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BRADSHAW, VIRGINIA COFFIN

SPATIAL PERSPECTIVE TAKING AND READING COMPREHENSION
ABILITY OF FOURTH GRADE STUDENTS

The University of Oklahoma

PH.D.

1980

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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

SPATIAL PERSPECTIVE TAKING AND READING COMPREHENSION

ABILITY OF FOURTH GRADE STUDENTS

A DISSERTATION

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SPATIAL PERSPECTIVE TAKING AND READING COMPREHENSION
ABILITY OF FOURTH GRADE STUDENTS

APPROVED BY

Robert L. Curry
O. J. Duperier
Sally Caldwell
Charles H. Higon
Dene Shepherd

DISSERTATION COMMITTEE

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SPATIAL PERSPECTIVE TAKING AND READING
COMPREHENSION ABILITY OF FOURTH
GRADE STUDENTS

CHAPTER I

INTRODUCTION

"Language is a system of signs through which those who know the system can transmit meanings; language is a medium for the expression and reception of meanings."¹ Whichever "language art" is in question, the expression and reception of meaning is of primary concern. While reading entails the additional demand of interpreting a graphic code, transmission of meaning is, nevertheless, the purpose of this language art.

According to Feldman "meaning depends on function and communication is the essential function of language."² Meaningful reading, then would be the result of communication between an author and a reader.³ The author's intention, purpose, or point of view must be considered.

¹Joan Tough, The Development of Meaning (New York: John Wiley and Sons, 1977), p. 31.

²Carol F. Feldman, "Two Functions of Language," Harvard Educational Review 47 (August 1977): 283.

³Richard T. Vacca and Jerry L. Johns, " $R > S_1 + S_2 + S_3 \dots S_n$," Reading Horizons 17 (Fall 1976): 9.

"Meaning is not in print, but it is meaning that the author begins with when he writes. Somehow the reader strives to reconstruct this meaning as he reads."¹

In an effort to understand this "somehow" researchers and theorists have delineated numerous components of the reading process.² The import of any given component is relative to the task at hand, that is, whether the reader is learning the sound/symbol relationship or using his reading ability to learn new concepts. The point is that these two very different tasks share an underlying presupposition: "At perhaps the most basic level, a child has to know that reading, as well as writing, has a purpose or function, and that the purpose is communication."³

Several researchers have reported that young children do not understand this nature of the reading task.⁴ When Johns⁵ asked over eleven hundred first through sixth graders, "What is Reading?", less

¹Kenneth Goodman, "Behind the Eye: What Happens in Reading," in Theoretical Models and Processes of Reading, 2nd ed., eds. Harry Singer and Robert Ruddell (Newark, Delaware: International Reading Association, 1976), p. 471.

²Eleanor J. Gibson, "Learning to Read," Science 148 (May 1965): 1066; Douglas Pidgeon, "Logical Steps in the Process of Learning to Read," Educational Research 18 (June 1976): 178-80.

³Gary T. Waller, Think First, Read Later: Piagetian Prerequisites For Reading (Bethesda, Md.: ERIC Document Reproduction Service, ED 146 570, 1977), p. 21.

⁴J. F. Reid, "Learning to Think about Reading," Educational Research 9 (1966): 56-62; Duane R. Tovey, "Children's Perceptions of Reading," The Reading Teacher 29 (March 1976): 536-40; Samuel Weintraub and Terry Denny, "First Graders' Responses to Three Questions about Reading," Elementary School Journal 66 (May 1966): 441-8.

⁵Jerry L. Johns, Is Reading Sensible for Children? (Bethesda, Md.: ERIC Document Reproduction Service, ED 158 268, 1978), p. 5.

than 20 percent focused on meaning or understanding as opposed to classroom procedures or word calling. Both Tovey and Johns found an increase with age in "meaning" responses. However, rather than conclude that poor pedagogy is the culprit, as did both Tovey and Johns, perhaps the developmental nature of communication skills in general ought to be considered.

Piaget's early work demonstrated that communication is dependent upon the speaker's ability to take the point of view of the listener: to discriminate and coordinate his own point of view and that of his listener and compose a message the listener can comprehend. "The child's initial universe is entirely centered in his own body and action in an egocentrism as total as it is unconscious (for lack of consciousness of the self)."¹

According to Piaget, the child is initially totally egocentric. Development is the process of becoming increasingly sociocentric both cognitively and affectively. The child at the sensorimotor level does not differentiate between the self and the human environment, and his task is to decenter on the level of action.

During the preoperational stage the action-schemes are internalized by means of the semiotic function: deferred imitation, symbolic play, drawing or graphic image, mental image, and beginning language. The child must now decenter on the level of representation. "The egocentric preschooler...is unaware of the fact that his representations

¹Jean Piaget and Barbel Inhelder, The Psychology of the Child (New York: Basic Books, Inc., 1969), p. 13

of reality are in various ways distorted as a consequence of his failure to see things from points of view other than his own."¹

The child has difficulty explaining something to another or trying to get another to do something because what he understands, he believes the other person understands. In his egocentrism the child "sees" only from his perspective and assumes others have this same vantage point. It is not until the end of this stage that the child becomes aware of the problem of point of view. Piaget refers to this as the transitional period between egocentrism and perspective.

At the level of concrete operations there is a gradual separation between self and world until there is a knowledge of self and a knowledge of objects. The child's language becomes essentially communicative because he speaks no longer for himself, but from the point of view of the listener. He is capable of engaging in true argument. In fact, Piaget claims that argument affirms the need to systematize opinions.

Thus, the child does not first become conscious of his point of view and then, later, of that of others. Rather, the collision of opposing views causes each to act on the other, so that the child begins to develop his own particular point of view as he becomes aware that others have different points of view.

Later, Piaget outlined this development of the ability to take another's point of view through the study of the development of the child's conception of projective space:

¹Ibid., p. 64.

Projective space...begins psychologically at the point when the object or pattern is no longer viewed in isolation, but begins to be considered in relation to a 'point of view.' This is either the viewpoint of the subject, in which case a perspective relationship is involved, or else that of other objects on which the first is projected. Thus from the outset, projective relationships presume the inter-co-ordination of objects separated in space as opposed to the internal analysis of isolated objects by means of topological relationships.¹

Each child was presented with four tasks ranging from the simplest projective task of forming a straight line to the more difficult task of discriminating and coordinating various points of view in order to represent another's perspective of a model of three mountains. Performance on these tasks represented what Piaget interpreted to be a clear developmental process which parallels cognitive development.

Initially, the child's perception is totally dominated by his egocentrism. Through trial and error the preoperational child learns that one perspective is better than others for forming the straight line. However, he can do so only in relation to the straight edge of the table. On the mountain task, he becomes dissatisfied with his representation of the other's perspective. He takes great pains but only succeeds in reproducing his own view. Gradually, he begins to choose pictures which are different from his viewpoint, but these do not yet represent the viewpoint of the 'other.' This transitional phase points up particularly the developmental nature of growth from egocentricity to perspective and is described as nonegocentric.

¹Jean Piaget and Barbel Inhelder, The Child's Conception of Space (Paris: Presses University of France, 1956), p. 153.

At about seven or eight the child is capable of operational discrimination between the viewpoint of the subject and the object. He intentionally forms a straight line by the method of "sighting" or "taking aim" which presupposes the coordination of all possible viewpoints. His own representations now reflect changes in perspective indicating his ability to anticipate. "...now that the child has reached an operational level in other realms of activity, he is now beginning to imagine perspective in the form of a continuous process of transformation and not just a static isolated case."¹

Flavell's research of the early 60's applied Piaget's theory of perspective taking to the development of "thinking about the social environment."² He and fellow researchers investigated the development of the ability and disposition to "take the role" of another person in the cognitive sense and the more specific ability to use this understanding of the other person's role as a tool in communicating effectively with him.

The basic and essential ingredient of any sort of skill sequence in this area appears to us to be that process in which the individual somehow cognizes, apprehends, grasps--whatever term you prefer--certain attributes of another individual. The attributes in question are primarily of the type that could be described as inferential rather than directly perceptible, for example, the other's needs, his intentions, his opinions and beliefs, and his emotional, perceptual or intellectual capacities and limitations.³

¹Ibid., p. 187.

²Jogn H. Flavell et al., The Development of Role-Taking and Communication Skills in Children (New York: John Wiley and Sons, Inc., 1968), p. 1.

³Ibid., p. 5.

This process of obtaining information about the other's internal events he termed discrimination of role attributes which is only a part of a larger context of motives and behaviors. Discrimination of role attributes is not a goal in itself but is a means of obtaining information which will be used for some purpose (in this case, verbal communication).

To the extent that the child fails to discriminate those role attributes of the other which are relevant to the sort of message the child should send to the other, in the latter's role as listener, to that extent is the message likely to be ill-adapted to the other's informational needs and hence inadequately communicative.¹

Interpretation of the results of these studies revealed that the preschool child does not have a firm concept of perspective variation, that is, he does not realize that another person may apprehend an event or object differently than he (egocentric). Given a task which demands role taking, the entering first grader has some understanding of the existence of perspective, but he is very limited in his ability to perceive that a situation may implicitly call for role taking.

The recognition of perspective differences is hypothesized as being less probable when the perspectives in question consist of cognitions, motives, feelings, affects, and the like rather than percepts, especially visual percepts.²

During middle childhood and adolescence the child's growing awareness of the necessity of taking into consideration another's point of view represented one of the clearest developmental trends. "The data from

¹Ibid., p. 8.

²Ibid., p. 181.

these studies abundantly document the generalization that profound and widespread changes in role taking and communication skills take place during this period."¹

Of particular interest to this paper is a communicative role-taking task included in Flavell's second study. Third, seventh and eleventh graders were directed to adapt a message to the high input requirements of a very young listener. After being read the fable "The Fox and the Grapes" and reading it aloud, the subject was instructed to tell the story to a young boy of four so that "he understands everything--be sure he understands what everything in the story means." This message was taped and transcribed then scored for substitutions, additions and deletions which could be interpreted as a deliberate attempt to make the story easier for a young listener to grasp. Six of the twenty third graders showed one or more instances of each of the three recoding categories; eighteen of twenty seventh and eighteen of twenty eleventh graders showed one or more instances of each category. Flavell interpreted this as strong evidence for developmental change.

Third graders appeared to function as if the situation were dyadic rather than triadic for them, that is, as if the fable alone, rather than the fable and audience, preempted their field of awareness. Accordingly, they simply read the text aloud, word for word--"lofty," "quoth," "tempting morsel" and all.²

In contrast, the seventh and eleventh graders either read the word then explained it or anticipated the young listener's difficulty and substituted what they determined would be more easily understood.

¹Ibid., p. 212.

²Ibid., p. 127.

The purpose of this task was to determine role taking for the sake of communication, and the criterion was one incidence each of substitution, addition, or deletion "...which appeared to stem from a motivated attempt to communicate more effectively." How the children actually comprehended the story was of no interest to the investigators. The subject was instructed to tell the story so that the young listener would understand "what everything in the story means." However, this instruction was evidently interpreted by seventh and eleventh graders as "be sure he knows what every word means" for there was no report of any subject interpreting the fable for the listener.

Flavell felt that the most important factor for the third graders' lack of recoding was the inability to take the listener's role, but he conceded that poor achievement in reading and vocabulary skills could have been partly at fault. Evidently by "reading skills" he meant "word attack skills" as no mention was made of meaning.

From a "reading for the sake of communication" point of view, then, several questions remained unanswered: What was the subject's comprehension of the meaning of the fable? What was the reading achievement of those who made no recodings, of those who made numerous recodings? Was there any difference in reading comprehension of those who made no recodings and those who made numerous recodings?

Statement of the Problem

In order to further investigate these questions, the following problem was formulated. The problem of this study was to determine whether there were statistically significant differences in reading comprehension scores of completely egocentric, partially decentered, and completely decentered perspective takers.

Purpose of the Study

The purpose of this study was to provide information which would help educators plan instruction aimed at facilitating the communication of thoughts and ideas between author and reader. Knowing whether a child could take another's point of view would enable teachers to anticipate his responses to material he reads and better understand his questions about it.

Hypothesis

There are no statistically significant differences in mean reading comprehension raw scores among nine year olds who are completely egocentric, who are partially decentered and who are totally decentered. A subsidiary phase of the study was an analysis of each group's performance on the designated comprehension items, translation and inference items, and analysis items of the reading comprehension test.

Operational Definitions

1. Egocentrism "denotes a cognitive state in which the cognizer sees the world from a single point of view only--his own--but without knowledge of the existence of viewpoints or perspectives and, a fortiori, without awareness that he is the prisoner of his own."¹
2. "Perspectivism is the child's progressive capacity to differentiate cognitively between the aspects of an event and between his own and other's points of view, then to reflect upon these differences and eventually to integrate his reflections into a personal 'theory' of the relationship of himself to other things and people in a given event."²
3. Coordination of perspectives refers to the knowledge that the appearance of objects is a function of the spatial position from which they are viewed, and to the ability to determine what that appearance will be for any specific viewing position.
4. Spatial perspective taking refers to the description of representation of another's literal perceptual viewpoint.
5. Cognitive perspective taking entails inferring another's cognitions (thoughts, motives, attitudes).
6. Point of view refers to a particular perspective.
7. Nine year old is defined as a child from 9.0 to 9.6 years of age.

Limitations of the Study

The following limitations were inherent within the design of the study:

1. Reading comprehension was limited to scores on the Reading test of the Sequential Tests of Educational Progress, Series II.
2. Perspective taking was limited to spatial perspective taking as measured by the Coordination of perspectives test.

¹Jean Piaget and Barbel Inhelder, The Psychology of the Child, p. 60.

²J. Langer, Theories of Development (New York: Holt, Rinehart and Winston, 1969), p. 79.

3. The population from which the sample was drawn was limited to fourth-grade boys and girls age 9.0 to 9.6. This was the earliest age at which the test developers found each stage of perspective taking to be adequately represented. At earlier ages Stage 3 was not represented; at later ages Stage 1 was not represented in sufficient numbers.¹

¹Monique Laurendeau and Adrien Pinard, The Development of the Concept of Space in the Child (New York: International Universities Press, Inc., 1970), p. 347.

CHAPTER II

REVIEW OF THE LITERATURE

According to Piagetian cognitive developmental theory, intellectual development occurred as the child interacted with objects and persons in his environment and through this interaction overcame the restrictions of his egocentrism. The child gradually became aware that others have a point of view literally, or perceptually, as well as socially, for the purpose of communication. The review of pertinent literature concerned with communicative and spatial egocentrism and the factors influencing the decline of each as well as relevant reading comprehension research is presented herein.

Communicative Egocentrism

Piaget's early work involved the transcription and categorization of speech of young children at play, a significant amount of which was found to be non-communicative or "egocentric."

Piaget does not use the term in the sense of selfish or self-serving. The young child is characterized as egocentric not because he is conceited or tries to satisfy his desires at the expense of other people, but because he is centered about himself (or his own ego in the general sense) and fails to take into account the other's point of view. When he delivers a monologue in a group, the desires of the egocentric child do not necessarily clash with those of other children; rather he is insensitive to what the others need to hear. In order to communicate, one must consider what information the listener

does and does not have and what he is and is not interested in, and this the young child does not do.¹

Piaget conducted experiments aimed at determining the extent to which a child of six to eight years of age could communicate information to a listener in one of two structured situations. In the first, the subject heard a story and was required to retell it to another child. Next, the working of a mechanical object was explained to the child, and he had to explain the process to another child. Again, a substantial proportion of the child's speech was non-communicative and characterized by the faulty use of pronouns and demonstrative adjectives (no clear indication to whom or what is referred): the incorrect ordering of events (begin with ending and end with beginning): the poor expression of causality; the tendency to omit important features; and juxtaposition (story or explanation does not form a coherent and integrated whole). These characteristics

...all are concrete manifestations of the child's egocentrism; that is, his inability to take the other person's point of view. With development, these egocentric manifestations decrease and speech becomes more communicative. The speaker becomes aware of the views of others and adapts his speech accordingly.²

A frequently used task for studying the child's ability to refer to an object or event in terms a listener can understand, is the "stack the blocks" task. Novel forms are printed on the four vertical faces of a 2 X 2 X 2 inch wooden block. A hole is drilled through the center vertically so that the blocks can be stacked on a fourteen inch peg. The child designated "speaker" is given a set of blocks in a

¹Herbert Ginsberg and Sylvia Oppen, Piaget's Theory of Intellectual Development (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1969), p. 90.

²Ibid., p. 92.

dispenser such that one can be removed at a time in a predetermined order, and the child designated "listener" receives a duplicate set of blocks laid out before him in a random order (speaker and listener are separated by an opaque screen). The speaker is instructed to remove a block, stack it on the peg and describe it to the listener so that the listener will be able to select the same block and put it on his peg. The "game" is explained using blocks which depict familiar objects. If the children are successful on the training trials, they attempt the task using the novel forms.¹ Theoretically, to be successful on this and similar tasks the speaker must decenter from his point of view which enjoys full knowledge of the situation, consider his listener's needs and refer to each object in such a way as to ensure the listener's choice of the correct item.

Glucksberg et al.² found that when familiar objects were used very young children, 52-63 months of age, could supply descriptions which resulted in the listener's correct choice of the referent from among several non-referents. However, when unfamiliar, novel shaped forms were used, the speaker gave short, highly ideosyncratic descriptions which did not result in correct listener response.

In order to study the developmental nature of "social, edited communication," Glucksberg and Krauss administered the "stack the blocks" task to kindergarten, first, third and fifth graders and to college students. The examiner acted as "listener" and requested additional

¹Sam Glucksberg, Robert M. Krauss, Robert Weisberg, "Referential Communication in Nursery School Children: Method and Some Preliminary Findings," Journal of Experimental Child Psychology, 3 (1966): 333-42.

²Ibid., p. 333-42.

information on half of the trials. Kindergarteners and first graders did not modify their messages in socially appropriate ways. In addition, it was only in these age groups that "pointing behavior" occurred, i.e., tracing the design or saying "like this" while pointing to the design which, of course, the listener could not see. The authors concluded that social editing develops with age and in conjunction with other cognitive processes.¹

Rubin² employed these novel figures but drawn on 3 X 4 inch cards rather than printed on blocks. The subject was instructed to describe a card so that the listener (the examiner) could match it. After each description, the examiner requested more information. The number of distinctive features given increased significantly between each grade. Appropriate response to listener feedback improved significantly between kindergarten and second grade, and second and fourth, but not between fourth and sixth.

Glucksberg and Krauss found 17 percent of the children's communications during a structured experiment (stack-the-blocks task) to be egocentric. However, Mueller³ found 62 percent of the children's communications during free play to be egocentric. Citing these extreme differences, Hoy theorized that "children's communications are better represented by a transactional model where communication

¹Sam Glucksberg and Robert M. Krauss, "What Do People Say After They Have Learned to Talk? Studies of the Development of Referential Communication," Merrill Palmer Quarterly, 13 (1967): 309-16.

²Kenneth H. Rubin, "Egocentrism in Childhood: A Unitary Construct," Child Development, 44 (1973): 102-10.

³Edward Mueller, "The Maintenance of Verbal Exchanges Between Young Children," Child Development, 43 (1972): 930-38.

success is seen to depend, not simply on message quality, but on a complex interaction of speaker, listener, and situational attributes."¹ To test this hypothesis, five, seven, and nine year olds were paired: one designated "speaker," the other "listener." The task of the speaker was to describe a model of first, a horse, and then, a random shape so that the listener could build an identical model. The conditions of the experiment varied thusly: 1) two-way verbal communication between speaker and listener, each in full view of the other; 2) two-way verbal communication with only a facial view of each other; 3) only the speaker allowed to talk but able to see each others' faces; 4) only speaker allowed to talk and speaker and listener completely shielded from each other; 5) speaker prepared a taped message which was played to listener.

The percentage of listener appropriate behavior significantly increased with age, and all subjects performed significantly better when attempting to replicate the horse model than when replicating the random shaped model. The percentage of appropriate listener response declined as the channels of communication were increasingly restricted. One of Hoy's conclusions was that "measures of egocentrism based on the effect of the speaker's communications alone, without regard to listener attributes or situational parameters, may lead to spurious estimates of the egocentric content of children's communications."²

¹E. A. Hoy, "Measurement of Egocentrism in Children's Communications," Developmental Psychology, 11 (1975): 392.

²Ibid., p. 392.

Greenspan and Barenboim were more critical of the Glucksberg-Krauss task itself.

Since order is implicit in the sequence of a child's comments, there is really only one dimension of the task which can be said to differentiate subjects and that is his or her effectiveness in communicating the shape of the design. Because the designs are quite abstract in shape, one is forced either to use highly subjective scoring procedures for assessing the child's communicative performance or else one is forced to rely on length of utterance which, while it may illustrate an awareness of the difficulty of the task, may or may not be related to adequate communication. The second drawback is that far too much emphasis is placed upon the child's ability to verbally label the objects.¹

According to Greenspan and Barenboim, a task which corrects both faults is the matrix test of referential communication. Materials consist of an 18 X 15 inch posterboard divided into a 3 X 3 matrix, each column a different color. Sixteen of the 18 geometric objects which differ in shape (circle, square, triangle), color (three colors other than those used on the board), and height (4 inches or 2.5 inches) are placed before the speaker who is instructed to choose nine and place one in each square on the board. The speaker is then instructed to describe the board so that the listener can build an identical board. There are 45 bits of essential information (column, row, height, color, and shape X nine), and the child's egocentrism score is based on the number of necessary items of information omitted. Therefore, the scoring is objective and the child is required to use only language with which he is familiar.

The matrix test was administered to 120 children in grades one through six. Performance followed a definite age trend increasing

¹Stephen Greenspan and Carl Barenboim. A Matrix Test of Referential Communication (Bethesda, Md.: ERIC Document Reproduction Service, ED 125 784, 1975), p. 5.

steadily from first graders who supplied about 20 percent of the necessary clues to sixth graders who supplied virtually all 45 clues. Major shifts in performance occurred at second and sixth grades and were interpreted to be coincidental with entry into concrete and formal operations periods. The second-graders' performance was described as

...relatively egocentric in that they do an imperfect and somewhat haphazard job of communicating. They still leave out vital pieces of information and seem to shift from one communication strategy to another, sometimes providing information about one dimension of the objects, sometimes about another, but only occasionally providing coordinated information about all of the dimensions of all of the objects.¹

The improvement from this point was gradual and not significant until sixth grade. The occasional error of a sixth grader was attributed to oversight rather than lack of coordination of attributes.

Decline of Social-Communicative Egocentrism

Recent research has supported Piaget's assertion that interaction with the environment was crucial to the child's overcoming his egocentrism. Deutsch² found a significant relationship between communicative egocentrism (as measured by a variant of the Glucksberg-Krauss task) and amount of observed social interaction in females three to five years of age. Rubin observed play and recorded the speech of young children with the following results: "Children who used less egocentric speech in naturalistic social situations were those who were most likely to interact with other children and to be interacted with by other children in like

¹Ibid., p. 27.

²Francine Deutsch, "Observational and Sociometric Measures of Peer Popularity and Their Relationship to Egocentric Communication in Female Preschoolers," Developmental Psychology, 10 (1974): 745-47.

situations."¹

Hollos and Cowan² and Hollos³ found that preschoolers reared on farms performed better than those reared in villages or towns on measures of classification and conservation. The results were interpreted as evidence that social-verbal isolation afforded the farm children opportunities to engage in self initiated play and to manipulate objects and observe interrelations. The finding that the farm-reared children performed poorly in comparison with the village and town-reared children on tasks of egocentrism was attributed to their relatively limited opportunities for social interaction with peers. The fact that there was no difference in performances of village and town children on the measures of role-taking lead the authors to formulate a "threshold" hypothesis of verbal stimulation.

Some minimal level of experience in verbal-social interaction appears to be sufficient for the development of logical operations, and a higher threshold is probably required for the development of role taking skills. Beyond this threshold, the sheer amount of interaction does not affect the development of role taking skills.⁴

¹Kenneth H. Rubin, "Social Interaction and Communicative Egocentrism in Preschoolers," Journal of Genetic Psychology, 129 (1976): 123.

²Marida Hollos and Phillip A. Cowan, "Social Isolation and Cognitive Development: Logical Operations and Role Taking Ability in Three Norwegian Social Settings," Child Development, 44 (1973): 630-41.

³Marida Hollos, "Logical Operations and Role-Taking Abilities in Two Cultures: Norway and Hungary," Child Development, 46 (1975): 638-49.

⁴Ibid., p. 648.

West¹ attempted to replicate the findings of Hollos and Cowan but found no significant differences between the role-taking ability of kindergarteners and third graders from three different Israeli environments. This was interpreted as evidence that each environment exceeded the hypothetical "threshold" setting.

Nahir and Yussen² administered two communicative role-taking tasks to first- and fifth-grade Israeli children. Half the students at each grade level lived in the city and the other half lived in kibbutzim. One task required the child to decenter in that he had to inhibit privileged information in order to tell a story as another child might who did not share his information. The second task required the subject to tailor a message to a very young child, then to an adult. Children reared in the kibbutz performed significantly better than the city-reared children on both tasks. The authors concluded that "the kibbutz seems to be a social environment which enhances the development of role-taking skills."³

According to Hartup⁴ the young child is less conforming in his behavior due to his egocentrism. It is the development of the ability to consider another's viewpoint which yields him susceptible to social

¹Helen West, "Early Peer Group Interaction and Role Taking Skills: An Investigation of Israeli Children," Child Development, 45 (1974): 1118-1121.

²Haya I. Nahir and Steven R. Yussen, "The Performance of Kibbutz- and City-Reared Israeli Children on Two Role-Taking Tasks," Developmental Psychology, 13 (1977): 450-55.

³Ibid., p. 454.

⁴Willard W. Hartup, "Peer Interaction and Social Organization," in P. Mussen (Ed.), Carmichael's Manual of Child Psychology, Vol. 2 (New York: Wiley and Sons, Inc., 1970), pp. 361-456.

influence. Weinheimer¹, however, found that the egocentric child of five to eight years of age was as likely to conform as to remain independent.

Tierney and Rubin² attempted to clarify the relationship between egocentrism and conformity. They administered a communicative egocentrism task to first graders and found that the most highly egocentric children elicited the greatest number of conformity responses, that is, they changed from an initial response to agree with a groups' response. This was interpreted in terms of the children's centration tendencies and the importance of peer interaction. The authors proposed that children pass through three sequential behavioral stages when confronted with a social influence situation: 1) The egocentric child of four or five resolves the conflict by centering on himself which results in independent behavior. 2) When the child begins school the importance of peer interaction increases and the center of attention may shift from self to other children and adults in the environment; thus there is increased conformity and a simultaneous decrease in independent responses.

3) Finally with continued cognitive growth, as with an increased environmental emphasis on being correct, the child begins to decenter (approximately eight or nine years of age). He is able to consider both his own judgments and the judgments of others. As a result, the child's behavior in social influence conditions becomes dependent on the nature of the situation. Conformity becomes reinforcing under highly ambiguous situations; here the group's response is the best clue to the correct answer. In simple or unambiguous situations, independent behavior is more reinforcing since the solution to the problem is self-evident.³

¹Sidney Weinheimer, "Egocentrism and Social Influence in Children," Child Development, 43 (1972): 567-78.

²Mary C. Tierney and Kenneth H. Rubin, "Egocentrism and Conformity in Childhood," Journal of Genetic Psychology, 126 (1975): 209-16.

³Ibid., p. 213.

Spatial Egocentrism

Laurendeau and Pinard published in The Development of the Concept of Space in the Child the most thorough attempt at experimental confirmation of Piaget and Inhelder's general conclusions on the development of spatial representation. Five tasks were administered to 450 children aged two to twelve years, "the very crucial period running from the beginning of mental representation to the mastery of the first operations of conceptual intelligence."¹ Two tasks dealt with the development of topological space and led the authors to confirm Piaget's general hypothesis that the child's spatial representations are topological before being projective.

Three tests directly examine the construction of projective space: Construction of a projective straight line, which deals with the representation of the straight line, the basis of all projective space, the development of Concepts of left and right, which is related to the relativistic aspect of the points of view which are implicit in projective space, and the Coordination of perspectives, which describes the progressive coordination of the different points of view possible in a group of three objects.²

Based on results of testing, a four stage developmental sequence was identified for each of these projective tasks: Stage 0, incomprehension or refusal of the task; Stage 1, egocentrism; Stage 2, transitional, partially decentered; Stage 3, deceleration.

Fifty percent of the 7.5 year olds were successful at constructing the straight line, but it was not until the age of 10.1 that fifty percent

¹Monique Laurendeau and Adrien Pinard, The Development of the Concept of Space in the Child (New York: International Universities Press, Inc., 1970), p. 22.

²Ibid., p. 23.

of the age group were successful on the Concepts of left and right task. Furthermore, fewer than fifty percent of the twelve year olds were successful on the Coordination of perspectives task. Scalogram analysis was conducted to determine whether individuals followed this same course of development. Results led the authors to conclude that "The various steps marking the development of the five concepts considered here are reached by most children in the order established by the group analysis, and the various decalages revealed in this group analysis are found in most of the individual protocols."¹ As to the concept of egocentrism, "It seems reasonable to conclude that, at least in the development of projective spatial concepts, the egocentric attitude is regular enough to suggest that it reflects a genuine and consistent form of mental organization."²

Laurendeau and Pinard warned against interpreting the finding that twelve year olds were not entirely successful as evidence that Coordination of perspectives required formal thought. While the complexity of the task required that one be in the last stages of the concrete operational stage in order to be successful, the subject would have to be required to "consider two different systems of relations at once and to go into operations of multiplicative composition or reciprocal cancellation, etc."³ in order to require formal operational thought. The slight decalage in relation to the age of accession reported by Piaget and Inhelder for coordination of perspectives (nine to eleven years of age) was not regarded by the authors as pronounced and was attributed to differences in the samples and in the testing materials, e.g., Piaget and Inhelder's pasteboard mountains had more distinctive features which would serve as cues for the subject.

¹Ibid., p. 416.

²Ibid., p. 439.

³Ibid., p. 400.

Decline of Spatial Egocentrism

The cognitive component of coordination of perspectives, the process by which a child estimates how an array appears to someone in a position different from his, has to do with the child's ability to deal with the projective relationships between objects. To be successful, he must coordinate the relationships of before/behind and left/right to the observer's view.

Piaget and Inhelder found that the decline in egocentric choice was first evidenced by the child's focusing on a dominant feature of the stimulus array and attempting to represent that feature in relation to the other's view. This "strategy" at best resulted in a non-egocentric choice since other objects in the array were not considered.

Observed next was the concept of before/behind in relation to the observer's point of view. The other's view still could not be inferred with accuracy because the dimensions of left/right were ignored. Finally, there was evidence of the child's ability to discriminate and coordinate the internal relationships of before/behind and left/right in relation to the observer and make a completely decentered response.

The decalage in the age of accession for each of Laurendeau and Pinard's projective tasks illustrated this sequence of skill acquisition. Construction of a projective straight line, the easiest test, required "aiming" or "masking" behavior.

This behavior consists merely of placing the homogeneous parts of one and the same object in a single projective dimension (before/behind) and in relation to a single observer along one line extending the observer's gaze and free of the distortions suggested by the board's outlines.¹

¹Ibid., p. 402.

The Concepts of left and right task was more difficult than forming the straight line but easier than Coordination of perspectives.

The difficulty of this test particularly concerns the two questions on the middle object, questions whose solution requires a purely relative decentration whereby a single object can be, for a single observer, both to the left of one of the two lateral objects and to the right of the other.¹

The Coordination of perspectives test was the most difficult because it combines the difficulties of all the preceding tests. The child must differentiate and coordinate the before/behind and left/right relationships and reconstruct mentally the observer's point of view.

Coie et al., also found evidence for this sequence of skill acquisition by analyzing the non-egocentric errors of five to eleven year olds on a three-mountain type task.

In reconstructing the viewpoint of another person, the child is first more cognizant of which objects in the spatial field are visible to the other than he is of some of the other spatial relations...The second source of spatial confusions resolved by the young child is that which involves the changes in the shape and orientation of objects when seen from another's view...The ability to reconstruct the right/left relationships among objects as they would appear to another is the final acquisition in the process of development (of spatial representation.)²

Fishbein et al., described three "rules" by which a child at each cognitive stage of perspective taking appeared to operate in attempting to understand the relationship between his visual perceptions and the visual perceptions of others. The Stage 1, egocentric child operated as if by the rule "You see what I see." (or "I see what you see."). The Stage 2, non-egocentric or partially decentered child operated as if by

¹Ibid., p. 403.

²John D. Coie, Philip R. Costanzo, Douglas Farnill, "Specific Transitions in the Development of Spatial Perspective-Taking Ability," Developmental Psychology, 9 (1973): 176.

the rule "If you aren't in my place, you don't see what I see." (or "If I am not in your place, I don't see what you see.").

The acquisition of this rule presumably stems from conflicts which arise from the application of rule 1....The acquisition of the second rule normally rapidly leads to the acquisition of rule 3. Once the child learns rule 2, he attempts to find out what it is that another person sees.¹

The Stage 3, completely decentered child operated as if by the rule "If I were in your place I would see what you see." (or "If you were in my place, you would see what I see."). "Once the child acquires this rule he does not invariably perform without error, even when he is using the rule. The child still has the problem of figuring out what it is that the other person sees."²

Salatas and Flavell supplied empirical evidence for the developmental nature of these rules which they summarized in two invariant rules concerning the concept of point of view: one observer will have one view of a given display; observers in different positions will have different views of the same display.³ While they found no significant differences in kindergartener's and second-graders' understanding of the "one observer-one view" rule, there was a significant increase with age in the understanding of the "different positions-different views" rule.

Flavell et al.⁴ extended these findings by focusing on the child's

¹Harold D. Fishbein, Susan Lewis and Karen Keiffer, "Children's Understanding of Spatial Relations: Coordination of Perspectives," Developmental Psychology, 7 (1972): 31.

²Ibid., p. 31.

³Harriet Salatas and John H. Flavell, "Perspective Taking: The Development of Two Components of Knowledge," Child Development, 47 (1976): 103-109.

⁴John H. Flavell, Richard C. Omason and Cynthia Lathan, "Solving Spatial Perspective Taking Problems by Rule vs Computation: A Developmental Study," Developmental Psychology, 14 (1978): 462-73.

use of the "different observers-different views" rule. Older elementary school children were more successful than younger ones at solving coordination of perspectives problems which could only be solved by rule use, that is, the display was covered so that the subject had to infer an observer's position after having been shown two photos and having been told which observer took one of the photos.

Correlational Studies

The inability to decenter, to shift attention from one aspect of an object to another, theoretically subsumes cognitive development in general as well as the various forms of egocentrism. However, results of correlational studies have not been consistent. Feffer and Gourevitch,¹ Rubin² and Turnure³ have reported significant correlations between various perspective taking and cognitive developmental tasks and, therefore, "support for the view that the ability to "decenter" or shift perspectives is an important aspect of cognitive development."⁴

On the other hand, nonsignificant correlations between perspective taking and cognitive developmental tasks were interpreted by Kurdek as offering "little support for the convergent validity of decentration."⁵

¹Melvin H. Feffer and Vivian Gourevitch, "Cognitive Aspects of Role-Taking in Children," Journal of Personality, 28 (1960): 383-96.

²Kenneth H. Rubin, "Egocentrism in Childhood: A Unitary Construct," Child Development, 44 (1973): 102-10.

³Cynthia Turnure, "Cognitive Development and Role Taking Ability in Boys and Girls from 7-12," Developmental Psychology, 11 (1975): 202-9.

⁴Ibid., p. 209.

⁵Lawrence Kurdek, "Generality of Decentering in First Through Fourth Grade Children," Journal of Genetic Psychology, 134 (1979): 93.

Similarly, Shantz¹ advised against using the terms "role-taking" and "decentration" synonymously after finding little correlation between communicative, spatial and social egocentrism tasks and two measures of decentration. The degree of correlation among just the egocentrism tasks, on the other hand, was interpreted as moderate support of the convergent validity of egocentrism.

Rubin² also reported significant correlations between measures of spatial, role-taking and communicative egocentrism. Kurdek and Rodgen³ tested kindergarten through sixth graders and found measures of perceptual, cognitive and affective perspective taking to be significantly correlated for fifth graders only. However, Sullivan and Hunt⁴ and Leahy and Huard⁵ found no relationship between various measures of egocentrism.

These discrepant findings have been explained in terms of task complexity and/or lack of comparability of measures.⁶ For example, most

¹Carolyn U. Shantz, Generality and Correlates of Egocentrism in Children: Final Report (Bethesda, Md.: ERIC Document Reproduction Service, ED 137 331, 1976).

²Kenneth H. Rubin, "Egocentrism in Childhood: A Unitary Construct," Child Development, 44 (1973): 102-10.

³Lawrence Kurdek and Maris M. Rodgen, "Perceptual, Cognitive, and Affective Perspective Taking in Kindergarten Through Sixth Grade Children," Developmental Psychology, 11 (1975): 643-50.

⁴Edmund V. Sullivan and David E. Hunt, "Interpersonal and Objective Decentering as a Function of Age and Social Class," Journal of Genetic Psychology, 110 (1967): 100-210.

⁵Robert L. Leahy and Carolyn Huard, "Role Taking and Self-Image Disparity in Children," Developmental Psychology, 12 (1976): 504-8.

⁶Sullivan and Hunt, "Interpersonal and Objective Decentering as a Function of Age and Social Class," pp. 199-210.

studies of spatial perspective taking have employed "modifications" or "variations" of Piaget and Inhelder's three-mountain task. These modifications have represented a wide range of variability as to complexity of the array itself and the type of response required of the subject.

Fehr¹ reviewed studies of spatial perspective taking in terms of their methodological inconsistencies and identified the following task differences which contribute to discrepancies in findings: 1) number and type of stimuli in the spatial array; 2) orientation of the "other"; 3) type of task performed by the subject; 4) number and type of choice stimuli; 5) animate or inanimate "other". In general, better performance was associated with tasks for which familiar objects such as mountains, toys or animals constituted the stimulus array;² the subject was allowed to view all positions of the array before testing;³ a person filled the role of observer,⁴ rather than a picture or a doll;⁵

¹Lawrence A. Fehr, "Methodological Inconsistencies in the Measurement of Spatial Perspective Taking Ability: A Cause for Concern," Human Development, 21 (1978): 302-15.

²Christine Eiser, "Recognition and Inference in the Coordination of Perspectives," British Journal of Educational Psychology, 44(1974): 309-12.

³M. V. Cox, "The Other Observer in a Perspective Task," British Journal of Educational Psychology, 45(1975): 83-5.

⁴Lawrence A. Fehr, "Hypotheticality and the Other Observer in a Perspective Task," British Journal of Educational Psychology, 49(1979): 93-6; Paul Dodwell, "Children's Understanding of Spatial Concepts," Canadian Journal of Psychology, 17(1963): 141-61.

⁵Monique Laurendeau and Adrien Pinard, The Development of the Concept of Space in the Child (New York: International Universities Press, Inc., 1970).

choice stimuli were fewer than ten;¹ choice stimuli were three dimensional,² rather than two dimensional.³ In other words, the more concrete the task, the fewer egocentric responses reported.

According to Laurendeau and Pinard correlational statistics are not appropriate for analyzing relationships between developmental phenomena. A significant correlation merely expresses a coincidence between two variables and is not an index of any developmental relationship, whereas developmental psychology is more interested in "the filiation of two behaviors, their reciprocal dependence or their complementarity, the substitution of one for the other, etc."⁴

Reading Comprehension

Piagetian cognitive developmental theory has been applied to reading to explain the acquisition of reading skills, particularly word-attack skills.⁵ Waller reviewed several studies and reported that

¹Jack W. Miller, "Measuring Perspective Ability," Journal of Geography, 66 (1967): 167-71; Alfred J. Nigl and Harold D. Fishbein, "Perception and Conception in Coordination of Perspectives," Developmental Psychology, 10 (1974): 858-67.

²Carolyn U. Shantz and John S. Watson, "Spatial Abilities and Spatial Egocentrism in the young Child," Child Development, 42 (1971): 171-81.

³Laurendeau and Pinard, The Development of the Concept of Space in the Child: 315.

⁴Ibid., p. 414.

⁵David Elkind, Children and Adolescents, Interpretive Essays on Jean Piaget (New York: Oxford University Press, 1974).

There is generally at least a low positive relationship between performance on a variety of tests of reading and reading readiness on the one hand, and measures of level of cognitive development as regards concrete operations (specifically conservation) on the other.¹

Cox² found that below grade level readers scored significantly lower on tasks of conservation than did children reading at or above grade level. She described characteristics of the thinking of the egocentric preoperational child (inability to achieve the tasks of centration, conservation, class inclusion, and seeing states in transformation) and cited research associating each characteristic with reading achievement with the exception of one: the ability to imagine how an object would appear from various points of view. She reported no research linking egocentrism with reading comprehension. A review of the literature revealed no study of reading comprehension in terms of the reader's ability to take another person's point of view.

Tough conducted a longitudinal study of language development which included a test of reading achievement. Those scoring lower in reading achievement were of the group which scored lower on measures of language development and IQ. While there was no specific measure of perspective taking, she explained the results of her study as evidence of these children's failure to recognize the need to understand another's point of view or to have the ability to carry through with such a projection. "If language is to provide a means of exchanging meanings, then those who communicate must project into the meanings of each other."³

¹Gary T. Waller, Think First, Read Later: Piagetian Prerequisites for Reading (Bethesda, Md.: ERIC Document Reproduction Service, ED 146-570, 1977), p. 14.

²Mary B. Cox, "The Effect of Conservation Ability on Reading Competency," Reading Teacher, 30 (1976): 251-58.

³Joan Tough, The Development of Meaning (New York: John Wiley and Sons, 1977): 175.

Pichert and Anderson studied the effect of reader perspective on recall of textual material. College students were instructed to read a specially prepared passage from the perspective of a burglar or a prospective homebuyer. They then wrote as much of the exact story as they could. The group which read from the burglar perspective recalled more burglar-relevant information and vice versa. Results were interpreted in terms of schema theory, that is, a reader's schema or perspective determined the relative significance of items of information within the text. The author's concluded that "it is inappropriate to speak as though the importance of an idea unit were an invariant structural property of the text."¹

In a replication of this study, Grabe² obtained similar results in support of the theory that what was retained from a passage reflected the reader's perspective or schema. In a second experiment, the members of one group were required to prepare a written outline of everything they knew about buying a house (augmented perspective group). This group's recall performance was compared with that of a second group which was assigned the homebuyer perspective just prior to reading (perspective group) and a third group which was assigned no perspective (control group).

As anticipated, the augmented perspective group recalled significantly more relevant information than did the control group. The fact that the perspective group did not recall significantly more relevant information than did the control group was interpreted as evidence that

¹James W. Pichert and Richard C. Anderson, "Taking Different Perspectives on a Story," Journal of Educational Psychology, 69 (1977): 309-15.

²Mark D. Grabe, "Reader Imposed Structure and Prose Retention," Contemporary Educational Psychology, 4 (1979): 162-71.

the activity of preparing the outline enabled the subjects to organize and integrate the information they knew about buying a house thereby making effective the schema imposed by the assigned perspective.

The attempt to understand new information by relating it to previous knowledge or schema, termed assimilation, was considered by Piaget to be the positive component of egocentrism which he considered to be inseparable from the negative component, lack of decentration and coordination.¹ Brooks et al., applied the concept of assimilation to the problem of understanding the nature of reading comprehension. Their finding that kindergarten, fourth- and ninth-grade children comprehended faster and recalled more frequently sentences which they had judged to reflect possible relationships as opposed to those judged to reflect improbable relationships was explained in terms of assimilability of material. The sentences regarded as more probable were those with which the children had had experience and so those sentences were more easily assimilated, that is, they were more rapidly understood and more likely to be recalled later. The authors concluded that "Comprehension, instead of being a separate, isolated skill, involves the relationship of the child's knowledge and the organization of that knowledge as it relates to the material that he reads."²

¹Jean Piaget, Introduction to The Development of the Concept of Space in the Child, by M. Laurendeau and A. Pinard (New York: International Universities Press, Inc., 1970), p. 3.

²Penelope H. Brooks, Drew H. Arnold and Maria Iacobbo, "Some Cognitive Aspects of Reading Comprehension," Peabody Journal of Education, 54 (1977): 152.

CHAPTER III

METHOD AND DESIGN

The Sample

The Administrative Staff of the public schools of Richmond County, Georgia, identified six elementary schools whose populations would give the widest representation of socio-economic level. The investigator met with the principal and fourth-grade teachers of these representative schools to explain the procedures, plan the schedule and arrange for testing.

Parental permission to test was obtained for a total of 550 children who were then administered the Reading test of the Sequential Tests of Educational Progress, Series II, Level 4, Form A (hereafter referred to as STEP Series II). Those children age 9.0 to 9.6, 126 boys and 124 girls, were individually administered the Coordination of Perspectives test. Subjects scoring Stage 0 were excluded. From this purposive and incidental sampling, 10 boys and 10 girls were randomly chosen from those scoring Stage 1, Stage 2 and Stage 3. These 60 subjects constituted the research sample.

Description of Measuring Instruments

Coordination of Perspectives test.--The Coordination of perspectives test is a "simpler and more schematized version of Piaget and Inhelder's three-mountain task and, like it, "describes the progressive coordination of the different points of view possible in a group of three objects."¹ In this task, the subject must coordinate the dimensions of before/behind and left/right in relation to several objects in order to select a picture which represents another viewer's perspective of the objects. Based on choice of picture and verbal justification of pictures chosen and not chosen, the subject is assigned to one of four stages: Stage 0: Incomprehension or refusal of the task; Stage 1: Complete Egocentrism (the subject always chooses the picture of his own point of view); Stage 2: Partial Decentration (the subject makes one or two correct responses); Stage 3: Operational Coordination of Perspectives or Complete Decentration (the subject makes three correct responses and his verbal justifications do not indicate a lack of coordination). Test developers found that four percent of the nine year olds tested scored Stage 0; twenty-six percent scored Stage 1; fifty-four percent scored Stage 2; and fourteen percent scored Stage 3.

Piaget and Inhelder designed the three-mountain task in order "to study the construction of a global system linking together a number of perspectives...to examine the relationships which the child establishes between his own viewpoint and those of other observers."² Flavell, et al.,³

¹Monique Laurendeau and Adrien Pinard, The Development of the Concept of Space in the Child (New York: International Universities Press, Inc., 1970), p. 23.

²Piaget and Inhelder, Space, p. 210.

³Flavell, et al., p. 55.

modeled a task of perceptual role-taking skill after the three-mountain task. The subject's task was to reconstruct four stimulus displays as they would appear to another viewer from various positions.

In a review of studies measuring the relationship of role-taking ability and communication skills, Shantz¹ reported that variations of Piaget's three-mountain task were especially appropriate for such studies. Because of the relatively low verbal demands of the task, researchers could be assured of measuring role-taking ability rather than verbal ability.

Sequential Tests of Educational Progress, Series II.--STEP Series II is a battery of achievement tests which includes tests of Reading, English Expression, Mathematics Basic Concepts, Science and Social Studies for grades 4 through 14. The STEP Series II Reading tests assess skill in

Comprehension, the ability to understand written material that implies a knowledge of sentence structure and word relationships and involves a recollection of sequences of ideas and facts.

Translation and Inference, the ability to identify ideas when they are stated in language different from the original presentation; to deduce the meaning of figurative or obscure words, phrases, or sentences; to apply ideas to new situations; and to recognize specific inferences.

Analysis, the ability to recognize and appraise (1) literary devices, "tone," and logical structure; and (2) the author's purpose and the attitudes, beliefs, and knowledge that influenced what he wrote.²

The sentences and passages include stories, poems and selections from the literature of the sciences, social studies and humanities. Total testing time is 45 minutes. Part I requires 15 minutes and contains 30 items: 15 comprehension and 15 translation and inference. Part II

¹Carolyn U. Shantz, Communication Skills and Social Cognitive Development (Bethesda, Md.: ERIC Document Reproduction Service, ED 116 795, 1975), p. 4.

²Handbook, STEP Series II. (Princeton, New Jersey: Cooperative Tests and Services, Educational Testing Service, 1971), p. 22.

requires 30 minutes and contains 30 items: 16 comprehension, nine translation and inference and five analysis. Items in Part I contain one or two sentences in which one word is underlined. The subject must choose an option word closest in meaning to the underlined word. Part II contains six passages of varying lengths (114-395 words per passage) and the subject must answer four to six questions about each passage. Kuder Richardson Formula 20 was used to compute internal consistency coefficients (.91, Form 4A).

The original STEP series was prepared by a committee of professional educators who surveyed curricula, course objectives and the literature in order to determine what was important to measure. Actual test construction was accomplished in workshops. In the Spring of 1966, the test publishers questioned users of the test for suggestions of how STEP Series II might better meet their needs. The new series reflected these suggestions plus those of test specialists and subject-matter experts in the field. Validity, therefore, is content validity.

Data Analysis

A 3 X 2 ANOVA factorial design was used to test the hypothesis which stated that there were no statistically significant differences in mean reading comprehension raw scores of completely egocentric, partially decentered and completely decentered nine year olds. The first step in the analysis was to randomly sample ten males and ten females from each of these stages of spatial perspective taking thus forming six groups. The .05 level of significance was adopted for rejection of the null hypothesis.

A subsidiary phase of the study was an analysis of each group's performance on the comprehension items, translation and inference items, and analysis items of the test of reading comprehension. The percentage of males and females at each stage of perspective taking who correctly responded to each item in proportion to the number who attempted each item was calculated. Results of these analyses are contained in Chapter IV.

CHAPTER IV

RESULTS OF DATA ANALYSIS

This study was conducted to determine whether statistically significant differences existed between the mean reading comprehension raw scores of completely egocentric, partially decentered and completely decentered perspective takers. Two hundred fifty fourth graders age 9.0 to 9.6 were administered a group test of reading comprehension and an individual test of spatial perspective taking. Table 1 illustrates the number and percentage of males and females who scored at each stage of spatial perspective taking.

Table 1.--Number and Percentage of Males and Females Scoring at Each Stage on the Coordination of Perspectives Test.

		STAGE				Total N
		0	1	2	3	
Male	N	2	47	62	15	126
	%	2	37	49	12	
Female	N	1	38	75	10	124
	%	1	31	60	8	
Total	N	3	85	137	25	250
	%	1	34	55	10	

Analysis of Variance

Ten males and ten females were randomly chosen from Stage 1, Stage 2 and Stage 3. Mean, standard deviation and range of reading comprehension raw scores were computed for each group (Table 2).

Completely decentered males and females obtained the highest mean raw scores of 33.9 and 31.8, respectively. Completely egocentric females obtained the next highest mean raw score of 29.5 followed by partially decentered females who obtained a mean raw score of 27.3. Completely egocentric and partially decentered males obtained the lowest raw score means of 26.3 and 26.0, respectively.

Raw scores varied widely within each group, moreso for males than for females: partially decentered males, 10-53 (s.d. = 14.59); completely decentered males, 14-57 (s.d. = 12.08); completely egocentric males, 11-42 (s.d. = 9.99); partially decentered females, 15-46 (s.d. = 10.79); completely egocentric females, 19-43 (s.d. = 7.49); completely decentered females, 22-41 (s.d. = 6.96).

Males' and females' scores were combined in order to consider only stage of perspective taking. These stage totals revealed that completely decentered perspective takers obtained the highest mean raw score, 32.85; completely egocentric perspective takers obtained the next highest mean raw score, 27.9; and partially decentered perspective takers obtained the lowest mean raw score, 26.7.

A 3 X 2 ANOVA factorial design was used to test the hypothesis that there were no statistically significant differences in mean reading comprehension raw scores of nine year olds among the three stages of

Table 2.--Mean, Standard Deviation and Range of Reading Comprehension
Raw Scores by Sex and Stage of Spatial Perspective Taking.

		Mean	S.D.	Range
Stage 1	Males	26.3	9.99	11-42
	Females	29.5	7.49	19-43
	Total	27.9	9.15	11-43
Stage 2	Males	26.0	14.59	10-53
	Females	27.3	10.79	15-46
	Total	26.7	12.51	10-53
Stage 3	Males	33.9	12.08	14-57
	Females	31.8	6.96	22-41
	Total	32.85	9.65	14-57
Total		29.1	10.71	10-57

perspective taking. Since the ANOVA summary presented in Table 3 revealed no significant differences at the .05 level of significance, the null hypothesis was considered tenable.

Table 3.--Summary Table of Analysis of Variance of Mean Reading Comprehension Raw Scores of Completely Egocentric, Partially Decentered and Completely Decentered Nine Year Olds.

Source	SS	df	MS	F	P
Between	511.73	5			
Stage	430.03	2	215.02	1.89	NS
Sex	9.59	1	9.59	.08	NS
Interaction	72.11	2	36.10	.32	NS
Within	6157.20	54	114.02		
Total	6668.93	59			

Subsidiary Analysis

A subsidiary phase of the study was an analysis of each group's performance on each of the three item types which comprise the STEP Series II, Form 4A Reading test: comprehension, translation and inference, and analysis. Performance on Part I was also compared with performance on Part II.

Of the 60 items, 31 are described in the test manual as comprehension items which require the ability to recall sequences of facts and ideas. Twenty-four items are classified translation and inference items and are described as requiring the ability to comprehend figurative language, make deductions and inferences and apply ideas to new situations. Five are classified analysis items and are described as requiring the ability to understand the author's point of view.

In addition, there are two parts to the test. Part I contains items of one or two sentences in which one word is underlined, and the reader must choose a word which means most nearly the same as the underlined word. Part II contains passages of varying length with several questions per passage. In Part I there are 15 comprehension items and 15 translation and inference items; in Part II there are 16 comprehension, nine translation and inference, and five analysis items. The ratio of subjects who correctly responded to each item type to those who attempted the item was determined for males and females at each stage of perspective taking.

Table 4 illustrates the number of males and females at each stage who correctly responded to each comprehension item in proportion

Table 4.--Ratio and Percentage of Correct Responses per Attempts to Comprehension Items by Sex and Stage of Spatial Perspective Taking.

Part I Items	Stage 1				Stage 2				Stage 3			
	Male		Female		Male		Female		Male		Female	
	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%
2	7/10	70	10/10	100	9/10	90	10/10	100	10/10	100	10/10	100
4	5/10	50	8/10	80	7/10	70	9/10	90	10/10	100	6/10	60
6	7/10	70	9/10	90	5/10	50	6/10	60	8/10	80	9/10	90
8	7/10	70	9/10	90	7/10	70	10/10	100	8/10	80	9/10	90
10	5/10	50	4/10	40	5/10	50	6/10	60	6/10	60	5/10	50
12	6/10	60	5/10	50	8/10	80	5/10	50	9/10	90	8/10	80
14	7/10	70	9/10	90	6/10	60	7/10	70	8/10	80	9/10	90
16	3/10	30	6/10	60	6/9	67	3/10	30	6/10	60	6/10	60
18	9/10	90	6/10	60	3/9	33	5/10	50	6/10	60	8/10	80
19	4/10	40	5/10	50	5/9	56	5/10	50	6/10	60	8/10	80
22	1/10	10	5/10	50	2/8	25	3/10	30	4/9	44	6/9	67
24	2/10	20	4/10	40	2/8	25	3/9	33	3/9	33	2/9	22
25	3/10	30	2/10	20	2/8	25	3/9	33	4/9	44	0/8	00
27	4/10	40	4/9	44	5/8	63	4/7	57	6/9	67	0/8	00
29	3/8	38	1/8	13	1/8	13	2/7	29	3/9	33	0/8	00
Total	73/148	49	87/147	59	73/137	53	81/142	57	97/145	67	86/140	61
Part II												
Items												
3	4/10	40	3/10	30	4/10	40	3/10	30	6/10	60	6/10	60
4	2/10	20	2/10	20	2/10	20	6/10	60	2/10	20	4/10	40
5	5/10	50	7/10	70	6/10	60	7/10	70	6/10	60	6/10	60
6	5/10	50	6/10	60	5/10	50	6/10	60	5/10	50	6/10	60
7	4/10	40	2/10	20	3/10	30	3/10	30	5/10	50	4/10	40
10	7/10	70	7/10	70	6/10	60	6/10	60	7/10	70	7/10	70
12	4/10	40	4/10	40	2/9	22	2/10	20	2/10	20	6/10	60
13	1/10	10	4/10	40	4/9	44	4/10	40	6/10	60	4/10	40
15	4/10	40	3/10	30	4/9	44	5/10	50	2/10	20	3/10	30
18	4/10	40	2/10	20	5/8	63	4/10	40	6/10	60	4/9	44
19	4/10	40	3/10	30	5/8	63	3/10	30	7/10	70	4/9	44
20	2/10	20	6/10	60	3/8	38	2/10	20	2/10	20	3/9	33
24	4/9	44	3/9	33	2/7	29	2/9	22	4/8	50	3/8	38
25	6/9	67	5/8	63	1/7	14	6/9	67	4/8	50	2/8	25
26	2/9	22	3/8	38	3/6	50	4/9	44	5/7	71	4/8	50
28	1/8	13	1/8	13	2/6	33	5/9	56	2/6	33	3/7	43
Total	61/155	39	61/153	40	57/137	42	68/156	44	71/149	48	69/148	47
TOTAL	143/303		148/300		130/274		149/298		168/294		155/288	
PERCENTAGE	44		49		47		50		57		54	

to the number who attempted each item. The percentage of correct responses per attempts varied widely among the items for all groups. For example, the percentage of correct responses to item number 2 ranged from 70 (Stage 1 males) to 100 (Stages 1, 2, and 3 females and Stage 3 males), and the percentage of correct responses to item number 18 ranged from 33 (Stage 2 males) to 90 (Stages 1 and 3 females). There was a very slight increase in performance with stage increase on both Parts I and II, and performance of each group was better on Part I than on Part II.

Table 5 illustrates the number of males and females at each stage who correctly responded to each translation and inference item in proportion to the number who attempted each item. Again, there was wide variation of percentage of correct responses among the items for all stages. For example, for item number 9 percentages correct ranged from 60 (Stage 2 females) to 100 (Stage 3 males and females), and for item number 11 percentages correct ranged from 30 (Stage 1 males and Stage 2 females) to 60 (Stage 1 females). Stage 3 males and females scored better than Stage 2 males and females and Stage 1 males. However, Stage 1 females performed almost as well as Stage 3 males and females. Again, each group performed better on Part I than on Part II.

Table 6 illustrates the number of males and females at each stage who correctly responded to each analysis item in proportion to the number who attempted each item. Wide variation in the percentage of correct responses among the items and for all groups was again evidenced. For item number 8 the percentage correct ranged from 20 (Stage 1 males) to 80 (Stage 3 females), and for item number 30 the percentage correct

Table 5.--Ratio and Percentage of Correct Responses per Attempts to Translation and Inference Items by Sex and Stage of Spatial Perspective Taking.

Part I Items	Stage 1				Stage 2				Stage 3			
	Male		Female		Male		Female		Male		Female	
	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%
1	8/10	80	8/10	80	9/10	90	9/10	90	10/10	100	9/10	90
3	8/10	80	10/10	100	8/10	80	9/10	90	10/10	100	10/10	100
5	8/10	80	10/10	100	5/10	50	6/10	60	8/10	80	9/10	90
7	7/10	70	9/10	90	5/10	50	8/10	80	10/10	100	9/10	90
9	7/10	70	9/10	90	7/10	70	6/10	60	10/10	100	10/10	100
11	3/10	30	6/10	60	5/10	50	3/10	30	4/10	40	5/10	50
13	7/10	70	8/10	80	8/10	80	7/10	70	7/10	70	9/10	90
15	5/10	50	6/10	60	5/9	56	5/10	50	7/10	70	6/10	60
17	5/10	50	7/10	70	4/9	44	4/10	40	8/10	80	10/10	100
20	5/10	50	5/10	50	1/9	11	2/10	20	3/10	30	3/10	30
21	3/10	30	5/10	50	2/8	25	2/10	20	4/9	44	2/10	20
23	4/10	40	4/10	40	5/8	63	5/10	50	4/9	44	8/9	89
26	4/10	40	7/9	78	5/8	63	3/8	38	8/9	89	6/8	75
28	2/10	20	1/9	11	3/8	38	3/7	43	5/9	56	0/8	00
30	2/8	25	2/8	25	3/8	38	0/7	00	3/8	38	1/6	17
Total	78/148	53	97/146	66	75/137	55	72/142	51	101/144	70	97/141	69
Part II												
Items												
1	6/10	60	6/10	60	6/10	60	5/10	50	7/10	70	6/10	60
2	6/10	60	8/10	80	4/10	40	6/10	60	9/10	90	5/10	50
9	5/10	50	5/10	50	7/10	70	6/10	60	6/10	60	7/10	70
14	4/10	40	3/10	30	2/9	22	1/10	10	5/10	50	2/10	20
17	4/10	40	7/10	70	4/8	50	8/10	80	6/10	60	8/9	89
21	5/10	50	3/10	30	1/8	13	1/10	10	4/9	44	6/9	67
22	3/9	33	1/10	10	5/7	71	0/10	00	2/9	22	2/8	25
23	2/9	22	2/9	22	4/7	57	1/9	11	3/8	38	2/8	25
29	3/8	38	0/8	00	2/6	33	4/9	44	1/6	17	2/7	29
Total	38/86	44	35/87	40	35/75	47	32/88	36	43/82	52	40/81	49
TOTAL	116/234		132/233		110/212		104/230		144/226		137/222	
PERCENTAGE		50		57		52		45		64		62

Table 6.--Ratio and Percentage of Correct Responses per Attempts to Analysis
Items by Sex and Stage of Spatial Perspective Taking.

Part II Items	Stage 1				Stage 2				Stage 3			
	Male		Female		Male		Female		Male		Female	
	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%	ratio	%
8	2/10	20	4/10	40	4/10	40	3/10	30	7/10	70	8/10	80
11	2/10	20	5/10	50	4/9	44	5/10	50	8/10	80	7/10	70
16	4/10	40	4/10	40	5/9	56	4/10	40	8/10	80	6/9	67
27	3/8	38	2/8	25	3/6	50	5/9	56	2/6	33	3/7	43
30	2/8	25	0/8	00	4/6	67	3/9	33	2/6	33	2/6	33
TOTAL	13/46		15/46		20/40		20/48		27/42		26/42	
PERCENTAGE		28		32		50		42		64		62

ranged from zero (Stage 1 females) to 67 (Stage 2 females). Only Part II contained analysis items.

Stage percentages of correct responses summarized in Table 7 indicated that Stage 3 perspective takers scored better than Stage 1 and Stage 2 perspective takers on all item types. Stage 2 perspective takers scored better than Stage 1 perspective takers on analysis items.

Summary of Data Analysis

A 3 X 2 ANOVA factorial design was used to test the hypothesis that there were no statistically significant differences in mean reading comprehension raw scores of nine year olds among the three stages of perspective taking. Results of this analysis revealed no statistically significant differences at the .05 level, and the null hypothesis was considered tenable. Comparison of the performance of subjects at each stage of perspective taking on comprehension, translation and inference, and analysis items indicated a possible trend toward increased performance on analysis items with increase in perspective taking ability.

Table 7.--Percentage of Correct Responses per Attempts on Comprehension,
Translation and Inference, and Analysis Items of the STEP Series
II Reading Test for each Stage of Spatial Perspective Taking.

	Items		
	Comprehension	Translation & Inference	Analysis
Stage 1	47	53	30
Stage 2	49	48	45
Stage 3	55	63	63

CHAPTER V

SUMMARY, CONCLUSIONS and DISCUSSION, and RECOMMENDATIONS

The basic purpose of this study was to determine whether nine year olds capable of taking another's literal spatial perspective performed better on a test of reading comprehension than did nine year olds who could not successfully "decenter" from their own points of view. Two hundred fifty fourth graders, 126 males and 124 females, age 9.0 to 9.6 were administered the Coordination of perspectives test,¹ a more schematized version of Piaget and Inhelder's three-mountain task, and the STEP Series II Reading test,² a group test of reading comprehension.

For the perspective task the child was seated in front of a three dimensional model of three cones, each a different size and color. For each of three problems a toy man was placed in a position different from the child's whose task was to select the picture the little man would take from among five pictures of various perspectives of the array. This required that the child coordinate the dimensions of left/right and before/behind since at least one alternative correctly represented one of

¹Monique Laurendeau and Adrien Pinard, The Development of the Concept of Space in the Child (New York: International Universities Press, Inc., 1970), p. 310.

²Sequential Tests of Educational Progress, Series II (Princeton, New Jersey: Cooperative Tests and Services, Educational Testing Service, 1971).

these dimensions. On the basis of his choice and his verbal justification of his rejections, the child was classified as to stage of perspective taking ability.

One percent of the subjects tested demonstrated a lack of comprehension or totally refused the task and were classified Stage 0. Thirty-four percent (.37, male; .31, female) invariably chose the picture which represented their point of view and were classified Stage 1, completely egocentric. Fifty-five percent (.49, male; .60, female) were in a transitional state and made one or two decentered choices and were classified Stage 2, partially decentered. The ten percent classified Stage 3, completely decentered (.12, male; .08, female), made three decentered choices and their verbalizations confirmed their ability to discriminate and coordinate perspectives.

In order to test the hypothesis that there was no difference in mean reading comprehension raw scores of completely egocentric, partially decentered and completely decentered perspective takers, ten males and ten females were randomly selected from Stage 1, Stage 2 and Stage 3. A two-way analysis of variance of mean reading comprehension raw scores and stage of perspective taking revealed no statistically significant differences.

A subsidiary phase of the study involved analysis of each group's performance on different item types of the reading comprehension test. The percentage of correct responses per attempts on comprehension, translation and inference, and analysis items was calculated for each group and the following differences were revealed: Stage 3 males and females obtained the largest percentages of correct responses on each

item type. Stage 2 males and females obtained higher percentages than did Stage 1 males and females on analysis items.

Conclusions and Discussion

1. The results on the Coordination of perspectives test confirmed findings of Laurendeau and Pinard, test developers, in that the majority of nine year olds were found to be in a stage of transition from egocentrism to perspectivism.

2. The reading comprehension raw scores of a sample of ten males and ten females at each stage of perspective taking varied widely within groups so that there was no statistically significant difference in the mean reading comprehension raw scores of completely egocentric, partially decentered and completely decentered perspective takers.

3. Stage 3 perspective takers (completely decentered) obtained a higher percentage of correct responses per attempts to analysis items of the reading test than did Stage 2 (partially decentered) perspective takers.

4. Stage 2 perspective takers obtained a higher percentage of correct responses per attempts to analysis items of the reading test than did Stage 1 (completely egocentric) perspective takers.

5. The ability to take another's literal spatial perspective appears to have little bearing on comprehension of sequences of details or the ability to deduce the meaning of figurative language and make specific inferences from material read.

6. There appears to be a trend toward increased comprehension of items on a reading comprehension test which required understanding the author's point of view with increase in stage of spatial perspective taking.

7. The conclusions drawn by some researchers that teachers neglect the meaning aspect of reading instruction as evidenced by elementary school children's lack of meaning definitions when asked "What is reading?" seems unjustified. If 34 percent of fourth graders are not able to take another's point of view, it might be assumed that those in earlier grades and particularly first graders would not be able to comprehend and/or communicate the notion that writing exists, and therefore reading, because one person is attempting to share an idea or an experience with another.

8. Ten percent of the 250 nine year olds administered the Coordination of perspectives test were completely successful. As concrete operations theoretically subsumes the ability to take another's point of view, only these students would be considered solidly concrete operational. Fifty-five percent were partially successful on the test and therefore partially concrete operational. Thirty-four percent were completely unsuccessful and would be assumed preoperational or transitional. This raises many questions since the ability to conserve has been found to be necessary for successful beginning reading instruction.

(a) Many of the subjects who scored poorly on the perspective taking task and who might therefore be considered preoperational or transitional were entirely successful in terms of number of correct answers on the test of reading comprehension. Are, then, concrete operations really necessary for successful beginning reading? Exactly what is "successful beginning reading?"

(b) Do concrete operations, in fact, subsume perspective taking ability?

(c) What was the stage of cognitive development of the ten percent of subjects who were completely successful on the perspective taking task?

Development occurs, according to Piaget, because one is confronted with opposition of some sort. Until an idea is opposed or action thwarted,

there is no reason for a child to give up the conviction that everyone sees, literally or figuratively, the situation just as he does. Therefore, the ability to engage in argument is an indication of the child's emerging ability to take another person's point of view. It is recommended that teachers make positive use of arguing behavior by structuring language activities which purposefully elicit differing points of view and help the students identify these and label them as being "mine," "yours," "author's," "classmate's," etc. In this way students become aware of the phenomenon of point of view, the initial step in overcoming egocentrism.

Progression beyond literal comprehension of written material becomes basically a matter of recognizing and successfully dealing with conflict of some sort. The conflict may be inherent as in a work of fiction; it may be due to lack of understanding of concepts or vocabulary; or it may be due to a lack of agreement with the author's point of view. Regardless of the source, communication between author and reader has no chance of becoming a reality if the reader either does not recognize the discrepancy or has no strategy for dealing with it.

The teacher's task, therefore, becomes one of creating an atmosphere in which conflict is regarded as a natural product of growth. This is the concept inherent in the Socratic method. Questions should be posed and responses probed in such a way as to set up a state of mild disequilibrium, thereby defining the problem, i.e., conflict, and assisting students in developing problem solving strategies.

Recommendations

Studies need to be conducted which will answer the above questions and clarify the apparent trend toward increased analytical reading comprehension with increase in the ability to take another's point of view. Specific recommendations are:

1. Compare major tests of reading comprehension in terms of percentages of literal, figurative and analytical items of each and at each grade level.

2. Conduct a study similar to this one with the following exceptions:

- (a) substitute an instrument which assesses literal, figurative and analytical reading comprehension in equal proportion;
- (b) exclude subjects reading below grade level;
- (c) include a measure of communicative egocentrism;
- (d) include subjects at a variety of ages, especially eleven to twelve year olds, 50 percent of whom would be expected to be completely decentered, and college students, the largest percentage of whom should be completely decentered.

3. Conduct a longitudinal study of reading comprehension and perspective taking ability.

4. Selman¹ has identified perspective taking as necessary but not sufficient for moral development. Considering the high percentage of moral relevant material contained in basal readers² an investigation of the relationship between reading comprehension of moral-laden content, stage of perspective taking and stage of moral development is recommended.

¹Robert Selman, "Toward a Structural Analysis of Developing Interpersonal Relations Concepts," In X Annual Minnesota Symposium on Child Psychology, ed. A. Pick (Minneapolis, Minnesota: University of Minnesota Press, 1976): 11.

²Charlotte Abercrombie, "A content Analysis of Reading Textbooks in Terms of Moral Value," Unpublished Dissertation, Columbia University, 1974.

5. Investigate content areas in terms of degree of decentration required to comprehend the concepts and type of reading required to comprehend the text, i.e., literal, figurative or analytical.

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APPENDIX

STEP SERIES II READING TEST RAW SCORES

Table 8.--STEP Series II Reading Test Raw Scores by Sex and Stage of Spatial Perspective Taking.

Stage 1 Males		Stage 2 Males		Stage 3 Males	
ID	RS	ID	RS	ID	RS
003	32	130	13	048	49
025	16	245	19	074	28
126	11	425	27	108	14
128	16	448	18	178	30
263	23	494	10	179	31
265	27	200	53	202	32
298	40	281	40	343	57
401	26	406	44	355	37
424	42	472	19	356	36
445	30	495	17	376	25
	<hr/>		<hr/>		<hr/>
	263		260		339
X =	26.3		26.0		33.9
<hr/>					
Females		Females		Females	
006	34	031	24	011	36
075	30	052	34	057	41
049	31	054	33	186	32
111	23	181	18	271	41
151	33	251	19	350	22
152	19	348	42	378	33
180	21	407	15	429	36
208	36	409	46	430	28
449	25	428	19	479	27
446	43	010	23	527	22
	<hr/>		<hr/>		<hr/>
	295		273		318
X =	29.5		27.3		31.8

Table 9.--Individual Performance of Stage 1 Males on the STEP Series II Reading Test by Item and Part.

ITEMS	STAGE 1 MALES									
	003	025	126	128	263	265	298	401	424	445
PART I	1	+	+	-	-	+	+	+	+	+
	2	+	-	+	-	+	+	+	+	+
	3	+	-	-	+	+	+	+	+	+
	4	-	-	-	-	+	-	+	+	+
	5	+	+	-	+	+	-	+	+	+
	6	+	+	-	-	-	+	+	+	+
	7	+	-	-	-	+	+	+	+	+
	8	+	-	-	+	+	+	+	+	+
	9	+	-	-	+	+	+	+	+	+
	10	-	-	-	+	+	+	-	+	-
	11	-	-	-	-	+	+	-	+	+
	12	+	+	-	-	-	+	+	+	+
	13	+	-	+	-	-	+	+	+	+
	14	+	-	-	+	+	+	+	+	+
	15	-	-	+	-	+	+	-	+	-
	16	+	-	-	-	+	-	-	+	-
	17	+	-	-	-	+	+	+	+	-
	18	+	-	+	+	+	+	+	+	+
	19	+	-	-	+	-	-	-	+	+
	20	+	-	+	+	-	-	+	+	-
	21	-	-	+	+	-	-	-	+	-
	22	-	+	-	-	-	-	-	-	-
	23	+	-	-	-	-	+	+	+	-
	24	-	-	-	-	-	+	+	-	-
	25	-	-	-	+	-	+	-	+	-
	26	-	+	-	-	-	+	-	+	-
	27	+	-	-	+	-	+	+	-	-
	28	-	-	-	-	-	-	+	-	+
	29	-	+	+	+	-	0	-	0	-
	30	+	-	-	-	-	0	-	0	+
	total:	19	7	7	13	15	18	17	15	16
PART II	1	+	+	-	-	+	+	-	+	+
	2	-	+	-	-	-	+	+	+	+
	3	-	-	+	-	-	+	+	-	-
	4	-	-	-	-	+	-	-	-	+
	5	-	+	-	-	-	+	+	+	+
	6	+	-	-	-	-	+	+	+	+
	7	-	-	-	+	-	+	-	+	+
	8	-	-	-	-	-	+	-	+	-
	9	-	+	-	+	-	+	+	+	-
	10	-	+	-	+	+	+	+	+	-
	11	+	-	-	-	-	-	-	+	+
	12	-	-	-	-	-	+	-	+	+
	13	-	-	-	-	-	-	+	+	-
	14	-	-	-	-	-	+	+	+	+
	15	+	-	-	-	-	+	+	+	-
	16	+	-	-	-	+	-	-	+	-
	17	+	-	+	-	-	+	-	+	-
	18	+	-	-	-	+	+	-	+	-
	19	+	+	-	-	-	+	-	-	-
	20	-	-	-	-	-	+	+	-	-
	21	+	+	-	-	+	-	-	+	+
	22	-	-	-	0	-	+	-	+	+
	23	+	-	-	0	-	+	-	-	-
	24	-	-	-	0	+	+	-	+	-
	25	-	+	+	0	-	+	+	+	+
	26	+	-	-	0	-	+	-	-	-
	27	+	-	-	0	-	-	+	0	+
	28	-	-	-	0	-	+	-	0	-
	29	+	-	+	0	-	+	-	0	-
	30	-	+	-	0	+	-	-	0	+
	total:	13	9	4	3	8	9	23	11	14

Table 10.--Individual Performance of Stage 1 Females on the
STEP Series II Reading Test by Item and Part.

STAGE 1 FEMALES										
ITEMS	006	075	049	111	151	152	180	208	449	446
PART I	1	+	-	+	+	+	-	+	+	+
	2	+	+	+	+	+	+	+	+	+
	3	+	+	+	+	+	+	+	+	+
	4	+	+	+	-	+	+	+	+	+
	5	+	+	+	+	+	+	+	+	+
	6	+	+	+	+	-	+	+	+	+
	7	+	+	+	+	+	-	+	+	+
	8	+	+	+	+	+	+	+	-	+
	9	+	+	+	+	+	+	+	-	+
	10	-	-	+	-	-	-	+	+	-
	11	+	+	+	-	+	-	+	-	+
	12	+	-	-	-	+	-	-	+	+
	13	+	-	+	+	+	-	+	+	+
	14	+	+	+	+	+	+	-	+	+
	15	+	-	+	-	+	+	-	+	+
	16	+	+	+	-	-	-	-	+	+
	17	-	+	+	+	+	+	-	+	+
	18	+	-	+	+	+	-	-	+	-
	19	+	-	+	-	-	-	-	+	+
	20	+	+	-	-	-	+	+	-	+
	21	-	+	+	-	+	+	-	+	-
	22	-	+	+	-	+	-	-	-	+
	23	-	-	+	-	+	-	-	-	+
	24	-	+	+	+	-	-	+	-	-
	25	-	-	-	-	+	-	-	-	+
	26	+	+	0	+	+	-	+	+	-
	27	+	-	0	-	-	-	+	+	+
	28	-	-	0	-	-	+	-	-	-
	29	-	-	0	-	0	-	-	-	+
	30	-	-	0	-	0	-	-	+	-
<hr/>										
total:	20	17	22	14	20	13	14	23	17	24
<hr/>										
PART II	1	+	-	+	+	+	-	-	+	-
	2	+	+	+	+	-	+	+	+	-
	3	-	+	-	-	+	-	-	-	-
	4	-	-	+	-	-	-	-	-	+
	5	+	+	+	+	+	-	-	+	+
	6	+	+	-	-	+	+	+	-	+
	7	-	-	-	-	+	-	-	-	+
	8	-	+	+	-	-	+	-	-	+
	9	-	+	-	-	+	-	-	+	+
	10	+	+	-	+	+	-	+	-	+
	11	+	+	+	-	+	-	-	-	+
	12	-	-	-	+	-	-	-	+	+
	13	-	-	-	+	+	-	+	-	+
	14	-	+	+	-	+	-	-	-	-
	15	-	-	-	-	+	-	-	+	+
	16	+	-	-	-	-	-	-	+	+
	17	+	+	+	+	-	-	-	+	+
	18	+	-	-	-	+	-	-	-	-
	19	-	+	-	-	-	-	-	+	+
	20	+	-	-	+	+	+	-	-	+
	21	+	-	-	-	-	+	-	-	+
	22	-	-	-	-	-	-	-	-	+
	23	+	-	-	-	0	-	+	-	-
	24	-	+	-	-	0	-	+	+	-
	25	-	-	+	+	0	-	+	+	0
	26	+	-	-	-	0	+	-	-	0
	27	-	+	-	-	0	-	-	+	0
	28	+	-	-	-	0	-	-	-	0
	29	-	-	-	-	0	-	-	-	0
	30	-	-	-	-	0	-	-	-	0
<hr/>										
total:	14	13	9	9	13	6	7	13	8	19

Table 11.--Individual Performance of Stage 2 Males on the STEP Series II Reading Test by Item and Part.

STAGE II MALES										
ITEMS	130	245	425	448	494	200	281	406	472	495
PART I	1	+	+	+	-	+	+	+	+	+
	2	+	+	+	-	+	+	+	+	+
	3	+	-	+	+	+	+	+	-	+
	4	-	+	+	-	+	+	+	+	+
	5	-	-	+	-	+	+	+	-	+
	6	-	+	+	-	+	+	+	-	-
	7	-	-	+	-	+	+	+	-	+
	8	+	-	+	+	+	+	+	-	-
	9	+	+	+	-	+	+	+	-	+
	10	+	-	-	-	+	+	+	-	+
	11	-	-	-	-	+	+	+	+	+
	12	+	-	-	+	+	+	+	+	+
	13	+	-	+	+	+	-	+	+	+
	14	-	+	+	+	+	-	+	-	+
	15	-	-	-	+	0	+	-	+	+
	16	-	+	-	+	0	+	+	+	-
	17	-	-	+	-	0	+	+	-	-
	18	-	-	+	-	0	+	+	-	-
	19	-	+	-	+	0	+	-	+	-
	20	-	-	-	+	0	-	-	-	-
	21	-	-	+	-	0	+	-	-	0
	22	-	-	-	-	0	+	-	-	0
	23	+	-	+	-	0	+	-	+	0
	24	+	-	-	-	0	-	+	-	0
	25	-	+	+	-	0	-	-	-	0
	26	-	+	-	+	0	+	+	-	0
	27	-	-	+	+	0	+	+	-	0
	28	-	-	-	-	0	+	+	-	0
	29	-	-	-	-	0	+	-	-	0
	30	-	-	-	-	0	+	+	+	0
	total:	10	10	17	13	4	27	19	24	13
PART II	1	-	+	-	-	+	+	+	+	-
	2	-	-	-	-	-	+	+	+	+
	3	-	+	-	-	-	+	+	-	-
	4	-	-	-	-	+	-	+	-	-
	5	-	-	+	-	+	+	+	-	-
	6	+	+	-	-	+	-	+	-	+
	7	-	-	-	-	+	+	-	-	-
	8	-	+	-	-	+	-	+	-	+
	9	+	+	-	-	+	+	+	+	+
	10	-	-	-	+	+	+	+	+	-
	11	-	-	-	+	+	+	-	-	0
	12	-	-	-	-	+	+	-	-	0
	13	-	+	+	-	+	-	+	-	0
	14	-	-	+	-	-	+	-	-	0
	15	-	-	-	-	+	+	+	+	0
	16	+	-	+	-	+	+	+	-	0
	17	-	-	+	-	0	+	+	+	0
	18	-	+	-	-	0	+	+	+	0
	19	-	+	+	-	0	+	+	-	0
	20	-	-	-	-	0	+	+	-	0
	21	-	-	-	+	0	-	-	-	0
	22	0	-	+	+	0	+	-	+	0
	23	0	-	+	+	0	+	-	-	0
	24	0	+	+	-	0	-	-	-	0
	25	0	-	-	-	0	-	+	-	0
	26	0	0	-	-	0	+	+	-	0
	27	0	0	-	-	0	+	+	-	0
	28	0	0	+	-	0	+	-	-	0
	29	0	0	-	-	0	+	+	-	0
	30	0	0	-	-	0	+	+	+	0
	total:	3	9	10	5	6	26	21	20	4

Table 12.--Individual Performance of Stage 2 Females on the STEP Series II Reading Test by Item and Part.

STAGE II FEMALES										
ITEMS	031	052	054	181	251	348	407	409	428	010
PART I	1	+	+	+	-	+	+	+	+	+
	2	+	+	+	+	+	+	+	+	+
	3	+	+	+	+	+	+	+	+	+
	4	-	+	+	+	+	+	+	+	+
	5	-	+	+	+	+	+	-	+	-
	6	+	+	+	-	-	+	-	+	+
	7	+	+	+	-	+	+	+	+	-
	8	+	+	+	+	+	+	+	+	+
	9	+	+	+	+	-	+	-	+	-
	10	+	+	-	+	-	+	-	+	-
	11	+	-	-	-	-	+	+	-	-
	12	-	+	+	-	-	+	-	+	+
	13	+	-	+	-	+	+	+	+	-
	14	+	-	+	+	-	+	-	+	+
	15	-	+	+	+	-	+	-	+	-
	16	+	-	-	-	-	+	-	+	-
	17	-	+	-	-	-	+	-	+	-
	18	-	+	+	+	-	+	-	+	-
	19	+	+	+	-	-	+	-	-	+
	20	-	-	-	-	-	-	+	-	+
	21	-	-	-	+	-	-	-	+	-
	22	-	+	+	-	-	-	+	-	-
	23	-	-	+	-	-	+	+	+	-
	24	-	-	-	-	-	+	-	+	-
	25	0	+	-	-	-	-	+	+	-
	26	0	-	+	0	-	-	-	+	-
	27	0	0	+	0	+	+	-	+	-
	28	0	0	-	0	+	+	-	-	-
	29	0	0	-	0	-	+	-	-	-
	30	0	0	-	0	-	-	-	-	-
total:13		17	19	11	10	24	11	23	11	14
PART II	1	+	+	+	-	-	-	+	+	-
	2	+	-	+	-	+	-	+	+	+
	3	-	-	+	+	-	-	-	+	-
	4	-	+	-	-	-	+	+	+	+
	5	+	+	+	-	+	+	-	+	+
	6	+	-	+	+	-	+	+	-	-
	7	-	+	-	-	-	-	-	+	+
	8	-	+	-	-	-	+	-	+	-
	9	+	+	-	+	+	-	+	+	-
	10	+	+	+	-	-	+	-	+	-
	11	-	+	+	-	+	+	-	+	-
	12	-	-	-	-	-	-	-	+	-
	13	+	-	+	-	-	+	-	+	-
	14	-	-	-	-	-	-	-	+	-
	15	-	+	+	-	-	+	-	+	-
	16	+	-	+	-	-	+	-	+	-
	17	+	+	+	+	-	+	-	+	+
	18	+	-	-	-	+	+	-	+	-
	19	+	-	-	+	-	+	-	-	-
	20	-	-	-	-	-	-	-	+	-
	21	-	-	-	-	-	+	-	-	+
	22	-	-	-	-	-	-	-	-	-
	23	0	+	-	-	-	-	-	-	-
	24	0	+	-	-	-	-	-	+	-
	25	0	+	+	-	-	+	+	+	-
	26	0	+	-	-	-	+	-	+	+
	27	0	+	+	-	+	+	-	+	-
	28	0	+	-	+	+	+	-	+	-
	29	0	+	-	+	+	+	-	-	-
	30	0	-	+	-	+	-	-	-	+
total:11		17	14	7	9	18	4	23	8	9

Table 13.--Individual Performance of Stage 3 Males on the STEP Series II Reading Test by Item and Part.

STAGE III MALES										
ITEMS	048	074	108	178	179	202	343	355	356	376
1	+	+	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+	+	+
5	+	-	-	+	+	+	+	+	+	+
6	+	+	-	+	+	-	+	+	+	+
7	+	+	+	+	+	+	+	+	+	+
8	+	+	-	+	+	+	-	+	+	+
9	+	+	+	+	+	+	+	+	+	+
10	+	-	-	-	-	+	+	+	+	+
11	+	-	-	-	+	-	+	+	-	-
12	+	+	-	+	+	+	+	+	+	+
13	+	+	-	-	+	+	+	+	+	+
14	+	+	-	+	+	-	+	+	+	+
15	+	-	-	+	+	+	+	-	+	+
16	+	-	-	+	+	+	+	+	-	-
17	-	+	-	+	+	+	+	+	+	+
18	+	+	-	+	-	-	+	+	+	-
19	+	+	-	-	+	+	+	+	-	-
20	-	-	+	-	-	-	+	+	-	-
21	+	-	-	-	+	-	+	-	+	0
22	-	+	+	-	-	+	+	-	-	0
23	-	-	-	-	-	+	+	+	+	0
24	+	-	-	+	-	-	+	-	-	0
25	+	-	-	+	-	-	+	-	+	0
26	+	+	+	+	+	-	+	+	+	0
27	+	+	-	-	-	+	+	+	+	0
28	+	-	-	-	-	+	+	+	+	0
29	+	-	-	-	-	+	-	+	-	0
30	-	0	-	-	+	+	+	-	-	0
total:	25	16	9	18	20	21	28	24	22	15

1	+	-	-	+	+	+	+	+	+	-
2	+	-	+	+	+	+	+	+	+	+
3	-	+	-	-	+	-	+	+	+	+
4	-	-	-	-	-	-	+	-	+	-
5	+	+	-	+	-	+	+	+	-	-
6	+	-	-	-	-	+	+	-	+	+
7	+	-	+	+	-	-	+	+	+	-
8	+	+	+	+	-	-	+	+	-	+
9	+	-	+	-	-	-	+	+	+	+
10	+	+	+	-	+	-	+	+	-	+
11	+	+	-	+	+	+	+	+	-	+
12	+	-	-	-	-	-	+	-	-	-
13	+	+	-	-	-	-	+	+	+	+
14	+	-	-	+	+	-	+	-	+	-
15	+	-	-	-	-	-	+	-	-	-
16	+	+	+	-	+	+	+	+	+	-
17	-	+	-	+	+	+	+	-	-	+
18	+	-	-	+	-	+	+	+	+	+
19	+	+	-	+	+	+	+	-	+	-
20	-	+	-	-	-	-	+	-	-	-
21	+	+	-	-	-	-	+	+	-	0
22	+	-	-	-	-	-	+	-	-	0
23	+	-	-	-	-	+	+	0	-	0
24	-	+	-	+	+	-	+	0	-	0
25	+	-	-	+	-	-	+	0	+	0
26	+	0	-	-	+	+	+	0	+	0
27	+	0	-	0	-	-	+	0	-	0
28	+	0	-	0	-	-	+	0	-	0
29	-	0	-	0	-	-	+	0	-	0
30	+	0	-	0	-	+	-	0	-	0
total:	24	12	5	12	11	11	29	13	14	10

PART II