inference in his model, he is differentiating between the presence of some skill or ability being present in the child, and the child's ability to apply what is present in a given situation. In other words, the child may understand that something is required or even know what is required, but be unable to provide the solution that is needed.

One significant difference between the model proposed by Flavell (1974) and others which are available in the literature, is that he recognizes that the development in the child of an awareness that another viewpoint exists is an important cognitive-developmental achievement. This recognition has implications similar to those assumed in the affective roletaking section. The development of an awareness that there is a difference between the present experience of oneself and that of another, is a significant achievement which could have an effect on other areas of performance. However, care should be taken when comparing the results of different studies to ensure that the distinction between competence or knowing, and performance or application, is not lost. This distinction is particularly relevant when the results of tasks of varying levels of difficulty are compared.

One of the main differences between the three mountain task and the tasks which result in different results being obtained, appears to be the level of complexity of the tasks. A study by Masangkay, McCluskey, McIntyre, Sims-Knights, Vaughn and Flavell (1974) is typical of studies using less complex tasks. Using two- and three-year-old children, they were able to demonstrate that the children could infer what another person would see when looking at a stimulus array from a position which differed from that of the child being questioned. However, in two further experiments within the same study, a distinction was made between two levels of visual perceptual ability. Level one was defined an earlier form of inference in which the child was capable of nonegocentrically inferring that another person could see something that was not presently visible to the child. However, this required very specific conditions. The second level went beyond the first in that the child was capable of inferring how an object would look from a specific perspective. Therefore, the child was seen as moving from an initially global inference-taking ability, to a more specific, differentiated inference-taking ability. Level one was characterized primarily by the recognition that a difference in perspective did exist, while level two was characterized by the ability to apply that information as a guide to successful perspective-taking task performance.

Shantz (1975) defined the difference between the two

levels just described in the following way. Level one performance demonstrates that the child can represent what another person sees, even if the child doesn't see the object. However, the child cannot represent how the object will be seen, or the visual perspective, until level two is achieved. It would appear from this differentiation that the conditions of the task can have a major effect on the results obtained. In particular, the materials used would seem to be important since simple materials might allow results which might appear to indicate successful performance. In contrast, more difficult materials might not allow a true evaluation of the young child's capabilities. Such a conclusion appears to be supported by the research which is available.

Fishbein, Lewis and Keiffer (1972) varied the difficulty of the stimulus array used in an examination of young children's understanding of spatial relations. The children were asked to respond by two methods, either by pointing to the correct photograph, or by turning a stimulus array on a round tray until specified visual perspectives could be seen by the experimenter from different positions. The results clearly indicated that as the stimulus difficulty increased, successful performance decreased. Similarly, it was found that the children found it more difficult to choose the correct photograph than to construct the correct perspective using actual stimulus figures. The hypothesis

was made that young children can perform more accurately when the task demands are concrete rather than when the task requires representational ability. These results were consistent with those reported by Hoy (1974), who found that children's performance on perspective taking tasks was dependent upon the type and number of dimensions which had to be considered simultaneously, and on the kind of response required. Based on those results, Hoy suggested that an egocentric response might be the young child's reaction to more information than could be effectively processed.

Kurdek and Rodgon (1975) used a visual task similar to that described by Fishbein et al (1972), to assess seven age levels ranging from kindergarten children up to sixth graders. They reported that successful visual perspective-taking increased with age and continued to improve up to the sixth grade children. The authors suggested that task difficulty and the cognitive-perceptual abilities involved in successfully completing a task, should be carefully considered before conclusions were made, rather than basing them on task results above. In a follow-up study, Kurdek (1977) found that perceptual perspective-taking was the best predictor of cognitive perspective-taking one year later. This result, in addition to several others, led Kurdek to suggest that a multitrait-multimethod analysis would be helpful in assessing the validity of the perspective-taking construct and its importance in cognitive development.

One further aspect needs to be clarified before considering the particular aspects of the visual roletaking task used in the present study. Shantz (1975) pointed out that it was necessary to consider the impact of the child's own viewpoint on the ability to correctly infer the viewpoint of another. The importance of this has been demonstrated in several studies. For example, Brodzinsky, Jackson and Overton (1972) used both masked and unmasked conditions with six-, eight-, and ten-year-olds on a perceptual task. Based on this and other studies, Shantz (1975) concluded that the effect of masking seemed to depend on a variety of variables such as the complexity of the stimulus, the age of the subjects, and other variables, such as whether the child moved about during the task, or whether the array itself was moved. The importance of perceptual dominance was also noted in the results of a study by Garmiza and Anisfeld (1976). Although they were assessing communicative ability, they concluded that the young child's ability to successfully communicate might be negatively effected by an inability to shift away from an existing perspective. Since successful performance depended upon being able to take the other's perspective, successful communication seemed to be blocked by the child's inability to break away from their existing perception.

As the above review of the various visual roletaking studies indicates, a number of potential tasks, and the

possible consequences for the obtained results were considered before choosing a particular task for use in this study. Once again, as with the affective roletaking task, a compromise task was constructed based on the tasks used in several studies. In particular, the methodologies described by Fishbein et al. (1972), and by Kurdek and Rodgon (1975), influenced the development of the task about to be described.

The task itself was essentially the same as that used by Kurdek and Rodgon (1975). Cartoon figures were placed on rotating trays in order to determine the child's perceptual roletaking ability. The main difference between the two methodologies was that Kurdek and Rodgon started with three figures on the tray. In the present study, the cartoon figures were added one at a time after a series of four successive orientations had been assessed for each of the increased stimulus conditions. Therefore, four different perspectives were assessed for each of the one figure, two figure, and three figure conditions. The variation was suggested by the results obtained by Fishbein, et al. (1972) and Hoy (1974). Concrete figures were used in the present study, rather than asking the children to imagine what the perspective would be like from a particular position, since young children seem to perform better with concrete materials. Having the child rotate the stimulus tray was considered to be a compromise between having the child simply point to a

photograph, and having the child actively construct a particular perspective from a second set of materials. It was recognized that some interference in perspective might occur since the tray in front of the experimenter would already be in position. However, if that occurred, it was possible to obtain some measurement of the contributing aspects of the task based on when such an interference was noticed. In summary, the task was adapted in order to construct a task which was at least partially within the capabilities of each child, and which at its upper limit, was beyond the capability of any of the children.

Decentering Ability

The concept of decentration was discussed earlier in the section which dealt with egocentrism. Briefly, decentration has been defined as the ability to disengage one's attention from one particular aspect of an object or an event and become aware of all of the relevant information (Looft, 1972). Therefore, a child who cannot decenter will exhibit the phenomenon of centering, or centration. As Piaget (1951; 1956; 1959; 1969) has emphasized, the egocentric child is unable to decenter and therefore neglects to take into account all of the available information. Instead, the egocentric child focuses on a central feature or one specific aspect of the stimulus. As a result, the child's reasoning is based on the partial information gathered and he is unable

to perform many of the tasks which can be successfully completed at later stages of development when all of the relevant information can be used to complete the task.

Because of its intrinsic relationship with the concept of egocentrism, and the resulting implications for cognitive development, decentration has been a major topic of interest in developmental literature for a number of years (Elkind & Scott, 1962; Elkind, Larsen & Van Doornick, 1965; Feffer and Suchotliff, 1966; Kemler & Smith, 1966; Looft, 1972; Lowe, 1973: Piaget, 1950). As was mentioned in the section on roletaking ability, decentration has also been an important variable of interest in the research related to roletaking development. Since roletaking requires that the child actively decenter from some information which is immediately available, and attempt to determine the perspective of another person which is not observable, it is in many ways analogous to the process of decentration. Both involve the processing of information, some of which is obvious and some of which must be deduced, in order to accurately determine a correct solution within a given situation. In both decentering and roletaking tasks, an inability to go beyond the information which is supplied will usually result in an incorrect answer.

Most of the literature already reviewed up to this point has been related, either explicitly or implicitly, to the process of decentration. In addition, most of the

tasks described fit fairly consistently into the general paradigm of requiring that information be inferred based on taking another person's perspective into account. Such a task cannot be performed unless the person attempting it is able to decenter from the information which is already available. Despite the similarities, there may be at least one difference between the roletaking tasks already described and the decentration task about to be described, which is particularly relevant to the present study.

The difference is to a large extent derived from the work of Flavell, et al. (1968), Flavell (1974), and Masangkay et. al. (1974). It is based upon Flavell's formulations (1974) and in particular on the first level of his theoretical model of how people develop the ability to make inferences about others. Flavell (1974) differentiated between knowing something, and being able to apply and use that information successfully. The latter aspect was further subdivided into a relatively primitive or direct application of the information, and a more advanced application based upon knowing all of the relevant information and being able to make inferences based on that information.

If the model outlined above is true, and there is conflicting support for it in the research (Higgins, 1980; Shantz, 1975), then a similar model may also be applicable to the more basic underlying concept of decentration. If a stage theory

approach is used, the following model can be hypothesized. It is assumed that the centration-decentration construct is a basic cognitive construct, as is argued by Piaget (Flavell, 1963). As a basic cognitive construct, the decentration process must progress through a number of qualitative stages before the process is complete (Lerner, 1976). The initial development of decentration ability will take place as outlined by Piaget (1959; 1969; Flavell, 1963, 1974) throughout the sensory-motor period of cognitive development. However, once the child achieves a realization that the process of decentration is possible, a process similar to that hypothesized by Flavell (1974) for the inferring process may occur. In the simplest terms, it was hypothesized that learning how to apply the information obtained from the decentering process may be a two-stage process rather than simply one qualitative stage. If this was true, then the process observed initially on decentration tasks is different from the more advanced process which underlies the ability to perform roletaking tasks.

In order to determine if this process existed, a methodology similar to those used by Fishbein et al. (1972), Flavell et al. (1968), and Masangkay et al. (1974) was used. Essentially, the decentration task was constructed in such a way that it began with very simple tasks based on a limited number of items, and gradually became more complex throughout the task as additional demands were

added. Also, the questions were designed to evaluate several aspects of each subtask. Often such assessments rely on a single question for each aspect of the task, such as is used in conservation assessment (Goldschmidt & Bentler, 1968). It was hypothesized that by using the approach described above that differences related to the two stage process hypothesized above would be able to be identified. It was expected that when the question and the characteristics of the stimulus materials were very similar, the child would be able to successfully answer the questions. However, as the difference between the questions and the characteristics of the stimuli increased, more difficulty will be encountered by the child. If such results were obtained, and a relationship could be demonstrated between the child's level of functioning on the decentration task, and the child's functioning on other tasks requiring decentration ability, the results would tend to lend support for a two stage, rather than a one stage, decentration process. The actual task developed to assess the hypothesis outlined above will be described in detail later.

Language Development

At the beginning of the study, it was stated that effective communication was dependent upon two components. One was language competence, such as an adequate vocabulary, and the other was communication competence, which involved using language to achieve communicative goals, such as

the sharing of information in a way in which it was comprehensible to the person receiving the information. While the focus of this study was primarily on the latter, the importance of an adequate level of language competence could not be ignored. For example, it is theoretically possible for a child to have developed all of the necessary skills or abilities required for communicative competence, but be unable to communicate due to being mute. While this example is extreme, it does point out the necessity of ensuring that the obvious is not overlooked.

In order to obtain an estimate of each child's level of language development, two tasks were used. Both tasks were obtained from the McCarthy Scales of Children's Abilities (McCarthy, 1972). They were chosen because of the relatively low involvement, compared to other possible tasks, of other areas of development which might have had an effect on the obtained language estimates. For example, one test of receptive language requires the child to match a picture, chosen from four alternatives, with a stimulus word (Kirk, 1959). The results of such a task could be effected by such areas as the child's visual perception, which is required to identify the pictures, and other areas not directly related to language competence, such as visual scanning ability and cognitive style. Finally, the tasks chosen focused on areas which have a good face validity when compared to the language demands of a verbal communication task.

The first task assessed word knowledge and was based primarily on vocabulary. It provided an estimate based on the identification of pictures in the first section, and the defining of words in the second section. It was chosen over an estimate based simply on word definitions because the pictures presented initially are relatively easy, and children tend to respond to them readily in comparison to some other tasks. They were designed for use with two-year-olds, and therefore it is very unusual for a four-year-old child not to achieve some measurable success on the task. One of the basic needs for success on a verbal communication task is an adequate vocabulary, and this task ensured that that aspect of language was taken into consideration in the estimate of the child's language competence which was used in the present study.

The second task provided a general estimate of expressive language ability. One of the requirements for successful communication is the ability to express ideas. The task chosen to evaluate that ability was based upon the child's ability to generate words in certain categories within a specified length of time. As would be expected, older children typically generate more words within each category than do younger children, but four-year-old children usually generate several words within each category. Also, there was a memory factor involved since no concrete stimuli were used. However, since a verbal communication task requires that

the child perform under somewhat similar conditions which require the production of memory-based information, the task was included. Therefore, the estimate of each child's language ability was based on two tasks. The tasks provided general estimates of each child's vocabulary development and expressive language ability, which were combined to provide a single index of each child's level of language competence.

Visual Perception

While the various abilities which have been considered up to the point have all been relatively directly related to communication effectiveness, visual perceptual ability initially appears to be somewhat further removed. In actual fact, however, visual perception has been shown to play a significant role in several verbal communication studies in which the effect of visual perceptual ability has been taken into consideration (Allen, 1974; Longhurst & Turnure, 1971; Waterman and Orr, 1978; Waterman, 1979). While the evidence is not consistent, there is some support for the hypothesis that children who have good visual perceptual skills perform better on verbal communication tasks than do children with poor visual perceptual skills. It should be noted that up to this time, the majority of verbal communication tasks which have been reported which have evaluated the influence of visual perceptual ability, have used visually based stimuli. Therefore, it is not possible to determine

whether the same relationship would exist if the communication stimuli were to be presented by a different sensory modality. In other words, the relationship may only exist when stimuli are used which are presented visually.

Before considering the studies which have directly investigated the relationship between these two areas of interest, it would be helpful to review briefly some of the research related to visual perceptual development. This will provide some information about how the child can be expected to visually perceive the stimulus at an early age, which will have an effect upon how it will be verbally encoded. For example, if the young child is not aware of some of the visual information which is available, that information could not be communicated. If the child's visual perceptual ability was not taken into consideration, the failure to communicate might be attributed to poor communication ability, rather than a lack of visual perceptual development. Two of the main influences in the visual perceptual literature have been the work of Piaget (1969) and the theoretical concepts of Werner (1948, 1957). The influence of the latter can be seen in a study of part-whole relationship in visual perception conducted by Lowe (1973). The study was an experimental investigation of Werner's orthogenetic principle which Lowe applied to perceptual development. As a result, perceptual development was described as proceeding from an initial

state of whole-orientated, diffuse perceptual awareness, to an end state in which the separate parts of a stimulus could be perceived and the relationship between those parts could be incorporated within the total structure of the stimulus. The results indicated that visual perception in younger children was influenced by the characteristics of the whole stimuli to a greater extent than was the visual perception of the older children. This suggested that the young child would be influenced more by the overall general characteristics of a stimulus, than by the specific details of the stimulus.

Similar characteristics of visual perception have been investigated in a series of studies by Elkind and his students. These studies were based on theoretical concepts of Piaget (1969) which are related to perceptual development. Piaget conceives of perception as an active developing system which becomes increasingly adaptive with age, as opposed to a fixed perceptual mechanism. The perception of the young child is seen as being initially passive, and dominated by the best organizational aspects of the visual field. For example, if the dominant visual effects suggest a whole or global percept, that is the way the young child will perceive the stimulus. If the best organization is in several separate parts, that is an equal possibility.

In Piaget's theory, the child moves from the initial

state of passive perceptual processing to a state of active perceptual processing by progressing through a series of stages. The stages of development occur as a result of the constant interaction of the child with the environment (Fellows, 1968; Flavell, 1963). As a result of this interaction, and the changes which occur in visual perceptual ability, a variety of effects have been able to be demonstrated which are related to children's perceptual development.

Elkind and Scott (1962) studied the effect of age on figure-ground reversals. This is directly related to the ability to decenter considered earlier. The child was asked to look at stimuli which could be identified correctly in two different ways, depending on how they were perceived. They found that task performance improved with age, with the older children being increasingly able to identify both possible responses to the ambiguous figures. Young children, in comparison, tended to focus on one possibility to the exclusion of the other.

In order to investigate part-whole visual perception as well, Elkind, Koegler and Go (1964) constructed a set of stimuli which were constructed of individual whole figures, which were combined to form a different figure. For example, the figure of a person was constructed by combining different kinds of fruit. The child could respond either to the whole stimulus, or to the different separate

parts. The results indicated that there was a regular increase with age in the ability to perceive parts and wholes, and that both could be integrated into a complete response by about nine years of age. These results tend to complement the results of a similar study reported by Meili-Dworetski (1956) which also indicated an increased ability to incorporate both separate features and a whole perception in one combined response. A third study was conducted by Elkind, Anagnostopoulou and Malone (1970) to determine if children who do not report part-whole combinations nevertheless actually do see them. The results indicated that if part-whole relationships were not reported, then the child was probably not aware of them.

The results of these studies indicate that young children are initially limited in their ability to process visual information as thoroughly as can older children. Since it is logical that only information which is available to the child can be communicated, these results would seem to suggest that young children are at a disadvantage when assessed on communication tasks which are dependent upon visual perceptual ability. However, it is also possible that the same process which underlies successful visual perceptual might underlie successful communication performance. In both types of tasks, the process of decentration appears to play an important role. Successful visual perception seems to rely to some extent on being able to

perceive both the details and the complete percept and being aware of the relationship between the two sets of information. Young children have difficulty because they tend to focus or center on a particular aspect and are unable to free themselves, or decenter, from that visual percept (Flavell, et al. 1968; Looft, 1972). A similar process can be seen in the communication performances of young children. Once the communication has been formulated, the young child seems to have difficulty in making revisions in the message without very specific guidelines from a second person (Peterson, Danner & Flavell, 1972; Waterman & Orr, 1978).

An inability to perceptually decenter has been shown to have an effect on a variety of tasks which depend to some extent on visual perception. Elkind, Horn and Schneider (1965), and Elkind, Larson and Van Doorninck (1965) investigated the role of perceptual decentration on a number of tasks related to reading. The results clearly supported the hypothesis that visual perceptual decentration was a significant factor in both the child's ability to recognize words, and in reading achievement. They also demonstrated that slow readers were less proficient on tasks involving perceptual manipulation in general, and perceptual decentration in particular, than were average readers. Such results would seem to suggest that visual perceptual ability may be a critical aspect of the young

child's ability to successfully perform any cognitive processing task which relies on visual information. While such a statement is admittedly obvious, it is possible that the obvious has been overlooked to some extent. Since most communication tasks have used visual stimuli, it is not surprising, on the basis of the information just summarized, that a relationship has been reported between verbal communication and visual perception in the research related to young children.

Actually, there have been few studies which have dealt specifically with the proposed relationship. It appears to have been first proposed in the cognitive-developmental literature by Longhurst and Turnure (1971). They demonstrated that both visual discrimination ability and communication effectiveness increased with age. On the basis of these results, they hypothesized that the relationship might be more than just correlational. Susswein and Smith (1975) attempted to validate the proposed relationship but their results were not significant. However, there is a question as to whether their failure to substantiate the proposed relationship was due to the lack of any significant relationship, or to a potential confounding effect between language and visual ability on the visual task which they used.

In an earlier study, Allen (1974) investigated the role of visual perception in the oral language production

of young children. The results clearly supported the importance of visual perceptual processes in the three aspects of language development which were examined. He also reported, as did Elkind, et al. (1965), that both verbal and figural perceptual factors were obtained in addition to a general visual perception factor, and that the two separate factors were each related to different aspects of language production.

The significance of the relationship between visual perception and communication effectiveness received further support from studies conducted by Waterman and Orr (1978), and Waterman (1979). In both studies, non-verbal visual perception tasks were used in an attempt to decrease as much as possible the effect of verbal ability. In the first study, a visual task developed by Birch and Lefford (1967) was used which required the child to point to the correct answer. Two subtests of the Frostig Developmental Test of Visual Perception (1966) were used in the second study. In both, a verbal communication task based on the paradigm described by Glucksberg, et al. (1966) was used. The results of both studies indicated that children with good visual perceptual ability performed better on the verbal communication task than did children who had poor visual perceptual ability, as measured by the tasks described. In addition, there was a significant improvement in performances on both sets of tasks with an

increase in age. On the basis of these results and those outlined above, there seems to be little doubt that a relationship does exist. However, the importance of visual perceptual ability in relation to other variables thought to be important for effective communication has not yet been established. The present study was designed to provide some insight into those potential relationships.

Higgins and Akst (1975) examined the comparison processes used by kindergarten children on verbal communication tasks using visual stimuli. They were particularly interested in whether young children would modify their verbal messages in a way which would indicate that they were sensitive to the differences between the target referent and the set of nonreferents. They evaluated the children's comparison processes using both single referents and sets of referents which contained a target stimulus. They found that the children did not use verbal comparisons as had been found with adults (Rosenberg & Cohen, 1966). However, they did use comparisons on the basis of features. In other words, the children would compare the various features of the referents and use the differences between them to describe the referent. They also pointed out that this was done primarily when the referent was presented with other stimuli, but less when a referent was presented alone. It is also worth nothing that the stimuli used were abstract nonsense figures, but were much simpler than some which have been used in previous studies (Glucksberg & Krauss, 1967).

One final study conducted by Mueller (1972) attests to another significance of visual influence. Mueller found that verbal responses by four-year olds were significantly related to the visual attention of the listener, as well as the technical quality of the message. This seems to suggest that the visual attention served to help the child focus his auditory and other cognitive processes in order to maintain the verbal exchange.

Before describing the tasks used to estimate each child's visual perceptual ability in the present study, several other aspects of visual perception should be clarified since they were considered when choosing the two kinds of visual tasks. The first aspect was the use of tasks based predominantly on visual scanning, such as a number of figures presented in a stimulus array. A series of studies performed by Ghent (1960, 1961, 1965), and Ghent and Bernstein (1961) have clearly demonstrated that young children have particular visual scanning patterns at certain ages, and that certain kinds of figures have an effect on their visual scanning. These conclusions received support from the results obtained by Vurpillot (1968; 1976). Rather than attempt to control for such effects, it was decided to avoid visual tasks which required responses based predominantly on visual scanning ability in order to be successful.

Similarly, visual tasks which required the comparison

of relevant and irrelevant task material were avoided, since Druker and Hagen (1969) found that improved performance on such tasks tended to be due to more efficient encoding and rehearsal strategies, rather than improved visual discrimination ability. Also, Etaugh and Turton (1977) have demonstrated that sex differences exist in the development of the ability to process form information. Finally, an attempt was made to choose tasks which were not derived from the theories of either Piaget (1969) or Werner (1948, 1957). This was done to avoid any potential biasing of the visual estimates toward a particular theoretical position. The results of the studies reviewed earlier, as well as more experimentally based research, make such a decision premature. For example, Kemler and Smith (1978) demonstrated that under certain conditions, children who would ordinarily demonstrate holistic decision-making strategies based upon visual information, could be influenced to base their decisions on dimensional rather than holistic aspects of the stimuli. The results of this and other studies (Gibson, 1969; Pick, Frankel & Hess, 1975; Wohwill, 1960) clearly demonstrate that none of the theoretical explanations of visual perceptual development can be accepted at this time in their entirety.

As a result of such considerations, two different methods were chosen to obtain estimates of each child's visual perceptual ability. The first task which was chosen

was the Block Design subtest from the Wechsler Preschool and Primary Scale of Intelligence (1967). This standardized task was chosen because it required the child to construct a number of visual patterns within specified time periods. The patterns were initially very simple and become progressively more difficult. Scaled scores could be calculated based on the child's age and raw score which tended to minimize differences based on individual differences which might or might not have had a significant effect.

The second estimate of visual perceptual ability was obtained from two of the subtests of the Frostig Developmental Test of Visual Perception (1966). The Figure-Ground and Position-in-Space subtests appeared to have the least effect of visual-motor and fine motor abilities of the five subtests which make up the test. Scaled scores were available for both subtests, and the results could be combined to form a single estimate of the child's visual perceptual ability. It was not considered necessary to administer the whole test since there is strong evidence to suggest that the test essentially measures only one factor which is related to perceptual ability and perceptual maturity (Ayres, 1965; Ward, 1970). Since at least one factor analytic study has related the general perceptual factor to motor ability (Ayres, 1966), an attempt was made to minimize this effect by choosing only those tasks which appear to require minimal fine motor ability.

Both of the methods chosen to obtain the estimates of visual perceptual ability within the present study were based on standardized tests. As such, some of the problems considered earlier tended to be decreased. The further analyses to be performed as part of the study would also allow a further evaluation to be made of the two methods used in the study.

Impulsive-Reflective Cognitive Style

The inclusion of a measure of cognitive style in a study evaluating the influence of different variables on the communication performance of preschool children is based upon several assumptions which will be outlined below. Before doing so, a brief summary of the literature related to the impulsivity-reflectivity conceptual style or dimension is necessary.

The particular cognitive style being discussed has been defined by Kagan and Kogan as being concerned with the extent to which a person reflects on the validity of a particular solution to task which contains some response uncertainty (Kogan, 1976). In the original monograph in which this particular style of responding was discussed, Kagan, Rosman, Day, Albert and Phillips (1964) suggested that this particular cognitive style was only relevant to situations in which the child must choose the correct response from a number of different alternatives. Responses

to questions requiring a single answer, or to other kinds of task situations were not considered to elicit similar kinds of responses since research to date had been limited to specific task situations (Kagan, et al. 1964).

The test used to measure the impulsive-reflective dimension was called the Matching Familiar Figures test (M.F.F.). Impulsives were defined by the test results as having fast response times and high error rates, while reflectives had slower response times and fewer errors. Different forms were also constructed for different age groups, including preschool children. While there is some controversy about whether the dimension is relevant to the cognitive styles of preschoolers (Block, Block & Harrington, 1974; 1975), the results of a number of studies have suggested that a stable cognitive style can be demonstrated fairly consistently by four years of age, and in some studies, before three years of age (Kogan, 1976). Despite the disagreement, it has been generally accepted that the battery designed for use with preschool children can be reliably used with four-year-old children, although care should be taken to ensure that an adequate differentiation has been obtained between the impulsive and the reflective groups (Messer, 1976).

The impulsivity-reflectivity cognitive dimension has been applied to a wide variety of research problems. For example, it has been demonstrated that impulsive children obtain lower performance scores on tasks related to

perceptual learning (Odom, McIntyre & Neale, 1971), programmed learning (Grippin, 1973), information processing (Heider, 1971), problem-solving (Ault, 1973), decision making (Mann, 1973), observing behaviour (Siegelman, 1969), and school failure (Messer, 1970). Higgins (1977) also postulated that impulsivity might be related to the planning and organization of verbal messages during communication tasks. However, no clear evidence for the relationship was obtained. In contrast to impulsive children, reflective children use more time on the decision making process, and obtain significantly lower error scores. There has also been evidence to suggest that reflective children engage in more comparison activity (Katz, 1971), and attend longer (Finley, Kagan & Layne, 1972) than do impulsive children when making their choices.

The studies mentioned above clearly demonstrate the importance of cognitive style to a wide variety of different problem-solving areas. Since an estimate of verbal communication ability is usually determined by a similar kind of problem-solving task, it is possible that the reflective-impulsive dimension might also play a significant role in successful communication. Successful task completion on verbal communication tasks requires that certain processes be completed, such as a roletaking analysis of what the task situation requires (Flavell, 1974), and/or a selection and comparison process (Rosenberg &

Cohen, 1964, 1966), to mention only two of the possible processes which may be required. There is no doubt that the successful completion of any such processes which are usually required to generate the correct informational response would require time to be completed. Therefore, it seemed reasonable to assume that an impulsive child would usually be less successful on such communication tasks than would a reflective child. There was evidence in the literature that the reflective child would probably attend longer, and engage in more comparative and analytic activity, than would the impulsive child. Therefore, it seemed reasonable to expect that the reflective child would more thoroughly analyze the task situation, and would therefore have more information available to communicate than would the impulsive child. Whether the information would be communicated was a separate question.

The literature related to the modification of conceptual tempo also seemed to support the assumption made above. Early attempts to change the conceptual strategy of children by simply increasing the response latency were markedly unsuccessful in demonstrating improvements in task performances (Denney, 1973; Messer, 1976). However, when the children were taught what to do with the increased time, performance on a number of different tasks improved. For example, Egeland (1973, 1974) demonstrated that training in scanning techniques improved performance on

visual discrimination tasks. As was discussed earlier, visual perceptual ability was one of the variables thought to be important for affective communication performance. A study by Cook (1975) suggested that training in visual analysis using verbal labels could also successfully modify impulsive behaviour. These results are consistent with those reported by Meichenbaum and Goodman (1969, 1971). They found that with training, impulsive children could learn to use language as a means of developing self-control which resulted in improved task performance.

There are other studies which have demonstrated it was more important to teach children how to achieve successful task performances rather than simply how to increase their response latency period. Denney (1972a, 1972b) and Ridberg, Parke, and Hetherington (1971), have both demonstrated that cognitive style can be modified through the use of live and filmed models demonstrating particular cognitive styles. Stanes (1973) was able to demonstrate changes in children's responses in relation to the kind of verbal task instructions which were provided. Simple, clear and direct instructions increased successful performances, while ambiguous instructions had the opposite effect. Similarly, Zelniker and Oppenheimer (1973) were able to demonstrate that children could be trained in a relatively short period of time to use a different method for processing information than they had used before the

training took place.

As a result of such studies, it seemed reasonable to conclude that the reflective children were doing something quite different with the information presented to them than were the impulsive children. The reflective children appeared to process and use the available information more effectively than did the impulsive children. Despite this rather obvious conclusion, there were two further groups of children whose modes of responding did not fit either of the classical impulsive or reflective groups as described by Kagen, et al. (1964). The two groups referred to have been described by Ault (1973), Eska and Black (1971), and others, and have been named the fast-accurate and the slow-inaccurate groups. The names refer to the latency periods and error rates which the members of each group demonstrate on the Matching Familiar Figures Test. As can be seen, there were children who responded very quickly but were still able to determine the correct response. In contrast, there were children who responded very slowly but made a lot of errors. While these two groups have not received as much study, there was some suggestion that the fast-accurate children were developmentally more advanced, relative to their peers, while the slow-inaccurate group was developmentally behind (Kogan, 1976).

Since the impulsivity-reflectivity dimension could be a potentially significant variable in effective communication

performance, each child was administered the preschool form of the Matching Familiar Figures Test. For each test item, the latency period and the number of errors were recorded for use in calculating an estimate of each child's cognitive style. Since Ward (1968a, 1968b) has found that the relationship between latency and error can fluctuate between the absence of any association for some children and a strong association for others, it was decided to attempt to take both aspects of the task into consideration. Therefore, both the mean latency and the mean number of errors scores for each child were included in the analysis. Such an approach permitted a more complete analysis of each of the components contributing to the child's cognitive style to be conducted.

Independent Cognitive Task

The idea of including a general cognitive task was derived from a suggestion made by Shantz (1975). In a discussion of the relationship between various different roletaking tasks. Shantz suggested the inclusion of a separate task which was theoretically unrelated to roletaking ability. The basis for such a suggestion can be found in an article by Campbell and Fiske (1959) which contained a discussion of the multitrait-multimethod

statistical analysis technique. The argument was made that by including an independent task, it was possible to determine whether the roletaking tasks intercorrelated more highly with each other than they did with a theoretically independent and unrelated ability (Shantz, 1975). According to Campbell and Fiske (1959), such a method provided a better measure of the discriminant validity of each of the experimental tasks than could be obtained by comparing their intercorrelations with zero as is usually the case.

Due to the wide variety of tasks included within the present study, it was not possible to include a completely independent task of cognitive ability. However, it did seem reasonable to include a general measure of cognitive ability which was derived from basic developmental abilities. This kind of task was believed to be desirable since a test of cognitive abilities based upon a specific kind of development would have a tendency to bias the results of the analysis. For example, a test based on some aspect of language development, or visual perception, could be expected to correlate highly with the tasks used to obtain estimates of similar areas of development which were included within the design of the study. Since none of the experimental tasks were based directly upon the acquisition of developmental abilities, such an estimate was believed to be relatively independent.

One value of including such a task within the present

study is similar to the reason outlined earlier in the discussion of the proposal by Shantz (1975). That proposal was based upon an argument put forward by Campbell and Fiske (1959). They argued that a task which was independent of the other tasks in a study should be included in order to provide an independent estimate against which the other results could be compared. It was argued that such a comparison would help to determine the validity of each of the other tasks. Due to the revisions made in some of the tasks used in the present study, it was decided to include a relatively independent cognitive task.

Due to the wide variety of tasks used within the present study, it was difficult to conceive of a task which would not incorporate some of the functions which were being assessed by other tasks. Therefore, an attempt was made to obtain a task which would require relatively basic skills in order to perform the task, but would provide a relatively pure estimate of cognitive development.

Two other considerations were believed to be important in choosing the cognitive task. First, it was thought that the task should require as little language as possible from the child. If language was necessary in order to administer and perform the task, it was decided that the language requirements for the child should be primarily receptive rather than expressive. This decision was made since the purpose of the present study was to investigate

children's expressive language skills, and to include that requirement in the cognitive task would tend to bias the results. A second consideration was to find a task which was relatively short, and did not take long to administer. This was necessary since there were definite limitations to the amount of time which each child could be kept for assessment purposes.

The task chosen was the Cognitive Perceptual Task developed by Rourke (1964). The task requires that the child understand the concept of different (or not the same). Each item on the task is presented as a three choice stimulus. The child has to point to the stimulus which differs from the other two stimuli according to specific criteria such as form and colour. The child is pretested to ensure that he/she has an understanding of each of the concepts when presented individually. The task increases in difficulty as concepts are combined to create more complex stimuli requiring choices based upon multiple combinations of concepts.

Non-Verbal Communication Task

The inclusion of a non-verbal communication task was based upon two considerations. The first was related to the question of whether the development of non-verbal communication ability was affected by the same variables as was verbal communication ability. The literature reviewed

earlier related to communication performance was only based upon tasks requiring verbal responses. A review of the communication literature did not reveal any studies which have investigated the non-verbal communication performance of preschool children. While other literature may be indirectly related to such an area of study, such as studies of problem-solving strategies and visual discrimination, there did not appear to be any directly related studies. Therefore, it seemed reasonable to include a non-verbal communication task in the present study for the sake of intellectual curiosity alone. However, a second consideration argued for the inclusion of the task from a theoretical position.

The position referred to is the stochastic theory proposed by Rosenberg and Cohen (1966), and Rosenberg (1972), to account for differences in the communication performances of children. As was outlined earlier, they proposed a sampling and comparison process which they argued was necessary in order to construct an adequate verbal message. Due to the limitations of the tasks used to evaluate this process, there has been little research reported which has attempted to demonstrate such a process in the communication performance of preschool children. The research which was available suggested that preschool children did not perform well on tasks which required the use of a sample and comparison process (Rosenberg, 1972).

One possibility which was considered in the decision to include a non-verbal task, was the possibility that the verbal nature of the tasks usually employed might interfere with the optimal task performance of the preschool children. A second consideration was that most of the tasks which have been used did not provide the child with concrete materials. Instead, the child was typically asked to compare two words or concepts which were supplied, and generate an appropriate clue based on an evaluation of the two stimuli. The tasks used by Asher (1976), Asher and Oden (1976), Rosenberg and Cohen (1966), and Cohen and Klein (1968), fit this kind of task description. When more concrete-based communication tasks have been used, such as the task used by Whitehurst and Merkur (1977), some success has been reported on the part of the communication abilities of preschool children.

The task chosen for the non-verbal communication task was based on a task described by Robinson and Robinson (1976, 1977). The stimulus pictures which were used were line drawings of figures in which certain aspects were varied throughout the task. In the original task, verbal communication was used to inform the listener of the critical component. In the adaptation used in the present study, pictures of various attributes were used which the listener could use to show the other person, in order to

communicate the desired information. The present task required that different attributes be sampled and compared to the accompanying drawings as well as the criterion drawing, in order to determine if the correct attribute had been chosen from among the available possibilities.

By using such a task, both aspects of the problem outlined earlier could be investigated. First, since the task did not require any verbal communication on the part of the child and only the picture which was chosen by the child was scored, the influence of verbal communication ability was kept to a minimum. While language was used throughout the training session, it was not necessary for the child's understanding or successful performance of the communication task. Secondly, successful completion of the task appeared to require that the child at least consider the available component parts of the figure before deciding which aspect might be the relevant component. Similarly, in order to determine if the choice was correct, it was necessary to compare the chosen attribute to the other alternatives which were available. Only in this way could the child determine if the choice was correct.

The requirements of the task just outlined appeared to satisfy the criteria outlined by Rosenberg and Cohen (1966) as being necessary in order to demonstrate the relevance of the sampling and comparison process in communication performance. In addition, the results allowed

an evaluation of the importance of the experimental variables which were assessed for non-verbal communication performance.

Demographic Information

Due to the age of the population being assessed and the potential effect of environmental factors on each child's task performance, certain information was taken into consideration as it related to the current situation of the child and the child's home environment. The results of the different studies have indicated that such variables as race and socioeconomic status (Baldwin, McFarlane & Garvey, 1971; Krauss & Rotter, 1968; Rackstraw & Robinson, 1967), age and sex (Karabenick & Miller, 1977; Krauss & Rotter, 1968), and familial interaction patterns, especially as related to parent-child communication (Dickson, Hess, Mijake & Azuma, 1979) have a significant effect on children's verbal communication performance.

Therefore, personal information was obtained from the parents of each of the children who were assessed in the study, at the same time as the parental permission for the child to participate was obtained. If the information was not provided, the child was not included in the study. The information obtained was related to several different areas, such as the language environment of the child (English or otherwise), changes within the child's environment within specified periods of time, the composition of the family (single parent, siblings, or

other relatives) and the socioeconomic status of the family, as determined by the Blishen Socio-Economic Index for Occupations in Canada (Blishen, 1967). The information obtained from the questionnaire was coded and was used to describe each of the children who participated in the research.

Summary

The present study was designed in order to evaluate the effect of different variables on the communication performance of preschool children. The underlying assumption upon which the study was based was that effective communication skills were dependent upon more than strictly linguistic processes. It was argued that there were other processes which were necessary for the development of effective communication ability. The purpose of this particular section of the study is to review the various possibilities which have been presented or implied throughout the introduction. Due to the design of the present study, no hypotheses can be made. However, it seems reasonable to state several expectations which can be derived from the review of the literature just presented.

It is believed that the present study will demonstrate that effective verbal communication is dependent upon more than adequate language skills such as vocabulary and grammatical structures. Several areas would seem to be of particular importance:

(a) visual perception has been identified in a number of studies to be significantly related to effective verbal performance. It is expected that the present study will support such research results.

(b) cognitive style has been identified as a significant factor in a wide variety of tasks. It is expected that impulsive children will be less effective on the verbal communication task than will reflective children.

(c) language is unquestionably necessary for successful task performance. However, it is considered possible that the present study will provide evidence that language is a necessary, but not sufficient, condition for successful performance.

(d) decentration ability would seem to be an important aspect of effective communication ability. It seems likely that children who can become aware of another person's perspective will be able to communicate more effectively than can egocentric children.

Finally, some very specific questions were asked about the tasks used to measure the abilities represented in the study, and the most appropriate indicator of effective communication. These question will be described in more detail later.

CHAPTER II

METHOD

Subjects

Sixty children (30 male and 30 female) were obtained from two private nursery schools in the city in which the study was conducted.[1] This resulted in children being obtained from four separate locations. The children were all older than 4 years, 0 months and younger than 5 years, 3 months. The children were obtained from a variety of socioeconomic and familial situations. The only restrictions placed on the use of children within the study was that English be used within the home and that the information requested from the parents be obtained.

The children were obtained by the following procedure. The directors of the nurseries were approached and gave their approval for the parents to be approached. The names of all of the children who were within the specified age range were provided and the following information was sent to them:

(i) A letter from the Director of the nursery school stating that he/she had discussed the study with the experimenter, that he/she had approved the study, and that there was no danger to the children who participated.

(ii) A letter from the experimenter, which was co-signed by the chairperson of the Dissertation committee, which briefly outlined the purpose of the study and the

procedure which would be used to obtain the data needed for the study.

(iii) A questionnaire which included a form which the parent signed to indicate permission, and a short questionnaire which the parent was asked to complete. Some of the information provided ensured that the children met the criteria outlined above. The rest of the information was used for demographic purposes.

Copies of the letter from the experimenter and the questionnaire which was sent to the parents can be found in Appendix A.

Assessment Materials

Due to the exploratory nature of the present study, a number of different variables were assessed by a variety of different methods. Since general descriptions were provided in the introduction, and explicit information is available in the appendices about each of the tasks which were used, the information will not be repeated here. However, a brief description of each task will be provided in the interest of continuity and clarity.

The primary variable in the present study was verbal communication performance. This was operationally defined as the ability to transmit information to a second person in such a way that the information can be used by that person to successfully perform a task. The task used to

assess communication performance was based on a paradigm described by Glucksberg, et al. (1966) but used different stimulus materials constructed by Waterman and Orr (1978). The child was required to verbally construct a message in reference to each stimulus picture which would allow the listener to choose a matching picture from an array of different pictures. Each child received one verbal request for more information after each verbal message (e.g., "Can you tell me anything else?"). The measure of the child's verbal communication performance was based on the communicative effectiveness of the child's messages. Each message was scored for egocentric and social information, as outlined by Glucksberg, et al. (1967), and Rubin (1973), and provided a latency score, a mean length score, and a percentage of the message which was egocentric score.

The other tasks used in the present study are outlined below. A short description of each has been provided in order to clarify the purpose of its inclusion in the study.

(i) Decentration Task: This task was included in order to determine the effect of the child's level of decentration ability on communication effectiveness.

(ii) Cognitive Roletaking Task: The purpose of this task was to determine how well the child could separate

and transmit information based solely upon the characteristics of the situation, from the position of another person.

(iii) Perspective-taking Task: The child was asked to create a particular perspective using materials which were identical to the materials used by the examiner. Each perspective was created first by the examiner; and then by the child who did not have access to the visual perspective of the examiner.

(iv) Affective Roletaking Task: The child was asked to infer the appropriate emotional response, based on four facial expressions, to information provided in three ways. The information was presented as stories and pictures together, pictures alone, and stories alone.

(v) Linguistic Ability: Two tasks were used to assess each child's linguistic level of development and the results were combined to form a single estimate. The two tasks will be described separately to avoid confusion. (a) A word knowledge task was used which required the child to first identify pictures which matched stimulus words, and secondly, to define words presented verbally. (b) The second task required the child to verbally generate words within four separate general categories.

(vi) Visual Perception: The child's visual perception was evaluated by three separate measures. (a) The

block design subtest was used to assess the child's ability to spatially reproduce visual designs based upon a visual analysis of each design. (b) The figure-ground and position in space subtests of the Frostig were used to obtain a second measure of visual perception. (c) The Similarities and Differences subtests from the Stanford-Binet was used as the third measure. It required the child to identify a different stimulus from a set of four possibilities, and make judgements about pairs of stimuli. The first task required the child to identify particular figures which were somewhat obscured by other information which overlapped the target figure. The second task required the child to choose a figure which matched a target figure based on its spatial orientation.

(vii) Cognitive Style: The cognitive style of each child was assessed using the preschool form of the Matching Familiar Figures test. Each child was assigned a mean latency score and a mean error score based on their performance on the task.

(viii) Individual Cognitive Task: An individual cognitive task was administered to each child. The task used was the Cognitive-Perception Task. The child was required to point to the visual stimulus which differed from two other stimuli according to specific criteria.

(ix) Non-Verbal Communication Task: The child was not required to use any language in order to successfully

perform the task. The child was presented with a number of pairs of stimulus pictures in which one picture was identified as the target stimulus. The child had to decide which of the available clue cards had the most information about the target stimulus, and shows that card to the examiner in order to complete the task.

(x) Popularity Rating: Each child was rated on the basis of his/her popularity in comparison with other children of the same age.

(xi) Demographic Variables: A variety of demographical information was obtained in order to more precisely define each child. For example, the child's level of intellectual development was assessed and information was obtained about the primary and secondary languages in the home, any recent traumatic events in the child's life and the individuals within the family home, including their relationship with the child. Also, the socio-economic status and educational level of the parents was obtained and evaluated based on the Blishen Socio-Economic Index for occupations in Canada (Blishen, 1967). Examples of the materials used in the assessment are provided where possible in Appendix B.

Procedure

On the basis of the information provided in the questionnaire which was completed by the parent(s) of each child, a group of 30 male and 30 female children

were obtained. Each child was assessed individually in two to four sessions which were conducted on separate days. The length of each session was dependent upon the child's performance on the tasks being administered and the child's concentration and cooperation.

The tasks were divided into four sets, A1, A2, B1, B2. Each set could be administered separately or in conjunction with the second set of the same letter. None of the children were given more than two sets of tasks at any one session. Some of the children were completely assessed in two sessions, while other children required a full four sessions. Unfortunately, the number of sessions required for completion of the assessment was not recorded and could not be included as a possible variable for analysis. Each child received a small 'prize' at the end of each of the assessment sessions.

Each child was assessed by a male experimenter, a female experimenter or by both. Twenty children were assessed in each condition. In each of the first two conditions, the tasks were administered according to one of two predetermined schedules. This allowed half of the children to be administered the assessment in an A-B order, while the second half received the tasks in a B-A order. Due to the difficulty in obtaining children within the specified age range, it was not feasible to obtain

equal numbers of males and females within each of the three conditions. Therefore, it was decided to use statistical methods to evaluate the effect of sex on the results. Since equal males and females were not used in each condition, sex was not taken into consideration when the assessment schedules were determined for each group of children.

In the third condition, each child was assessed by both the male and female experimenters. Since the order of assessment had to be counterbalanced, the following procedure was used. The twenty children were randomly divided to form four grups of five children, Groups One to Four. The assessment tasks were administered in the AB or BA order described earlier. This allowed the male experimenter to assess Group One using the A group of task followed by the female experimenter using the B group of tasks. Group Two received the A tasks from the female experimenter followed by the B group administered by the male experimenter. Group Three was assessed by the female experimenter using the B tasks, followed by the A tasks given by the male experimenter. Group Four similarly received the B tasks administered by the male experimenter followed by the A tasks given by the female experimenter.

The data from each of the groups created by the counterbalancing schedules was analyzed in order to

evaluate the results within each of the subgroups and to compare them with the results of the other groups.

Statistical Analysis

A number of statistical methods were used to analyze the data. They will be described in the approximate order in which they were performed. The purpose of each analysis will also be presented. Most of the analyses were performed using the Statistical Analysis System (SAS) described by Barr, Goodnight, Sall, and Helwig (1976).

Means, standard deviations, minimum and maximum values, and ranges were calculated for all of the variables using the complete sample of 60 subjects. The same analyses were performed separately for the male and female groups, each of which were comprised of thirty subjects. A third set of analyses was obtained for each of the three groups of twenty children which were created based on the examiner(s) who gathered the data.

Potential differences in the sets of scores created by dividing on the basis of sex and examiner were evaluated by analysis of variance and manova analyses. In addition, significant differences in the demographic composition of each group were evaluated by analysis of variance.

The first attempt to evaluate the relationships between the full set of variables was based on a correlation analysis. The matrix was used to determine which variables were significantly

correlated with three verbal communication or criterion variables. It was also used to help determine if the variables were actually measuring what they were expected to measure. For example, the correlations between the verbal scores were examined in order to see if they were highly correlated.

A second evaluation of the relationship between the verbal communication criterion variables, and the remaining set of eighteen predictor variables was performed using a stepwise regression analysis. Two kinds of information were obtained for each of the three criterion variables. The first was the best predictive model which could be constructed from among the predictor set of variables. The second kind of information was the amount of variance which could be accounted for by each of the obtained predictive models, as well as for the full set of predictor variables.

In order to further evaluate the relationships within the predictor variables, factor analysis was used. It was believed that an examination of the resulting factor structures would supplement the information obtained from the regression analysis. Secondly, it would also help to evaluate whether the variables were in fact measuring discrete areas of functioning as intended.

The full set of scores of the sixty subjects was used to produce the correlation matrix for the factor analysis. The principal axis method, followed by a varimax rotation, was used to obtain the initial results. In order to aid in the interpretation of the results of the factor analysis, a hierarchical cluster

analysis was used. Also, examining the clusters of variables would aid in determining whether variables which were intended to measure certain abilities clustered together.

The second analysis was based on the principal axis method. The obtained factors were examined for their potential predictive value. It was decided to use the first fourteen in the SCORE procedure of SAS. The technique multiplied the produced factors with the original data set. The obtained factor scores were then examined to determine the contribution made by each of the predictor variables to each of the factors. The results of the analysis were used in three regression analyses based on the three verbal communication criterion variables.

Another analysis used to evaluate the relationship between the criterion and predictor variables was a canonical correlation. The three verbal communication variables were used as the criterion variables, and the remaining set of eighteen variables comprised the set of predictor variables.

In summary, a number of analyses were used for a variety of purposes. After the descriptive statistics were computed, the results were evaluated for significant differences between groups which would affect the interpretation of further analyses. Then, an attempt was made to determine if the variables were measuring what had been expected. This was done by examining the full correlation matrix and by evaluating the factor plots and factors produced by the factor analysis.

A major focus for the present study was to determine if verbal communication could be predicted with significant accuracy. This was evaluated using regression analyses, canonical correlation analysis, and the factor score analysis. Factor analysis was also used to help understand the relationships within the set of predictor variables.

CHAPTER III

RESULTS

The results of the analyses described earlier will be presented in this chapter. Due to the variety of analyses, the results will be presented in three general sections. While some overlap will occur, the three sections will be based upon (a) a presentation of the descriptive statistics, including information relevant to the implications for further analyses, (b) the results of the regression analyses, and (c) the results of the factor analyses.

A Pearson Product Moment Correlation was computed, based on a sample of 60 responses from ten verbal communication protocols which were scored by a second person according to established criteria. The obtained correlation was 0.987 which was significant at the $p \leq .01$ level of significance.

(a) Descriptive Statistics: The mean, standard deviation, minimum and maximum values, and the range are presented in Table 1 for each of the variables, based on the full sample of 60 children. Similar information for the 30 male and 30 female children is presented in Appendix D (i) and (ii). The same information is also presented for each of the three groups of 20 children, as defined by the identity of the examiner(s), in Appendix D (iii), (iv), and (v).

Potential differences between the groups of variables defined by sex and by examiner were evaluated using an analysis of variance. The only significant difference between the male and female scores was on Block Design. The mean score for males was 11.133, while the mean score for females was 12.867. When an analysis of variance was performed for the three groups defined by examiner, significant differences were found for four variables: verbal communication latency, decentration, visual roletaking, and popularity. The mean scores for each are presented in Table 2.

A third analysis of variance was used based on the verbal scores obtained from the group of children assessed by both the male and female examiners. In particular, the order of the tasks on which the children had been assessed, and the effect of being examined by the two examiners in a counterbalanced design were analyzed. No significant effects were obtained for either condition. However, this may have been due in part to the small numbers of children involved (n = 20).

A Pearson Product Moment correlation was computed using the full set of variables and complete sample of 60 children. The correlation matrix is presented in Table 3. As described earlier, two kinds of information were obtained from the matrix. An examination of Table 3 shows the significant correlations between the predictor variables. Similarly, the significant correlations are shown for the verbal communication or criterion variables.

TABLE 1

Descriptive Statistics for Full Sample of Children (n=60)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	54.100	4.395	48.000	62.000	14.000
Socioeconomic Status	42.603	12.862	26.710	70.430	43.720
Verbal Communication: Latency	7.327	4.429	2.957	30.417	27.460
Verbal Comm.: Mean Length	6.139	2.890	2.000	12.833	10.833
Verbal Comm.: Egocentrism	0.562	0.235	0.029	1.000	0.971
Nonverbal Ability	30.083	3.495	14.000	36.000	22.000
Nonverbal Intelligence	100.983	13.670	80.000	138.000	58.000
Frostig Visual Perception	20.017	2.390	15.000	26.000	11.000
Similarities & Differences	14.133	1.631	7.000	18.000	11.000
Block Design	12.000	2.456	5.000	19.000	14.000
Cognitive Perceptual Task	16.267	4.104	8.000	22.000	14.000
Matching Figures Latency	5.220	2.986	1.626	18.327	16.701
Matching Figures Errors	2.269	0.707	1.000	5.833	4.833
Verbal Fluency	11.467	3.629	5.000	19.000	14.000
Word Knowledge	15.717	2.401	10.000	21.000	11.000
Decentration Ability	6.100	2.222	4.000	12.000	8.000
Visual Roletaking	4.550	3.337	0.000	14.000	14.000
Cognitive Roletaking	0.733	0.733	0.000	3.000	3.000
Affective Roletaking	9.933	4.345	0.000	22.000	22.000
Popularity	6.050	2.056	1.500	9.500	8.000

TABLE 2

Mean Scores for the Variables With Significant Differences Between the Three Groups Defined by Examiner

(n=20)

	Verbal Communication Latency	Decentration Ability	Visual Roletaking	Popularity
Male Examiner	5.584	5.100	2.900	7.250
Female Examiner	9.422	6.250	5.200	5.225
Male and Female Examiner	6.975	6.950	5.550	5.675

TABLE 3

Correlation Matrix Based On Scores Of All Children (N=60)

Variable Name		SEX	AGE	SES	VCL	VCM	VCP	NVC	NVI	FVP	VSD
Sex of Child	SEX	1.000									
Age in Months	AGE	-0.114	1.000								
Socioeconomic Status	SES	-0.114	0.055	1.000							
Verbal Communication Latency	VCL	0.155	-0.071	-0.027	1.000						
Verbal Communication Length	VCM	-0.116	0.024	0.341**	-0.043	1.000					
Verbal Communication Percent	VCP	0.243	-0.086	-0.453**	0.144	-0.659**	1.000				
Nonverbal Ability	NVC	-0.101	0.046	-0.009	0.065	0.100	-0.064	1.000			
Nonverbal Intelligence	NVI	-0.055	-0.354**	0.206	-0.097	0.252*	-0.086	-0.017	1.000		
Frostig Visual Perception	FVP	0.106	-0.192	0.199	0.132	0.366**	-0.189	0.028	0.370**	1.000	
Similarities & Differences	VSD	-0.021	0.135	0.209	-0.213	0.247*	-0.236	-0.121	0.110	0.208	1.000
Block Design	WBD	0.356**	-0.261*	0.184	-0.029	0.074	-0.052	0.018	0.087	0.170	0.165
Cognitive Perceptual Task	CPT	-0.025	0.253*	0.305**	-0.018	0.444**	-0.411**	0.009	0.206	0.164	0.514**
Matching Figures Latency	MFL	0.034	0.204	0.102	-0.075	0.222	-0.263*	0.220	0.017	0.097	0.105
Matching Figures Errors	MFE	-0.135	-0.052	-0.103	0.082	0.006	0.066	-0.018	0.012	-0.033	-0.109
Verbal Fluency	VFL	-0.139	0.311**	0.159	-0.133	0.469**	-0.394**	0.121	0.237	0.308**	0.138
Word Knowledge	WDK	-0.175	0.379**	0.216	0.126	0.276*	-0.414**	0.051	0.034	0.060	0.239
Decentration Ability	DET	-0.227	0.124	0.167	-0.110	0.183	-0.144	-0.053	-0.071	0.022	0.160
Visual Roletaking	VRT	-0.146	-0.119	0.056	0.164	0.010	-0.000	-0.263*	0.026	0.224	0.201
Cognitive Roletaking	CRT	0.138	-0.176	-0.259*	0.299*	-0.189	0.178	-0.163	-0.073	-0.094	-0.012
Affective Roletaking	ART	0.031	0.139	0.036	0.005	0.240	-0.176	-0.109	0.197	0.214	0.207
Popularity	POP	0.065	0.160	0.105	-0.314**	0.236	-0.217	0.001	0.319**	0.146	0.271*

* $p \leq .05$

** $p \leq .01$

TABLE 3 (cont'd)

Correlation Matrix Based On Scores Of All Children (N=60)

Variable Name	WBD	CPT	MFL	MFE	VFL	WDK	DET	VRT	CRT	ART	POP
Sex of Child											
Age In Months											
Socioeconomic Status											
Verbal Communication Latency											
Verbal Communication Length											
Verbal Communication Percent											
Nonverbal Ability											
Nonverbal Intelligence											
Frostig Visual Perception											
Similarities & Differences											
Block Design	1.000										
Cognitive Perceptual Task	0.146	1.000									
Matching Figures Latency	-0.088	0.218	1.000								
Matching Figures Errors	0.002	-0.012	-0.132	1.000							
Verbal Fluency	-0.069	0.285*	0.431**	-0.133	1.000						
Word Knowledge	0.040	0.319**	0.187	-0.051	0.410**	1.000					
Decentration Ability	0.075	0.241	0.020	0.151	0.223	0.091	1.000				
Visual Roletaking	0.126	0.075	-0.348**	0.084	-0.036	0.143	0.308*	1.000			
Cognitive Roletaking	-0.075	0.052	-0.136	0.043	-0.239	-0.053	-0.067	0.013	1.000		
Affective Roletaking	-0.057	0.278*	0.276*	-0.018	0.310**	0.442**	-0.050	0.054	-0.027	1.000	
Popularity	-0.060	0.229	0.259*	0.138	0.337**	0.224	0.047	-0.128	-0.025	0.154	1.000

* $p \leq .05$

** $p \leq .01$

A canonical correlation analysis was also used to obtain additional information about the relationship between the three criterion variables, and the eighteen predictor variables. The results are presented in Table 4. As indicated, only the first variate was significant. An examination of the correlation coefficients revealed an interesting pattern of correlation coefficients between both the criterion and predictor variables and the canonical variables. The results are presented in Table 4.

(ii) Regression Analysis: as explained earlier, a major focus of the present study was to obtain information about the relationship between the verbal communication criterion variables, and the set of predictor variables.

A stepwise regression analysis was used to obtain two kinds of information. First, the best predictive model was determined for each of the criterion variables, based on the set of eighteen predictors. Secondly, the amount of variance which could be accounted for by the full set of predictor variables was calculated for each of the criterion variables.

The first regression analysis was computed for the latency of response criterion variable. The best predictor of response latency was the popularity variable which accounted for almost 10% of the variance ($R^2 = 0.099$). The best predictive model which could be constructed consisted of the following variables: popularity, cognitive roletaking, word knowledge,

TABLE 4

Results of the Canonical Correlation Analysis

Canonical Variates	Canonical Correlation	Chi-Square (x^2)	df	
1	0.733	78.193	54	**
2	0.687	41.249	34	N.S.
3	0.446	10.619	16	N.S.

**$p \leq .01$

Correlation Coefficients Between Each Canonical Variable and the Criterion Variables

Variate	Verbal Communication (Latency of Response)	Mean Length of Verbal Response	Percentage of Egocentric Verbal Communication
1	-0.117	0.858	-0.952
2	0.972	-0.050	-0.031
3	0.207	0.512	0.304

TABLE 4 (cont'd)

Correlation Coefficients (Above .300) Between Each Canonical Variable and the Set of Predictor Variables

Variate	Cognitive Perceptual Task	Verbal Fluency	Socio-Economic Status	Word Knowledge	Frostig Perception	Matching Figures Latency	Similarities and Differences	Popularity
1	0.630	0.628	0.612	0.540	0.380	0.370	0.358	0.334
2	0.024	-0.160	0.063	0.290	0.165	-0.057	-0.281	-0.435
3	0.215	0.303	-0.184	-0.232	0.584	-0.051	0.056	0.050

Frostig visual perception, and similarities and differences (see Table 5). The model was able to account for almost 32% of the variance ($R^2 = 0.317$), while the full set of predictor variables was able to account for about 46% of the variance ($R^2 = 0.461$).

The second regression used the mean length of verbal response for its criterion variable. The best single predictor of verbal response length was the verbal fluency variable ($R^2 = 0.220$). The best predictive model was composed of the following variables: verbal fluency, cognitive-perceptual ability, and Frostig visual perception (see Table 6). The model was able to account for almost 37% of the variance ($R^2 = 0.368$), while the full set of predictor variables could account for almost 45% of the variance ($R^2 = 0.448$).

The third regression analysis used the estimate of egocentric content as the criterion variable. The best single predictor variable for the amount of egocentric content in a verbal response was socioeconomic status ($R^2 = 0.205$). In contrast, the best predictive model, composed of socioeconomic status, verbal fluency, and word knowledge (see Table 7) was able to account for almost 36% of the variance ($R^2 = 0.357$). The full set of predictor variables was able to account for almost 51% of the variance ($R^2 = 0.506$).

TABLE 5

Best Predictive Model for Latency of Response on a Verbal Communication Task

Variable	SS	df	F	R^2
Frostig Visual Perception	64.742	1	4.42*	--
Similarities & Differences	53.168	1	3.63	--
Word Knowledge	71.124	1	4.86*	--
Cognitive Roletaking	120.806	1	8.25**	--
Popularity	117.437	1	8.02**	--
Best Model			5.02**	0.317
Full Variable Set			1.97	0.402

*$p \leq .05$

**$p \leq .01$

TABLE 6

Best Predictive Model for Length of Response on a Verbal Communication Task

Variable	SS	df	F	R^2
Forstig Visual Perception	21.066	1	3.78*	--
Cognitive-Perceptual Ability	45.973	1	8.26**	--
Verbal Fluency	40.404	1	7.26**	--
Best Model			10.85**	0.368
Full Variable Set			1.92	0.396

*$p \leq .05$

**$p \leq .01$

TABLE 7

Best Predictive Model for Percentage of Egocentric Content on a Verbal Communication Task

Variable	SS	df	F	R^2
Socioeconomic Status	0.410	1	10.92**	--
Verbal Fluency	0.153	1	4.09*	--
Word Knowledge	0.149	1	3.98*	--
Best Model			7.87**	0.297
Full Variable Set			1.51	0.341

*$p \leq .05$

**$p \leq .01$.

(iii) Factor Analysis. In the present study, factor analysis was used to examine how various predictor variables were clustered in order to (a) determine the best possible predictors of the criterion variables, and (b) to determine more explicitly whether groups of variables thought to measure the same ability actually grouped together.

The eigenvalues and cumulative proportion of variance accounted for are presented in Appendix I. Factor one accounted for almost 20% of the variance. The factors are presented in Tables 8 and 9. Four factors were retained by both the principal axis and varimax analyses for examination. The unrotated factor plot for factors one and two is presented in Figure 1. The results of the factor analyses without the verbal communication scores are included in Appendix G for comparison with the results just presented. A hierarchical cluster analysis was used to help interpret the results of the factor analyses. The relevant cluster groups are presented in Table 10. A two-dimensional factor plot was produced and is presented in Figure 2. The full hierarchical cluster output is presented in Appendix H.

A second set of factor analyses were conducted using the principal axis method and a varimax rotation. The purpose of this analysis was to generate as many factors as possible which made a statistically significant contribution

TABLE 8

Factor Analysis with Verbal Communication Scores:

Principal Axis Solution

Variable Name	Factor 1	Factor 2	Factor 3	Factor 4
Verbal Communication: Mean Latency	-0.194	0.213	-0.027	0.542*
Verbal Communication: Mean Length	0.728*	0.130	0.080	-0.127
Verbal Communication: Egocentrism	-0.715*	0.010	0.075	0.180
Sex of Child	-0.194	0.211	0.496*	0.381*
Age in Months	0.292	-0.596*	-0.413*	0.244
Socioeconomic Status	0.502*	0.204	-0.039	-0.299
Nonverbal Ability	0.101	-0.344*	0.256	-0.144
Nonverbal Intelligence	0.363*	0.334*	0.485*	-0.141
Frostig Visual Perception	0.408*	0.474*	0.335*	0.043
Similarities & Differences	0.501*	0.285	-0.204	0.126
Block Design	0.081	0.537*	0.198	-0.087
Cognitive Perceptual Task	0.655*	0.163	-0.140	0.230
Matching Figures Latency	0.473*	-0.426*	0.371*	0.114
Matching Figures Errors	-0.050	0.174	-0.262	-0.034
Verbal Fluency	0.705*	-0.244	0.083	0.021
Word Knowledge	0.588*	-0.127	-0.261	0.400*
Decentration Ability	0.284	0.150	-0.539*	-0.238
Visual Roletaking	0.054	0.600*	-0.503*	0.060
Cognitive Roletaking	-0.287	0.191	-0.040	0.564*
Affective Roletaking	0.469*	-0.038	0.099	0.494*
Popularity	0.479*	-0.109	0.198	0.021
SSQ	4.134	2.073	1.819	1.553
Portion	0.197	0.099	0.087	0.074
Cumulative Portion	0.197	0.296	0.382	0.456

*Designates factor loadings $\geq (\pm)$ 0.300.

TABLE 9

Factor Analysis With Verbal Communication Scores:

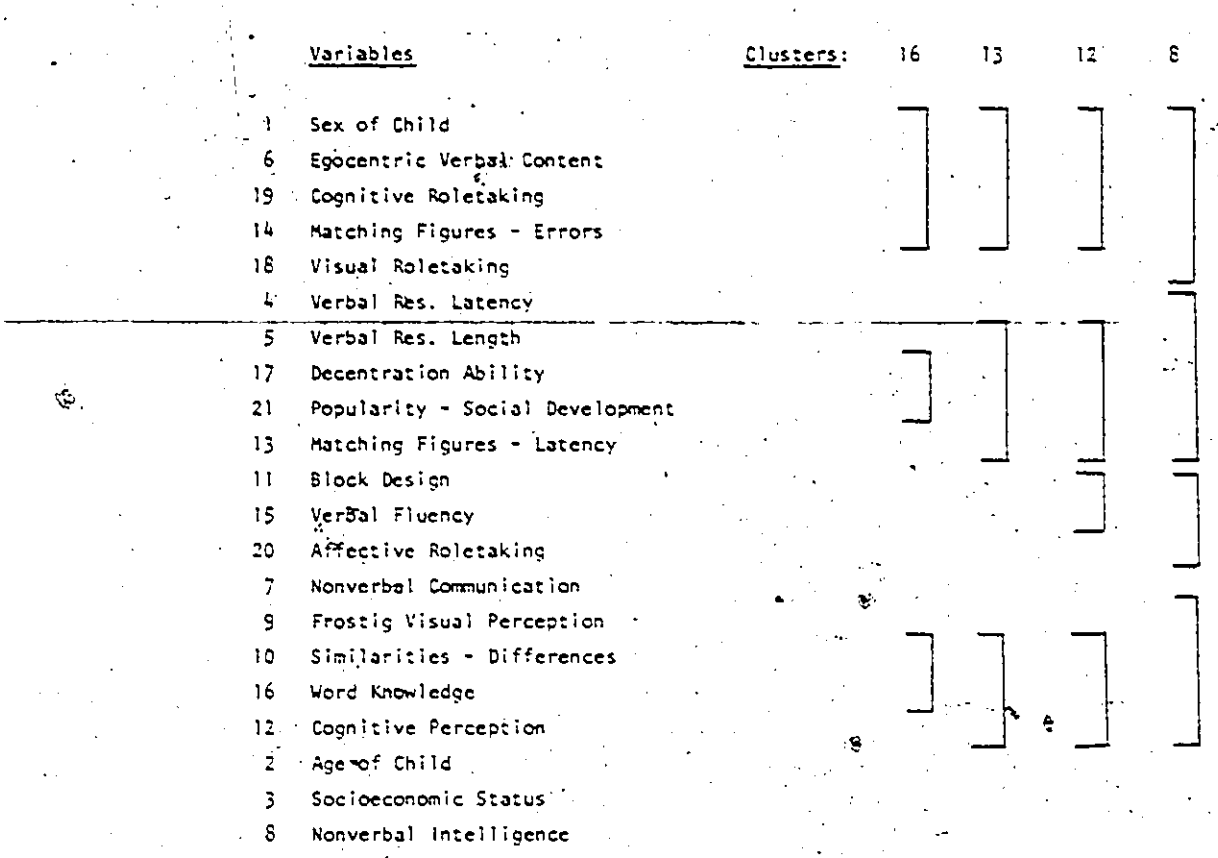
Varimax Solution

Variable Name	Factor 1	Factor 2	Factor 3	Factor 4
Verbal Communication: Mean Latency	0.037	0.002	0.157	0.593*
Verbal Communication: Mean Length	0.601*	0.301*	-0.031	-0.341*
Verbal Communication: Egocentrism	-0.589*	-0.110	-0.002	0.437*
Sex of Child	-0.087	0.348*	-0.244	0.534*
Age in Months	0.421*	-0.694*	-0.084	-0.069
Socioeconomic Status	0.340*	0.279	0.128	-0.419*
Nonverbal Ability	0.011	-0.058	-0.418*	-0.190
Nonverbal Intelligence	0.212	0.636*	-0.188	-0.116
Frostig Visual Perception	0.341*	0.622*	0.008	0.035
Similarities & Differences	0.524*	0.156	0.297	-0.049
Block Design	0.006	0.555*	0.181	0.027
Cognitive Perceptual Task	0.701*	0.110	0.156	-0.025
Matching Figures Latency	0.441*	-0.035	-0.593*	-0.092
Matching Figures Errors	-0.032	-0.029	0.317*	-0.022
Verbal Fluency	0.645*	-0.012	-0.270	-0.272
Word Knowledge	0.727*	-0.227	0.068	0.077
Decentration Ability	0.224	-0.114	0.496*	-0.377*
Visual Roletaking	0.120	0.146	0.761*	0.066
Cognitive Roletaking	-0.037	-0.043	0.159	0.640*
Affective Roletaking	0.612*	0.017	-0.147	0.280
Popularity	0.424*	0.118	-0.258	-0.145
SSQ	3.698	2.026	1.933	1.932

* Designates factor loadings $\geq$ (+ -) 0.300.

TABLE 10

Cluster Chart of Relevant Hierarchical Clusterings



Lines Ratio's and Proxemity Levels for the Four Cluster Levels Presented

Cluster Level	Lines Ratio	Proximity Level
16	1.000	537.000
13	0.833	1018.000
12	0.696	1222.000
8	0.483	2475.000

Figure 1

Plot of Factor One and Factor Two - Principal Axis Solution

Number	Variable
1	Sex of Child
2	Age of Child
3	Socioeconomic Status
4	Verbal Response Latency
5	Verbal Response Length
6	Egocentric Verbal Content
7	Nonverbal Communication
8	Nonverbal Intelligence
9	Frostig Visual Perception
10	Similarities - Differences
11	Block Design
12	Cognitive Perception
13	Matching Figures - Latency
14	Matching Figures - Errors
15	Verbal Fluency
16	Word Knowledge
17	Decentration Ability
18	Visual Roletaking
19	Cognitive Roletaking
20	Affective Roletaking
21	Popularity - Social Development

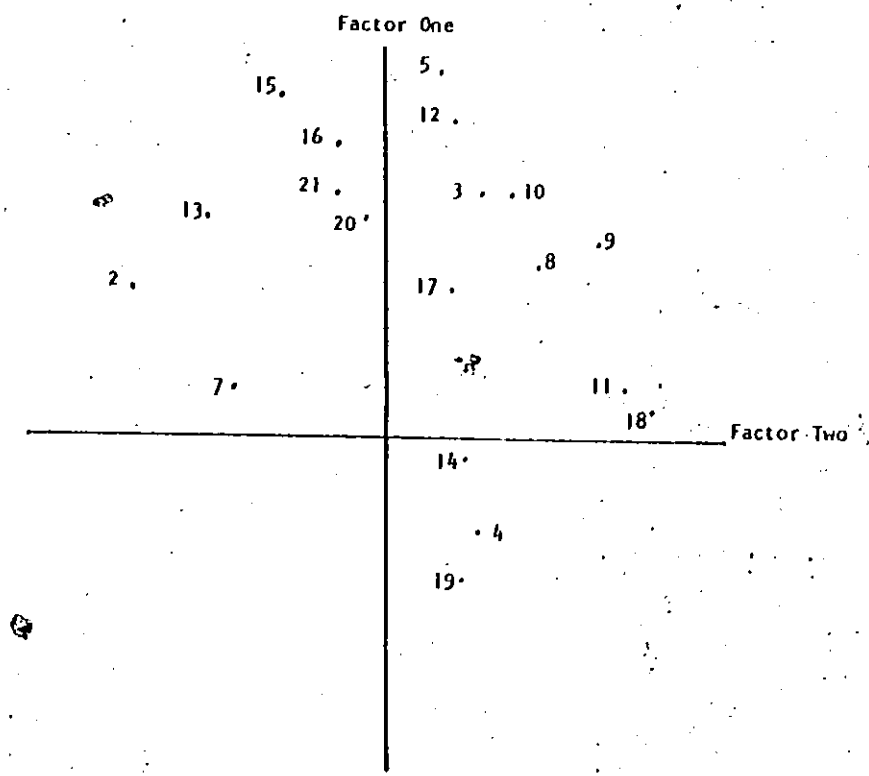
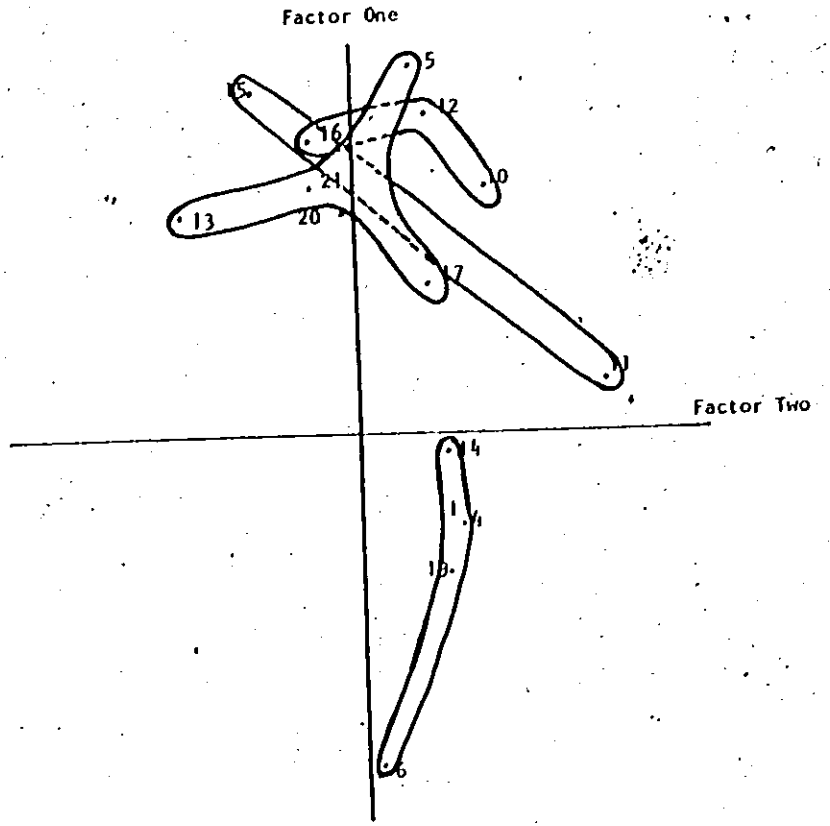


FIGURE 2

Plot of Cluster 12 of the Hierarchical Cluster Analysis

Number	Variable
1	Sex of Child
6	Egocentric Verbal Content
19	Cognitive Roletaking
14	Matching Figures - Errors
5	Verbal Response Length
17	Decentration Ability
21	Popularity - Social Development
13	Matching Figures - Latency
11	Block Design
15	Verbal Fluency
10	Similarities - Differences
16	Word Knowledge
12	Cognitive Perception



to the prediction of verbal communication performance. It was decided, after examining all of the potential factors, to establish a minimum eigenvalue value of .400 for acceptance in the factor pool. This resulted in 14 factors being retained. Since these factors were generated for the purposes of further analyses, no attempt was made to label or interpret what each represented at this point in the analysis.

The factors were used in the SCORE procedure of SAS which multiplied the set of factors with the set of original data scores. The resulting data set is presented in Appendix F. This analysis was used in order to examine the contribution made by each variable in the original data to each of the factors obtained in the factor analysis.

The analyses which were computed using the new values generated by the SCORE procedure, were a series of three stepwise regressions. The generated predictor variables were used in an attempt to further evaluate the effect of each on the three verbal communication scores. The first analysis used the mean latency of verbal response scores as the criterion variable. The best single predictor variable of verbal response latency was Factor 12 ($F = 9.91$, $p \leq .01$). However, with the addition of Factors 6 ($F = 3.69$, $p \leq .05$) and 7 ($F = 3.77$, $p \leq .05$), the predictive value of the model was increased from $R^2 = 0.135$ to $R^2 = 0.237$. Therefore, the three sets of factor scores were able to account for about 23 1/2%

of the variance in the mean latency scores of the verbal communication task. The variables which loaded highly on Factor 12 included socioeconomic status, visual ability variables, and variables related to cognitive flexibility and nonverbal reasoning. An examination of the other two factors revealed fewer, but essentially similar, loadings except for a moderate loading for popularity on Factor 6.

The second regression analysis used the mean length of the verbal response scores as the dependent variable. In contrast to the results of the first regression, only one of the generated factors was found to meet the minimum level of significance ($p \leq .05$) needed for acceptance as a predictor variable. Factor 1 was the only significant variable ($F = 26.38, p \leq .01$). It was able to account for about 31% of the variance in the length of verbal response scores ($R^2 = 0.313$). The third stepwise regression analysis used the percentage of egocentric verbal response scores as the dependent variable. Once again, the only generated variable to be retained in the analysis was Factor 1 ($F = 23.35, p \leq .01$).

The composition of factor one was primarily made up of age, socioeconomic status, popularity, visual perception tasks, and the language tasks. The major set of variables which appeared relatively unimportant were those concerned with decentration and roletaking ability. These results will be discussed in detail in the next chapter.

CHAPTER IV

DISCUSSION

The purpose of the present study was to evaluate whether results and conclusions based to a large extent on the verbal communication performance of older children were applicable to preschool children. There has been some discrepancy between the hypothesized abilities of young children to successfully perform verbal tasks (Flavell, et al. 1968; Glucksberg & Krauss, 1967; Krauss & Glucksberg, 1970; Rosenberg & Cohen, 1964; 1966; Rosenberg, 1972) and what has been reported when different aspects of the verbal task are manipulated, such as altering particular aspects of the task (Higgins & Akst, 1975; Maratsos, 1973), and varying the kinds of feedback which the child receives (Fishbein & Osborne, 1971; Peterson, et al. 1972; Waterman & Orr, 1978). The present study included the major variables which might contribute to any potential variation and evaluated which of the variables were most important in the development of effective verbal communication of preschool children.

It was apparent that not all of the variables, or processes, were equally important for effective verbal communication. However, there was also some variation in the variables which were related to different aspects of the verbal response. In

particular, there was a qualitative difference between those variables found to be important for the length, or quantity, of the verbal response, and those found to be important for the amount of egocentric content, or quality, of the verbal response. The qualitative or egocentric content measure, appeared to rely more extensively on verbal ability alone, while the length of the response, or the quantitative measure, relied to a greater extent on both verbal ability and visual perception. These results were evident both in the best single predictor obtained for each of the measures, and also in the construction of the best composite predictive model for each measure. The significance of these differences will be discussed in more detail below.

In contrast to the two verbally based measures, the latency of the response measure appeared to be more socially based. The best single predictor of verbal response latency was the popularity-social ability variable described earlier, while the best predictive model was composed of a variety of variables which represented several different abilities and processes. These included visual-spatial skills, visual perceptual abilities, verbal ability, and the ability to decenter in addition to the variable mentioned above. Such a composition is congruent with the aspects of the task which are represented by the latency measure. However, it is clearly not an appropriate measure of verbal communication ability, as the analyses clearly indicated.

Before considering the qualitative-quantitative differences, one further aspect of the latency score deserves to be noted. Despite being a latency score also, the Matching Familiar Figures

(M.F.F.) latency score was not significantly correlated with the verbal response score. This is probable due to the difference in task demands. The M.F.F. latency score is influenced by the time used by the child for comparative activity and visual discrimination, and the thoroughness of the child performing the task. In comparison, the verbal task used in the present study did not demand such processes in order to provide an appropriate response. Since it was a quantitative rather than a qualitative task, the child could start to respond as soon as some aspect of the stimulus was able to be interpreted verbally. Future studies in this area of research would do well to include both qualitative and quantitative tasks, or at least be able to obtain a measure of each from the task chosen.

The differences between the quantitative and the qualitative verbal scores may help to explain some of the variation in the literature on verbal performance. It seems likely that if the primary requirement of a task is seen as being able to provide a quantitative response, or a large amount of information about a stimulus, then the child is going to rely to a greater extent on verbal and visual abilities to fulfill the task demands. Also, as was suggested above, if the primary requirement of the task appears to be for information, there would seem to be little need for the child to compare or carefully select the information to be transmitted. Failure to succeed at the task might therefore be due to a wide variety of processes, of which verbal ability and visual perception are only two alternatives.

Such tasks would seem to be similar to those used in studies conducted by Glucksberg, et al. (1966), Glucksberg and Krauss (1967), Krauss and Glucksberg (1969), Waterman and Orr (1978), and Waterman (1979).

In contrast, if the task requires a qualitative response, then the speaker would have to rely on different, and probably more highly developed, abilities. For example, if the task requires the speaker to compare various words or other information, and to chose the most appropriate variate as a response, then very different kinds of processes would seem to be required. The tasks used by Asher and Oden (1976), Asher and Parke (1976), Cohen and Klein (1968), Rosenberg and Cohen (1964; 1966), and Whitehurst and Sonnenschein (1978) were all of the comparison type. It seems likely that success on such tasks is dependent upon a variety of rather well developed abilities. For example, tasks of the comparison type would seem to require the use of memory, cognitive manipulation, comparative processes, social knowledge, general information, discrimination ability, and language for successful performance. Those familiar with the structure of intelligence tests will recognize these processes as being essential elements in the assessment of intelligence.

If the conclusions outlined above are true, then any conclusions drawn from research based upon a particular kind of task would have to be made with extreme care. It seems likely that the kinds of conclusions which could be derived from the use of each type of task would vary widely. The resulting apparent discrepancy would be particularly confusing since both

sets of results would be valid within the context in which they were obtained. In contrast, the usefulness of using response latency as a measure of verbal performance was not supported by any of the results presented earlier. It was found to be distinctly different from the other two verbal measures discussed above, and was consistently associated with social maturity rather than verbal performance.

The results discussed above support the hypothesis that verbal communication is based on a number of different processes (Bearison & Cassell, 1975; Higgins, 1977; 1978; 1980; Hollos & Cowan, 1973; Piche, et al. 1975; Rubin, 1973; Waterman & Orr, 1978; Waterman, 1979). However, the results also suggest that the kind of processes found to be involved in verbal performance are to some extent dependent upon the particular aspect of verbal communication being investigated, and the kind of task used in the investigation.

A second consideration within the study was the relative importance of the different variables which were included for evaluation. As the discussion above suggests, not all of the variables were equally important. This conclusion is similar to that reported by Higgins (1977) and Rubin (1973). While there are some similarities between the three evaluation studies, there are also some differences which make each unique. The results of the present evaluation resulted in questions being raised about the importance of several variables or processes for preschool children's verbal performance.

It was found that the different roletaking/decentration and the impulsivity-reflectivity measures had little or no relationship with the verbal performance of the preschool children. While these results are necessarily specific to the task used in the study, a number of hypotheses seem worthwhile considering. It may be that the children in the present study were not able to use these kinds of abilities or processes in the verbal task situation. However, such an explanation is not consistent with what is known about the ability of preschool children in each of these areas. Therefore, another explanation would appear to be needed.

It is possible, as was suggested above, that the task demands were such that the particular processes represented by these variables were not perceived by the children as being necessary. The children may have perceived the task as requiring them to provide as much information as possible, as quickly as possible. Such a style of response would be primarily dependent upon a feature analysis of the stimuli (Higgins & Akst, 1975), rather than a careful comparison and evaluation of the most appropiate answer (Rosenberg, 1972). It would also appear to be related to the differentiation made by Higgins (1980) between social category knowledge and knowledge derived from role-taking activities. The task used seems to make more demand on social or shared knowledge than it does on specific information obtained from being able to take the other's perspective. The fact that the task did not require specific information in

order to be successfully completed also helps to explain the lack of significance of the impulsivity-reflectivity latency and error measures, which would seem to be related to comparative activities. The lack of significance of the impulsivity-reflectivity latency measure is also consistent with that reported by Higgins (1977).

A third explanation, derived from the theoretical formulations of Shatz (1977), may also be worth considering. Shatz attempted to explain various aspects of children's communication performance within a developmental framework. In particular, she used the concepts of limited information processing capacity and variations in workload values to help explain variations in performance.

Shatz argued that while there is no difference in the information processing capacity of children and adults, there are significant differences in the techniques which each has at their disposal for fulfilling the task demands. She argued that when a particular technique has a high workload value associated with it, or is unfamiliar to the child and therefore requires a lot of energy to use, other aspects of the task will suffer. Therefore, it could be argued that in the present study, the necessity of providing a verbal response to the stimulus pictures was too demanding to allow other relevant abilities to be used, such as roletaking/decentration skills or more reflective strategies of response.

A second aspect of the position advanced by Shatz (1977) suggests that as children become more familiar with using a

variety of techniques to solve a task, they become capable of using a wider variety and combination of techniques. This is suggestive of a maturational component which includes the concepts of familiarity and competence in the abilities which are required. Evidence was found in the present to support a general maturity component in addition to both social development and cognitive flexibility, all of which would seem to be compatible with Shatz' position. This will be discussed in more detail below. The explanation of the present results, based on Shatz' theory, would appear to be that the older child not only has more techniques available in order to solve a particular task, but also has an increased awareness and ability to use a combination of such skills to fulfill a greater proportion of the task demands. In contrast, the younger child must exert a comparable level of energy in order to meet the minimum task demands. While the younger child can fulfill simple task demands, such as providing basic information about a stimulus, he is unable to fulfill more complex demands, such as those requiring comparative processes. Therefore, it may be that in the present study, the preschool children fulfilled the primary demand of providing information at the expense of other developing abilities, such as providing more specific differentiating responses. If the task demand had been to take the other person's perspective, or if the task had been simpler, such abilities may have been more significant in the results.

The maturational component mentioned above was evident

when the full group of variables was analyzed to determine their structure and how they would cluster together. A maturational component was evident in each of the four factors as well as the results of the cluster analysis. Also, qualitative differences were found between the maturational components of the different factors.

The first factor reflected a social development component. In contrast, factor two was found to include a general maturational component with strong loadings on a variety of variables related to development. Factors three and four also contained similar maturational components, but there was a subtle difference between them. On factor three, maturation appeared to be more related to cognitive style. This seemed to be related to styles of response to particular situations. In contrast, the maturational theme of factor four was one of cognitive flexibility. Despite the variety of maturational themes, there was little doubt that maturation was a component in each of the factors and was also evident in the results of the cluster analysis. The significance of maturity is not only consistent with Shatz' theory, but is also consistent with the general improvement in verbal communication found in older age groups which are used in verbal communication studies.

Another consideration of the present study was the evaluation of various tasks used to assess the same variable. For example, the differences between the two measures of language ability are apparent from the previous discussions of their

relationship with the verbal scores. Similar differences were found between the visual perception tasks. The best tasks appeared to be those which were relatively simple and had very little language or motor involvement. The least useful visual ability tasks were those in which low scores could be attributed to either a lack of visual ability, poor verbal comprehension of the task explanation, lack of understanding of the concepts required, or poor fine-motor ability.

Despite an expected relationship between the various roletaking/decentration measures, they were found to be relatively independent of each other. Similarly, the measure of nonverbal communication was found to be unrelated to the rest of the variables. The independent cognitive measure was found to include a strong verbal component and a lesser visual component. Therefore, while it alligned with these two processes, it was not able to be used for comparison as an independent variable.

One other aspect of the study is worthwhile considering. In spite of the difficulties within the study itself, a large number of variables were evaluated for their role in effective communication performance. Despite this, only about half of the available variation in verbal performance could be explained. This would seem to suggest that there may be other variables or processes which are important in the development of verbal communication which have not yet been identified.

Given the age of the children in the present study, the sources of such processes would appear to be limited. The two most logical sources to evaluate would seem to be the influence of the family and of the peer group. Since all of the children in the present study had attended a nursery school for a reasonable length of time, it seems reasonable to consider that in the present study, peer group influence was to some extent equalized. This does not mean that variables associated with the peer group could not still be significant, such as the number of peers with whom the child has interacted, or the length of time the child has interacted with other children. However, it is suggested that family characteristics and expectations may make a more significant contribution to the child's early verbal communication performance than had been believed.

The number of variables which could be significant within the family structure are virtually endless. They could include such diverse aspects as the social class of the family, which has been shown to significantly affect language development (Bernstein, 1960; Deutsch, 1965; Higgins, 1976), the amount of language used by the parents, and the emotional security of the child. While the possibilities are seemingly endless, the significant detectable variables may be relatively easy to determine on the basis of careful family observation, and the literature which is available on family processes. There may well be some optimum conditions within a family structure which

allow a child to develop more effective verbal skills. At this point in time, however, whether such conditions exist, and what they might be, is not yet known.

A number of hypothesis have been considered and several speculations advanced about the necessary conditions for the development of effective verbal communication. While a great deal of research is available, there does seem to be a lack of observational and naturalistic studies which could serve as a comparison to the results of more experimental manipulations. Secondly, there would seem to be evidence to suggest that extreme care must be given to the choice of tasks to assess various processes, and that the results must be assessed with extreme caution in order to avoid erroneous conclusions upon which future research would be based.

APPENDIX A

(i) Letter sent to parents by the experimenter.

(ii) Questionnaire used to gather information from parents.

UNIVERSITY OF WINDSOR

WINDSOR, ONTARIO N9B 3P4

TELEPHONE: AREA CODE 519
253-4232

DEPARTMENT OF PSYCHOLOGY

July 16, 1979

Dear Parent(s):

I am writing in order to request your permission for your child to take part in a research project which I am conducting for my Doctorate degree in Psychology. The nursery has kindly granted me permission to approach you, and to assess your child with your permission, during nursery school hours. The research project itself is being conducted under the supervision of the chairperson of my committee, M. E. Bunt, Ph.D., of the University of Windsor.

The research project is concerned with how children learn to communicate effectively. The research which has been done to date suggests that there is more involved than simply adequate language skills such as an adequate vocabulary. The major purpose of my research is to determine if the factors found to be important for effective communication in older children, are also important in younger children. That is why I am only using children who are above 4.0 years of age and less than 5.4 years of age.

It has been found that most children enjoy taking part in such research projects because of the attention they receive and the praise which is given throughout the assessment periods. In addition, each child who takes part will be given a small prize as a reward for participating in the project. While there are a number of tasks to be performed, they will be administered in several short sessions over a two- or three-day period.

If you have any questions or concerns about the research, please contact me at either the Department of Psychology, 253-4232, Ext. 144 or at the Child's Place, 966-2211 (Monday through Wednesday). Thank you for your cooperation. I will ensure that you receive a summary of the research results, when they are available, through the Nursery.

In order to indicate your approval, please complete and sign the attached form.

Sincerely,

Larry W. Waterman, M.A.

Miriam E. Bunt, Ph.D.

I, _____ (Please print your name), hereby give my permission for my son/daughter _____ (Please print name), to take part in the research project being conducted by Larry Waterman as described in the accompanying letter.

Date: _____ (Signed) _____

The following questions are related to background and current information about your child which may be related to effective language development. All information will be treated as strictly confidential. After it has been coded, the information will be destroyed.

Thank you for your cooperation.

(Please circle the correct answer or fill in the blanks where necessary).

1. English is the main language spoken in the home. True False
2. There is no second language spoken in the home. True False
3. The family has been in Windsor for the past year. True False
4. My child has attended this nursery for the past four months. True False
5. My child has not experienced the loss of someone close within the past four months. True False
6. My child has not experienced the loss of a favourite pet within the past month. True False
7. The family has not experienced any major change in the past year as a result of a loss, divorce, separation, remarriage, etc. True False
8. The family, as it now exists, consists of the following members:

Father: _____ (age) _____ (occupation) _____ (education)

Mother: _____ (age) _____ (occupation) _____ (education)

Siblings:

Brothers		Sisters	
(Name)	(Age)	(Name)	(Age)

9. Other people living with the family include:

Adults			Children		
(Relationship)	(Age)	(Sex)	(Relationship)	(Age)	(Sex)

*Please return this form as soon as it is complete, to the Nursery School. Thank you.

APPENDIX B

(i) Verbal Communication Task

(ii) Nonverbal Communication Task

(iii) Nonverbal Intelligence Test

(iv) Cognitive Perceptual Task

(v) Block Design

(vi) Visual Perception Task

(vii) Simmilarities and Differences

(viii) Verbal Fluency

(ix) Word Knowledge

(x) Decentration Ability

(xi) Cognitive Perspective-taking Task

(xii) Visual Roletaking Task

(xiii) Affective Roletaking Task

(xiv) Matching Familiar Figures

(xv) Popularity Measure

APPENDIX B (i)

Name of Task: Verbal Communication Task

Source: The task used in the present study was adapted from the method described by Glucksberg, Krauss and Weisberg (1966). The construction of the stimulus figures used in the task was influenced by a study by Grushcow and Gauthier (1971).

Description of Original Task: The basic task paradigm was adapted from the work of Maclay and Newman (1960) while the original task materials were developed by Krauss, et al. (1964). The children were seated at a table, one on each side, and were visually separated by a screen which divided the table. The speaker had to try to describe a particular task figure so that it could be correctly chosen by the listener from six possible alternatives. The figures used initially were complex, abstract and had low codability ratings on a scale developed by Brown and Lenneberg (1954). The referent figures were presented in a "Stack-the-Blocks" game format. Each figure was printed on four sides of a wooden block which was dispensed one at a time to the speaker. After the speaker described the figure, the block was stacked on a wooden cylinder. The listener attempted to stack the blocks, which were randomly displayed on the table, in the same order as those of the speaker, using the descriptions provided by the speaker. The children were usually pretested and taught how to play the game using animal figures. A posttest could be conducted using these figures to ensure that performance was not due to the children forgetting how to play the game. Different variables were able to be manipulated within this framework and the obtained referential descriptions could be analyzed for linquistic features.

The "Stack-the-Blocks" paradigm was developed in order

to study four main aspects of referential communication: (i) the verbal message generated by the speaker, (ii) the discriminative response made by the listener, (iii) various types of verbal feedback and, (iv) modifications of the original description by the speaker. It has been widely used for these purposes and most referential research involving children has been based on this paradigm or a slightly modified version usually involving the way the referents were presented to the speaker.

Description of Revised Task:

The revised verbal communication task was constructed by Waterman (1976). The revision consisted primarily of the construction of new stimulus figures which were strongly influenced by the figures used by Grushcow and Gauthier (1971). The purpose in constructing the revised figures was to create figures which were structurally abstract and complex, but which were more easily encoded. This was accomplished by using a stimulus format which was more familiar to children. By using an animal-like stimulus, it was felt that the same demands were being placed upon each child in terms of the figures' difficulty to encode. The difference would be that the children would be able to relate the figures more easily to information which was more closely related to their childhood experiences. By doing this, it was felt that the issue of low versus high encodability could be avoided without detracting from obtaining an estimate of each child's ability to verbally communicate effectively.

The six animal-like figures were composed of six animal parts derived from the drawings of six different animals. The animals were randomly chosen from among a set of fourteen used by Grushcow and Gauthier (1971). Three of the animals were from their set of familiar animals (bear, camel and elephant) and three were from their set of-

unfamiliar animals (anteater, aardvark and armadillo). Each animal was then divided into six parts (head, tail, front legs, back legs, back and stomach). The six animal parts were divided so that they corresponded to six similar divisions of the abstract figures (left, middle and right top parts and left, middle, and right bottom parts). One section from each of the six animals was then randomly combined to form one of the six experimental animal figures. The experimental figures were constructed so that only one part of each animal was used in each of the composite animals. The resulting figures were therefore composed of six different animal parts. They were complex (composed of many parts) and abstract (not real or concrete animals) but were more easily codable since they contained familiar animal features such as a head, tail, etc.

The resulting task figures consisted of a pretest animal figure and six animal-like figures. Each of the seven figures was drawn in black ink on white, unlined 13 x 18 cm. cards. Each card was enclosed in clear plastic in order to protect it. The pretest figure and two of the stimulus figures are provided at the end of this section.

Materials: 1 pretest and six task stimulus figures, a Sony TC 252 tape recorder, a stopwatch, and the partition to divide the table between the two participants in the task.

Directions: Each child was assessed individually and all verbal communications were recorded throughout the assessment. The latency period was recorded between the time when each stimulus figure was presented and the time when the child began to give a verbal response to the figure. Both the mean verbal communication score and the mean latency score for each child were used within the analysis. In addition, a ratio score was obtained based upon each of the mean scores described above.

Throughout the verbal communication assessment, the child was seated at a table with the examiner. The table was divided by a partition which contained an opening (11.5 x 16.5 cm) through which the referential stimulus materials were presented. A second round hole (2.5 cm in diameter) contained a microphone in order to record the child's responses. Upon entering the room, the child was given the following instructions:

> We are going to play a game which is called Match-the-Picture. You will see a picture through this hole and I want you to tell me what it looks like. I will try and pick out the one you are describing from these pictures which I have in front of me. After you tell me about each picture, I'll hold up the one that I think it is, and you tell me if I chose the right one, all right? Let's try an easy one for practice.

When the child completed the pretest trial, the following instructions were given:

> You did very well on that one. We got it right. Let's try the rest, all right? They are a little harder but if you try hard on them all, you will win a prize at the end. Are you ready? Remember, I have to pick out the right one, so try to tell me all about each one that you see, O.K.?

Scoring: Based on the performance of each child, six latency scores and six verbal communications were obtained. The latency scores were used to calculate a mean latency estimate of each child's response time.

The six verbal communications provided by each child were scored according to the criteria outlined below which were described by Glucksberg and Krauss (1967) and Rubin (1973). The information was divided into individual pieces of information. Each piece of information was based on a separate description of the stimulus figure, or some described characteristic which was related to it. Each

referent feature which was included in the description was scored based on the following criteria:

(i) an Egocentric description (1 point): a description which is based on information that the listener could not normally be expected to know. E.g., It looks like my mommy's hat.

(ii) a Social description (2 points): a description that is based on information of which the listener could be expected to have some knowledge or could apply to the set of alternative figures to determine the figure in question. E.g., It looks something like a shirt, or, It has a long nose.

According to the theoretical basis for the scoring system (Glucksberg & Krauss, 1967), a higher score indicates more advanced or social communication performance, while a lower score is indicative of a more immature or egocentric level of communicative performance.

The problem with the scoring criteria as it was just outlined, is that it was possible for one child to obtain a higher verbal communication score based entirely upon egocentric information, than the score of a second child who provided social responses. For example, if the first child gave seven egocentric responses, and the second child only two social responses, the first child would receive a higher communication score than would the second child even though the information provided by the second child was more useful. Since a higher score supposedly indicates more advanced communicative competence, an attempt was made to obtain a more reliable estimate of the child's level of communicative competence.

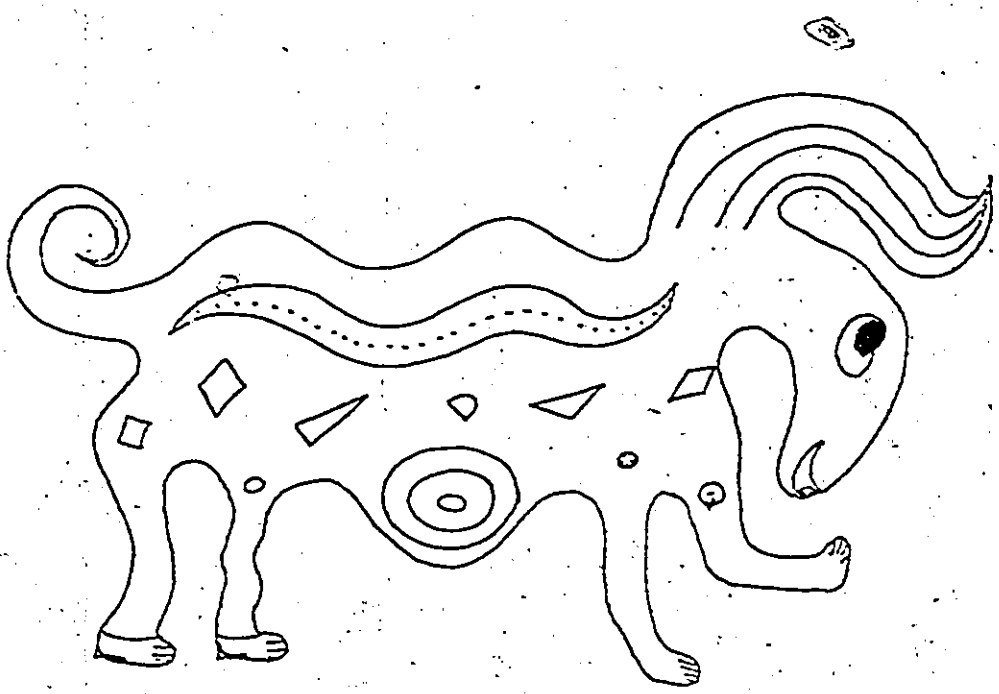
The most important aspect of each child's verbal communication within the rubric of the present study appeared to be the amount of egocentric communication that was obtained and used as the basis for such an estimate. An estimate of each child's degree of egocentrism, or lack of communicative competence, was calculated for each child based on the percentage of egocentric communication relative to the total communication of the child. Therefore, the estimate of

communicative egocentrism could range from 0.0, indicating a complete lack of egocentric communication, up to 1.0, indicating that all of the information communicated by the child was judged to be egocentric, as opposed to social, communication.

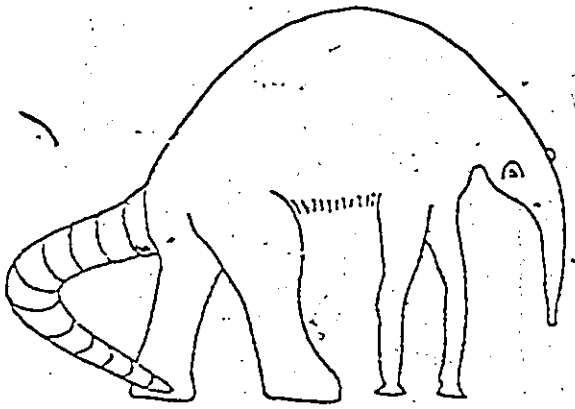
The third verbal communication score to be calculated was the mean length of the verbal responses to the visual stimuli. This was calculated by counting each piece of information as a separate unit with a value of one. The total scores for the six responses were then used to obtain a mean length score which was not effected by the quality of the response, but rather the number of attempts to communicate information.

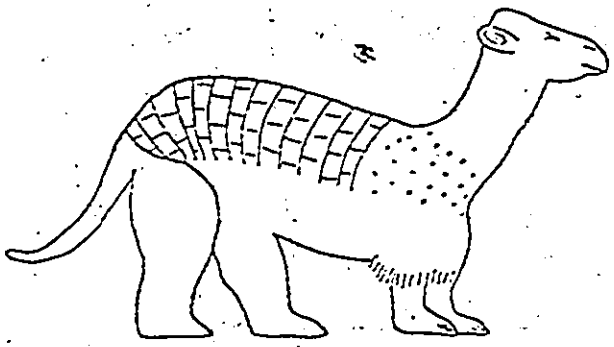
Finally, the verbal communication responses of ten children were randomly chosen and were scored by an independent judge as well as the original scorer. An interjudge correlation coefficient (based on the sixty scored responses) was computed to determine the level of scoring agreement between the two sets of scores.

Pretest Figure:



Stimulus Figures:





APPENDIX B (ii)

Name of Task: Non-Verbal Communication Task.

Source: This task was constructed by the author for use in the present study. While similar tasks may be available in the literature, none were found which seemed to meet the criteria required in the present study. The construction of the task was influenced by the tasks used in a number of studies, including those described by Garmiza and Anisfeld (1976), Robinson and Robinson (1977), and Shantz and Wilson (1972).

Materials: The task consisted of twelve pictures which were displayed on white, unlined, 12 x 18 cm cards. Accompanying each of the pictures were three small cards on which information related to the stimulus pictures was displayed. Two of the twelve items were used for training purposes, and the remaining ten items made up the task.

Description of Task: The task was designed to measure a child's ability to non-verbally communicate information to a second person which would enable that person to correctly complete the task requirements. An attempt was made to approximate as closely as possible the process required in a verbal communication task. Therefore, the task was designed to require a visual analysis of the stimulus, a comparison of different potential pieces of information, and a final choice which would determine the child's score. In order to achieve the above criteria, the following paradigm was used.

The child was presented with a card which contained two separate pictures. Each of the pictures varied on a predetermined dimension. One of the pictures was designated as the target picture by being enclosed in a circle. The child was told that the experimenter had the same pictures, but that the target picture on his card

was not circled. The child's task was to choose the best clue from among the three choices available on the smaller cards, and show it to the experimenter. Each of the smaller cards contained information related to the dimension on which the two stimulus pictures varied. A description of each item is provided below.

If the child showed the correct card to the experimenter, the child was given full credit for the item. Anything the child said was not scored, and the child was reminded to show a card rather than verbally describing the clue.

Scoring Criteria

Three different scores were possible for each item based on the differences between the three clue cards. One card was unrelated to either of the two stimulus pictures and the child received a score of 0 if that was chosen. A second card contained information related to the non-target stimulus picture. Since that information was at least relevant to the task, even though it was not correct, a score of 1 was given for that choice. This was done since it was felt that such information was somewhat similar to egocentric verbal communication. While such information is of no use to the listener, it is still related to the task from the perspective of the speaker. Since egocentric information received a score of 1 on the verbal task, a similar scoring system was incorporated into the nonverbal task. The third card contained the clue which was specifically related to the target stimulus. The child received a score of 2 if that card was chosen.

A second measurement was also obtained which was related to the child's performance on this task. The time between the presentation of the stimulus pictures and the child's response was measured. This allowed a mean latency score to be computed for each child. Therefore,

each child received two scores on the non-verbal communication task. One was a mean latency score based on how long the child took to respond. The second was a communication score based on the child's choice of clue cards for each of the ten items.

Description of Task Items

The task items were designed to measure the childs ability to analyze and compare different kinds of information. Four dimensions were used within the task as a basis for constructing the clue cards: colour, form, number and abstract relationship. A description of each pair of stimulus items followed by the three clues provided for the child for that item are outlined below.

Training Items

(i) Two circles were presented on a card. The target circle was red and the other circle was green. The clues consisted of a red circle, a green circle, and a blue circle.

(ii) Two forms were presented to the child. The target form was a cross and the other form was a triangle. The clues consisted of a cross, a circle, and a triangle.

Task Items

(i) Two forms were presented to the child. The target form was a circle and the other form was a square. The clues were a circle, a square, and a triangle.

(ii) Two squares were presented. The target square was divided into four smaller squares, two of which were coloured green. The other square was divided into four triangles by diagonal lines and two of the triangles were coloured red. The clues consisted of red, yellow and green circles.

(iii) The stimuli consisted of two combs. The target comb had a handle while the other comb did not have a handle.

The clues consisted of a rectangular shape with a bar protruding from one edge which was similar to a handle, a rectangle, and a long bar with a half circle in the center of it.

(iv) Two circles were presented. The target circle contained two small circles while the other circle contained four stars. The three clue cards contained drawings of two green squares, three green squares and four green squares.

(v) The stimuli were two yellow hats. The target stimuli had a green band and the other one had a red band. The clues were red, green, and brown triangles.

(vi) The stimuli were two black and white flags, similar to the American and Canadian flags. The target item was the one similar to the Canadian flag. The clues were three balls: one had alternating black and white stripes, one had small crosses on it, and the last was divided into thirds. The two outside thirds were black and the inside third was white.

(vii) The target figure was a rabbit with long ears. The other figure was a cat with short ears. The clue figures were a head with long ears, a head with short ears, and a head with a beard.

(viii) The stimuli were two hands. The target hand had two rings while the other hand had one ring. The clues consisted of one, two, and three baseballs.

(ix) The target stimulus was a figure of a chicken with a ruffle of feathers around its neck. The other figure was a duck which had a plain neck. The clue figures were a person wearing a plain blouse, a person wearing a blouse with a ruffle, and a person wearing a hat.

(x) The last item contained pictures of scissors and a key. The scissors were the target stimulus. The clues consisted of three pictures: an open door, a pen on top of a page with writing on it, and a partially cut out picture of a house.

Directions Given to the Child

Each child was given the following directions:

"We are going to play a game now that is different from the other things we have done. It is different because once we start, we can't talk to each other. I will show you how to play the game and then we will try one for practice."

The child was then shown how to perform the task using the first practice item. Once all the directions had been given and any questions had been answered, the second practice item was given. If the child did not successfully perform that task, the first task was reintroduced and the procedure was explained again. A second trial was then given with the second practice item. Pretesting had indicated that most children learned the task quickly and seldom needed a second explanation. After successfully completing the second practice item, the child was given the following instructions:

"You did very well on that one. Let's do the rest now. Remember, try not to talk while we are playing this game. Just show me the card you have chosen once you decide which one would give me the most help in choosing the right picture."

The examiner always chose the correct stimulus, whether the child provided the correct clue or not. The latency period for each response and the card chosen were also recorded.

APPENDIX B (iii)

Name of Task: Nonverbal Intelligence Test

Source: Leiter International Performance Scale (Leiter, 1969)

Description: The Leiter Scale is a nonverbal test which requires no verbalization on the part of the child or the examiner. This made it particularly useful in the present study. It is a point-scale which provides a mental age and an intelligence quotient. There are no time limits and it can be used with children as young as two years. At the younger levels, the test measures the child's ability to learn rather than relying on acquired skills or on materials the child has mastered.

The scale is composed of sixty items. Each chronological year is represented by four tasks, each of which is given a weight of three months. The materials were presented in an adjustable card holder which is part of the response frame. The child is required to choose the picture on the block which matches those on the card. The types of tasks range from the matching of colours and forms, to the completion of patterns and the classification of objects, which lead to more difficult tasks. Most of the tasks require good perceptual organization and discrimination for successful completion.

Directions to the child: Each child was told that they were going to play a game that was different from the others. It was different because the examiner could not tell the child how to play the game, but could show him/her how it was played. The child was advised to watch carefully while the examiner showed him/her how to play.

The examiner demonstrated how to play the game according to the instructions provided in the manual. Once the child had demonstrated that he/she understood what was required, the rest of the items were presented as prescribed in the manual.

Scoring: Each item was scored according to the criteria provided in the manual. Each task was worth three months. The results were converted into I.Q. scores using the conversion table which accompanies the test.

APPENDIX B (iv)

Name of Task: Cognitive-Perceptual Task

Source: The task was obtained from Rourke (1964).

Description of Task: (from Rourke, 1964).

The task used in the present study was derived from Wohlwill (1962). The task presented by Wohlwill to his subjects was to pick out the odd one from among three stimuli. The stimuli were simple geometric figures, varying along one or more of the following four attributes: shape (square, triangle, pentagon), colour (red, green, blue), shading (outline, dotted, solid), size (large, medium, small). The sole difference between the task developed by Wohlwill and the one adapted by Rourke was that the latter employed a cross instead of a pentagon as one of the dimensions of shape. Five different sheets, each containing eight triplets of figures, were constructed, according to the design outlined below.

SCHEMA FOR STUDY ON THE ROLE OF IRRELEVANT AND REDUNDANT INFORMATION (Rourke, 1964)

Test	Number of Attributes that are: Relevant or Critical	Fixed or Quiet	Irrelevant or Noisy
*A	3	0	1
*B	2	1	1
*C	1	2	1
D	1	1	2
E	1	0	3

*Used in the present study.

For the purpose of the present study, the first three sheets taken together comprised the "cognitive-perceptual task." The three sheets of stimuli contained 24 separate "subtests" within this task.

"Relevant" or "criterial" attributes in this study were those on which two of the three figures were alike, the third being the odd one. "Irrelevant" or "noisy" attributes were those on which all three figures of a triplet differed. It will be noted that the amount of relevant or redundant information was varied while keeping irrelevant information constant (Tests A, B, C). Similarly, the "fixed" or "quiet" attributes were also varied.

Finally, it should be noted that one change was made between the administration of the task as described by Rourke (1964) and the administration in the present study. In order to decrease the influence of language, and because of the age of the children being assessed, they were not required to give the reason for their choice. All that was required was that they point to the correct choice.

Materials: The task consisted of three sheets each of which contained eight subtests. The child's answers to each subtest were recorded and the total number of correct answers constituted the final score.

Directions: Each child received the following directions:

"Now I want you to look at these figures. This one is a ...?" (pointing to the square, then the triangle, then the cross. The child was corrected if wrong). "This colour is ...?" (pointing to blue, then green, then red. The child was excluded from study if he/she count not correctly identify the three colours). "You can also see that these figures are large, medium, or small" (pointing to large, medium, and small figures). "And

you can see that the figures are also just outlines or dotted or solid" (pointing to outlined, dotted, and solid figures).

"You can see that the figures are arranged in groups of three. Within each group of three figures there is one which is different from the other two. I would like you to show me which of the figures is different from the other two. Here are a few sets of figures for practice. (Set of examples was placed before the child.) Remember, I want you to show me which one of the three figures is different from the other two." (The child was shown each of the four sample figures. He was corrected if his choice was erroneous. After this had been concluded, the instructions continued as follows.)

"Now I am going to show you some more figures. In each case, show me which one of the three figures is different from the other two. I want to see how well you can do this without my help, so I will not tell you whether your answer is right or wrong. There are only a few sets of figures for you to look at, so it won't take very long to finish."

Total Possible Score = 24

APPENDIX B (v)

Name of Task: Block Design

Source: Wechsler Preschool and Primary Scale of Intelligence (1967)

Description of Task: (Based on Wechsler, 1967).

For the young child, Block Design is to some extent a sorting as well as a perceptual motor test. The blocks used in the WIPPSI battery are different from those used in the more familiar WISC or WAIS batteries. The WIPPSI blocks are flatter and somewhat wider than the blocks used in the other kits. The major difference is in the number of working sides. While the more advanced blocks of the WISC and WAIS use all six sides, the WIPPSI blocks use only two working sides, which simplifies the task a great deal.

The child's task is to match a design presented to him/her in the form of a picture. The child must use the coloured sides of the blocks to create an identical design for each picture of a design presented by the experimenter.

The child is presented with the designs and given two chances at reproducing each one. If successful on the first trial, full credit is received, but only half credit is given for success on the second trial. A time limit is given for each design and increases as the designs become more difficult.

Materials: 6 flat blocks painted red on one side and white on the other
8 flat blocks painted red on one side and one-half red and one-half white on the other
3 cards with printed designs, bound into a booklet

Directions: The child works directly from a block model on all but the last three designs. The patterns used in setting up models for Designs 1 through 7 are shown on the Record Form where shaded areas represent red; the patterns for Designs 8 through 10 are printed on separate cards bound in a booklet and shown to the child.

In setting up models and presenting designs, the examiner should make sure that the designs are properly oriented. Construct the model so that the top edge of the design as printed in the Record Form faces the child, and the lower edge faces the examiner. As an additional aid, the reproduction of Design 1 as shown in the Record Form has letters added to the top and bottom, to show which side of the design is to face the child (C) and which is to face the examiner (E). In the case of the cards bound in the booklet, present each design so that the unbound edge of the card is toward the child.

In explaining a demonstration, the examiner should use such phrases as, I put a red block here...and another red one here...here I have to use a red and white block, etc.

Timing for each trial begins when the last word of the directions is given.

Two trials of each design are permitted. If the child succeeds on his first trial, present the next design. If the child fails on his first trial, allow a second trial.

On Designs 1 through 4, if a child positions the blocks correctly but leaves definite gaps between them, the examiner should ask, "Is that right?" If the child does not close the gap, the item is scored as failed but the examiner should demonstrate proper closure before proceeding to the next trial.

Rotation of Designs: Any reproductions of Designs 1 through 4 that can be produced by rotation of the model are to be counted as correct. Rotation does not include reversal of colours.

Note: The following reproductions of Design 4 are not rotations and are to be scored as failures:

Any rotations of Designs 1 through 4 should nevertheless be corrected for instructional purposes. Correct the blocks and say, "But you see, it goes this way."

Rotations of Designs 5 through 10 are scored as failures, and if the child rotates the first trial of one of these designs, correct the blocks and say, "But you see, it goes this way." Then scramble the blocks and proceed with the second trial in the prescribed manner.

Where to Start and When to Discontinue: Children under 6, and older suspected mental defectives: Begin with Design 1. Regardless of failure on 1, present 2. If both 1 and 2 are failed, discontinue. If either 1 or 2 is passed, give both 3 and 4. Discontinue after 2 consecutive failures, counting from Design 3. (A design is considered failed only if both trials are failed.)

Children 6 and older, not suspected mental defectives: Begin with Design 3. If 3 is passed on either trial, go on to 4 and allow full credit for Designs 1 and 2. If 3 is failed, go back to 1 and 2 and proceed as indicated above. (Do not repeat Design 3.)

For Designs 1 and 2, use the 6 blocks which are painted red on one side and white on the other.

Design 1. Behind a screen (the Manual may be used for this purpose), prearrange the set of 3 blocks as shown in the diagram of Design 1 on the Record Form. Place the model in front of the child. Now take the 3 remaining blocks and casually place them before the child. (Be sure that the blocks are not in a straight line; 1 red and 2 white faces should show.) Say, "You see these blocks--they are painted red on one side and white on the other." (Show both sides.) "I'm going to put them together to look like this." (Point to the model.) "Watch me." Slowly copy the model, explaining each step. After a brief pause, scramble this arrangement. Then replace the blocks as above, with 1 red and 2 white

faces showing, and say, "Now you make me one just like this." (Point to the model.)

If the child fails to complete the design within the time limit or arranges the blocks incorrectly, say, "No, it should go like this" and illustrate by correctly arranging the child's performance. Then break up the second demonstration, place the blocks as originally presented, and say, "Now you do it by yourself. Go ahead."

Time: 30 seconds for either trial.

Design 2: Whether the child fails or passes Design 1, set up the model for Design 2 out of the child's sight. Casually place the 3 remaining blocks in front of the child (1 red, 2 white faces), and say (pointing to the model), "Now you make me one like this. Go ahead."

If the child fails, say, "No, it should go like this." (Illustrate by correctly arranging the child's incorrect performance and explaining each step.) Then break up your demonstration, replace the blocks as originally presented, and say, "Now you do it yourself."

Time: 30 seconds for either trial.

For Designs 3 and 7, use the 8 blocks which are painted red on one side and one-half red and one-half white on the other.

Designs 3 and 4: Take 2 of the blocks and make a model of Design 3 out of the child's sight, and place it in front of him. Then, taking 2 other similar blocks in hand, say, "Here are two blocks; each is painted red on one side and (pause and stress) half red and half white on the other. I am going to put these blocks together to make a design that looks just like this." (Point to the model.) "Watch me." While assembling the blocks, casually remark, "This time the blocks go up and down." Explain each step, and say, "You see, they look the same now." (Point to the model and to your own performance.) Pick up the blocks of your demonstration, hand them to the child, and say, "Now you make one just like this." (Point to the model.)

If the child fails, say, "Watch me again," and demonstrate a second time. Then hand the blocks to the child and say, "Now you make one that looks like this." (Point to the model.)

Whether the child passes or fails Design 3, present Design 4. Proceed as in Design 3, but omit the remark, "This time the blocks go up and down."

Time: 30 seconds for either trial.

Design 5: Use 4 of the blocks and make a model of Design 5 out of the child's sight and place it in front of him. Take the remaining 4 blocks, scatter them haphazardly before the child (no special arrangement is required, but be careful that the blocks do not all show the same face), and say, "Now I have some more blocks that are painted red on one side and half red and half white on the other side. I am going to put these blocks together to make them look like this. (Point to the model.) Watch me." Explain each step. After completing the demonstration, pick up the design you have just made, put the blocks in front of the child in mixed order, and say, "Now you make me one just like this. (Point to the model.) Go ahead."

If the child fails, repeat the demonstration and allow a second trial.

Time: 45 seconds for either trial.

Design 6: Make a model of Design 6 out of the child's sight and place the remaining blocks in mixed order in front of the child. This time without demonstration say, "Now you make me one like this. (Point to the model.) Make it all by yourself. Go ahead."

If the child fails, demonstrate with explanation. Then scramble the demonstration, scatter the blocks in front of the child and say, "Now you try it again."

Time: 45 seconds for either trial.

Design 7: Proceed as in Design 6, presenting Design 7 without demonstration and with the remark, "Now make one like this."

Time: 60 seconds for either trial.

For Designs 8 through 10, use the bound booklet and four of the blocks used in the previous design.

Design 8: Present the card with Design 8 (place the unbound edge toward the child) and say, "Now I want to see if you can put the blocks together so that they will look like the design (picture) on this card. Watch me." Put the blocks together, indicating by gestures and with words that you are being guided by the design on the card. After completing the demonstration, scramble the blocks in front of the child and say, "Now go ahead. Make one like this."

If the child fails, repeat the demonstration and allow a second trial.

Time: 60 seconds for either trial.

Designs 9 and 10: Present the card and blocks without demonstration and say "Put these together to make them look like this. (Point to the card.)

If the child fails, demonstrate and explain, and allow a second trial.

Time: 75 seconds for either trial.

Scoring: Each design is scored 2, 1, or 0. Give 2 points for each design correctly reproduced within the time limit on the first trial, 1 point if correct within the time limit on the second trial, and 0 points if both trials are failed.

Any reproduction of Designs 1 through 4 that can be produced by rotation of the model is to be counted as correct. Rotations of Designs 5 through 10 are scored as failures. If the child positions the blocks correctly, but leaves definite gaps between them, score as a failure.

In the "Pass-Fail" column on the Record Form, enter a P if the child make an acceptable reproduction of the design, and an F if he failed. In the "Score" column, circle the 2

if the child passed on his first trial, circle the 1 if he passed on his second trial, and circle the 0 if he failed both trials. Sum the circled numbers to obtain the total.

Note: The examiner is cautioned to use the 0's, not the F's, in determining when to discontinue the test.

Maximum score: 20

APPENDIX B (vi)

Name of Task: Visual Perception

Source: Frostig Developmental Test of Visual Perception (1961)

Description of Task:

Two subtests of the Frostig Visual Perception battery were chosen to obtain a score which represents each child's level of visual perceptual ability. The subtests were chosen in an attempt to minimize the effect of fine-motor ability on the child's performance. While it was not possible to eliminate its effect, protocals were scored from the viewpoint of visual perceptual ability as much as possible within the criteria outlined by Frostig (1961).

The first subtest which was used was Figure-Ground. This task was chosen because it requires the child to separate a particular part of a stimulus configuration from the total stimulus. The task begins with a simple embedded figure and becomes progressively more difficult. The child is asked to trace each embedded figure with a separate coloured crayon. The child is presented with all eight stimuli and achieves a score based on the number of complete stimuli shapes identified.

The second task which was used is called Position-in-Space. In this task, the child is required to make a choice from an array of figures which matches a criterion figure. The array is composed of a number of figures which vary in terms of their spatial orientation as compared to the criterion figure. The child is required to mark the correct alternative with an X. The task begins with a very simple choice, and becomes increasingly difficult. The first four subtasks require the child to choose the alternative which has a different spatial orientation from the criterion figure. The final four

subtests require more subtle differences to be detected within a spatial context. The child's score is based on the number of correct alternatives which are chosen.

The child's final visual perceptual score is based on a total of the scores obtained on the Figure-Ground and Position-in-Space subtests.

Procedure: (a) Figure Ground Task

Materials: Four pencils of contrasting colours for each child, (red, blue, green, brown). Crayons for nursery children. Demonstration materials: 7 cards displaying a triangle, rectangle, cross, "moon," star , "kite," oval.

Note: The figures should not be shown to any of the children in the same position as the figures in the tests. For instance, the demonstration triangles should be shown upside-down.

Be sure to tell the children before each item: Do not take your pencil off the paper. Keep it right on the line. When you are finished outlining the triangle, (box, etc.) put your coloured pencil down. Show demonstration cards each time. Erase drawing or remove cards before children begin to outline the demonstratrated item. Make it very clear that the children should not take their pencils off the paper but should draw one unbroken line for each item.

Item 1: Triangle -- Here is a new game. In this game we are going to try to find something. Do you know what a triangle looks like? It looks like this. (Draw a triangle on the blackboard.) Do you know what the word outline means? It means to cover up lines of a figure, like this triangle, but not to colour it in. Watch me while I outline the triangle. (Demonstrate.)

It is important to explain "outline" and to use this word consistently throughout the remainder of the test. The expression "draw around" is often interpreted literally by the child, and he may draw a circle around the figure.

I have outlined the triangle on the blackboard, I did it carefully, and I did not lift my chalk from the baord. Do you see a triangle here? (Indicate Item 1.)

The examiner should never use a pencil or one finger for pointing. Rather, the entire hand should be used so as to avoid giving what the child may interpet as a cue.

Take your blue pencil and outline the triangle. When you have finished put your pencil (crayon) down. Now do it!

With young children, the examiner may wish to have the children hold up the blue crayon to check if each child has selected the proper colour.

Item 2: Rectangle -- Now here is a shape like a long box. (Show.) In this picture (indicate Item 2) are a long box and a triangle. Take your red pencil and outline the long box only. (Remove demonstration card or drawing). Find the long box and outline it. Try not to lift your pencils from the paper. Now do it. (Check that the children put their pencils or crayons down.)

Item 3: Cross -- (Follow directions for Item 2, substituting "cross" for long box.) Have the children use red pencil again for this item.

Item 4: Moon -- (Follow directions for Item 2, substituting "moon" for long box.) The brown pencil should be used for this item. Now let's turn the page....

(Concerning Items 5 & 6). Because these two items involve the outlining of stars, the test administrator should take care that the children work on the correct item. Use the booklet to demonstrate to the children which item they should tackle first. See that they put their coloured pencils down after completing Item 5 and do not go on to Item 6 until told to do so. The examiner will designate the colour of the pencil. Show the children the correct pencil as you mention the coloured. Tell them to take a pencil of the same colour and hold it

up, then check.

Item 5: Two Stars -- Here is a star. (Show on card; then point to items in booklet.) Here are two stars. Take your green pencil and outline one of the stars. Try not to lift your pencil. After the children have finished, say: Now put your pencil down. Take a red pencil and outline the other star. Put your pencil down. (Check that the children put their crayons or pencils down.)

Item 6: Four Stars -- Examiner points to Item 6. Here are four stars. (Follow directions for Item 5, making sure that the children use a pencil (or crayon) of a different colour for each of the four stars. The order is green, brown, blue and red.)

Item 7: Kites -- Examiner points to Item 7. Here is a ball (circle) (indicate). Inside the ball are some kites. They are shaped like this. (Show card.) Take your blue pencil and outline all of the kites. Only outline the kites--nothing else. Go ahead. (Check that the children put their crayons down.)

Item 8: Easter eggs -- Examiner points to Item 8. (Follow directions for Item 7, substituting "Easter eggs" for kites. Show "oval" demonstration card. Use green pencil for this item.)

Procedure: (b) Position-in-Space

Note: Since the children used in the study ranged from 4.0 years up to about 5.0 years in age, all children were administered all 8 items for the sake of standard administration.

Materials: For each child, a primary pencil or #2 (for kindergarten and above) or crayons (for nursery school children). Demonstration card.

Now let's turn the page. Examiner holds up demonstration card. Look at this row of arrows. One of the arrows is not like the other arrows because it points in a different direction (indicate). We must mark it like this. (Show).

For group testing, it is often helpful to ask the class which one is "different," and then to let a child explain why.

This subtest should be administered as briskly as possible.

Item 1: Tables -- Examiner holds up test booklet. Look at this first row (point). These are tables. Most of the tables are right side up. But one table is upside down. Mark the one that is upside down. Now do it. (Check that the children put their pencils down.)

Item 2: Chairs -- Examiner holds up test booklet. Look at this row. These are chairs. Most of the chairs are turned the same way, but one is turned the wrong way. Mark the one that is turned the wrong way. (Check that the children put their pencils down.)

Item 3: Moons -- Same directions as for the previous item.

Item 4: Ladders -- Same directions as for the previous item.

With nursery school children, stop here and begin Test V.

Now let's turn the page...Examiner holds up demonstration card. Look at the first girl--the one in the box. Now look at this row of girls. One girl is just like the one in the box. She is turned the same way (show). The others are facing the other way. This one over here is the one you mark, because she is just the same as the one in the box. Like this (show). It is often helpful to make the example more concrete by saying,

for example, "The girl in the box is facing the windows." Examiner holds up test booklet.

Item 5: Flowers -- Now look at your book. Look at this row of flowers. Put your finger on the one in the box, and then find the one that is just like the one in the box. Now take your pencil and mark it. (Check that the children put their pencils down.)

Item 6: Snowmen -- Same directions as for previous item.

Item 7: Beachball -- Examiner holds up test booklet. Here are balls with drawings on them. Put your finger on the first ball. Find one which is just like it over here and mark it. Go ahead. (Check that the children put their pencils down.)

Item 8: Boxes -- Same directions as for previous items.

Scoring: The results were scored according to the criteria outlined by Frostig (1966). Since a score of 20 was possible on the Figure-Ground task and a score of 8 was potentially possible on the Position-in-Space task, a total score of 28 could be achieved based on the combined totals of both tasks.

APPENDIX B (vii)

Name of Task: Similarities and Differences.

Source: The task was obtained from the Stanford-Binet, Form L-M.

Description of the Task:

The Similarities and Differences subtest of the Stanford-Binet is considered to be the fourth 'best' test of intelligence within the total number of subtests. As such, it is considered to be a valid predictor of a subject's level of problem solving ability. Since the task requires little language ability beyond an understanding of the words "same" and "different," it was considered to be a good predictor of a child's level of cognitive ability. The test also includes an initial test of the child's understanding of the terms used to ensure that the child understands the task demands. Once this has been assured, the child simply has to either point to the correct answer, or give one of the two words, same or different, in response to stimulus pictures.

Administration of the Task: The child is presented with two separate subtasks. The first involves pointing to the one picture, out of a possible four, which differs from the other three pictures. The second task involved deciding whether pairs of pictures are the same or different. In both instances, the accuracy of the response depends heavily on the child's ability to visually discriminate between sets of stimuli.

Score (based on two subtests): 5 + 14 = 19

APPENDIX B (viii)

Name of Task: Verbal Fluency

Source: McCarthy Scales of Children's Abilities (1972)

Description of Task: This is a variation on the controlled association tests, and measures the child's ability to classify and think categorically. He has to think quickly of words falling into each of 4 categories (things to eat, animals, etc.) and name as many words as he can in 20 seconds. Many children enjoy word games such as this, and feel challenged. Because the time limit is short, the prolonged strain of looking for more and more words in each category is avoided.

Fluency is generally regarded as one aspect of divergent or creative thinking. Although only the child's fluency--the number of "things" named--is considered in determining his score, other aspects of divergent thinking such as flexibility and originality can also be noted.

Materials: Stopwatch.

Test Limits: Give the entire test to all children.

Procedure:

1. Things to Eat. Say,"Let's see how many different things to eat you can think of before I say stop. You know, like bread and potatoes. Ready, go." Start the stopwatch and after 20 seconds, say, "Stop." If the child gives no responses or only 1 response after 5 seconds, say "Try to tell me some things to eat. (Do not stop the stopwatch.) Record all responses. If the child is exceptionally fluent, use abbreviations and return later to complete the record. If it is impossible to keep up with the child, tally the acceptable answers but record all doubtful responses for later checking.

If the child gives a number of variations of a kind of food, all of which repeat the same word (e.g., eggs, scrambled eggs, fried eggs), say, "What other things to eat can you think of?"

2. Animals. Say, "Good for you. Now let's see how many different animals you can think of before I say stop. You know, like cat and bear. Ready, go." Start the stopwatch and after 20 seconds say, "Stop." If the child gives no responses or only 1 response after 5 seconds, say "Try to tell me some animals." Record all responses as above. If the child gives responses which repeat the same word (e.g., cat, Siamese cat, tomcat), say, "What other animals can you think of?"

3. Things to Wear. Say, "Now tell me all the things to wear that you can think of before I say stop. You know, like shoes. Ready, go." Start the stopwatch and after 20 seconds say, "Stop." If the child gives no responses or only 1 response after 5 seconds, say, "Try to tell me some things to wear." Record all responses as above. If the child gives responses which repeat the same word (e.g., coat, overcoat, raincoat), say, "What other things to wear can you think of?"

4. Things to Ride. Say, "Now let's see how many different things to ride on you can think of before I say stop. "You know, like a bus. Ready, go." Start the stopwatch and after 20 seconds say, "Stop." If the child gives no responses or only 1 response after 5 seconds, say, "Try to tell me some things to ride." Record all responses as above. If the child gives responses which repeat the same word (e.g., car, racing car, sports car), say, "What other things to ride on can you think of?"

Scoring:

1 point for each acceptable response, up to a maximum of 9 for each item. If the child gives 9 or more acceptable responses for an item, his score equals 9.

The following general rules are presented as an aid in judging the child's responses:

1. Give only 1 point if the same acceptable response is given more than once.

2. Do not give credit if the child repeats any of the examples given by the examiner. However, give credit if the child gives a response that is similar to an example (e.g., mashed potatoes when the example was potatoes).

3. If the child names a series of things that involve repetition of the same word (e.g., boat, ferry boat, sailboat), give 2 points--and only 2--for the entire series.

4. If the child names a general category and also several objects that belong in this category (e.g., dog, collie, bulldog, poodle), give 1 point for each response, including the name of the general category (i.e., dog) if the child mentions it. Note that this rule applies only if the child does not repeat the same word. (See rule 3, above.)

5. If the child names 2 or more words that are synonyms (e.g., taxi and cab, hot dog and frankfurter, pants and trousers), give 1 point for each response.

In addition to the general rules stated above, the following criteria for each specific item may facilitate scoring. Examples of "borderline" responses (rather than obviously acceptable or unacceptable responses) are shown for each item.

1. Things to Eat. Any food, whether customarily eaten as part of a meal or as a between-meal snack (e.g., sandwiches, peanuts).

1 point for white bread, French fried potatoes, soup, margarine, food, protein, calories.
0 points for milk, tea, soda (or any other beverage), toothpaste, gum, breakfast, medicine.

2. Animals. Any wild or domesticated mammal, bird, fish, amphibian, reptile, insect, mollusk, or other animal (e.g., dog, snake).

1 point for grizzly bear, Siamese cat, reptile, mammal, carnivore (or other general category), puppy, kitty, dragon, monster, man.
0 points for big animals, tame animals, furry animals, four-legged animals, meat-eating animals, shells, fossils.

3. Things to Wear. Any functional or decorative article which may be worn on the person (e.g., shirt, belt).

1 point for high-heeled shoes, clothes (clothing), jewelry, costume, uniform, nylons, glasses, nail polish, makeup, head band.
0 points for cotton, rayon, wool, sleeve, buttons.

4. Things to Ride. Any device, vehicle, or animal which may be used as a means of transportation (e.g., horse, airplane).

1 point for school bus, elevator, escalator, spaceship, power mower, merry-go-round, ferris wheel, monorail, skate board, water skis, skis, skates, sled, snowmobile, cable card, Ford, Plymouth, Oldsmobile (or any other automobile brand-name).
0 points for piggyback, cockhorse, stairs.

APPENDIX B (ix)

Name of Task: Word Knowledge

Source: McCarthy Scales of Children's Abilities (1972).

Description of Task: Part I, Picture Vocabulary, was designed primarily for the younger age levels. It requires the child to demonstrate his understanding of the spoken language of others (which developmentally precedes the active use of language) by pointing to 5 objects and naming 4 additional objects, all pictured on cards. Part II, Oral Vocabulary, consists of 10 words given in the usual manner. They are graded in difficulty, and range from concrete, familiar words to abstract concepts.

Materials: 5 Picture Vocabulary Cards (in the Card Book)

Test Limits: For children below 5 years of age, begin with Part I. Administer Part II only if the child receives at least 6 points on Part I.

For children 5 and above, begin with Part II. If the child scores above 0 on both item 1 and item 2 of Part II, give him full credit for Part I (9 points); otherwise, complete the administration of Part II, and then administer Part I.

Discontinue testing if the child receives less than 6 points on Part I. Discontinue testing on Part II after 4 consecutive failures on that part.

PART I. PICTURE VOCABULARY

Procedure:

CARD 1. Turn to Picture Vocabulary Card 1 in the Card Book and place it on the table, in front of the child. Say, "Show me the apple." If the child does not respond, say, "Which one is the apple?" or "Put your finger on the apple." Continue with the other objects on Card 1, varying the questions in the same way if the child does not respond.

(Note that the child is asked to point to only 5 of the 6 objects on the card.)

Card 1: Show me the apple.
Show me the tree.
Show me the house.
Show me the woman.
Show me the cow.

Score: 1 point for each correct response.
Give credit for a spontaneous correction, but do not give credit for a change from a correct to an incorrect response.

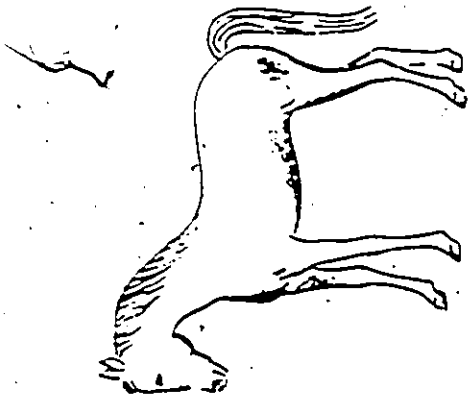
Maximum Score on Card 1 = 5.

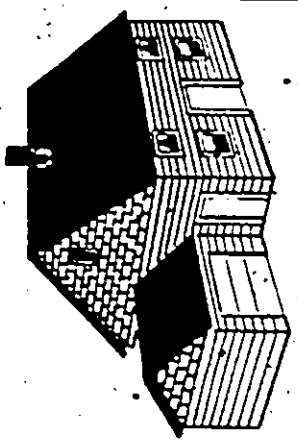
CARDS 2-5. Present Cards 2-5, one at a time, saying, "What is this?" If the child does not answer, say, "What is this a picture of?" or "What do you call this?" If the child mentions a detail in the picture, say, "But what do you call the whole picture?"

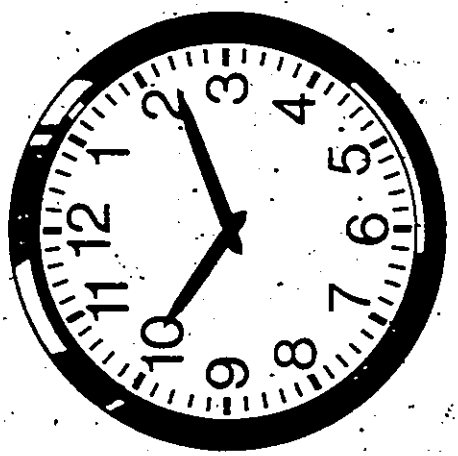
Card	Acceptable Responses
2	clock, watch, wristwatch, stopwatch, tick-tock, or name of specific clock (e.g., alarm clock)
3	sailboat, boat, sailing boat, ship, or name of a specific boat (e.g., canoe)
4	flower, flowers, or name of a specific flower (e.g., rose, daisy)
5	purse, pocketbook, handbag, change-purse, bag.

Score: 1 point for each card to which the child gives an acceptable response (see list above.)

Maximum Score on CArds 2-5 = 4



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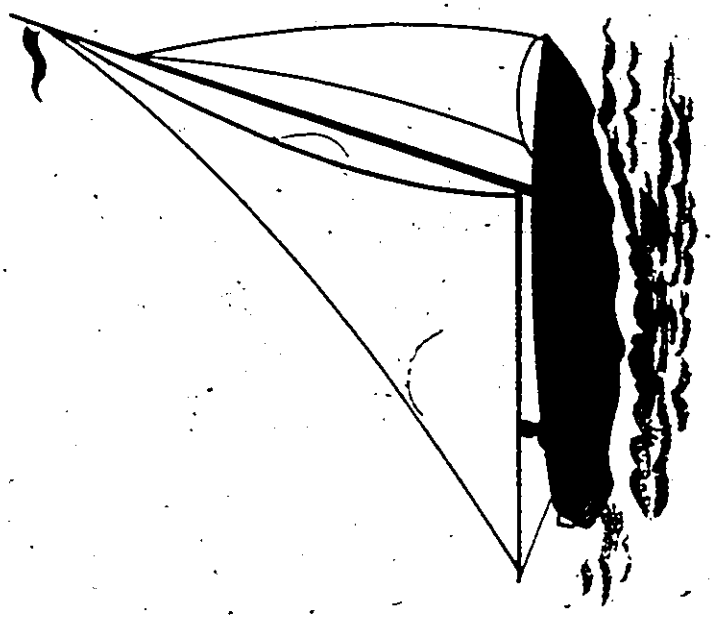
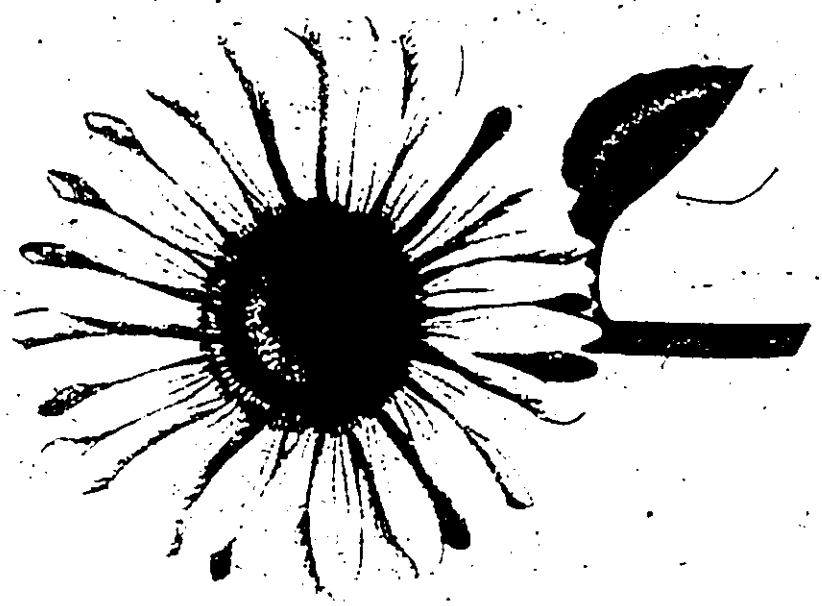
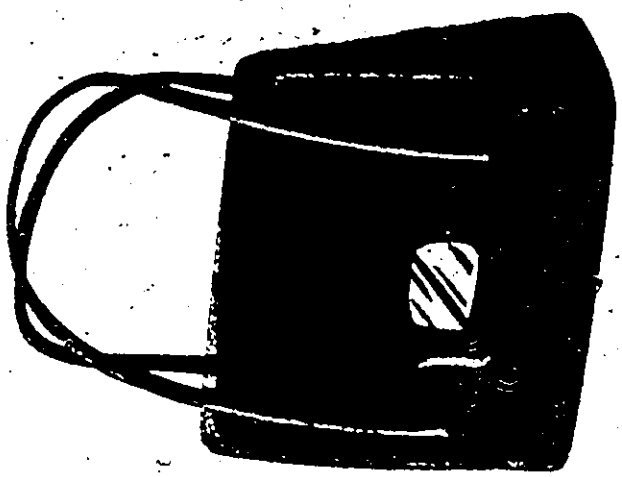






PART II. ORAL VOCABULARY

Procedure:

Say, "Now I am going to ask you about some words. Some of them are easy and some are hard but I want you to tell me about all the ones you know." Be careful to pronounce the words clearly and distinctly. Do not spell any word or present it in written form.

Say, "What is a towel?" If the child hesitates, encourage him with such words as, "You know what a towel is, don't you? Then tell me about it." If he still remains silent, say, "What is a towel" You have seen a towel, haven't you? What is it?" For other words to which the child does not reply, say, "Have you ever heard that word?" If the child has heard the word, say, "How have you heard it used?". If he uses it in a sentence, say, "Yes, and what does that mean?" Vary the form of presenting the words in order to avoid a set pattern. Nouns may be preceded by the articles "a" or "an" as in "What is a tool?" Other words may be given in the form, "What do we mean by loyal?"

If the child gives a response worth only 1 point, or one that is ambiguous, say, "Is there anything else?" or "What else?" or "Try to tell me more about it," or "Try to explain what you mean."

If the child merely uses the stimulus word or a derivative of it in his definition without demonstrating comprehension (e.g., "a candy factory"), say, "Tell me in some other words. It's not fair to use the same word again."

Responses are sometimes based on a word whose sound resembles that of the stimulus word, but whose meaning is different. For example, "coat" may be defined as "colt." If this occurs, say, "Listen carefully. What does coat mean?"

If the child gives a slang definition of a word (e.g., "A shrink is a psychiatrist"), say, "What else does shrink mean?" Do not give any credit for a slang definition.

No other forms of questioning about the words are permissible. The examiner should attempt to obtain the child's maximum response to each word, although he should avoid belaboring brief but correct answers.

Words Used in Oral Vocabulary:

1. Towel
2. Coat
3. Tool
4. Thread
5. Factory
6. Shrink
7. Expert
8. Month
9. Concert
10. Loyal

APPENDIX B (x)

Name of Task: Decentration Ability.

Sources: The stimuli used in this test were derived from studies conducted by Elkind (1964), Elkind, Koegler and Go (1964), Feffer and Gourevitch (1960), and Goldschmid and Bentler (1968). However, the task demands based on each stimulus varied from those in the original sources.

Purpose: The purpose of this test was to determine whether each child was capable of some degree of decentration. Therefore, none of the subtests were presented in such a way that the child either succeeded or failed. Rather, each subtest was initially presented as described in the original source. If the child failed to respond correctly, additional information was presented in order to help the child obtain the correct solution. The child's level of decentering ability was determined by the amount of information which the child required in order to complete the various subtests. An attempt was made to differentiate between four different levels of response based on the child's ability to decenter. Level one responses were those in which the child was unable to complete the task. Level two responses were those in which the child had to be given the necessary information but was able to complete the task once this was done. Level three responses were those in which the child required minor help in order to complete the tasks. Level four responses were those in which the child clearly provided an answer based upon decentration ability.

Description of the Specific Tasks

Task 1. The child was presented with the number task from Form A of the Concept Assessment Kit--Conservation developed by Goldschmid and Bentler (1968). The task

was presented initially as they describe in the manual. Six red and six white chips were placed in parallel rows in front of the child. Once the child agreed that there were equal numbers of chips, the white chips were spread farther apart than the red chips. The child was again asked if there were equal numbers of chips or whether there were more of one colour. If the child responded correctly, and was able to explain why they were equal, a level four response was credited for the task which was worth 4 points. If an incorrect answer was given, the child was asked to look at the two rows again and see if there were more of one kind of chips than the other. If a correct response was obtained in addition to the appropriate reason for the answer, a level three score was given which was 3 points. If the child again responded incorrectly, the examiner counted the chips in each row with the child and pointed out that each row had the same number of chips. The child was again asked if there were an equal number of chips and also for the reason for the answer obtained. If the child responded correctly, a level two score of 2 points was assigned. If the child again answered inappropriately, a level one score of 1 point was assigned for the task.

Task 2. The child was presented with one of the items constructed by Elkind, Koegler and Go (1964). The drawing was of a face which was constructed from various materials such as light bulbs, telephones, etc. The child could respond either to the whole figure or to the various parts or to both the whole and the parts of the drawing. If the child responded to both of the possible alternatives, a level four response was given. If only one of the possible alternatives was given, the child was told that sometimes people could see other things in addition to what the child had described. The child was asked to look again.

If the child could provide the alternative answer in addition to the previous answer, a level three response of 3 points was given. If the child was unable to provide further information, an alternative was pointed out but not verbalized. If this was sufficient to obtain a full response, a level two score was given. If the child was again unable to provide any more information, 1 point for a level one response was given.

Task 3. This task is based on a description provided by Feffer and Sourevitch (1960) which they called the bead problem. The child is given a box containing 12 beads, 10 of which are blue and two of which are white. The child is told that both the blue beads and the white beads are made of wood. Therefore, all of the beads are made of wood. Once the child agrees, the child is asked whether there are more wooden beads or more blue beads. If the correct response is given, a level four score is given. If the response is incorrect, the child is asked to look at the bead again, to think of what they are made of, and to listen carefully to the question. If the correct answer is given, the child is asked for the reason for the answer. If the correct reason is given, a level three score is given. If the child is unable to provide the correct answer, the examiner questioned the child about what the blue and white beads were made of, and whether all of the beads were made of the same thing. Once the child was able to respond correctly to the questions, the original question was again asked. If the child was able to provide the correct response and the reason for the response, a level two score of two points was given. If the child was unable to respond correctly, only 1 point was given.

Task 4: The fourth task was based on an item used by Elkind (1964). The stimulus can be seen as either a

butterfly or as two faces. The figure was presented to the child who was asked to tell the examiner everything that was seen. If both possibilities were reported, a score of 4 for a level four response was given. If only one alternative was given, the child was told that sometimes people could see other things as well. The child was asked to look again and see if anything else could be seen. If the other information was reported, a level three score was obtained by the child. If not, the examiner drew the child's attention to either the whole stimulus and asked the child what it looked loke, or to one of the two wings which contained the faces. If the child was able to see the information, a level two score was given. If not, only 1 point for a level one response was obtained.

Final Score: The child's individual scores on each of the four tasks were used to calculate a mean decentration ability score. The score could range from 1.0, which would indicate no decentration ability, up to 4.0, which would indicate complete decentration ability.

APPENDIX B (xi)

Name of Task: Cognitive Perspective Taking Task

Sources: Flavell, et al, 1968; Selman, 1971; Kurdek and Rodgon, 1975.

Description of Task: The cognitive perspective taking task was derived from Flavell et al. (1968) and the procedure was adapted from Selman (1971) and Kurdek and Rodgon (1975). This task was chosen because it has been used with subjects in the age range included in this study (Flavell, et al. 1968; Irwin & Ambron, 1975; Selman, 1971; Kurdek & Rodgon, 1975). It involves the child taking the hypothesized viewpoint of a friend rather than a stranger and, being a verbal task, depends upon the child making a verbal response more than some of the other tasks.

The stimuli consists of an ordered series of seven pictures depicting a story about a boy being chased by a dog, running down the street, and climbing a tree to eat an apple as the dog trots away. The specific illustration on each card is as follows:

Card 1: The boy is walking along a sidewalk, whistling and brushing a stick against a wooden fence.

Card 2: The boy looks frightened and drops his stick as he sees a dog running toward him.

Card 3: The boy runs, looking anxiously over his shoulder at the dog who is following close behind.

Card 4: The boy is shown running with arms outstretched toward an apple tree. The dog is not shown in the picture and the boy's face (showing fear in the two previous pictures) is hidden by a branch of the tree.

Card 5: The boy climbs the tree, with the dog nipping at his heels.

Card 6: The boy is seated on a branch of the tree, munching an apple; the dog is nowhere in sight.

Card 7: The boy is shown standing up in the tree. The dog can be seen across the street and shows no evidence of ferocity. Although the boy's face is partly turned in the dog's direction, it shows no particular emotional expression.

The removal of cards 2, 3, and 5 from this series eliminates the fear of dog motive for climbing the tree and shows the boy first walking and then running to an apple tree, climbing it, and eating an apple. There is still a dog in the last picture, but it is unrelated to the motivational theme of the four-card story. The child can thus egocentrically incorporate the fear of dog motive into the predicted story of another person who views only the four-card sequence.

Selman's (1971) categorical scoring system, reflecting qualitative differences in cognitive perspective taking was used. A score of 0 was given to the responses of children who could not perform any transformation of the original story; the angry dog remained the motive for the boy's climbing the tree even in the predicted story of another person who viewed only the four-card sequence. A score of 1 was given to the responses of children who told a straightforward, perceptually correct, four-card story, but were unable to maintain this story line upon being questioned about the motivational conditions relevant to the four-card story. A score of 2, the highest given to responses on this task, was given when the child successfully told an appropriate four-card story and indicated upon questioning that he understood the nature of the task; i.e., that the other person viewing the four-card sequence did not have the information available to one viewing the seven-card sequence and that this lack of information influenced the way the other person would tell the story.

Procedure: The experimenter presents the seven-card sequence to the child and asks him/her to tell a story about the pictures: "Do you like telling stories about pictures? Well, here are some for you; they're just like cartoons, aren't they? All of them tell part of a story. Can you tell me what's happening in this picture?" (the experimenter points to the first picture). The child's response to each card is recorded verbatim at the time of testing.

In addition to recording the child's first story verbatim, the child is also asked (a) why the boy climbed the tree and, (b) what is the dog doing in the story. These answers are recorded at the time for comparison with answers based on the second story.

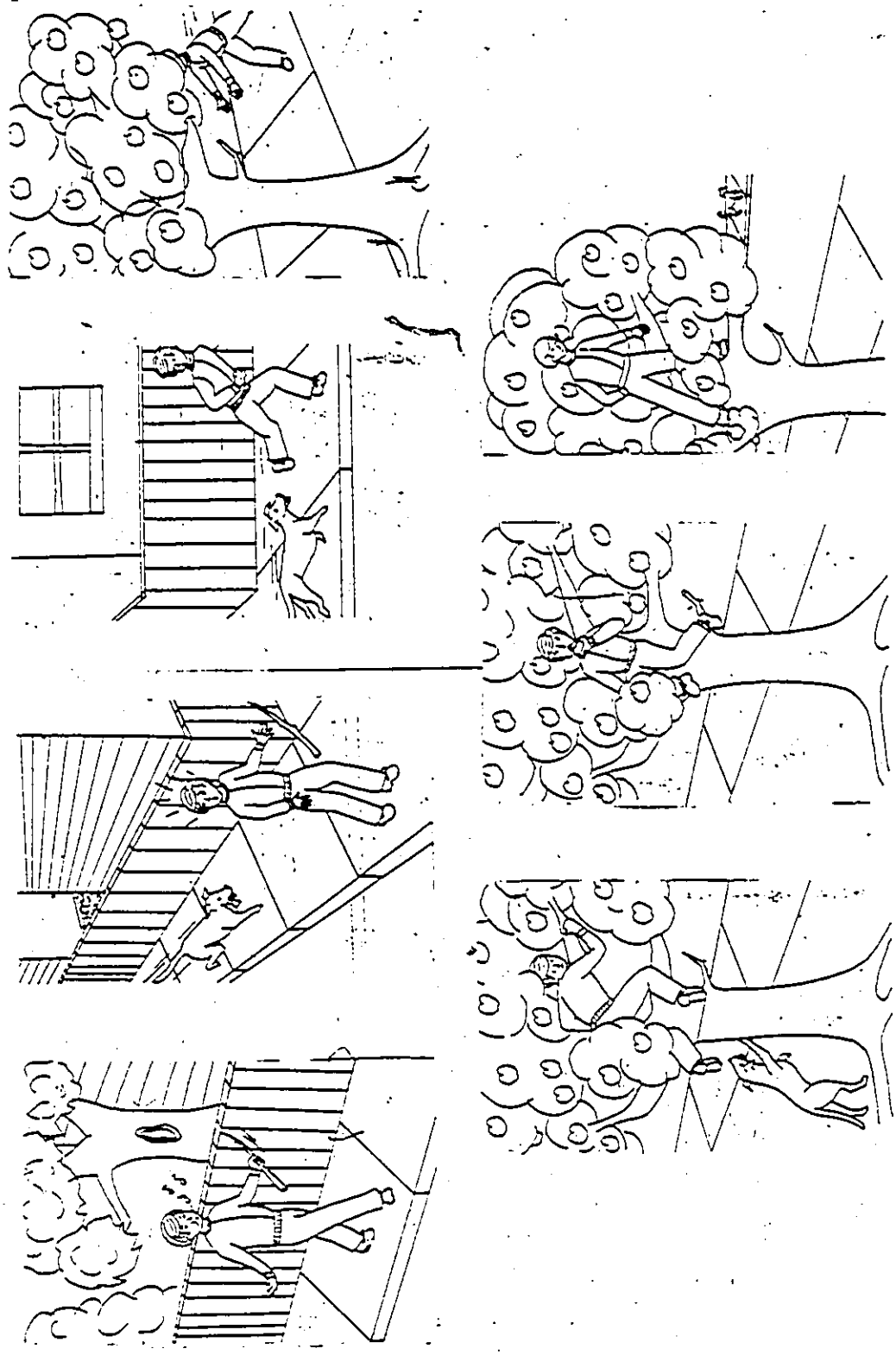
Following completion of the questions, the child is asked to name a friend with whom he/she played a lot. The experimenter then said: "Well, let's say I saw _____ and asked him/her to look at some pictures and to tell a story about them. _____ says, "Yeah, I think I'd like to do that." Let's say _____ is going to come through this door and is going to sit right where you're sitting now; he's going to look at some pictures (the experimenter here took away cards 2, 3, and 5 in full view of the child). I'll say, "_____, could you tell me what's happening in these pictures?" (Subject's name), what do you think your friend will say is happening in this picture?" (the experimenter points to the first and then the remaining pictures). Again, responses are recorded verbatim.

At the end of the second story, the child is questioned as to (a) the motive his/her friend attributes to the boy's climbing the apple tree: "Why will _____ say the boy climbed the tree?" and (b) the reason for the dog's presence in the last card: "What will _____ say the dog is doing here?" (the experimenter points to the dog in the last card). Responses here are also recorded verbatim.

Scoring System: The categorical system of scoring developed by Selman (1971) was used. The system reflects qualitative differences in the role-taking skill necessary for each task. Category 1 classifications are made for those children who could not perform any transformation of the original story. In both accounts, the angry dog remained the spontaneously explained motivational force behind the boy's climbing the tree.

Category 2 reflects the ability of the child to tell a straightforward, four-card, perceptually correct story but the inability to maintain this perceptual image presentation upon being asked the motivational conditions of the four-picture story. For example, upon being asked to tell the story as _____ would see it, the child responds, "He walks with a stick; he runs down the street; he climbs a tree and eats an apple." However, when asked why the boy climbed the tree, he responds, "To get away from the dog."

Category 3 is the highest level of role-taking skill measured by this task. Here the child successfully tells the four-card story that _____ would tell, suppressing the original seven-card motivational scheme. Upon being questioned, the child indicates that he/she understands the nature of this task; that is, that _____ did not have the information available earlier to the child and that the lack of this information would influence the way _____ would tell the story.



Cognitive Perspective Taking Task -- Answer Sheet

Story #1

Card 1: _____

Card 2: _____

Card 3: _____

Card 4: _____

Card 5: _____

Card 6: _____

Card 7: _____

Question #1: Why did the boy climb the tree? _____

Question #2: What is the dog doing in the story? _____

Story #2

Card 1: _____

Card 2: _____

Card 3: _____

Card 4: _____

Question #1: Why will _____ say the boy climbed the tree?

_____

_____

Question #2: What will _____ say the dog is doing here?

_____

_____

APPENDIX B (xiii)

Name of Task: Visual Roletaking Task

Source: The task was adapted from the task used by Kurdek and Rodgon (1975). The changes in methodology were strongly influenced by the results reported by Fishbein, Lewis and Keiffer (1972), and those reported by Shantz and Watson (1971).

Description of Task: The materials required for this task included two circular revolving (lazy susan) trays and three pairs of popular cartoon figures. Each of the trays had three positions marked on them to indicate where each of the figures was to be placed. One of the trays was placed in front of the child, and the other was placed in front of the experimenter, who was seated on the other side of the table facing the child.

The experimenter placed one of the pairs of figures on the tray in front of him and placed the corresponding figure on the tray in front of the child. The experimenter then turned the first tray so that the figure faced the experimenter. The child was then asked to turn the other tray so that the child would see the figure just as the experimenter was seeing it. After recording the child's response, the experimenter rotated the first tray into three new positions which were 90, 270, and 180 degrees from the original starting position. The child was asked to duplicate each position according to instructions which were similar to the instruction following the first position.

The experimenter ensured that the child's tray was initially in an incorrect position to ensure that each child had to manipulate the tray in order to obtain the correct answer. No feedback was given to the child about each response, except to encourage the child's continued

participation within the task. In order to ensure that the child did not simply copy the rotation of the tray by the experimenter, the experimenter used both clockwise and counterclockwise movements to obtain the four positions to be reconstructed by the child.

The same procedure was used using two- and three-figure arrays on the tray. The order of the four stimulus positions were varied to ensure that the child did not simply respond from memory. Each child received the same order of stimulus figures and the same order of stimulus arrays. The child was given one point each time that the correct tray position was replicated. Since four positions were used for each of the one, two and three figure stimulus arrays, each child could receive a maximum score of twelve. The higher the score, the more advanced the child was considered to be in perceptual roletaking ability.

APPENDIX B (xiii)

Name of Task: Affective Perspective Taking Task
Sources: Borke, 1971; Kurdek and Rodgon, 1975; Gardiner,
Description of Task: The materials and procedure for this task are adapted from the tasks developed by Borke (1971), the adaptation developed by Kurdek and Rodgon (1975), and the kit developed by Dupont, Gardner and Brody (1974).

Before beginning the task, each child is shown four faces of a same sexed character expressing the emotions of happiness, sadness, fear or anger. The child is asked to show the experimenter the face of the boy/girl who is happy, said, afraid or angry. This procedure is used to (a) give the child practice in matching affect labels to the appropriate facial expression, and (b) ensure that each child is aware of which picture matches each affect label. If the child has difficulty or makes a mistake, he/she is corrected by having the appropriate facial expression pointed out by the experimenter.

The affective perspective taking task consists of theee parts. In the first part, the child is shown a picture depicting a boy or a girl in a situation in which an emotion of anger, fear, sadness or happiness would be appropriate. The face of the boy or girl is not visable in each picture. The child is also read a short story which corresponds to the emotional content of the picture. On the basis of the short story and the picture, the child is asked to choose the appropriate emotion from a set of four facial expressions. The female children are always shown four pictures of female facial expressions and the male children are shown four pictures of male facial expressions.

The second part of the task consists of either (a) showing only four different pictures to the child without

any short story or (b) telling a short story to the child without an accompanying picture. In each case, the child is again asked to choose the appropriate emotional response from either the male or female sets of facial expressions.

For the third part of the task, the child is given the alternative task not presented in part two. Therefore, if the child was shown the picture in part two, he/she is read the short stories for part three, and vice versa. The response of the child to each of the four situations within each of the three parts are recorded as the child makes his/her choice. Therefore, the score can range from 0 to 12 based on each of the three parts of the task.

A further 12 points can be earned by providing an acceptable reason for the facial expression chosen. If, for example, the happy expression is chosen, the child is asked why he/she thinks that the child in the situation is happy. Each response will be recorded and scored either 0 or 1. A number of responses will be scored by a second person in order to provide a measure of inter-rater reliability. Therefore, based on the 12 choices of facial expressions and the 12 reasons for the choices, each child can achieve a maximum score of up to 24 points.

Materials: The eight stories and the eight picture situations used in the assessment are provided below. The stories and pictures are based on those used by Borke (1971) in her Interpersonal Awareness Test. The male and female emotional facial expressions were adapted from a procedure called Teaching Affective Development which was developed by Dupont, et al. (1974).

The actual stories and pictorial situations used in the study are outlined below as they were presented to the child in the task situation.

AFFECTIVE PERSPECTIVE TAKING TASK

Pretest

Instructions: The examiner places the sheet depicting four facial expressions, happiness, anger, sadness and fear, in front of the child. The pictures are of a child of the same sex as the subject. The subject is given the following instructions:

"These are pictures of Billy/Cindy. Can you show me the picture of Billy/Cindy which shows him/her looking happy (sad, angry, afraid)?" The examiner corrects any mistakes which the subject makes in the pretest period. No further help is given throughout the task. If the child refuses to make a choice, it is counted as a wrong answer. Each child will be administered the complete task which includes all three parts.

PART I

Instructions: Each child will be introduced to this section of the task with the following instructions:

"Now I am going to show you some pictures of children doing different things. As you will see, none of the boys/girls have any faces in the pictures. I will read you the story which goes with each of the pictures. After I finish the story, I want you to show me the face of the boy/girl which you think should go on the boy/girl. Don't choose a face until after I finish the story and you have looked at the picture."

After the child has chosen a facial expression, he/she is told the following:

"That is a good choice. Why do you think that Billy/Cindy feels like that?" The child's answer will be recorded for each of the four choices.

PARTS II AND III

(a) Pictures Only Condition:

Instructions: After completing Part I, each child will be told the following:

"You did very well on that part. Now I'm going to show you some pictures of Billy/Cindy doing some different things than he/she was doing before. This time though, I'm not going to tell you a story with each picture. What you have to do is look at the picture and then decide what kind of face Billy/Cindy should have."

After the child has chosen a facial expression, he/she is told the following:

"That is a good face for that picture. Why do you think that Billy/Cindy feels like that?"

The child answer will be recorded for each of the four choices.

(b) Stories Only Condition:

Instructions: After completing Part II, each child will be told the following:

"You did so well with that part that you can play the last part now. I'm going to read you some stories about Billy/Cindy. After each story, I want you to choose the face which you think goes with the story the best. Remember, listen to the story carefully and then show me the face that you think is the same as how Billy/Cindy would look in the story."

After the child has chosen a facial expression, he/she is told the following:

"Very good. Why do you think that Billy/Cindy feels like that?"

The child's answer will be recorded for each of the four choices.

General Procedure:

Each child is presented with the stories and/or pictures in the predetermined sequence given below. The order of presentation was changed for each part in order to try and avoid having the child respond in a learned sequence, rather than in response to the presented situations. The four stories presented below are presented with the four pictures which follow. The following four pictures and story sections were presented in a random sequence as outlined earlier.

Stories Used in Part I: (Adapted from Borke, 1971).

1. Billy/Cindy went to bed one night and had a bad dream. He/she dreamt that a big, hungry tiger was chasing him/her.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that?

2. Billy/Cindy did not like to share his/her candy with his/her friend because they never shared theirs. One day the babysitter made him/her share a chocolate bar.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that?

3. One day Billy/Cindy found out that his/her very best friend was going to move away to another town.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that?

4. Billy/Cindy was playing outside one day when his/her aunt and uncle came to visit. They brought him/her a present that was just what he/she wanted.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that?

Stories Used in Part II or III: (Adapted from Borke, 1971).

1. One day Billy/Cindy went shopping with his/her parents. Because he/she was so good, they took him/her to the movies.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she would feel like that?

2. One day there was a big thunderstorm with lightning and thunder and lots of rain. Billy/Cindy were all alone in the house and it started to get really dark and he/she heard lots of strange noises.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she would feel like that?

3. Billy/Cindy was playing one day with some other children. He/she had worked hard and built a big house out of blocks. Suddenly, one of the other children came over and knocked it down.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she would feel like that?

4. Billy/Cindy had a pet goldfish that he/she called Goldie. One day, Goldie got really sick and wouldn't eat his/her food.
   (a) Show me how Billy/Cindy would look. (Circle picture chosen.)
   Happy Sad Afraid Angry
   (b) Why do you think he/she would feel like that?

Pictures Used in Part II or III. (Adapted from Borke, 1971 and Kurdek & Rodger, 1975).

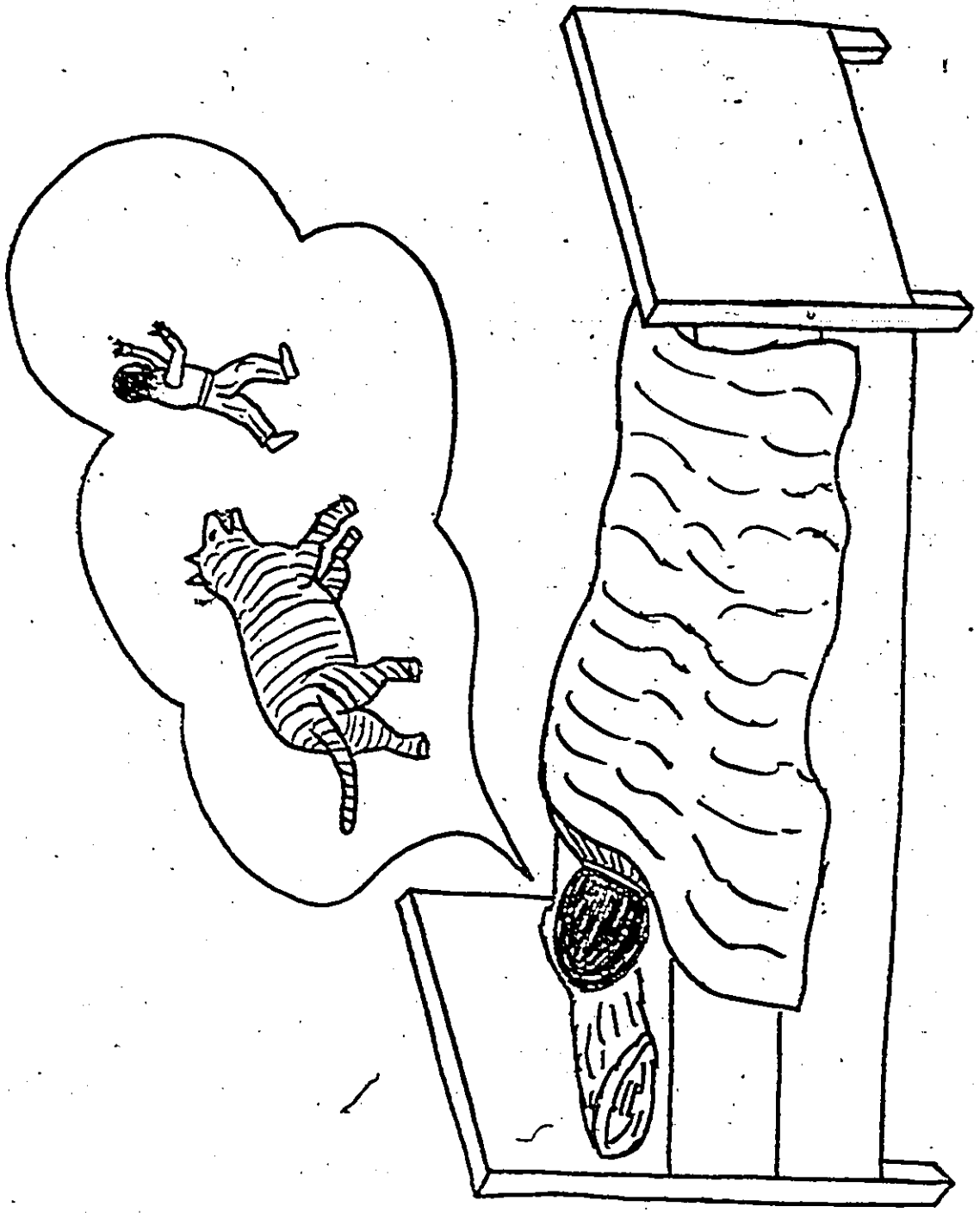
Present each picture and wait for child to make a choice from among the four same-sexed facial expressions. If the child does not make a choice, ask him/her to show you how Billy/Cindy looks in the picture. Circle each answer in the space provided and continue on to the second question.

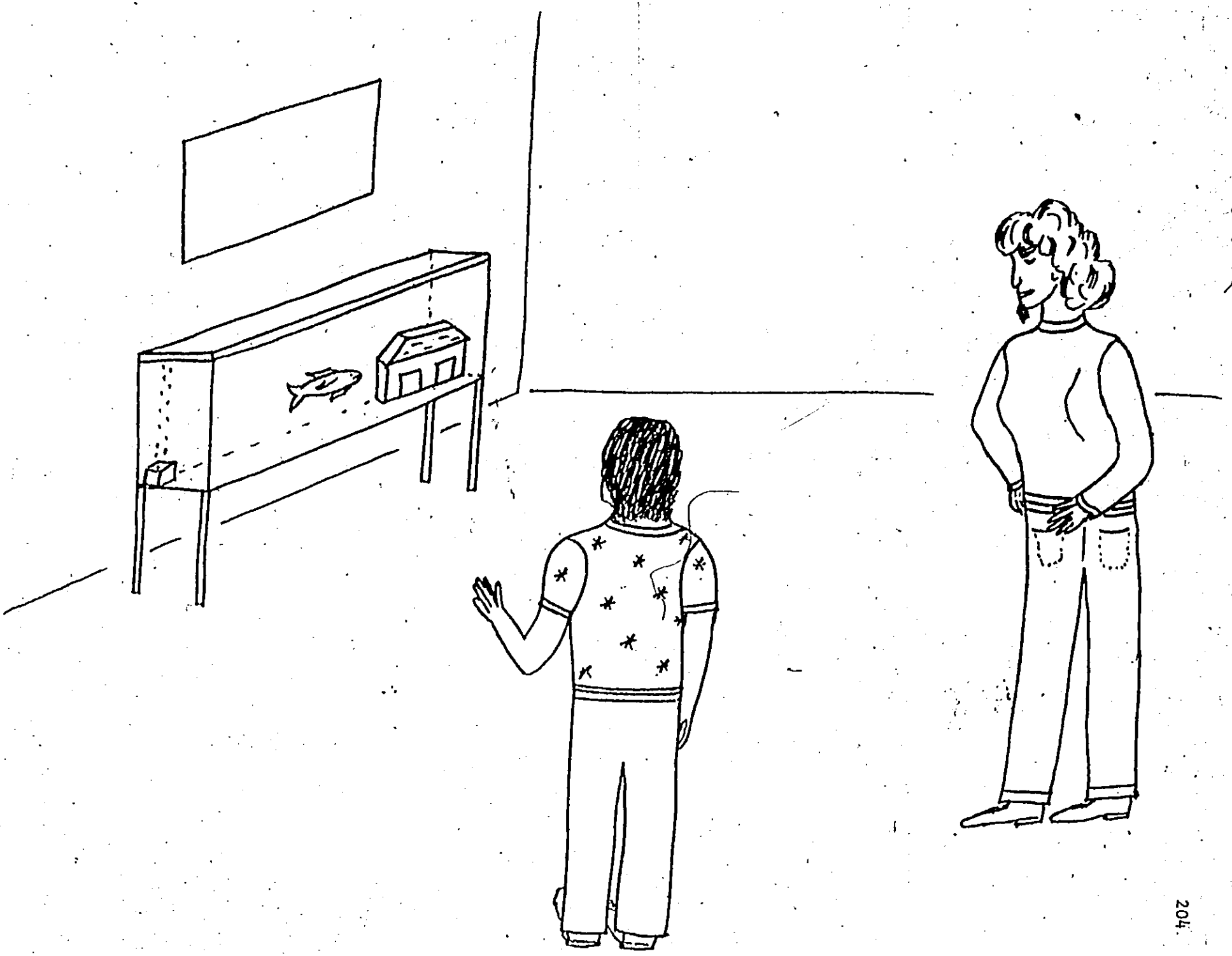
1. (a) Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that? _____

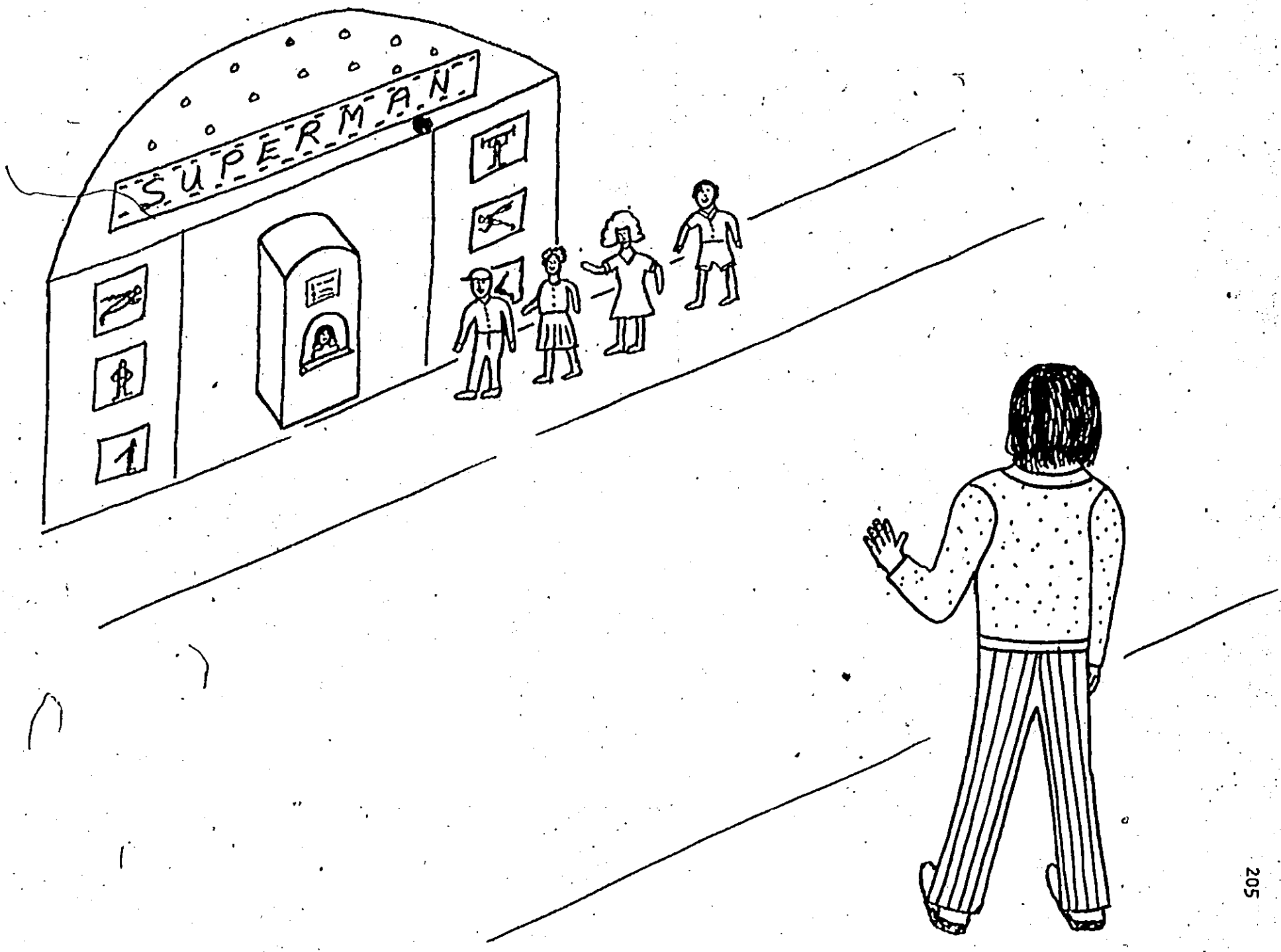
2. (a) Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that? _____

3. (a) Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that? _____

4. (a) Happy Sad Afraid Angry
   (b) Why do you think he/she feels like that? _____



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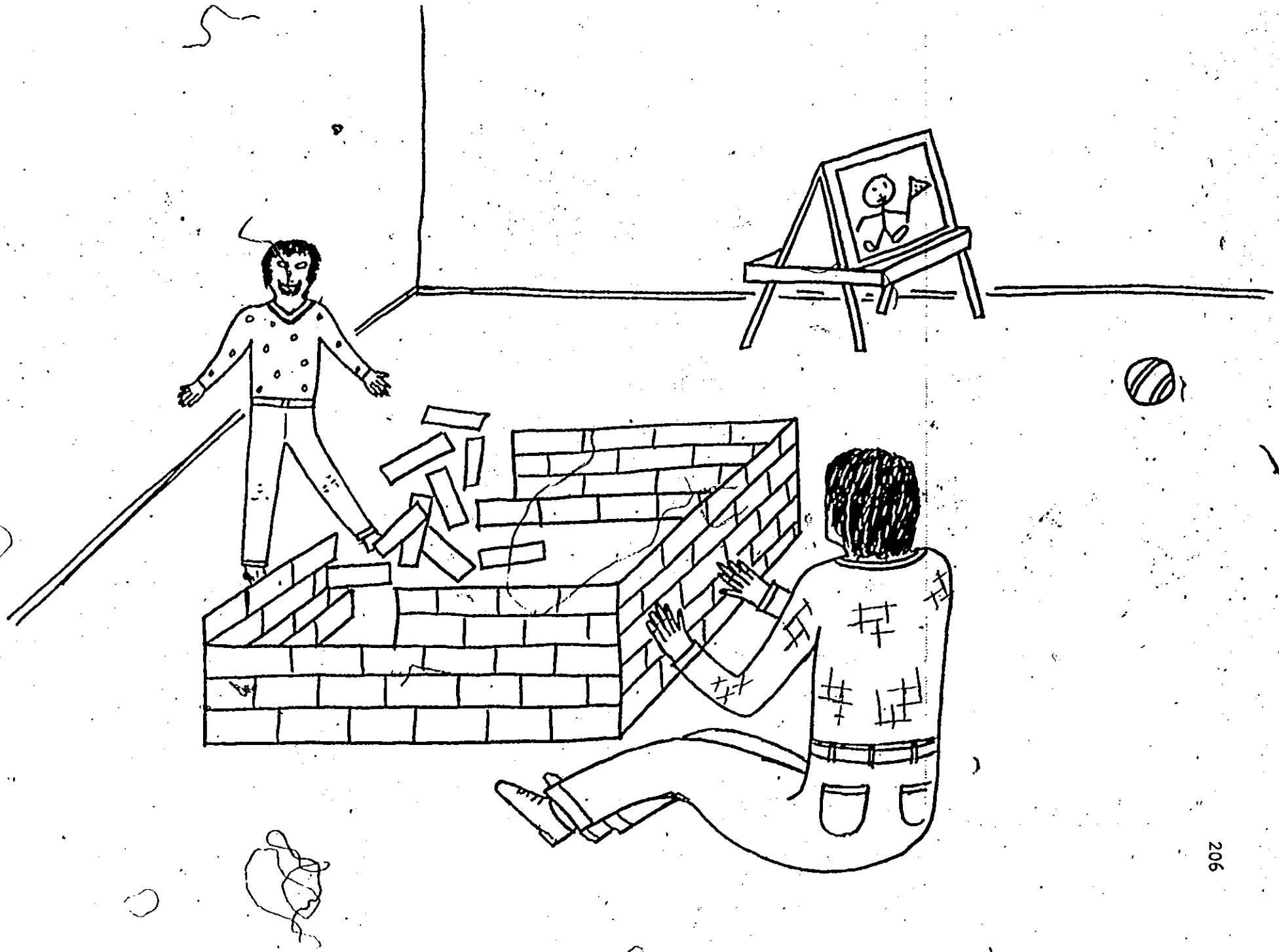

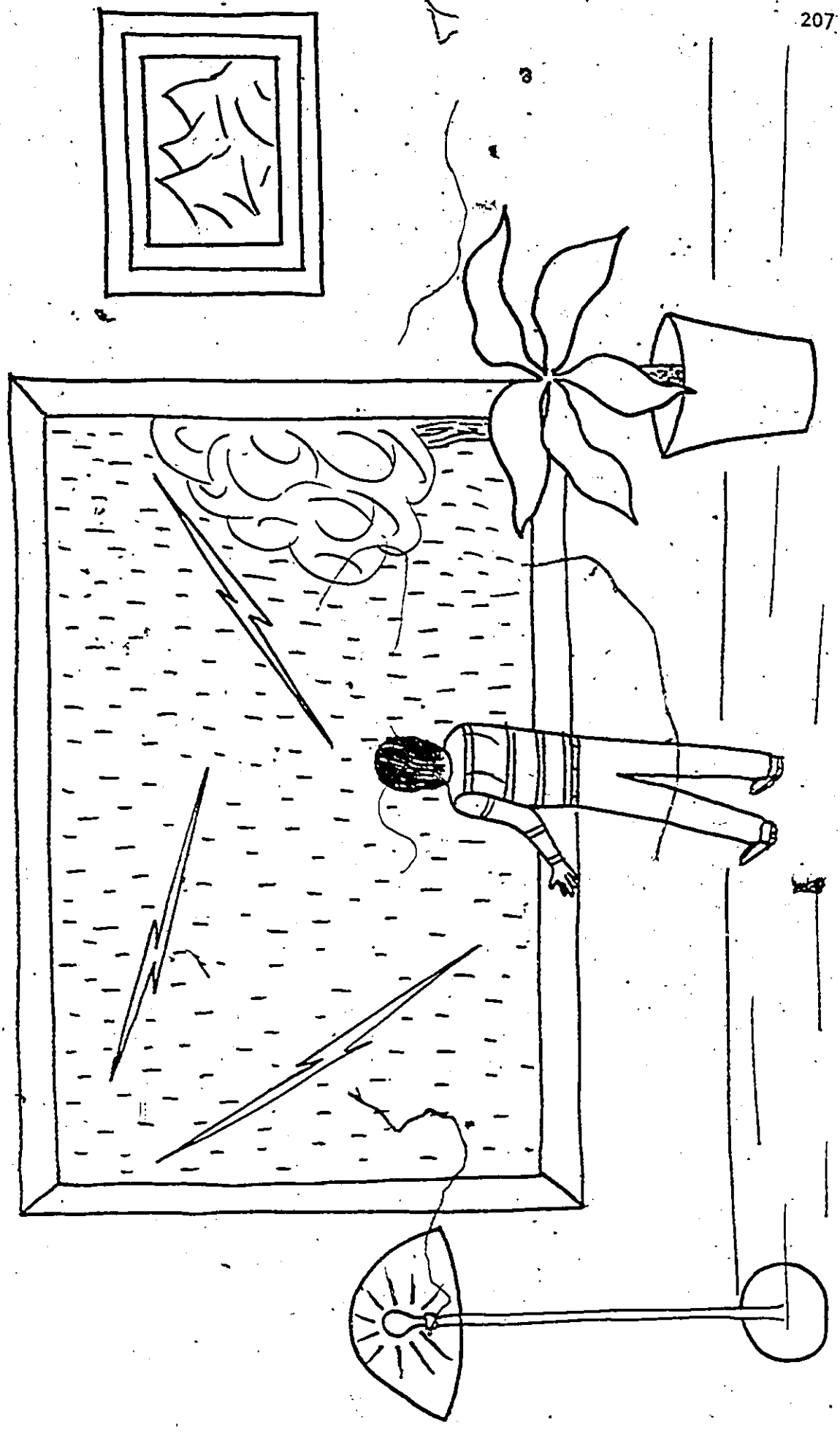

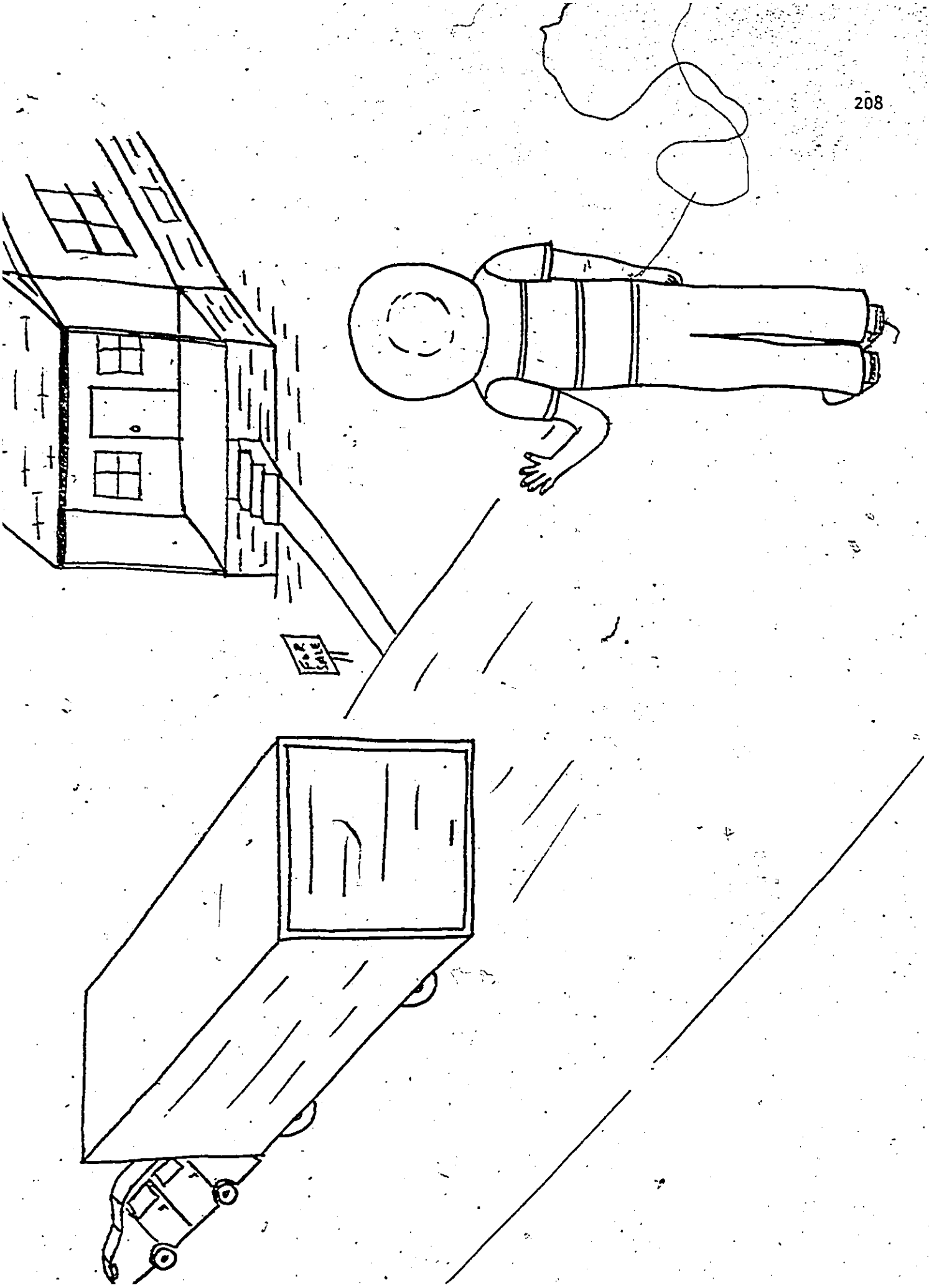
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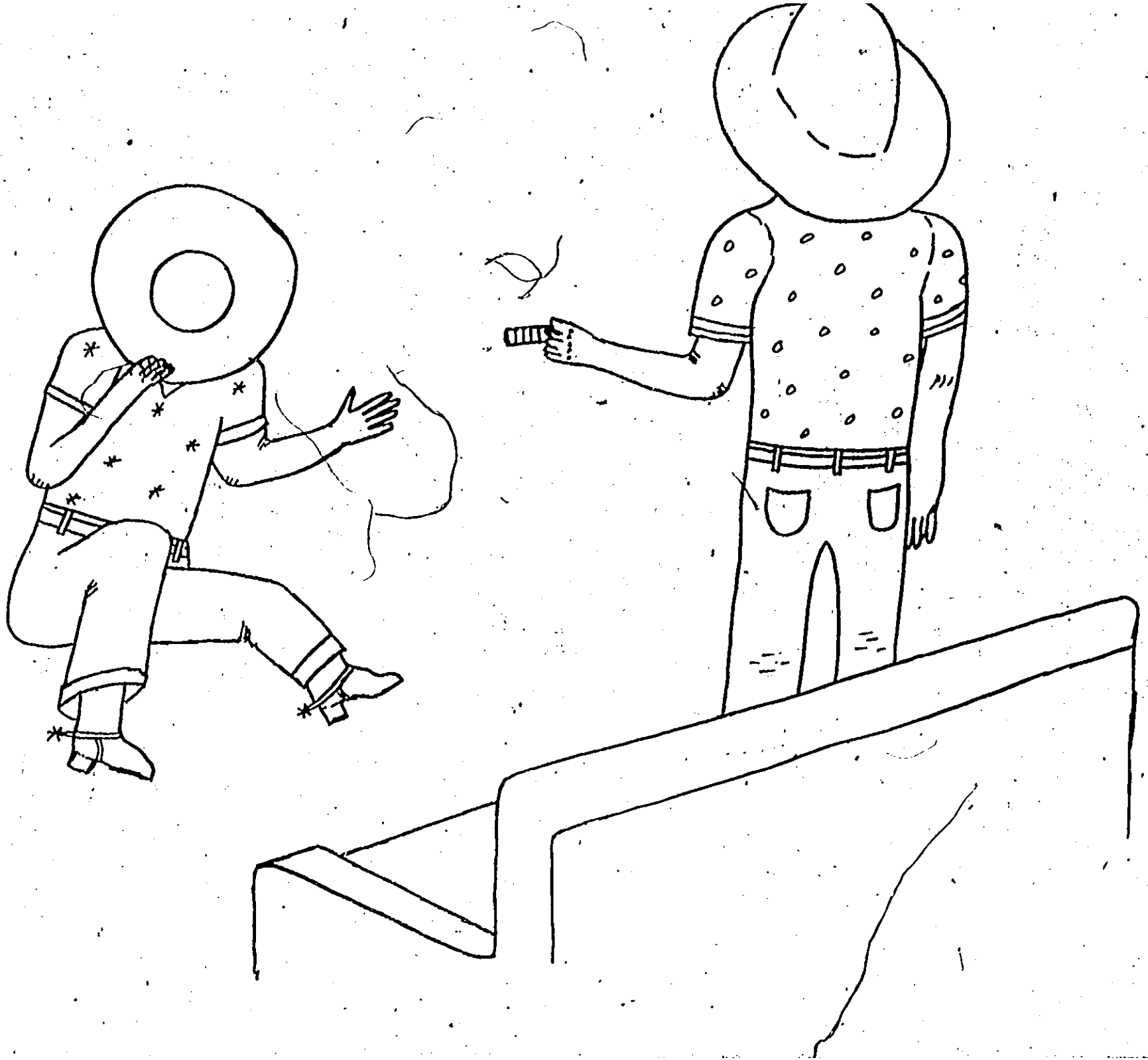
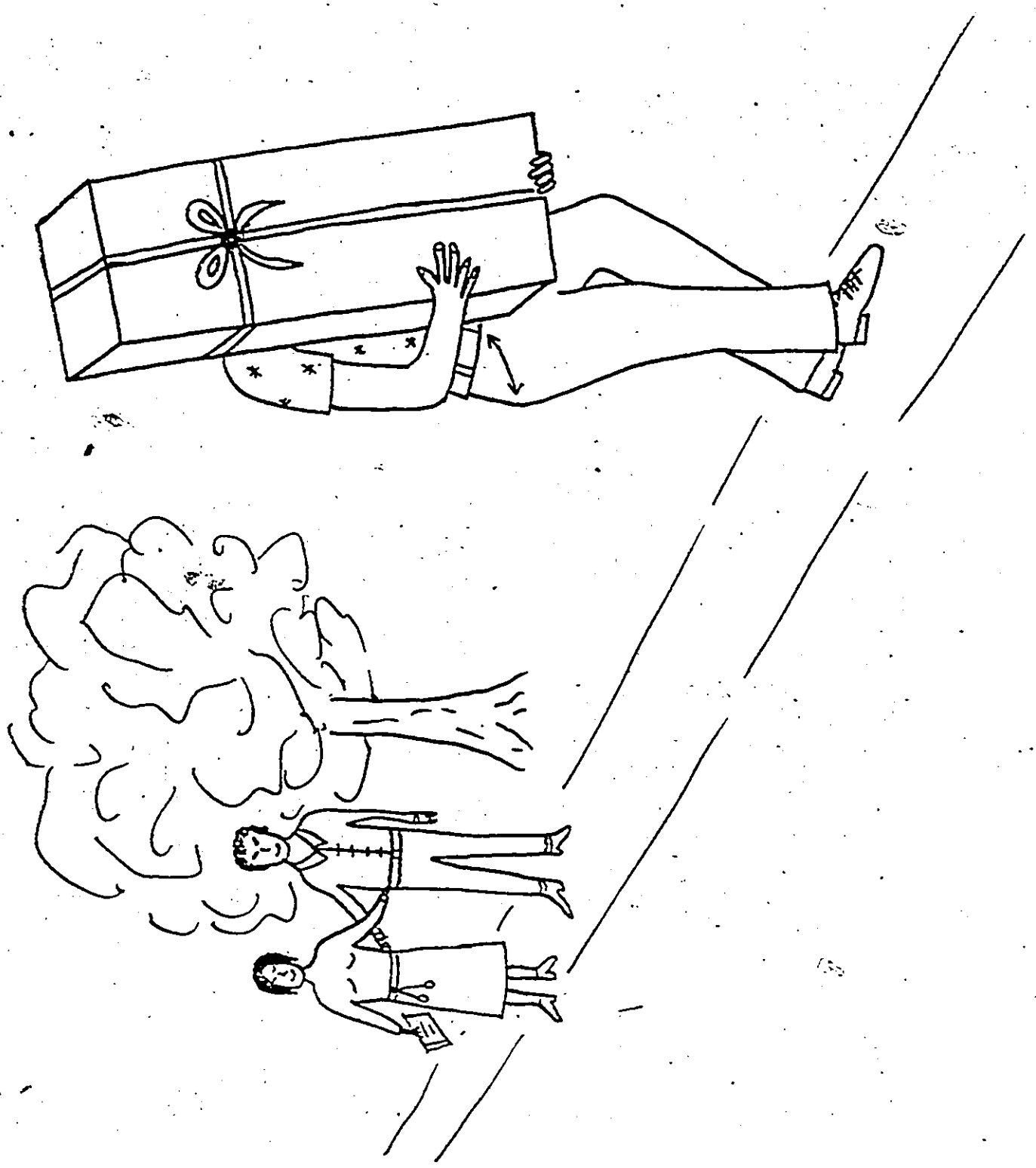




APPENDIX B (xiv)

Name of Task: Matching Familiar Figures

Source: The concept of impulsivity-reflectivity was first conceptualized and operationalized in a monograph by Kagan, Rosman, Day, Albert and Phillips (1964).

Description of Task:

The impulsivity-reflectivity instrument developed by Kagan, et al. (1964) is called the Matching Familiar Figures test. The test consists of three forms, each of which is used to assess the cognitive style of a different age group, ranging from preschool children to adults. The preschool form consists of two pretest and twelve test items, each of which consists of a standard picture and six variants, one of which is identical to the standard. The child's task is to select the variant which matches the standard. Two scores are obtained based on the child's performance. One score is the number of errors which are made by the child based on the child's initial response to each item. The second score is based on the response latency between the time when the item is presented and when the child actually makes an initial response.

The test itself consists of a series of black and white drawings. The figures used become progressively more complex and difficult. Similarly, the variations presented are based on more progressively subtle differences which require increasingly careful evaluation and comparison in order to make a correct choice.

Materials: Matching Familiar Figures stimulus cards, timer with foot control.

Procedure: The procedures outlined below are based on the descriptions outlined in a number of studies (Kagan, 1966; Kagan, Moss & Sigel, 1963; Kagan & Kagan, 1970; Kagan, et al., 1964). and include the brief description provided with the Scale for preschool children as outlined below.

Each child is introduced to the task and shown what is expected using the two pretest items. If the child appears to understand what is required by successfully completing the pretest items, the test is presented in its entirety.

Directions for Administering Matching Familiar Figures Test:

I am going to show you a picture of something you know and then some pictures that look like it. You will have to point to the picture on this bottom page (point) that is just like the one on this top page (point). Let's do some for practice. E shows practice items and helps the child to find the correct answer. Now we are going to do some that are a little bit harder. You will see a picture on top and six pictures on the bottom. Find the one that is just like the one on top and point to it.

E will record latency to first response to the half-second, total number of errors for each item and the order in which the errors are made. If S is correct, E will praise. If wrong, E will say, No, that is not the right one. Find the one that is just like this one (point). Continue to code responses (not items) until child makes a maximum of six errors or gets the item correct. If incorrect, E will show the right answer.

Scores: (a) A score ranging from 0 to 12 is determined based on the number of errors obtained according to the initial response choices of each child.

(b) A mean response score is calculated based on the mean latency between the time when the item is presented, and the time when the child makes the initial response to each item.

APPENDIX B (xv)

Name of Task: Popularity-Social Development Measure.

Source: Constructed by Waterman (1979) in order to obtain an estimate of the popularity-social development of each child who participated in the study.

Description of Task: The task was designed to elicit an estimate of each child from the preschool teacher who was most familiar with the child. Each teacher was asked to rate their children for their popularity-social development on a scale which ranged from 0.5 to 9.5. The actual instructions are presented below and the scale itself is presented on the next page. The scale was administered after the assessments were completed.

Instructions to Teachers:

The children listed below took part in my research. I would like to obtain a Popularity-Social Development rating for each child. Please rate the children which you know best. Another teacher will rate those which you do not know as well.

Thr rating should be based on the child's relative popularity and social development in comparison with other children in the groups, and with other children of that age which you have taught.

When thinking of each child's rating, you should take into consideration such aspects as whether the child interacts easily with other children, the ease of initiating play with others, relative friendliness with others, leadership qualities (leader or follower), play activities during free time (alone or with others), and other such behavioral indicators.

An example is provided on the scale. If you have any questions, please contact me at 966-2211 before

Friday, when I will return to pick up the scales.
Thank you for your cooperation.

Larry W. Waterman

POPULARITY-SOCIAL DEVELOPMENT RATING FORM

(Name of School) / Child's Name	Not Popular Low Social Develop. Inappropriate Behavior Isolated	Average Popularity Expected Social Develop. Appropriate Behavior Some Interactions	Very Popular Excellent Develop. Very Appropriate Initiates Interactions
	0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5		
Eg. "Joe X"		X	

APPENDIX C

The following is a list of the scores which were obtained for each of the variables used in the present study.

(i) Verbal Communication Task: the three obtained scores included the mean number of individual units of information contained in each response, a mean latency score based on response time, a communicative competence score based on a percentage derived from the total number of responses divided by the total number of egocentric responses.

(ii) Non-Verbal Ability: a total score based on the sum of the subscores obtained on the task.

(iii) Non-Verbal Intelligence Estimate of the Child: based on the child's performance on the Leiter International Performance Scale.

(iv) Visual Perception: three scores were obtained based on the tasks described below:

(a) Block Design: a standard score based on the number of designs the child was able to complete.

(b) Visual Ability: a total score based on a combination of the two standard scores obtained on each of the Frostig subtests.

(c) Similarities and Differences: a total score based on the child's ability to discriminate visual stimuli on the basis of similarities and differences.

(v) Language Development: two scores based upon the tasks described below:

(a) Verbal Fluency: a standard score based on the total number of items generated by the child in each of the four categories.

(b) Word Knowledge: a standard score based on the child's performance on the picture vocabulary and the oral vocabulary sections of the McCarthy subtest.

(vi) Matching Familiar Figures: two scores based on (a) the number of errors based on the initial response choices of each child subtracted from the total number of trials presented, and (b) a mean latency score based on the response latency for each trial.

(vii) Cognitive-Perceptual Grouping: a score based on the total number of correct responses made by the child.

(viii) Cognitive Perspective Taking Task: a total score based on the child's perspective taking skill.

(ix) Visual Roletaking Task: a total score based upon the child's ability to reproduce each visual perspective.

(x) Affective Perspective Taking Task: a total score based upon correctly identifying the 12 expressions and supplying the reason for each choice.

(xi) Decentering Ability Task: a mean score based on the total score obtained on each of the four tasks.

(xii) Popularity Rating: a score was assigned for each child by a preschool teacher who was familiar with the child's social development.

(xiii) Demographic Variables: the following variables were obtained from the questionnaire completed by the parent(s) of each child prior to that child's taking part in the study:

(a) Intellectual level of the child (based on the child's performance on the Leiter International Performance Scale).

(b) Age of the child in months.

(c) Sex of the child: (male = 1, female = 2).

(d) Socio-Economic Status (as determined by the Blishen Scale) based upon the parent whose occupation is highest on the Blishen Scale.

(e) Mean educational level of the parents based on level of education achieved.

(f) A second language in the home (= 2); if English is the only language (= 1).

(g) Number of siblings in the home (brothers or sisters).

(h) Number of other people in the home (e.g.. relatives, friends).

APPENDIX D (i)

Mean Scores for Male Children (n = 30)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	54.600	4.207	49.000	62.000	13.000
Socioeconomic Status	44.056	13.321	27.770	70.430	42.660
Verbal Communication: Latency	6.648	2.811	3.241	14.101	10.860
Verbal Communication: Mean Length	6.472	3.115	2.167	12.833	10.666
Verbal Communication: Egocentrism	0.506	0.237	0.148	1.000	0.852
Nonverbal Ability	30.433	3.159	18.000	36.000	18.000
Nonverbal Intelligence	101.733	12.520	83.000	132.000	49.000
Frostig Visual Perception	19.767	2.254	16.000	25.000	9.000
Similarities & Differences	14.167	1.931	7.000	18.000	11.000
Block Design	11.133	2.315	5.000	15.000	10.000
Cognitive Perceptual Task	16.367	4.013	9.000	22.000	13.000
Matching Figures Latency	5.120	2.285	2.023	11.419	9.396
Matching Figures Errors	2.364	0.852	1.000	5.833	4.833
Verbal Fluency	11.967	3.479	5.000	19.000	14.000
Word Knowledge	16.133	2.193	12.000	21.000	9.000
Decentration Ability	6.600	2.401	4.000	12.000	8.000
Visual Roletaking	5.033	3.211	0.000	11.000	11.000
Cognitive Roletaking	0.633	0.615	0.000	2.000	2.000
Affective Roletaking	9.800	4.382	0.000	17.000	17.000
Popularity	5.917	2.047	1.500	9.500	8.000

APPENDIX D (ii)

Mean Scores for Female Children (n = 30)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	53.660	4.591	48.000	62.000	14.000
Socioeconomic Status	41.150	12.439	26.710	70.130	43.420
Verbal Communication: Latency	8.006	5.572	2.957	30.417	27.460
Verbal Communication: Mean Length	5.806	2.658	2.000	11.667	9.667
Verbal Communication:Egocentrism	0.619	0.223	0.029	0.917	0.888
Nonverbal Ability	29.733	3.823	14.000	35.000	21.000
Nonverbal Intelligence	100.233	14.908	80.000	138.000	58.000
Frostig Visual Perception	20.267	2.532	15.000	26.000	11.000
Similarities & Differences	14.100	1.296	11.000	15.000	4.000
Block Design	12.867	2.315	9.000	19.000	10.000
Cognitive Perceptual Task	16.167	4.260	8.000	22.000	14.000
Matching Figures Latency	5.320	3.591	1.626	18.327	16.701
Matching Figures Errors	2.174	0.522	1.077	3.538	2.461
Verbal Fluency	10.967	3.764	5.000	19.000	14.000
Word Knowledge	15.300	2.562	10.000	19.000	9.000
Decentration Ability	5.600	1.940	4.000	11.000	7.000
Visual Roletaking	4.067	3.443	0.000	14.000	14.000
Cognitive Roletaking	0.833	0.834	0.000	3.000	3.000
Affective Roletaking	10.067	4.378	2.000	22.000	20.000
Popularity	6.183	2.091	3.000	9.500	6.500

APPENDIX D (iii)

Mean Scores for Children Assessed by Male Examiner (n = 20)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	54.500	4.617	48.000	62.000	14.000
Socioeconomic Status	43.613	11.067	27.770	60.930	33.160
Verbal Communication Latency	5.584	1.507	3.350	8.151	4.801
Verbal Communication Mean Length	6.375	3.363	2.000	12.833	10.833
Verbal Communication: Egocentrism	0.520	0.232	0.029	0.917	0.888
Nonverbal Ability	30.550	2.724	26.000	36.000	10.000
Nonverbal Intelligence	105.300	14.393	82.000	138.000	56.000
Frostig Visual Perception	20.550	2.605	17.000	26.000	9.000
Similarities & Differences	14.250	1.020	12.000	15.000	3.000
Block Design	11.250	2.693	5.000	17.000	12.000
Cognitive Perceptual Task	15.700	4.293	8.000	22.000	14.000
Matching Figures Latency	6.245	4.001	2.331	18.327	15.996
Matching Figures Errors	2.112	0.396	1.154	2.615	1.461
Verbal Fluency	12.450	4.236	5.000	19.000	14.000
Word Knowledge	15.750	2.845	10.000	19.000	9.000
Decentration Ability	5.100	1.619	4.000	9.000	5.000
Visual Roletaking	2.900	3.463	0.000	14.000	14.000
Cognitive Roletaking	0.600	0.598	0.000	2.000	2.000
Affective Roletaking	10.550	4.286	2.000	17.000	15.000
Popularity	7.250	1.773	3.000	9.500	6.500

APPENDIX D (iv)

Mean Scores for Children Assessed by Female Examiner (n = 20)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	53.750	4.689	48.000	62.000	14.000
Socioeconomic Status	40.300	10.896	26.710	60.930	34.220
Verbal Communication Latency	9.422	6.065	2.957	30.417	27.460
Verbal Communication Mean Length	5.958	1.536	3.000	9.167	6.167
Verbal Communication Egocentrism	0.622	0.166	0.304	0.875	0.571
Nonverbal Ability	30.250	1.860	26.000	33.000	7.000
Nonverbal Intelligence	97.500	13.904	80.000	132.000	52.000
Frostig Visual Perception	19.800	2.397	15.000	24.000	9.000
Similarities & Differences	14.050	1.317	11.000	15.000	4.000
Block Design	11.900	2.222	7.000	15.000	8.000
Cognitive Perceptual Task	15.550	4.084	8.000	22.000	14.000
Matching Figures Latency	4.319	2.437	1.626	12.026	10.400
Matching Figures Errors	2.254	0.573	1.077	3.538	2.461
Verbal Fluency	11.150	2.907	7.000	19.000	12.000
Word Knowledge	15.850	2.390	12.000	21.000	9.000
Decentration Ability	6.250	2.489	4.000	12.000	8.000
Visual Roletaking	5.200	2.840	0.000	10.000	10.000
Cognitive Roletaking	0.750	0.786	0.000	2.000	2.000
Affective Roletaking	10.100	4.483	3.000	22.000	19.000
Popularity	5.225	1.930	3.000	9.000	6.000

APPENDIX D (v)

Mean Scores for Children Assessed by Male and Female Examiners (n = 20)

Variable Name	Mean	Standard Deviation	Minimum Value	Maximum Value	Range
Age in Months	54.050	4.045	49.000	62.000	13.000
Socioeconomic Status	43.895	16.250	27.770	70.430	42.660
Verbal Communication Latency	6.975	3.730	3.241	20.094	16.853
Verbal Communication Mean Length	6.083	3.490	2.167	12.667	10.500
Verbal Communication Egocentrism	0.545	0.290	0.148	1.000	0.852
Nonverbal Ability	29.450	5.135	14.000	35.000	21.000
Nonverbal Intelligence	100.150	12.110	83.000	128.000	45.000
Frostig Visual Perception	19.700	2.179	16.000	23.000	7.000
Similarities & Differences	14.100	2.337	7.000	18.000	11.000
Block Design	12.850	2.277	10.000	19.000	9.000
Cognitive Perceptual Task	17.550	3.818	9.000	22.000	13.000
Matching Figures Latency	5.097	1.939	2.432	8.993	6.561
Matching Figures Errors	2.442	1.005	1.000	5.833	4.833
Verbal Fluency	10.800	3.592	5.000	18.000	13.000
Word Knowledge	15.550	2.012	12.000	19.000	7.000
Decentration Ability	6.950	2.164	4.000	10.000	6.000
Visual Roletaking	5.550	3.187	0.000	11.000	11.000
Cognitive Roletaking	0.850	0.813	0.000	3.000	3.000
Affective Roletaking	9.150	4.368	0.000	15.000	15.000
Popularity	5.675	1.969	1.500	9.000	7.500

APPENDIX E

Eigenvalues and Cumulative Proportion of the Total Variance of All of the Produced Factors

Factor	Eigenvalue*	Cumulative Proportion of the Total Variance*
1	3.283	0.182
2	2.042	0.296
3	1.809	0.396
4	1.419	0.475
5	1.313	0.548
6	1.171	0.613
7	0.962	0.667
8	0.903	0.717
9	0.884	0.766
10	0.727	0.806
11	0.694	0.845
12	0.587	0.877
13	0.497	0.905
14	0.475	0.931
15	0.391	0.953
16	0.305	0.970
17	0.279	0.986
18	0.259	1.000

*Note: Discrepancies in the addition of values and the final total are due to the rounding off of all scores to three decimal points.

APPENDIX F

Scoring Coefficient Matrix of Generated Data Set

(Eigenvalue = 0.4)

Original Variable Names	Generated Variables						
	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6	FACTOR7
Sex of the Child	-0.04435	0.09069	0.28004	0.32801	0.32946	0.06213	0.08852
Age in Months	0.11377	-0.28117	-0.23593	0.12920	0.18903	0.02449	-0.05075
Socioeconomic Status	0.13574	0.10733	-0.01077	-0.26699	0.23430	0.07500	-0.41695
Nonverbal Ability	0.02719	-0.18549	0.13476	-0.25663	0.07040	0.19986	0.55376
Nonverbal Intelligence	0.11569	0.17134	0.26991	-0.13407	-0.33777	-0.01217	-0.19739
Frostig Visual Perception	0.12305	0.21924	0.19168	-0.12823	-0.08864	-0.18921	0.16002
Similarities & Differences	0.16339	0.16842	-0.10637	0.20628	0.06424	0.21027	-0.05851
Block Design	0.01873	0.26837	0.12225	-0.02416	0.42116	0.17308	0.30548
Cognitive Perceptual Task	0.20137	0.08614	-0.07071	0.17154	0.13415	0.17168	-0.10927
Matching Figures Latency	0.15569	-0.20799	0.20183	0.00904	0.00590	0.10317	-0.01745
Matching Figures Errors	-0.01347	0.08054	-0.14918	0.04328	-0.35340	0.45178	0.41672
Verbal Fluency	0.21832	-0.11477	0.04042	-0.11796	-0.06238	-0.12444	0.04806
Word Knowledge	0.19242	-0.06773	-0.13573	0.11102	0.07293	-0.24914	0.22228
Decentration Ability	0.08515	0.09242	-0.30050	-0.17417	0.02449	0.20659	0.03961
Visual Roletaking	0.02309	0.29580	-0.26771	-0.06564	-0.05239	-0.30636	0.14849
Cognitive Roletaking	-0.07726	0.07214	-0.01518	0.44680	-0.16210	-0.01803	-0.04881
Affective Roletaking	0.16450	-0.02282	0.05778	0.22125	-0.10282	-0.36441	0.30948
Popularity	0.15645	-0.02502	0.10564	0.15732	-0.24734	0.31988	-0.16723
	FACTOR8	FACTOR9	FACTOR10	FACTOR11	FACTOR12	FACTOR13	FACTOR14
Sex of the Child	0.40104	-0.04152	0.02743	-0.01648	0.21976	-0.25580	0.33206
Age in Months	0.18683	-0.17045	-0.16971	0.18769	0.17873	-0.32777	-0.19435
Socioeconomic Status	-0.29167	-0.20748	0.20815	-0.03503	0.70917	0.16855	0.27252
Nonverbal Ability	-0.37592	0.21828	-0.12326	0.42093	-0.01838	-0.12167	0.46421
Nonverbal Intelligence	-0.16408	-0.01418	0.20143	-0.08675	0.33539	-0.40659	-0.10681
Frostig Visual Perception	0.22108	0.10528	-0.46327	0.31435	0.58922	0.11615	-0.23501
Similarities & Differences	-0.15434	-0.10639	-0.59071	0.04144	-0.39241	0.53178	0.03896
Block Design	0.01060	-0.05262	0.38238	-0.06089	-0.28335	0.11481	-0.40693
Cognitive Perceptual Task	-0.32510	0.24751	-0.19171	-0.05131	0.07202	-0.23813	0.28689
Matching Figures Latency	0.06873	0.27637	-0.06829	-0.52163	-0.02335	0.76491	-0.05576
Matching Figures Errors	0.02897	-0.32804	0.04713	-0.27310	0.43922	-0.01241	0.34007
Verbal Fluency	0.35716	0.21240	0.12462	0.12928	-0.06121	-0.06597	-0.60210
Word Knowledge	-0.19692	-0.20272	0.52468	0.23917	-0.03213	0.34053	-0.15565
Decentration Ability	0.33370	0.52246	0.23664	-0.27292	0.04665	-0.11897	0.41020
Visual Roletaking	0.14064	0.02866	-0.06007	0.16694	-0.20045	0.10143	0.40573
Cognitive Roletaking	-0.27863	0.55513	0.26522	0.05694	0.37847	0.23768	-0.12242
Affective Roletaking	-0.12407	-0.16657	-0.00083	-0.52566	0.13329	-0.27265	0.49204
Popularity	0.29036	-0.20886	0.27082	0.49478	-0.14658	0.05559	0.54316

APPENDIX G

Factor Analysis Without Verbal Communication Scores: Principal Axis Solution

Variable Name	Factor 1	Factor 2	Factor 3
Sex of Child	-0.146	0.185	0.506*
Age in Months	0.374*	-0.574*	-0.427*
Socioeconomic Status	0.446*	0.219	-0.020
Nonverbal Ability	0.089	-0.379*	0.244
Nonverbal Intelligence	0.380*	0.350*	0.488*
Frostig Visual Perception	0.404*	0.448*	0.347*
Similarities & Differences	0.536*	0.344*	-0.192
Block Design	0.061	0.548*	0.221
Cognitive Perceptual Task	0.661*	-0.176	-0.128
Matching Figures Latency	0.511*	-0.425*	0.365*
Matching Figures Errors	-0.044	0.181	-0.270
Verbal Fluency	0.717*	-0.234	0.073
Word Knowledge	0.632*	-0.138	-0.246
Decentration Ability	0.280	0.189	-0.543*
Visual Roletaking	0.076	0.604*	-0.484*
Cognitive Roletaking	-0.254	0.147	-0.028
Affective Roletaking	0.540*	-0.047	0.105
Popularity	0.514*	-0.051	0.191
SSQ	3.283	2.042	1.809

* Designates factor loadings>(+ -) 0.300.

APPENDIX G (cont'd)

Factor Analysis Without Verbal Communication Scores:

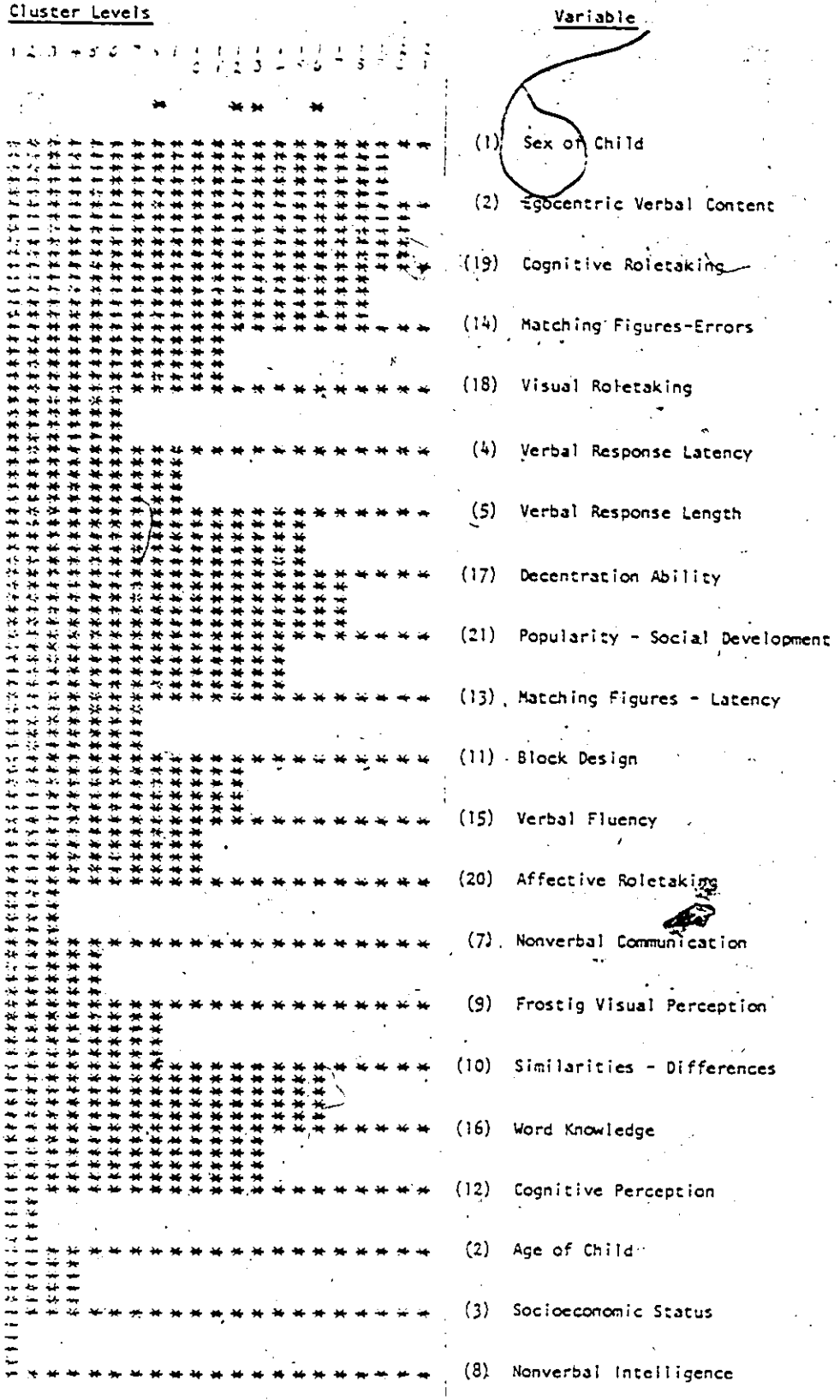
Varimax Solution

Variable Name	Factor 1	Factor 2	Factor 3
Sex of Child	-0.161	0.472*	-0.252
Age in Months	0.415*	-0.690*	-0.061
Socioeconomic Status	0.429*	0.171	0.183
Nonverbal Ability	0.114	-0.106	-0.432*
Nonverbal Intelligence	0.352*	0.609*	-0.104
Frostig Visual Perception	0.370*	0.585*	0.068
Similarities & Differences	0.512*	0.150	0.398*
Block Design	0.022	0.554*	0.213
Cognitive Perceptual Task	0.648*	0.078	0.242
Matching Figures Latency	0.538*	-0.034	-0.534*
Matching Figures Errors	-0.055	-0.054	0.319*
Verbal Fluency	0.731*	-0.082	-0.181
Word Knowledge	0.641*	-0.234	0.114
Decentration Ability	0.269	-0.217	0.539*
Visual Roletaking	0.036	0.116	0.768*
Cognitive Roletaking	-0.263	0.075	0.109
Affective Roletaking	0.541*	0.067	-0.085
Popularity	0.515*	0.121	-0.152
SSQ	3.277	1.938	1.919

*Designates factor loadings > (+ -) 0.300.

APPENDIX H

RESULTS OF HIERARCHICAL CLUSTER ANALYSES
(* INDICATES LEVELS USED FOR INTERPRETATION)



APPENDIX I

Eigenvalues, Portions, and Cumulative Portions of Variance Accounted for Based on Initial Factor Analysis

Factors	1	2	3	4	5	6	7
Eigenvalues	4.134	2.073	1.819	1.553	1.425	1.316	1,101
Portion	0.197	0.099	0.087	0.074	0.068	0.063	0.052
Cumulative Portion	0.197	0.296	0.382	0.456	0.524	0.587	0.639

Factors	8	9	10	11	12	13	14
Eigenvalues	0.019	0.899	0.792	0.740	0.729	0.690	0.534
Portion	0.049	0.043	0.038	0.035	0.035	0.033	0.025
Cumulative Portion	0.688	0.730	0.768	0.803	0.838	0.871	0.896

Factors	15	16	17	18	19	20	21
Eigenvalues	0.488	0.427	0.332	0.297	0.247	0.218	0.166
Portion	0.023	0.020	0.016	0.014	0.012	0.010	0.008
Cumulative Portion	0.920	0.940	0.956	0.970	0.982	0.992	1.000

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VITA AUCTORIS

Larry William Waterman was born in Lacombe, Alberta on April 10, 1947 He attended Lindsay Collegiate and Vocational High School and Neil McNeil High School. He began his undergraduate work at the University of Waterloo in 1969, and graduated in 1973 with an Honours B.A. in Psychology. He married Dianne L. Stevens, a Registered Nurse from Kitchener, in 1973. He began his graduate work in Psychology at the University of Windsor in September, 1973, and received his Masters degree in 1976. His specialty at the doctoral level was in Developmental-Clinical Psychology.