

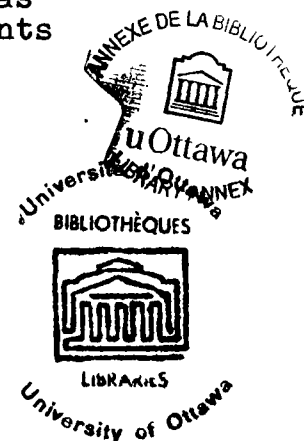
PSYCHO-LINGUISTIC GUESSING AND FIELD-  
DEPENDENCE-INDEPENDENCE IN READING  
COMPREHENSION ACHIEVEMENT IN  
GRADE 7

by

Augustus Pierre

Thesis presented to the School of Graduate  
Studies of the University of Ottawa as  
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### CURRICULUM STUDIORUM

Augustus Pierre was born in Trinidad, West Indies on August 27, 1919. He obtained the Degree of Bachelor of Arts in Economics from Exeter University, England, in 1960 and the Degree of Master in Education from the University of Ottawa in 1973.

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## INTRODUCTION

The work of Goodman and his associates (1970)<sup>1,2</sup> on the concept of psycho-linguistic guessing game in reading comprehension has stimulated widespread interest and generated much discussion and research by other investigators.

Recent studies (1970, 1973)<sup>3,4</sup> have demonstrated a functional relationship between efficient psycho-linguistic guessing and reading comprehension achievement. From the findings of these and other studies (1971, 1974)<sup>5,6</sup>

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<sup>1</sup>Kenneth Goodman, "Reading: A Psycho-linguistic Guessing Game," in Theoretical Models and Processes of Reading, Delaware, I.R.A., 1970, p. 260. (Ed. Singer and Ruddell).

<sup>2</sup>Yetta Goodman, "Using Children Miscues for New Reading Strategies," The Reading Teacher, Vol. 23, Feb., 1970, pp. 445-449.

<sup>3</sup>Frank Smith, Understanding Reading, New York, Holt, Rinehart and Winston, 1970, pp. 70-77.

<sup>4</sup>Frank Smith, Psycho-linguistics and Reading, New York, Holt, Rinehart and Winston, 1973, 211 p.

<sup>5</sup>Frank Smith, "The Role of Prediction in Reading" in Condensed Version of Presentation to the Reading '74 Conference at York University, Toronto, Feb., 1974, pp. 9-10.

<sup>6</sup>L. Perney, "The Relationship of Field-Dependence-

it would appear that Goodman's good psycho-linguistic guessers, not bound by the constraints of the printed page, tend to excel in reading comprehension by bringing their experience to bear on the reading matter. Thus, in processing information, they make correct predictions by anticipating the grammatical structure and by depending largely on a system of cues.

Clearly, in style of cognitive functioning and in their patterns of adaptation, Goodman's good psycho-linguistic guessers have many of the attributes of Witkin's field-independent subjects, that is, they go beyond the information given.<sup>7,8</sup>

In brief summary, a number of the characteristics associated with comprehension ability appear similar to those associated with cognitive style.<sup>9</sup>

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Independence," Unpublished Doctoral Dissertation, Ann Arbor, Michigan, University Microfilms, 1971, p. 3.

<sup>7</sup>J. Bruner, Going Beyond the Information Given, New York, Norton, 1973, p. 135.

<sup>8</sup>F. Bartlett, The Mind at Work and Play, Boston, Beacon Press, 1957, p. 42.

<sup>9</sup>L. Perney, "The Relationship of Field-Dependence-Independence with Academic Achievement," Unpublished Doctoral Dissertation, Ann Arbor, Michigan University Microfilms, 1971 (Introduction II).

It would, therefore, seem that personality traits are related to comprehension ability in Goodman's frame of reference. However, it appears that so far, very little has been done to investigate such relationships.

It is out of this uncertain situation that the present study has emerged. Broadly expressed, this study lies within the area of cognitive style and reading comprehension. More specifically, it seeks to examine the extent to which achievement in comprehension in Goodman's frame of reference is related to field-dependence-independence.

The thesis is organized into four chapters. The first consists of a review of the literature which leads to the statement of the problem and the research hypothesis. The second chapter states and describes the procedures by means of which the hypothesis stated in the first chapter is tested. The third chapter presents the results of the study. In the final chapter a discussion of the results is attempted. The report ends with a summary and the statement of conclusions, an annotated bibliography, several appendices and an abstract of the thesis.

## CHAPTER I

### REVIEW OF THE LITERATURE

The review of the literature in this chapter falls into two main categories. The first part surveys the literature of reading comprehension as expounded by Kenneth Goodman and his colleagues who maintain that reading is a psycho-linguistic guessing game (1966, 1970, 1971).

The second part surveys the literature of field-dependence-independence as postulated by Witkin and his associates (1954, 1962, 1967, 1973).

An attempt is then made to establish the theoretical basis for the present enquiry. The chapter then ends with a statement of the research hypotheses.

#### 1. The Nature of Reading as a Psycho-linguistic Guessing Game

Reading as postulated by Goodman is a selective process which involves partial use of the least amount of the available language cues selected from the printed page on the basis of the reader's expectations.<sup>1,2,3</sup>

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<sup>1</sup>Kenneth Goodman, Reading: A Psycho-linguistic Guessing Game in Theoretical Models and Processes of

To Goodman the propensity to formulate expectations on the basis of rejecting irrelevant items and selecting the fewest most productive cues necessary to produce guesses from the printed page which are right the first time is a psycho-linguistic guessing game.<sup>4,5,6</sup> This concept of psycho-linguistic guessing game conceived by Goodman finds considerable support from Frank Smith who states that there is a limit on the amount of "visual information" of print the brain can process during the act of reading.<sup>7</sup>

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Reading, Delaware, I.R.A., 1970, p. 260. (Ed. Singer & Ruddell).

<sup>2</sup>-----, "Analysis of Oral Reading Miscues: Applied Linguistics," in Reading Research Quarterly, Fall 1969, p. 17.

<sup>3</sup>Frank Smith, Understanding Reading, Toronto, Holt, Rinehart and Winston, 1971, p. 70.

<sup>4</sup>K. Goodman, Op.cit., 1970, p. 260.

<sup>5</sup>Y. Goodman and C. Burke, "Do They Read What They Speak?" in Grade Teacher, March 1969, p. 144.

<sup>6</sup>Ronald Santora and Louise Jensen, "Reality Therapy in Reading: It's What in People That Counts," in English Journal, Vol. 63, No. 8, Nov., 1974, p. 49.

<sup>7</sup>Frank Smith, "The Role of Prediction in Reading," in Condensed Version of Presentation to the Reading '74 Conference at York University, Toronto, Feb., 1974, p. 2.

To put the matter briefly, the reader who is trying to identify letters or words, one after the other, is embarking on a slow and restricted process since he is overloading his short term memory and, therefore, loses the greater part of the information given on the printed page. This, indeed, is a negation of efficient reading.

In Goodman's view efficient reading involves interaction between thought and language.<sup>8</sup> The concept of this interaction between thought and language has great significance in a cultural context.<sup>9,10,11</sup>

In brief summary, the writer and reader of a language are silent partners to an agreement to see and think of their world in a certain way. Their world can be structured in many ways and the language they learn as children directs the formation of their structure,

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<sup>8</sup>K. Goodman, Op.cit., 1970, p. 260.

<sup>9</sup>J. Carroll (ed.), Language and Thought, Selected Writings of Benjamin Lee Whorf, Massachusetts, M.I.T. Press, 1967, pp. 134-172.

<sup>10</sup>K. Goodman, "Dialect Barriers to Reading Comprehension," in Elementary English, 42:8, Dec., 1965, pp. 853-860.

<sup>11</sup>-----, A Psycho-linguistic View of Reading Comprehension in New Frontiers in College-Adult Reading, 15th Yearbook of the National Reading Conference, Milwaukee, 1966, pp. 188-195.

linguistic or cognitive.

Structure is thus an all-pervasive phenomenon in psycho-linguistic theory and this stems from the fact that language is systematic in its grammar. To quote Goodman:

On the basis of my research to date it appears that readers who have achieved some degree of proficiency decode directly from the graphic stimulus in a process similar to Chomsky's sampling model and then encode from the deep structure. . . . Their oral output is not directly related to the graphic stimulus and may involve transformation in vocabulary and syntax even if meaning is retained.<sup>12</sup>

The designation of structure as applied in psycho-linguistic theory, originates from Goodman and his concept of the psycho-linguistic guessing game, but it has had its first development from Chomsky's transformational generative grammar.<sup>13,14</sup> In summary, Chomsky's transformational generative grammar is a

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<sup>12</sup>K. Goodman, Reading, A Psycho-linguistic Guessing Game, Theoretical Models and Processes of Reading, Delaware, I.R.A., 1970, p. 260. (Ed. Singer & Ruddell).

<sup>13</sup>K. Goodman and J. Fleming, Psycho-linguistics and the Teaching of Reading, Delaware, I.R.A., 1968, p. 28.

<sup>14</sup>Naom Chomsky, Studies in Semantics in Generative Grammar, Hague (or Paris), Mouton, 1972, pp. 162-203.

system of rules that can be analyzed into three major components, namely, the syntactic, the phonological and the semantic components. In this system of rules, the syntactic component generates and transforms the deep structure (semantic) into the surface structure (graphic elements) for each sentence.

Goodman's linguistic analysis implies that language has two levels, a surface structure, that is, the sounds or written representation of language and a deep structure, that is, meaning. These two levels of language are related in a complex way through the system of rules that is known as grammar or syntax.

In the absence of these rules a reader would never understand a sentence because the meaning of a sentence is not given by the individual words but by the manner in which these words interact with each other.<sup>15</sup> For example to ignore the rules of syntax in "The child drinks milk," would mean the same as, "Milk drinks the child."

Related to the psycho-linguistic view, the reader has an unconscious internalised knowledge of the

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<sup>15</sup>Frank Smith and K. Goodman, "On the Psycho-linguistic Method of Teaching Reading," in Elementary School Journal, January 1971, p. 178.

system of sounds and rules of grammar which he uses in speaking. Thus he sets up expectations which strongly influence his perceptions and his ability to perceive.<sup>16,17</sup> The fact that a reader can follow a familiar language more easily than an unfamiliar one is that he is constantly able to anticipate the perceptual input. More than a little of what a reader thinks he perceived, is what he guesses he heard or saw.<sup>18</sup>

Without structure and system, language would, therefore, be a jumble of random words, incapable of conveying meaning. Structure has deeply imbedded itself in the mind of children before they begin to learn to read, that is, they unconsciously organize their aural perceptions through structure as they listen to language.

Goodman believes that readers can organize their visual perception according to the expectations

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<sup>16</sup>Frank Smith, "The Role of Prediction in Reading," in Condensed version of presentation to the Reading '74 Conference at York University, Toronto, Feb., 1974, pp. 6-8.

<sup>17</sup>K. Goodman, "Linguistic Insights which Teachers may Apply," in Education, Vol. 88:4, April-May 1968, pp. 313-316.

<sup>18</sup>-----, "Decoding - From Code to What," in Journal of Reading, April 1971, Vol. 14, p. 160.

which the language structure sets up as they read.<sup>19</sup>

In the perceptual process he expounds how the four systems of language operate.

1. Pattern. In English syntax, pattern is the most important system. There are a small number of basic patterns with many variations and transformations. In the example: The dog stole the bone, the reader discovers the familiar subject - verb - object pattern. Readers who don't know anything about nouns, will invariably supply one, if one is left out in this pattern: The ----- stole the -----.

2. Inflection. This can be considered as one system of pattern makers. Some morphemes of the English language are bound forms, that is, they never occur separately. Inflectional suffixes are bound forms that occur with certain classes of free morphemes: nouns or verbs for example: In: "The dogs chased the cats," the s represents the plural noun morpheme and thus confirms that dogs and cats are nouns. Similarly d marks the verb as past and confirms that chased is a verb.

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<sup>19</sup>K. Goodman, "Word Perception: Linguistic Bases," in Education, May 1967, p. 542.

3.     Function words are usually small relatively meaningless words that serve as pattern markers. Together with the inflectional suffixes, they set up the pattern and structure of the sentence and thus link together and define the relationship between meaning bearing morphemes, "The -----s are not -----ing -----s," is an example of an empty structure. It has no meaning but it is capable of carrying meaning if meaning-bearing words are included.

4.     Intonation is the fourth language system. Through variations in pitch, stress and pause, readers (or speakers) mark off units and patterns and communicate fine differences in meaning. In the written language, punctuation partly represents this.

These four systems do not need to be taught to children who speak English. They have learned them very early in their lives. They are the linguistic bases of perception in reading.

This relationship between the structure of language and thought is fundamental to the understanding of how anyone reads or learns to read since it is through this relationship that the reader is able to process written language and create in his mind thoughts that match or relate to the thoughts in the mind of a writer who may be to him so distant in time and place.

The problem of match or mis-match in the comprehension situation is often present. That is, there is always some degree of interference in this dialogue between writer and reader which could be minimised through a common background of experience or knowledge possessed by both reader and writer.

Ausubel relates success in reading to the presence of meaning which a reader possesses in a previously established structure of knowledge.<sup>20</sup> Ausubel formulates two presuppositions regarding the occurrence of meaning in reading: (1) the learner must manifest a set to relate the new learning task to what he already knows; and (2) the learning task must be related to the structure of knowledge.

The use of Ausubel's advanced organizers by the instructor can help to facilitate the student's grasp of knowledge by providing him with the necessary relevant experience beforehand. In this way the new incoming information can be subsumed, that is, it can be more readily incorporated or assimilated into his cognitive structure.

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<sup>20</sup>David Ausubel, "Cognitive Structure," Learning to Read in Education, Vol. 87, May 1967, pp. 544-548.

Almy in studying some of Piaget's theories and their implications found that certain developmental changes bear a direct influence on the child's ability to arrive at certain concepts and constructs.<sup>21</sup> Elkind also studying the application of Piaget's theory of concept development found that a sound understanding of the maturational patterns of children would add considerably to a better understanding of problems encountered in reading.<sup>22</sup> It was Elkind's belief that a child must be able to cope with the varied and complex acts basic to the acquisition of reading skills and that the ability to cope with these acts is a function of maturation.

Stauffer focuses his attention on the picture of the developing readers in the secondary school situation where he is faced with the problem for reading subject texts for content.<sup>23</sup> He agrees on the reader's

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<sup>21</sup>Millie Almy et al., Young Children's Thinking, Studies of Some Aspects of Piaget's Theory, New York, Columbia University Press, 1966, pp. 1-125.

<sup>22</sup>David Elkind, Piaget's Theory of Perceptual Development: It's Application to Reading and Special Education in Journal of Special Education, Vol. 1, No. 4, 1967, pp. 357-361.

<sup>23</sup>Russell Stauffer, Teaching Reading as a Thinking Process, Delaware, Reading Study Center of University of Delaware, 1969, pp. 9-12.

need for a sound understanding of the concepts concerned prior to any reading of the materials. The ability of Stauffer's mature reader to synthesise and draw conclusions from his reading practice is dependent upon the standards which have been reached in his background information. Evidently, his experiential background helps him to interpret or reconstruct the message of the printed words.

From Goodman's viewpoint reading is a process by which a person reconstructs a message encoded graphically by a writer. Central to the purpose of reading, like all language activities, is effective communication of meaning. That is, comprehension is the only objective of the reader.<sup>24</sup> Meaning is supplied by the reader himself as he processes the symbolic system of language. As a user of the language he relates sequences to experiences and conceptual structures. Accordingly, the reader cannot get the message unless he can process the language. But neither can he process the language unless he has the relevant experiential-conceptual background to bring to the particular task. Briefly put,

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<sup>24</sup>K. Goodman, "Comprehension-Centred Reading Instruction," in Proceedings of the 1970 Claremont Reading Conference, pp. 125-135.

reading is a process of getting meaning from print, that is, looking beyond the surface features of oral or silent reading activity.

Smith believes that reading is not primarily a visual process. In the act of reading two kinds of information are involved in reading, one that comes from "in front of the eyeball," from the printed page which he calls visual information; and the other, that is derived from "behind the eyeball," from the brain which he calls non-visual information.<sup>25</sup>

Meaning, in short, is both output and input in the reading process. Sounds or patterned arrangement become words, words become sentences and sentences become paragraphs as the child communicates with other children through the use of language.<sup>26</sup>

Communication will now be defined as the process by which one mind affects another mind. The medium for the transmission is not limited to language; the intermediary process between the writer (or speaker) who is the encoder and the reader (or hearer) who is the decoder

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<sup>25</sup>Frank Smith, Psycho-linguistics and Reading, Toronto, Holt, Rinehart and Winston, 1973, p. 6.

<sup>26</sup>Dolores Silva, "The Teaching of Communication: Problems and Possibilities," in Focus on Learning, Vol. 3, No. 1, Spring/Summer, 1973, pp. 29-33.

can be gesture, sign or facial expression. Shannon and Weaver describe the scope of communication this way:

The word communication will be used in a very broad sense to include all the procedures by which one mind may affect another. This of course involves not only written and oral speech but also music, pictorial arts, the theatre, ballet and in fact all human behaviour.<sup>27</sup>

In the reading situation, the reader sees the writer as a producer or generator of language. The writer as an encoder, who has a message in his mind, creates in print something tangible and observable to represent this message. The writer sees the reader as a user able to use the writer's product to draw on his own experience, concept and language ability to comprehend.<sup>28</sup>

The writer's message grows out of his life and his view of the world. The reader's message is just as much a result of his life and his view.<sup>29</sup> But the writer is always attempting to affect the mind of the reader through a flow of information between them.

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<sup>27</sup>Claude Shannon and Warren Weaver, The Mathematical Theory of Communication, University of Illinois Press, 1949, p. 3.

<sup>28</sup>K. Goodman, "Reading: You can get back to Kansas anytime you're ready, Dorothy," in English Journal, Vol. 63, No. 8, 1974, pp. 62-64.

<sup>29</sup>J. Carroll (ed.), Op.cit., 1967, pp. 134-172.

However, the data transmitted by the writer are bounded by his unique frame of reference and by the way in which his experience has caused him to perceive and respond to given ideas. If the writer and reader are to function adequately in communication, this mismatch must be minimised.<sup>30</sup> The writer and reader must direct their energies towards this resolution.

Redundancy, which can mitigate this mis-match, has been acclaimed a factor that facilitates language processing.<sup>31,32,33</sup> This term derived from Information Theory means the tendency in language for information to be carried by more than one part of the signal. That is, in encoding a message, there are more stimulus features

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<sup>30</sup>Dolores Silva, "The Teaching of Communication: Problems and Possibilities," in Focus on Learning, Vol. 3, No. 1, Spring/Summer, 1973, pp. 29-33.

<sup>31</sup>K. Goodman, Chapter: The Reading Process: Theory and Practice, in Hodges and Rudorf (eds.), "What Teachers of Reading Need to Know About Language," Houghton Mufflin, 1972, pp. 143-159.

<sup>32</sup>Fred Attneave, Application of Information Theory to Psychology, Toronto, Holt, Rinehart and Winston, 1959, p. 35.

<sup>33</sup>G.A. Miller, G.A. Heise and W. Lichten, "The Intelligibility of Speech as a Function of the Content of the Test Materials," Journal of Experim. Psychology, 1951, 41, pp. 329-335.

than the theoretical minimum necessary to transmit a particular amount of information.

The young reader requires more redundancy in a pattern to perceive it correctly. Thus both incomplete and very complex patterns will be difficult for him, and it is highly probable, all things being equal, that more miscues will be made by a younger child than by an older one.

Over the last five years of descriptive studies Goodman's Taxonomy of Cues and Miscues in reading has evolved. This taxonomy organises miscues according to linguistic and psychological characteristics implied in the interaction process between thought and language.

From his investigations of the reading of moderately difficult unseen passages from basal reader texts, Goodman concludes that a child, whatever his mental development, can predict on the basis of sequential constraints set up by the grammatical information, elements he has not perceived. In brief, Goodman claims that perception is not exact. The child sees what is there as well as what he thinks is there.<sup>34</sup> That is, the child in

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<sup>34</sup>K. Goodman, "A Psycho-linguistic Approach to Reading: Implications for the Mentally Retarded," in The Slow Learning Child (Australia), Summer 1969, p. 87.

meaningful reading, does not focus his attention on the identification of letters and words, but tries to predict outcomes on the basis of his past knowledge.

According to Smith, it is not possible to read meaningfully without prediction. Prediction is as much a part of spoken language comprehension as it is of reading, and a child with sufficient ability to understand written material that is read to him has both the competence and experience to direct his ability in prediction to reading.<sup>35</sup>

Reading in Goodman's view is a psycholinguistic process in which the reader, a language user, reconstructs, as best as he can a message which has been encoded by a writer as a graphic display in which there is interaction between visual and non-visual information. In this display he develops the strategies which yield the most reliable prediction to cope with the situation.

This he accomplishes by sampling, by relying on the redundancy of language and his knowledge of linguistic constraints. He predicts structures, tests them against semantic context and then confirms or disconfirms as he processes further language.

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<sup>35</sup>F. Smith, Op.cit., 1974, p. 1.

In the reading situation Goodman uses "cues" whenever the reader's observed responses equates with the expected responses, and "miscues" when observed responses deviate from the expected responses. In his studies of cues and miscues among readers he enumerates three different kinds of cue systems which the reader uses simultaneously.<sup>36</sup>

The starting point is graphic in reading and the cue system may be called graphophonic. The reader responds to graphic sequences and may utilize the correspondences between the graphic and phonological systems of English dialect.

The second cue system the reader uses is syntactic. The reader using pattern makers such as function words and inflectional suffixes as cues, recognises and predicts structures. Since the underlying or deep structure of written and oral language is the same, the reader seeks to infer the deep structure as he reads so that he may arrive at meaning.

The third cue system is semantic. In order to derive meaning from language, the language user must be

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<sup>36</sup>K. Goodman, "Psycho-linguistic Universals in the Reading Process," in Journal of Typographic Research, Spring 1970, pp. 103-110.

able to provide semantic input. This means that the reader must have sufficient experience and conceptual background to feed into the reading process so that he can make sense from what he is reading. Briefly put, the structure of the language and its redundancy and the experiential background of the reader are factors that facilitate information processing and prediction. Indeed, to anticipate outcomes is central to the concept of Goodman's psycho-linguistic guessing game, and it is with this consideration in mind that the investigator has selected the Cloze Procedure Test as the best available measuring device to evaluate reading comprehension.

## 2. Measurement of Comprehension and Cloze Procedures

The Cloze Procedure was developed by Wilson Taylor<sup>37</sup> (1953). He adopted the word Cloze from the Gestalist psychologists' concept of closure which means filling in the parts in an incomplete message in order to arrive at a conclusion. He held the view that if a person could understand the message of a printed passage when

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<sup>37</sup>W.L. Taylor, "Close Procedure: A New Tool for Measuring Readability," in Journalism Quarterly, 1953, 30, pp. 415-438.

words were deleted and could replace these words exactly, he was experiencing a form of closure, hence the origin of the term cloze.

### Cloze Readability Procedure

Cloze tests can be made in a variety of ways, but when they are used to measure the comprehension difficulties of text materials, investigators almost invariably use a specific set of procedures called the Cloze Readability procedure.<sup>38</sup> Cloze readability tests are constructed by deleting every fifth word from a passage. The deleted words are replaced by underlined blank spaces of a uniform length, and the tests are mimeographed.

### Validity of Cloze Readability Tests

As a method of teaching and testing comprehension, the Cloze Procedure has been in existence for nearly twenty-two years. A survey of Cloze studies compiled by Rankin (1962) shows that the majority of Cloze studies have focussed on its use as a test instrument.<sup>39</sup> Rankin

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<sup>38</sup>J.R. Bormuth, "Cloze Readability Procedure," in CSEIP Occasional Report No. 1, Los Angeles, University of California, Feb. 1967.

<sup>39</sup>E.F. Rankin, "The Definition of Reading

advanced the view that since pupils must use context clues in the passage in order to replace deleted words, it should result in better understanding of the materials that they read.

Since 1957 researchers like Rankin<sup>40,41,42</sup> (1957, 1959, 1962, 1965) and Jenkinson<sup>43</sup> (1957) have introduced the Cloze Procedure in the field of Reading. Bormuth<sup>44</sup> (1963), Greene<sup>45</sup> (1964), Manis<sup>46</sup> (1961) and

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Comprehension," in First Year Book of the North Central Reading Association, 1962, pp. 15-31.

<sup>40</sup>-----, "An Evaluation of the Cloze Procedure as a Technique for Measuring Reading Comprehension," in Unpublished Doctoral Dissertation, University of Michigan, 1957.

<sup>41</sup>-----, "The Cloze Procedure - Its Validity and Utility," in Eighth Year Book of the National Reading Conference, 1959, pp. 131-144.

<sup>42</sup>-----, "The Cloze Procedure: A Survey of Research. The Philosophical Bases of Reading," in Fourteenth Year Book of the National Reading Conference, 1965, pp. 133-150.

<sup>43</sup>M.E. Jenkinson, "Selected Processes and Difficulties in Reading," Unpublished Doctoral Dissertation, University of Chicago, 1957.

<sup>44</sup>J.R. Bormuth, "Cloze as a Measure of Readability," in Conference Proceedings of I.R.A., 1963, pp. 131-134.

<sup>45</sup>F.P. Greene, "A Modified Cloze Procedure for Assessing Reading Comprehension," Unpublished Doctoral

Weaver<sup>47</sup> (1963) have studied the use of the Cloze in varieties of ways to demonstrate its usefulness to reading and to education in general. (Table 1, page 22.)

After reviewing the literature on the Cloze Procedure, Culhane (1970) states:

One important fact that emerged from these studies is that the Cloze method is as good as, and, in many ways, better than existing<sup>48</sup> methods for teaching and testing comprehension.

#### Cloze Test Reliability

When Cloze Readability tests are used only as measures of the relative abilities of subjects, they are somewhat less reliable than well made multiple choice tests containing the same number of items. For example, Bormuth<sup>49</sup> (1962) found that the reliabilities of the nine

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Dissertation, University of Michigan, 1964.

<sup>46</sup>M. Manis and R.M. Davis, "Cloze Scores as a Function of Attitude," in Psychological Reports, 1961, 9, pp. 79-84.

<sup>47</sup>W.W. Weaver and A.J. Kingston, "A Factor Analysis of the Cloze Procedure and other Measures of Reading and Language Ability," in The Journal of Communication, 1963, 13, pp. 252-261.

<sup>48</sup>J. Culhane, "Cloze Procedures and Comprehension," in The Reading Teacher, Vol. 23, No. 5, February 1970, p. 411.

<sup>49</sup>J.R. Bormuth, "Cloze Tests as Measures of Readability," Unpublished Doctoral Dissertation, Indiana University, 1962.

Table 1

Correlations Between Cloze Readability Tests and  
Standardized Tests of Reading Achievement

| Study                                                | Subjects                         | Tests                                                                                                                                   | Corre-<br>lations        |
|------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Jenkinson<br>(1957)                                  | High<br>School                   | Cooperative Reading 02<br>Vocabulary<br>Level of Comprehension                                                                          | .78<br>.73               |
| Rankin<br>(1957)                                     | College                          | Diagnostic Survey<br>Story Comprehension<br>Vocabulary<br>Paragraph                                                                     | .29<br>.68<br>.60        |
| Fletcher<br>(1959)                                   | College                          | Cooperative Reading 02<br>Vocabulary<br>Level of Comprehension<br>Speed of Comprehension<br>Dvorak-Van Wagenen<br>Rate of Comprehension | .63<br>.55<br>.57<br>.59 |
| Hafner<br>(1963)                                     | College                          | Michigan Vocabulary<br>Profile                                                                                                          | .56                      |
| Ruddell<br>(1963)                                    | Elementary                       | Stanford Achievement<br>Paragraph Meaning                                                                                               | .61-.74                  |
| Weaver and<br>Kingston<br>(1963, 2nd<br>Cloze Tests) | College                          | Davis Reading                                                                                                                           | .25-.5                   |
| Green<br>(1964)                                      | College                          | Diagnostic Reading<br>Survey<br>Total Comprehension                                                                                     | .51                      |
| Friedman<br>(1964)<br>(20 Cloze<br>Tests)            | College<br>(Foreign<br>Students) | Metropolitan Achievement<br>Vocabulary<br>Total Reading                                                                                 | .63-.85<br>.71-.87       |

30 item multiple choice tests used in his study exhibited reliabilities about equal to those of the nine 50 item Cloze Readability tests made from the same passage.

The reliability of Cloze procedure as a measure of comprehension has also been investigated by Taylor<sup>50</sup> who reported a correlation of .88 on test-retest and by Ruddell<sup>51</sup> who found split-half reliability coefficients of .95 and .96.

#### The Reading Comprehension Passage

According to Bormuth Cloze readability tests are given to subjects who have never read the passage. The subjects are instructed to fill in each blank with the word they think deleted. A response can differ from the deleted word in semantic meaning, grammatical inflection and spelling. Users of Cloze readability tests nearly always score correct just those responses where the stem of the response, the uninflected form of

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<sup>50</sup>W.L. Taylor, "Cloze Procedure: A New Tool for Measuring Readability," in Journalism Quarterly, Vol. 30, 1953, pp. 415-433.

<sup>51</sup>R. Ruddell, "A Study of the Cloze Comprehension Technique in Relation to Structurally Controlled Reading Material," in Improvement in Reading through Classroom Practice, J.A. Figurel (ed.), Delaware, I.R.A., 1964, pp. 298-330.

the word, exactly matches the word deleted.<sup>52</sup>

Taylor<sup>53</sup> (1953) found that scores obtained by counting synonyms in addition to responses exactly matching deleted words, were no better than scores obtained by counting only responses exactly matching the words deleted when the scores were used to discriminate among passage difficulties.

All things considered in the Cloze Readability Tests, the experimenter has selected this reading passage shown in Appendix (4) for the comprehension exercise. The vocabulary and the content material fall well within the range of ability of students in Grade 7, who, by and large, encounter the more difficult words in their basal reader texts.

The pupil's task will therefore, be to predict the exact word that was removed and replaced in making his word predictions or good guesses. This will depend upon his prior knowledge, general understanding of the material, context clues, a knowledge of word usage and

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<sup>52</sup>J.R. Bormuth, "Cloze Readability Procedure," in CSEIP Occasional Report No. 1, Los Angeles, University of California, February 1967, pp. 1-21.

<sup>53</sup>W.L. Taylor, "Cloze Procedure: A New Tool for Measuring Readability," in Journalism Quarterly, Fall 1953, pp. 115-432.

the structure of the language. In attempting to replace the deleted word the pupil is forced to pay attention to the message of the passage, as conveyed by the remaining words.

### 3. Goodman's Psycho-linguistic Guessing Game and Field Independence

In many ways Goodman's good psycho-linguistic guessers have many of the attributes of Witkin's field-independent subjects. That is, they are both free from the constraints imposed by the visual field and are more discriminating in the selection of anything within the stimulus field. Moreover, they are both able to impose structure on the environment. In Goodman's case, his good guessers can structure or reconstruct the message of the writer, whereas Witkin's field-independent subjects can structure or restructure the whole environmental field. This ability to impose structure on the environment involves organization and manipulation of cognitive structures, and in this light, Witkin and Goodman are very close to Bruner. Perhaps, Bruner has formulated the best known theory which can serve as a connecting link between these two theorists.

In the first place, Bruner's theory of cognition embodying the various stages of perceptual learning, concept attainment and problem solving strategies is

relevant in this situation. Bruner's investigations of learning covers a wide range of studies, from a baby's attempts to recognise stimulus inputs to enquiries into a nuclear physicist's attempt to explain the phenomenon of nuclear fission.

This scope of learning from a Brunerian viewpoint involves organization and manipulation of cognitive structures, organization which is not only applicable to the constructs of a specific learning situation, but rather organization that may be generalised to all situations in which learning is involved.

As an arch-proponent of discovery learning, Bruner has defined it as a matter of re-arranging or transforming evidence in such a way that one is enabled to go beyond the information given that is communicated to learners. The most common form of "going beyond", is to go beyond sense data to the class identity of the object being perceived.<sup>54,55</sup>

Clearly, Goodman's good psycho-linguistic guessers share this quality, "to go beyond the information

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<sup>54</sup>J.S. Bruner, Cognition, The Colorado Symposium, Harvard University Press, 1957, p. 42.

<sup>55</sup>F. Bartlett, The Mind at Work and Play, Boston, Beacon Press, 1951, pp. 121-123.

given," as they are not constrained by the visual input of the printed page. That is, in the reading process, they bring their experiential background to bear on the printed matter and, therefore, look beyond the proximal stimuli of letters and words of the printed material.<sup>56,57,58,59,60,61,62</sup>

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<sup>56</sup>K. Goodman, "A Psycho-linguistic View of Reading Comprehension," New Frontiers in College - Adult Reading, 15th Year Book of the National Reading Conference, Milwaukee, 1966, p. 133.

<sup>57</sup>K. Goodman, "On Valuing Diversity in Language," Childhood Education, December 1969, Vol. 46, No. 3, pp. 123-126.

<sup>58</sup>K. Goodman, "Up-Tight Ain't Right!" School Library Journal, October 1972, pp. 82-84.

<sup>59</sup>D. Ausubel, "The Use of Advanced Organizers in the Learning and Retention of Meaningful Verbal Material," Journal of Educational Psychology, 1960, Vol. 51, No. 5, pp. 267-272.

<sup>60</sup>R. Stauffer, The Language Experience Approach to the Teaching of Reading, New York, Harper and Row, 1970, pp. 4-16.

<sup>61</sup>J. Piaget, The Language and Thought of the Child, New York, Kegan Paul, Trubner, 1932, pp. 127-161.

<sup>62</sup>D. Berlyne, Structure and Direction in Thinking, New York, John Wiley, 1966, pp. 124-162.

Witkin's field-independent subjects in a similar vein are not constrained by the visual context of the environmental field. They have shown themselves as individuals who can overcome the influence of the prevailing stimulus field and can utilise previously acquired knowledge and experience in conjunction with the stimulus field in relation to the correct frame of reference.<sup>63,64,65</sup>

According to Bruner many benefits can be derived from the experience of learning through discoveries which the learner makes through his own efforts. The main benefit is the self-establishment of concept formation which provides a basis for making inferences. Thus, those who are armed with expectancy that there will be regularities and relationships to be joined in all

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<sup>63</sup>H. Witkin, "Psychological Differentiation and Forms of Pathology," Journal of Abnormal Psychology, 1965, Vol. 70, No. 5, pp. 317-336.

<sup>64</sup>R. Conklin et al., "Field-Dependency-Independency and Eye Movement Patterns," Perceptual and Motor Skills, 1968, 26, pp. 59-65.

<sup>65</sup>P. Wachtel, "Style and Capacity in Analytic Functioning," Journal of Personality, 1968, 36, pp. 202-212.

things devise personal strategies of enquiry.<sup>66</sup>

Goodman's good psycho-linguistic guessers also have effective strategies which they utilize in selecting the most useful cues from three kinds of information, namely (a) grapho-phonetic information, (b) syntactic information, (c) semantic information. In fact, there are strategies for guessing a deep structure so that readers may derive meaning, as well as other strategies for testing guesses. Essentially, in the latter, the reader must be able to test the fit of his guesses against the grammatical and semantic constraints. To do this, the reader must ask himself whether what he thinks he has read makes sense within the semantic constraints.

Briefly summarised, Goodman's good psycho-linguistic readers are selective. They make partial use of the available minimal language cues selected from the perceptual input on the basis of the reader's expectations. As this partial information is processed, tentative decisions are made to be confirmed, rejected or refined as reading progresses.<sup>67,68</sup>

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<sup>66</sup>J. Bruner, Going Beyond the Information Given, New York, Norton, 1973, p. 135.

<sup>67</sup>K. Goodman, "The Reading Process: Theory and Practice," in Hodges and Rudolf, What Teachers of

In the light of Witkin's view, his field-independent subjects are seen to possess great facility to perceive distinctions, detailed structures and relationship within a stimulus field. They are not only discriminating in their perceptions but they are also adept in transferring their attention from one source of stimuli to another, and ignoring irrelevant information.<sup>69,70,71,72,73</sup>

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Reading Need to Know About Language, Houghton-Mufflin, 1972, pp. 445-459.

<sup>68</sup>Y. Goodman, "Using Children's Miscues for New Reading Strategies," The Reading Teacher, Vol. 23, No. 5, February 1970, pp. 445-459.

<sup>69</sup>H. Witkin, "The Nature and Importance of Individual Differences in Perception," Journal of Personality, 1949, 18, pp. 145-176.

<sup>70</sup>H. Witkin, "Further Studies of Perception of the Upright when the Direction of the Force Acting on Body is Changed," Journal of Experimental Psychology, 1952, 43, pp. 9-20.

<sup>71</sup>Witkin and Asch, "Perception of the Upright in the Absence of Visual Field," Journal of Experimental Psychology, 1948, 38, pp. 603-614.

<sup>72</sup>L. Perney, The Relationship of Field-Dependence-Independence, Unpublished Doctoral Dissertation, 1971, p. 3.

<sup>73</sup>P. Rabbit, "Ignoring Irrelevant Information," British Journal of Psychology, 1964, 55, 4, pp. 403-414.

In his discussion of information and the increase of intellectual power through discovery, Bruner differentiates between episodic empiricism at one extreme of a continuum of enquiry, a state of deficient organization persistence, unbound by prior constraints; and cumulative constructionism at the other extreme of the continuum, a state characteristic by sensitivity to constraint, by connective manoeuvres and by organized persistence.

It is emphasis on the latter that enables the learner to become a constructionist, that is, to organize that which he encounters, to find patterns, to avoid certain information by employing constraint inherent in his question; in other words, to be able to "hit" on a solution through selective and sequential questioning and then to persist by summarizing and organizing his questions in cycles.<sup>74,75</sup>

Now, according to Goodman meaning cannot be derived directly from the printed page. The graphic display on the printed page can be considered a written

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<sup>74</sup>J. Bruner and L. Postman, "Personal Values as Selective Factors in Perception," Journal of Abnormal Psychology, Vol. 43, 1948, pp. 142-154.

<sup>75</sup>J. Bruner, The Process of Education, Cambridge, Harvard University Press, 1966, pp. 17-22.

surface representation of language. A writer starts with meaning. He then assigns a deep underlying grammatical structure. Using the transformational rules, he then generates a written surface structure.

Goodman's good psycho-linguistic guessers must infer from that graphic display the rules that have produced it and its underlying deep structure. Only then can the reader reconstruct the writer's message, that is comprehend the meaning.<sup>76,77,78,79</sup>

This tendency on the part of the learner to impose structure on the environment or to re-structure the whole environmental field is also characteristic of Witkin's field-independent subjects.

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<sup>76</sup>K. Goodman, "Comprehension Centred Reading," Proceedings of the Claremont Reading Conference, 1970, pp. 125-135.

<sup>77</sup>K. Goodman, "The Reading Process: Theory and Practice," in What Teachers of Reading Need to Know About Language, Hodges and Rudorf (eds.), Houghton-Mifflin, 1972, pp. 143-159.

<sup>78</sup>K. Goodman, "Psycho-linguistic Universals in the Reading Process," Journal of Typographic Research, Spring, 1970, pp. 103-110.

<sup>79</sup>G. Miller and S. Isard, "Some Perceptual Consequences of Linguistic Rules," in Journal of Verbal Learning and Verbal Behavior, 1963, 2, pp. 217-218.

Witkin found that the ability to perceive the embedded figure is related to field-independent subjects who saw parts of the design as discrete and separate rather than fused into a single pattern. They possess greater flexibility in relating the separate elements in the design for manipulating or reorganizing the elements into meaningful relationships.<sup>80,81,82</sup> (Illustration 1, page 34, is a summary of the comparisons of the characteristics of Goodman's good psycho-linguistic guessers and Witkin's field-independents).

#### 4. The Nature of Field-Dependence-Independence

In previous paragraphs the concept of field-independence was introduced as an aspect of cognitive functioning. In that context it was an attempt to look

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<sup>80</sup>H. Witkin, "The Nature and Importance of Individual Differences in Perception," Journal of Personality, 1949, 18, pp. 145-176.

<sup>81</sup>H. Witkin and S. Asch, "Studies in Space Orientation (110), Perception of the Upright in the Absence of a Visual Field," Journal of Experimental Psychology, 1948, 38, pp. 603-614.

<sup>82</sup>L. Perney, "The Relationship of Field-Dependence-Independence," Unpublished Doctoral Dissertation, 1971, p. 3.

Illustration 1

Comparisons of the characteristics of  
Goodman's good psycho-linguistic  
guessers and Witkin's  
field-independents

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Goodman's good linguistic  
guessers

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Witkin's Field-  
independents

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- |                                                                                                                                                                                                                    |                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Are not constrained by the visual input of the printed page, that is, they bring their experiential background to bear on the printed page, and, therefore, look beyond the printed page.                       | 1. Are not constrained by the visual context and make their adjustments independent of the prevailing stimuli and in relation to the correct frame of reference. |
| 2. Are more discriminating in the selection of printed symbols and rely on the language structures viz. a) phonographic; b) syntactic; c) semantic. Moreover, they see the inter-relationship of these structures. | 2. Are seen to possess a greater faculty to perceive distinctions, detailed structures and relationship within stimulus field.                                   |
| 3. Are guided by a system of cues, that is, they select the minimum relevant cues a) phonographic; b) syntactic; c) semantic in the reading process.                                                               | 3. Direct their attention to relevant stimuli in a field while inhibiting attention to irrelevant or distracting stimuli.                                        |
| 4. Are able to structure or reconstruct a message given by the writer (or speaker).                                                                                                                                | 4. Are able to impose structure on the environment or can re-structure the whole environmental field.                                                            |
-

into the functional relationship of field-independence and Goodman's concept of reading as a psycho-linguistic guessing game.

It now becomes desirable to treat this concept in greater detail by looking at its construct. Field-dependence-independence as defined by Witkin et al (1967, 1971) is, essentially a personality dimension which refers to self-consistent patterns of cognitive and affective behaviours that are oriented to the individual's psycho-social environment.<sup>83,84,85</sup>

In style of experiencing and at the level of intellectual functioning, a field-dependent person tends to be global, low in self-esteem, has relatively poor control over his impulses and exhibit a general passivity; whereas a field-independent person tends to be analytical,

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<sup>83</sup>H.A. Witkin, "A Cognitive Style Approach to Cross-Cultural Research," International Journal of Psychology, Vol. 2, No. 4, 1967, p. 234.

<sup>84</sup>H.A. Witkin, The Role of Cognitive Style in Academic Performance and in Teacher-Student Relations (Research Bulletin), Princeton, Educational Testing Service, February 1973, p. 2.

<sup>85</sup>B.L. Brilhart et al, "Field-Independence and Academic Achievement of Engineering Students," Perceptual and Motor Skills, 1971, 32, pp. 443-446.

structured and articulated.<sup>86,87,88</sup>

This means that where relationship with the surrounding field is concerned the perception of the field-dependent subject is strongly dominated by the over-all organization of the field, and parts of the field are experienced as fused; whereas in the field-independent mode of perceiving, parts of the field are experienced as discrete from the organized background. Moreover, the field-independent subject is able to reorganize a field when it is 'organized', and when there is relatively inherent structure in the field, to improve structure on it, and so perceive it as organized.<sup>89</sup>

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<sup>86</sup>R. Gardner et al, "Field Articulation, Constricted-Flexible Control, and the Abilities of Flexibility of Closure and Spatial Relations and Orientation," Psychological Issues, Vol. 2, No. 4, 1960, p. 21.

<sup>87</sup>V. Grandall, "Children's dependent and achievement behaviors in social situations and their perceptual field-dependence," Journal of Personality, 32, 1964, pp. 1-22.

<sup>88</sup>V. De Fazio, "Field Articulation, Differences in Language Abilities," Journal of Personality and Social Psychology, 1973, Vol. 25, No. 3, pp. 351-356.

<sup>89</sup>H.A. Witkin et al, Psychological Differentiation, New York, Wiley, 1962, p. 14.

To continue, subjects with a more articulated or more global mode of cognitive functioning also differ in an important aspect of the self, namely, sense of separate identity. Subjects with an articulated cognitive style give evidence of a developed sense of separate identity, that is to say, they have an awareness of needs, feelings, attributes which they recognize as their own and which they identify as distinct from those of others. Sense of separate identity implies experience of the self as segregated. The less developed sense of separate identity of persons with a global cognitive style manifests itself in reliance on external sources for definition of their attitudes, judgments, sentiments and of their views of themselves.<sup>90</sup>

The concept of field-dependence-independence originates from Witkin's concept of psychological differentiation, which was first developed by Werner. Differentiation as explained by Werner refers to increasing structuralization of functions and systems, be they physical, biological or psychological: for example, in the emotional sphere the young child's

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<sup>90</sup>H.A. Witkin, "Psychological Differentiation and Forms of Pathology," Journal of Abnormal Psychology, Vol. 70, 1965, pp. 317.

diffuse feelings of comfort-discomfort later take on the form of more differentiated reactions of joy, sorrow and fear.<sup>91</sup>

Witkin in general terms, states that differentiation refers to the complexity of a system's structure; that a system's extent of differentiation may be judged through a particular functional manifestation, and that one of the major characteristics of the functioning of a highly differentiated system is specialisation.<sup>92</sup>

Degree of differentiation, according to Witkin et al also affects a system's integration, which refers particularly to the form of functional relationships among a system components, resulting in more or less harmonious working together of system components with each other and of the total system with its environment, thereby contributing to the adaptation of the organism.<sup>93</sup>

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<sup>91</sup>H. Werner, Comparative Psychology of Mental Development, New York, International University Press, 1948, pp. 40-56.

<sup>92</sup>H. Witkin, Psychological Differentiation, New York, Wiley, 1962, p. 9.

<sup>93</sup>H. Witkin et al, Op.cit., 1962, p. 10.

It seems reasonable to believe that Witkin's two cognitive styles are aspects of general and developmental trends and processes, closely linked with growth in psychological differentiation. Dyk believes that these styles begin to develop in the pre-school years and that by the time the child enters school the style is functionally part of his psychological make up.<sup>94</sup>

Witkin et al maintain that young children tend, at first, to perceive in a relatively global fashion, and as they grow older, this perception assumes a generally more independent form.<sup>95</sup> These two cognitive styles are on a continuum, and according to Witkin, children would differ in extent of differentiation at any age level; and that greater disparity in differentiation would be manifested in a given child in each of the development areas of psychological growth along the life process.<sup>96</sup>

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<sup>94</sup>R. Dyk et al, "Family Experiences Related to the Development of Differentiation in Children," Child Development, 36, 1965, pp. 21-27.

<sup>95</sup>H.A. Witkin et al, Psychological Differentiation, New York, Wiley, 1962, p. 7.

<sup>96</sup>H.A. Witkin et al, Psychological Differentiation, New York, Wiley, 1962, p. 22.

The findings from a series of studies have revealed a marked degree of stability in Witkin's classification of cognitive styles over long periods of time, and despite increases in differentiation are noticeable in terms of perceptual functioning with an increase in age; each individual tends to maintain his relative position among his peers.<sup>97,98</sup>

Sharp and significant sex differences have been established in perception in general, and at different age levels, as well as in verbal skills and in the performance of intellectually functioning of a high cognitive order. Greater field-dependence in females has been reported in various groups of different educational and socio-economic background in Western European countries including England, Holland, France, Italy, Israel, Japan, United States, Hong Kong, Sierra Leone, Africa<sup>99</sup> as well as in India.<sup>100</sup>

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<sup>97</sup>H.A. Witkin et al, Personality through Perception, New York, Harper, 1954, pp. 1-10.

<sup>98</sup>H.A. Witkin et al, "Stability of Cognitive Style from Childhood to Young Adulthood," Journal of Personality and Social Psychology, Vol. 7, No. 3, 1967, pp. 291-300.

<sup>99</sup>H. Witkin, "A Cognitive Style Approach to Cross Cultural Research," International Journal of

However, no significant sex differences with reference to the field-dependent-independent dimension have been reported among the Eskimos, whose child-rearing practices foster self-reliance and independence for both boys and girls.<sup>101,102,103</sup>

In perceptual and intellectual functioning, the literature reveals that females generally tend to confine their cognitive activities to a single context; males on the other hand, are inclined to a mode of operation whereby they perform in a number of contexts: as a group, females show greater dependence on others than males do, and also seem more likely than their counterparts to adjust their behaviour to their social environment.

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Psychology, Vol. 2, No. 4, 1967, p. 233-250.

<sup>100</sup>C.G. Pande, "Sex Differences in Field-Dependence: Confirmation with Indian Sample," Perceptual and Motor Skills, Vol. 31, 1970, p. 70.

<sup>101</sup>J. Berry, "Culture Determinants of Perception," Unpublished Thesis, University of Edinburgh, 1966.

<sup>102</sup>J. Berry, "Temne and Eskimo Perceptual Skills," International Journal of Psychology, Vol. 1, 1966, pp. 207-229.

<sup>103</sup>R. MacArthur, "Sex Differences in Field Dependence for the Eskimo: Replication of Barry's Findings," International Journal of Psychology, Vol. 2, 1969, pp. 139-140.

Developmental studies have, however, shown that the sex variable on cognitive style difference may be negligible below eight years and above sixty years of age.<sup>104,105</sup>

To summarise the relevant studies on the field-dependence-independence dimension, including those of Witkin et al, the characteristics of field-dependence-independence will be presented.

In the literature reviewed field-dependent subjects have difficulty in locating a familiar figure embedded in a complex design, and as a general rule, experience ambiguous stimuli as vague and indistinct. Their performance in the block design, picture-completion and object-assembly parts of standard intelligence tests tends to be fair, but they are, nevertheless, likely to do better than field-independent subjects on the items concerned with vocabulary, information and comprehension.<sup>106,107,108</sup>

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<sup>104</sup>D.R. Goodenough and C. Eagle, "A Modification of the Embedded Figures Test for the Fourth Young Children," Journal of Genetic Psychology, Vol. 103, 1963, pp. 67-74.

<sup>105</sup>D. Schwartz and S. Karp, "Field Dependence in a Geriatric Population," Perception and Motor Skills, Vol. 24, 1967, pp. 495-504.

<sup>106</sup>L. Tyler, The Psychology of Individual

Field-dependent subjects have been found to excel their field-independent counterpart in recognising faces they have briefly seen before.<sup>109</sup>

Field-independent subjects on the other hand, tend to have no problem with embedded figures test;<sup>110</sup> they are also likely to do well in the analytical part of the intelligence tests.<sup>111,112</sup>

However, while field-independent subjects are often able to function with a high degree of autonomy, some of them are isolated individuals, over-controlled, cold and distant and are often uninfluenced by their

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Differences, New York, Appleton-Century-Crofts, 1965, pp. 224-226.

<sup>107</sup>S. Karp, "Field Dependence and Overcoming Embeddedness," Journal of Consulting Psychology, 1963, Vol. 27, No. 4, pp. 294-302.

<sup>108</sup>D. Goodenough and S. Karp, "Field Dependence and Intellectual Functioning," Journal of Abnormal Psychology, 1961, Vol. 63, No. 2, pp. 241-246.

<sup>109</sup>H. Witkin et al, Op.cit., 1962, pp. 2-3.

<sup>110</sup>Ibid., p. 45.

<sup>111</sup>P. Vernon, "The Distinctiveness of Field-Independence," Journal of Personality, 1972, 40, pp. 367-391.

<sup>112</sup>H. Witkin et al, Op.cit., 1962, p. 70.

immediate social environment.<sup>113</sup>

Witkin et al (1962) emphasise that the characteristics of the field-dependent-independent subjects are not a haphazard cluster of disparate or random elements but fall into distinct and coherent patterns which suggest consistency in personality structure "which pervades the individual's perceptual, intellectual, emotional, motivational, defense and social operations."<sup>114</sup>

Hitherto, consideration of the field-dependence-independence dimension has been focused mainly on perceptual and intellectual functioning. However, there is sufficient evidence reported in the literature to establish the fact that the pervasive effects of the field-dependence-independence dimension go beyond the cognitive domain. For instance, Witkin (1973) maintains that in social situations, a field-dependent subject is likely to adjust himself more readily to his immediate social environment in shaping his attitudes beliefs and feelings. That is, the field-dependent subject in his desire to be outward-directed in the interest of social esteem and his self-concept pays attention to the human content of

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<sup>113</sup>H. Witkin, Ibid, 1962, p. 3.

<sup>114</sup>H. Witkin, Op.cit., 1973, pp. 7-8.

the environment.<sup>115</sup>

From the analysis of more recent works Witkin (1973) claims that field-dependent subjects are by far superior to field-independent subjects in attending to verbal messages that are more socially oriented, and that their ready acceptance of, and adjustments to the social environment result in a cluster of highly developed social skills.<sup>116</sup>

Field-dependence-independence has also been shown to be related to academic achievement.<sup>117</sup> Frederick (1968) conducted a study of 6th, 8th and 10th grade students. His interest in research centred on "Information Processing and Concept Learning . . . as a Function of Cognitive Style." His field-independent subjects showed higher achievement in English, social studies and mathematics than do the field-dependent subjects.<sup>118</sup>

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<sup>115</sup>H. Witkin, Op.cit., 1973, pp. 7-8.

<sup>116</sup>H. Witkin, Op.cit., pp. 8-9.

<sup>117</sup>Ibid., p. 13.

<sup>118</sup>W. Frederick, "Information Processing and Concept Learning at Grades 6, 8, and 10 as a Function of Cognitive Style," Technical Report No. 44, Wisconsin, Research and Development Center for Cognitive Learning, March 1968.

Stein (1968) investigated the inter-relationship of field-dependence-independence, vocational interest, verbal comprehension and self-perception to level of academic achievement in college, and concluded that the development of cognitive skills and the capacity to learn in the sciences and in the humanities are related to personality traits.<sup>119</sup> In a similar study, Frehner (1972) demonstrated that cognitive style is a determinant of achievement.<sup>120</sup>

On the basis of the evidence of a number of similar studies Witkin (1973) concludes that field-independent subjects tend to pursue such areas as science, mathematics and engineering which entail analytical skills, whereas field-dependent subjects prefer areas which call for interpersonal relationships and communication skills.<sup>121</sup>

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<sup>119</sup>F. Stein, "Consistency of Cognitive Interest and Personality Variables with Academic Master," Dissertation Abstracts, 29, 1429, 1968.

<sup>120</sup>V. Frehner, Cognitive Style as a Determinant of Educational Achievement, University Microfilms, Ann Arbor, Michigan, 1972.

<sup>121</sup>H. Witkin, Op.cit., 1973, pp. 16-17.

Measures of Field-Dependence-Independence

The earlier findings led by Witkin and his associates stimulated them to formulate a construct best explained by describing the main tests used to tap this perceptual mode, namely the (a) Rod and Frame Test (RFT), the (b) Body Adjustment Test (BAT) and the (c) Embedded Figures Test (EFT).

According to Witkin et al, the magnitude of an individual's psychological differentiation is measureable by the performance of one or all of the following: (a) the Rod and Frame Test (RFT); (b) the Body Adjustment Test (BAT) and (c) the Embedded Figure Test.<sup>122,123</sup>

The Rod and Frame Test (RFT) is an apparatus consisting of a luminous rod pivoted at the centre of a luminous square. The rod, frame and the subject's chair can be tilted together or separately to right or to left. The test is conducted in a dark room so that the subject is able to see only the rod and frame. Both the rod and frame are presented in tilted positions. If the subject believes that the rod is tilted, he is

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<sup>122</sup>H. Witkin, Op.cit., 1962, pp. 36-40.

<sup>123</sup>H. Witkin, Op.cit., 1973, pp. 2-5.

asked to adjust it, by verbally instructing the experimenter, to a position where it appears upright to him, while the frame remains in its initial tilted position. The performance range falls between two extremes. At one extreme is the person who decides on the upright position of the rod in accordance with the surrounding frame. At the other extreme are subjects who can adjust the rod to the upright quite independently of the surrounding frame. The test consists of three series each comprising eight trials. Series 1: Both the subject and the frame are tilted to the same side at 28 degrees left or right; the rod is to be adjusted to the upright from an initial tilt of 28 degrees to the same side or opposite side. Series 2: The body and the frame are tilted 28 degrees to the opposite sides. Series 3: The body is erect and the frame is tilted 28 degrees left or right. The score for each series is the mean 'absolute' error in degrees from the true upright for the eight trials of the series. The raw scores for each series are expressed in standard scores, using the mean and standard deviation of the subject's age-sex group. The total RFT index is the mean of the standard scores for the three series. Positive scores reflect field-dependence, negative scores, relative field-independence.

The Body Adjustment Test (BAT) is, by and large, very similar to the RFT, except that here the object of perception is the body itself. The apparatus is a small room into which a chair is projected. Both the room and the chair can be tilted together or independently of each other, clockwise or anti-clockwise. At the outset of each trial, the chair and the room are presented in prepared tilted positions, and the subject is asked to adjust himself to an upright position. Individual differences in performance become evident in this test. There are individuals who can be tilted as much as 30 degrees in order to perceive the body as upright, as dictated by the surrounding tilted room. At the other extreme are individuals who are able to bring the body more or less to the upright, whatever the position of the surrounding room may be. The test consists of six trials, in half of which the room and the chair are initially tilted to the same side, and in the other half to the opposite sides. The initial tilt of the chair is 22 degrees and of the room 35 degrees. The subject's score is obtained and interpreted in the same way as in the case of the R.F.T.

The Embedded Figures Test (E.F.T.) is quite different from the first two. In this test, the subject's task is to locate in a complex design a simple figure

which he is previously shown. The standard test of Witkin's consists of twenty-four figures of graded difficulties. A maximum of five minutes is allowed for each search. The subject's score is the mean amount of time taken for the task. The raw score is also converted into a standard score. A positive standard score signifies relative field-dependence while a negative standard score indicates relative field-independence. And though the E.F.T. is not specifically related to body orientation or vertically judgment, Witkin reports a high correlation between results on this test (E.F.T.) and results on the R.F.T. and B.A.T.<sup>124</sup>

Witkin (1973) holds the view that subjects tend to be self-consistent in performance across these three tests. That is, if the same subjects are tested in these three situations, those who tilt the rod far towards the tilted frame are likely to tilt their bodies towards the tilted room and, thus, they take a long time in spotting the simple figure in the complex design.<sup>125</sup>

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<sup>124</sup>H. Witkin et al, Op.cit., 1954, pp. 83-89.

<sup>125</sup>H. Witkin, Op.cit., 1973, p. 5.

Witkin's theoretical position is supported by earlier studies. For instance, Jackson described a short form of the Witkin's Embedded Figures Test which has been widely used by investigators to study field-dependence-independence.<sup>126</sup> According to the findings of Spotts and Mackler, there is some evidence of significant correlations between the individual and group forms of the Embedded Figures Test.<sup>127</sup> Dubois and Cohen (1970) reported a correlation between the R.F.T. and the E.F.T. in their research as 0.56<sup>128</sup> Elliott (1961) found a correlation of 0.42 between the R.F.T. and E.F.T. in his study.<sup>129</sup> Oltman (1968) improvised a small table-top

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<sup>126</sup>D. Jackson, "A Short Form of Witkin's Embedded Figures Test," Journal of Abnormal and Social Psychology, Vol. 53, No. 2, 1956, pp. 254-255.

<sup>127</sup>J. Spotts and I. Mackler, "Relationships of Field Dependent and Field Independent Cognitive Styles to Creative Test Performance," Perceptual and Motor Skills, Vol. 24, No. 1967, pp. 239-268.

<sup>128</sup>T. Dubois and W. Cohen, "Relationship between Measures of Psychological Differentiation and Intellectual Ability," Perceptual and Motor Skills, Vol. 31, 1970, pp. 411-416.

<sup>129</sup>R. Elliott, "Inter-relationships among Measures of Field Dependence, Ability and Personality Traits," Journal of Abnormal and Social Psychology, Vol. 63, No. 1, 1961, p. 31.

model of the rod-and-frame apparatus which obviated the necessity of a dark room in his experimental studies with his subjects. Correlations between Oltman's R.F.T. and Witkin's R.F.T. and E.F.T. are respectively 0.89 and 0.60.<sup>130</sup>

However, there is one group test which is significantly correlated to those Witkin et al developed. This is Thurstone's Closure Flexibility Test, or more commonly known as Thurstone's Concealed-Figures Test (Form A). This is a group test which is easily scorable and lasts only ten minutes. It is a paper-and-pencil test consisting of forty-nine items. Each item comprises a simple figure presented on the extreme left of the page; followed by a row of four, more complex drawings to the right. The subject's task is to spot the simple figure in each of the complex drawings, in which it is concealed and to put a check mark (✓) under each drawing which contains it, and a zero (0) under each which does not. The raw score is the number of correct answers minus the number of wrong answers and this is then converted to a standard score.

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<sup>130</sup>P.K. Oltman, "A Portable Rod and Frame Apparatus," Perceptual and Motor Skills, Vol. 26, 1968, pp. 503-506.

As originally stated, Thurstone's Concealed-Figures Test has been well supported in the literature. Witkin et al (1962) have buttressed the findings of other researchers by stating:

. . . Performance (on Thurstone's Concealed-Figures Test) has been found to relate significantly to performance in the tests of our perceptual battery.<sup>131</sup>

Significant correlations between Witkin's Embedded Figures Test and Thurstone's Concealed Figures Test have been reported by Elliott (1961) ( $r = 0.55$ ,  $p .01$ ,  $N = 128$ )<sup>132</sup> and by Podell and Phillips (1959) ( $r = 0.77$ ,  $p .01$ ,  $N = 32$ ).<sup>133</sup>

##### 5. Summary and Basic Hypothesis

In the foregoing pages an attempt has been made to explore the concept of the psycho-linguistic guessing game in reading, as expounded by Goodman and his associates and its various implications. A number of studies in the field-dependent-independent dimension has

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<sup>131</sup>H.A. Witkin, Op.cit., 1962, p. 49.

<sup>132</sup>R. Elliott, Op.cit., p. 31.

<sup>133</sup>J. Podell and L. Phillips, "A Developmental Analysis of Cognition as observed in Dimensions of Rorschach and Objective Test Performance," Journal of Personality, Vol. 27, No. 4, 1959, pp. 439-463.

also been reviewed, which seem to suggest a possible linkage between Goodman's psycho-linguistic guessing game and the field-dependence-independence dimension. The main points considered may be summarised as follows.

1. In style of experiencing and at level of intellectual functioning Goodman's good-psycho-linguistic readers are not constrained by the visual input of the printed page, that is, they bring their experiential background to bear on the printed page, and, therefore, look beyond the mere surface features of the printed page to get meaning. In a similar vein, Witkin's field-independent subjects are not bound by the visual context and make the necessary adjustments independent of the prevailing stimuli and in relation to the correct frame of reference.

2. Imbued with certain perceptual and psychological characteristics Goodman's good psycho-linguistic readers are more discriminating in the selection of the printed symbols and rely on the language structure, that is, (a) the phonographic structure; (b) the syntactic structure; (c) the semantic structure, and perceive the inter-relationship of these structures. On the other hand, Witkin's field-independent subjects are seen to process a greater faculty to perceive distinctions, detailed structures and relationship within the stimulus

field.

3. In processing information, Goodman's good psycho-linguistic readers use the least amount of the available words on the printed page. They are guided by a system of cues, that is, they select the minimum relevant cues: (a) phonographic; (b) syntactic; (c) semantic in the reading process. In their normal intellectual functioning, Witkin's field-independent subjects direct their attention to relevant stimuli in a field while inhibiting attention to irrelevant or distracting stimuli.

4. In the process of communication (as defined by Shannon and Weaver) Goodman's good psycho-linguistic readers are able to participate actively by structuring or reconstructing a message given by the writer or speaker. In a similar manner, Witkin's field-independent subjects are able to impose structure on the environment or can restructure the whole environmental field.

5. A functional relationship has been demonstrated between Goodman's good psycho-linguistic readers and field-independence in relation to achievement. Moreover, a number of field-dependent-independent studies have supported the fact that personality pre-disposition is involved in the reading learning efficiency situation and that relationship certainly exist between cognitive

style and reading comprehension. However, so far very little seems to have been done to investigate the relationship between cognitive style and reading performance in the light of Goodman's frame of reference, that is, to make good psycho-linguistic guesses in processing reading information.

6. In style of experiencing and at level of intellectual functioning, a person ranges along a continuum of being poor psycho-linguistic guessers, just as he is being relatively field-dependent at one end of the continuum to being relatively field-independent at the other.

7. It is generally held that male subjects excel female subjects in the higher level of cognitive skills. Male subjects as a group also tend to be relatively more field-independent than females, and according to the literature field-independent subjects should achieve a higher degree of performance at the comprehension level.

8. It is a widely held view that the Cloze Test gives a considerably more accurate reading level of placement than the traditional standardised reading tests. The ability to make word predictions or good psycho-linguistic guesses will largely depend on the reader's general understanding of the material, his knowledge of word usage and structure of the language, his prior

knowledge and his desire to make maximum use of context clues.

On the basis of the above, it seems not unreasonable to postulate that, other variables being controlled for in the process of reading comprehension, especially at an intermediate level, a field-independent subject may have certain advantages over his field-dependent counterpart. In an attempt to test this postulate, the following hypothesis is formulated: Field-independent subjects achieve higher scores on the Cloze Test of reading comprehension than field-dependent subjects.

## CHAPTER II

### EXPERIMENTAL DESIGN

This chapter presents the procedures that were adopted in conducting the experiment to test the hypothesis stated in the Review of the Literature. The first two sections describe the pilot study and the sample that were used. The third, fourth and fifth sections discuss the instruments and the methods by which the data were gathered and analyzed.

#### 1. The Pilot Study

The pilot study which involved three grade 7 classes of a Cornwall school was conducted on March 5, 1975. There were 27 students (boys and girls) in each class. Three different tests employing the Cloze Procedure (described in the previous chapter) and limited to a twenty minute period were administered to these three classes.

Each of the three tests contained three distinct passages selected from basal reader materials commensurate with the attainment of the grade 7 groups.

After the scores were compiled two of these three tests revealed leptokurtic distributions, while

the third showed a better measure of dispersion, approximating a relatively normal distribution. It was this last test which was used in the full scale study, now under consideration.

## 2. The Sample

The original sample included 361 grade 7 students (167 girls and 194 boys) from eleven classrooms in two Junior High Schools controlled by the Ottawa Separate School Board. All subjects normally spoke English at home and the language of instruction at school was English.

To test the hypothesis, it was necessary to identify the extreme groups on the field-dependence-independence continuum. In this respect a method used by Cooper (1972)<sup>1</sup> and later followed by Bowles (1973)<sup>2</sup> showed that about 30% of the cases should be in either of the extreme groups so as to ensure a clear cut

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<sup>1</sup>M. Cooper, Cattell's Personality Factors as Predictors of High School Performance, Unpublished Doctoral Dissertation, University of Ottawa, 1972, p. 87.

<sup>2</sup>A. Bowles, "Extent of Psychological Differentiation as Related to Achievement in Science and Attitude Toward Science," Unpublished Master's Thesis, University of Ottawa, 1973, p. 32.

dichotomy in psychological differentiation. The present study adopted the same procedure and made use of the top 30% and the bottom 30% of the subjects on the field-dependence-independence continuum who were assigned to one of the following four cells: (1) field-dependent boys; (2) field-dependent girls; (3) field-independent boys; (4) field-independent girls.

### 3. The Measuring Instruments

Scores in respect of field-dependence-independence were obtained for each subject. Scores regarding achievement in Reading Comprehension were obtained for only those actually involved in the analysis of the data.

Thurstone's Closure Flexibility Test, (Form A) Appendix 3, was administered in group form as a measure of field-dependence-independence. Information on this test has been reported in the Review of the Literature. Correlations in the 0.55 range were reported with both Witkin's R.F.T.<sup>3</sup> and E.F.T.<sup>4</sup>

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<sup>3</sup>R. Elliott, "Inter-relationships Among Measures of Field-Dependence Ability and Personality Traits," Journal of Abnormal and Social Psychology, Vol. 63, No. 1, 1961, p. 31.

<sup>4</sup>Rudin and Stagner, "The Figure Ground Phenomena in the Perception of Physical and Social Stimuli," Journal of Psychology, Vol. 45, 1958, pp. 213-225.

The split-half-reliability coefficient for the test is reported in the manual as 0.78.<sup>5</sup> A number of other researchers<sup>6,7</sup> who used this test to investigate Witkin's theory have also found it to be an adequate group measure of field-dependence-independence.

Achievement in reading comprehension was measured by means of the Cloze Procedure Test. Designed and developed by Taylor in 1953,<sup>8</sup> this test is based on the concept of closure, which means predicting the parts in an incomplete message in order to arrive at a conclusion.

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<sup>5</sup>L. Thurstone, "A Factorial Study of Perception," Psychometric Monographs, No. 4, Chicago, University of Chicago Press, 1944.

<sup>6</sup>R. Long, "Field Articulation as a Factor in Verbal Learning and Recall," Perceptual and Motor Skills, Vol. 15, 1962, pp. 151-158.

<sup>7</sup>E. Gardner, "Reliability of Group Test Scores for Cognitive Controls and Intellectual Abilities over a One-Year Period," Perceptual and Motor Skills, Vol. 36, 1973, pp. 753-754.

<sup>8</sup>W. Taylor, "Cloze Procedure: A New Tool for Measuring Readability," Journalism Quarterly, Fall 1953, 30, pp. 415-432.

Schneyer found that Cloze tests have sufficient validity in measuring reading comprehension to be useful evaluating devices.<sup>9,10,11</sup> Ruddell reported reliability coefficients for the Cloze Comprehension tests, by using the split-half-reliability coefficient method (corrected by Spearman-Brown formula) as ranging from .85 to .90 on individual tests and from .95 to .96 on pooled tests.<sup>12</sup>

Using the Co-operative English Test, Reading Comprehension 2 as a criterion of general comprehension Jenkinson obtained correlations of .78 and .73 between Cloze Test scores based on literacy materials and the Vocabulary and Level of Comprehension sub-tests.<sup>13</sup>

A fairly large number of studies have reported correlations between Cloze Readability tests and standardised tests of reading achievement. Table 1 of Chapter I shows the studies and correlations reported.

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<sup>9</sup>W. Schneyer, Op.cit., Dec., 1965, pp. 174-179.

<sup>10</sup>E. Rankin, Op.cit., 1957.

<sup>11</sup>M. Jenkinson, Op.cit., 1957.

<sup>12</sup>R. Ruddell, "The Effect of Oral and Written Patterns of Language Structure on Reading Comprehension," The Reading Teacher, Vol. 18, 1965, pp. 270-275.

<sup>13</sup>M. Jenkinson, Op.cit., 1957.

Cloze Readability Tests are constructed by deleting every fifth word from an unseen passage.<sup>14</sup> The subjects are instructed to fill in each blank with the word they think was deleted. A response is scored correct when it exactly matches the word deleted.

After administration to a group the correct identified omissions are tallied. Experimental results, according to Brown,<sup>15</sup> show the Cloze method is reliable; seemed to handle specialised passages more adequately than other methods and that the same rankings of readability were obtained when words were deleted at random, or every ninth word.

The passage (Appendix 4) in this Cloze Procedure is unseen and every fifth word was deleted. To provide an orientation to the context of the passage, the first two sentences, and the last two were left intact. The passage is reproduced with some standard sized of blank in place of each missing word and the subjects are asked to write their guesses in corresponding blanks.

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<sup>14</sup>J. Bormuth, "Cloze Readability Procedure," C.S.E.I.P., Occasional Report, No. 1, February 1967, University of California.

<sup>15</sup>J. Brown, "Taylor Wilson Cloze Procedure: A New Tool for Measuring Readability," Psychological Abstracts, No. 850, 29, 842-851, p. 79.

Structural deletions (Appendix 4) are used in the test since, according to the literature, they correlate significantly more highly with comprehension than lexical deletions.<sup>16</sup> The test comprised of 31 cloze units for the subjects to complete in 15 minutes and the exact word removed had to be supplied by them.

The score of any subject on any passage is the number of the subject's proposed words that match the original ones deleted.<sup>17</sup>

Culhane who strongly supports the Cloze Text maintains that subjects must use context clues and must pay attention to the remaining words in the passage in order to replace deleted words, thus resulting in better understanding of the materials that they read.<sup>18</sup>

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<sup>16</sup>W. Weaver and A. Kingston, "A Factor Analysis of the Cloze Procedure and other Measures of Reading and Language," Journal of Communication, Vol. 13, 1963, p. 23.

<sup>17</sup>W. Taylor, "Cloze Readability Scores as Indices of Individual Differences in Comprehension and Aptitude," Journal of Applied Psychology, Vol. 41, No. 1, 1957, pp. 19-26.

<sup>18</sup>J. Culhane, Op.cit., February 1970, pp. 410-415.

#### 4. Collection of Data

An application for permission to conduct the two tests with a specified number of subjects in the schools was submitted to the Ottawa Separate School Board on March 7, 1975, together with an outline of the research proposal. Approval was received on March 18, 1975.

A meeting was subsequently convened on March 26, 1975, with the writer's thesis supervisor and the Principals whose schools were involved in the study, and there all plans were finalised for the dates of these two tests.

With consideration for the minimum disruption of the time-table for the eleven classes involved in the study, it became desirable to solicit the help of the school counsellor and teachers of the classes concerned.

The teachers who were assisting, and the students who were participating actively in the study were informed of the general nature and purpose of the study as outlined in Appendices 3 and 4.

Thurstone's Closure Flexibility Test was timed for ten minutes and the procedure in the manual was strictly adhered to.<sup>19</sup> For the Cloze Procedure Test the

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<sup>19</sup>L. Thurstone, T. Jeffrey, "Closure Flexibility Test," University of North Carolina, 1965, U.S.A.

subjects were allowed fifteen minutes to complete the test.

As the sample was drawn from two different schools, it was necessary to administer the tests on different days and at different times in each school. The tests were given to subjects at one school on April 14 and 15, 1975, and at the other on April 16, 1975.

#### 5. Analysis of Data

The research hypothesis was tested in the null form by means of analysis of variance (A.N.O.V.A.) as described by Keith<sup>20</sup> with field-dependence-independence and sex as the independent variables and achievement in comprehension as the dependent variable.

The level of significance was set at  $p < .05$ .

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<sup>20</sup>Virginia Keith, Design and Analysis in Experimentation, Ottawa, University of Ottawa Press, 1972, pp. 98-136.

## CHAPTER III

### PRESENTATION OF RESULTS

In this chapter, the results of the study are presented and discussed under the following headings: Control Variables, Reiteration of the Research Problem and Hypothesis, and the Inferential Analysis of Data.

#### 1. Control Variables

As reported in a previous chapter studies have revealed that reading comprehension is related significantly to field-dependence-independence. Thus, Thurstone's Concealed Figures Test (Form A) was first administered to obtain the field-dependent and field-independent subjects and shortly after the administration of this test, the reading comprehension test got underway in order to avoid "experimental mortality".

The teacher variable was largely controlled by the rotary system, that is, students were exposed to the same teachers who taught this subject at different periods of the day.

In the light of certain suggestions in the literature that the subject becomes more field-independent with age, preliminary consideration was given to the age factor, that is, the subjects who participated

in the experiment were limited to the age range of 12/6 to 13/0.

As seen from Appendix 2, most of the 361 subjects tested on Thurstone's Concealed Figures Test (Form A) clustered between standard scores 48 and 42, and between these two standard scores, there are one hundred and forty-five subjects, that is, those in the field-central.

In conformity with the original design, 30% of the subjects from the two extremes of the field-dependence-independence continuum were assigned to their corresponding cells - "cut off" points being 48 and 42 (standard scores) corresponding respectively to 58 and 35 points in raw scores as indicated in Appendix 2.

Table 3 shows that the mean value of reading comprehension of the field-independent group is 19.43 and that of the field-dependent group is 13.07.

From the summary of a two-way analysis of variance in Table 3 the dependent variable, that is performance in reading comprehension is significantly different from zero ( $F = 63.76$ , significant at .05 level).

## 2. Reiteration of the Research Problem and Hypothesis

The problem which gave birth to the present study is based on the question: To what extent in

Goodman's frame of reference is a person's achievement in reading comprehension related to his or her perceptual and psychological differentiation?

With this statement of the problem and on the basis of the literature surveyed in this area, it was hypothesised that:

In reading comprehension, students who are field-independent are higher achievers than students who are field-dependent.

### 3. The Inferential Analysis of Data

As already stated in Chapter II, the research hypothesis was tested in the null form by means of a two-way analysis of variance (ANOVA) with the level of significance set at .05. The results are presented in Table 2.

The data was subjected to a 2 x 2 analysis of variance. The largest F ratio obtained for the main effect is for the Concealed Figures Test comparison ( $F = 63.76$ ) which with 1 and 212 df reach a significant value ( $P = .0001$ ). None of the interactions is significant at the .05 level.

Table 2

ANOVA for Field-Dependent and Field-Independent Males and Females on the Reading Comprehension Test

| Source    | S.S.    | N.D.F. | M.S.    | F      | P. value |
|-----------|---------|--------|---------|--------|----------|
| A (Sex)   | 1.19    | 1      | 1.19    | 0.03   | 0.856    |
| B (F-D-I) | 2309.54 | 1      | 2309.54 | 63.76* | 0.0001   |
| A.B.      | 110.04  | 1      | 110.04  | 3.04   | 0.828    |
| R (Error) | 7678.62 | 212    | 36.22   |        |          |

\* Significant at .05 level.

Table 2 shows that there are no significant differences on measures of reading comprehension between the two sexes.

Table 2 also shows that there is a significant difference between the field-independent subjects and the field-dependent subjects on the reading comprehension test. Hence the results did succeed in rejecting the null hypothesis. In other words, the research hypothesis which states that "Field-independent subjects achieve higher scores in reading comprehension than field-dependent subjects" was confirmed at the .05 level.

Table 3

Mean and Standard Deviation for Field-Dependent  
and Field-Independent Males and Females on  
the Reading Comprehension Test

|             | F.D.M. | F.D.F. | F.I.M. | F.I.F. |
|-------------|--------|--------|--------|--------|
| Mean        | 13.54  | 12.23  | 18.47  | 20.36  |
| Stand. Dev. | 6.36   | 6.88   | 6.22   | 4.74   |

The field-independent male subjects obtained a higher score than their field-dependent male counterparts. This phenomenon is also observable for the female subjects of the field-independent group. Moreover, the mean score for the field-independent female subjects exceeded the mean score of the field-independent males by 1.89. Although the female subjects in this field-independent group had a slightly larger mean, and a smaller standard deviation than the male independent group, the difference between the sexes in these two field-independent groups was not significant. A similar phenomenon is observable between the sexes of the two field-dependent groups.

## CHAPTER IV

### DISCUSSION OF RESULTS

This chapter will present a discussion of the results outlined in the previous chapter. The first section discusses the hypothesis in the light of the statistical results. The second section presents a discussion of the experimental findings insofar as they open up a new dimension of the sex variable in relation to reading comprehension performance.

In the light of the findings of section two, it becomes desirable to discuss in section three the main results and their ramification in an individual's intellectual functioning.

The fourth section discusses the application of a researcher's knowledge of cognitive styles of learners to the method of presentation in the classroom. The fifth section briefly describes the limitation of the present research.

The sixth and final section discusses succinctly the link between Goodman and Witkin.

#### 1. The Hypothesis

The results of the statistical analysis of the sample in this study permit the rejection of the null

hypothesis. In brief, the research hypothesis was supported, that is, subjects who manifest a field-independent cognitive style were found to be higher achievers in reading comprehension than subjects who manifest a field-dependent cognitive style. Hence, further support was given to Witkin's theory of psychological differentiation.

## 2. Sex as a Variable

In this study, the dependent variable was the total number of correct responses obtained from a maximum of 31 responses. The possibility that sex differences might exist was recognised in the literature. To test this, a two-way analysis of variance was carried out on the criterion measure, comprehension, and in no instance, for either the effect for sex, or the interaction of sex with field-dependence-independence did any value approach significance at the .05 level. The failure to get any sex differences in reading comprehension in the field-independent dimension gets support from the study of Conklin.<sup>1</sup>

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<sup>1</sup>R. Conklin, "Field-Dependence-Independence and Eye Movement," Perceptual and Motor Skills, 1968, 26, pp. 59-65.

Contrary to Witkin's expectation, Bieri<sup>2</sup> in a similar study found that the mean performance scores on the males and females on the Embedded Figures Test were significantly different and that males were relatively field-dependent and the females were field-independent. However, Bieri attributed this phenomenon to his subjects' identification with parents of the opposite sex.

### 3. Main Results

From an analysis of the data, it would seem that field-dependent and field-independent subjects differ not only in regard to degree of dependence on external cues but also in regard to the content to which they respond, the field-independent subjects seemed more responsive to the relevant syntactic and semantic cues, that is, field-independent subjects demonstrated a superior ability to anticipate the language system by using their own repertoire of responses.

Perhaps the most significant finding and one which should be further pursued is the highly reliable

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<sup>2</sup>J. Bieri, "Parental Identification, Acceptance of Authority, and Witkin Sex Differences in Cognitive Behavior," Journal of Abnormal and Social Psychology, 1960, Vol. 60, No. 1, pp. 76-79.

difference found in the reading comprehension performance variable. The result lends support to the notion that field-independent subjects are capable of attending to the more relevant information in the stimulus field with the outcome that they can more readily solve such problems which are encountered in Concealed Figures Test (Form A) and the Reading Comprehension Test based on the principles of the Cloze Procedure.

#### 4. Application of this Study

This research strongly suggests that groups within a class could be formed with reference to their cognitive style. Accordingly, the mode of presentation could be modified to suit the nature of the perceptual style of the individual learner. The method of presentation of a field-dependent learner would start with the whole (since field-dependent people see things globally), whereas the mode of presentation for a field-independent learner could start with the parts, eventually putting the parts together. Cognitive style mapping, within the framework of the school situation could be of invaluable assistance to the learner. This line of approach has been reported in the literature by Nunney

and Hill.<sup>3</sup>

They report a program which is underway at Oakland Community College where an individualized approach to the learning situation is being used by first diagnosing each individual's cognitive style (that is, field-dependent or field-independent) and his academic strengths in certain areas. The main purpose behind this innovation is to match the cognitive style of the learner to the method of presentation.

It is, yet, too early to evaluate the impact of this innovation and the full implications it may have on the future of the project. However, reports obtained recently reveal a marked improvement in all round achievement.

##### 5. Limitation of the Present Research

One limitation of the present research is that only one test covering thirty-one items in reading comprehension was given. The present researcher suggests that further work covering a larger number of tests be given to investigate fully the relationship between

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<sup>3</sup>D. Nunney and J. Hill, "Personalized Educational Programs," Audio-Visual Instruction, Feb. 1972, Vol. 17, No. 2, pp. 10-15.

field-dependent-independent cognitive style and reading comprehension in Goodman's frame of reference.

## 6. General Remarks

While this study has examined only a few of the possible links that may exist between Goodman's good guessers and Witkin's field-independents, continued research in the area may well uncover factors that are important to the understanding of the concept of "cognitive style" as it relates to the reading comprehension process.

In the light of the supporting evidence revealed in Table 3 it appears that there exists a strong relationship between the concept of field-dependence-independence and the psycho-linguistic guessing game in reading comprehension.

## SUMMARY AND CONCLUSIONS

The present study attempted to examine the extent to which reading comprehension achievement is related to field-dependence-independence.

It was hypothesised that field-independent students would be higher achievers in reading comprehension than field-dependent students.

The research sample comprised 361 grade 7 students (193 boys and 168 girls) chosen from two English-speaking schools in Ottawa. All these students normally spoke English at home.

Thurstone's Closure Flexibility Test (Form A) was used as a criterion measure of field-dependence-independence while reading comprehension achievement was measured by the Cloze Procedure Test.

A two-way analysis of variance (ANOVA) was used as a statistical test of significance at the .05 level. The results revealed that there was a statistical significance in achievement between the field-dependent subjects and the field-independent subjects; thus the results confirmed the research hypothesis. However, the variable Sex and its interaction with the main factor, Field-Dependence-Independence, were not statistically significant.

## BIBLIOGRAPHY

BARTLETT, F., The Mind at Work and Play, Boston, Beacon Press, 1951, pp. 121-123.

A clearly written summary of a series of lectures dealing with a number of topics, relevant to mental behaviour and revealing how it can be studied scientifically by means of simple experiments.

BERLYNE, D., Structure and Direction in Thinking, New York, John Wiley, 1966, pp. 124-162.

Concentrates mainly on a system of concepts that may enable the similarities and differences between thought processes and other forms of behaviour to come into sharp focus. The book abounds with many many hypotheses formulated in the light of the concepts introduced and considered, and many relevant experimental evidence is cited to lend support to these concepts.

BRUNER, J., Going Beyond the Information Given, New York, Norton, 1973, 490 p.

This book presents some of Bruner's main ideas in the psychology of knowing, that is, what man does with information and, in particular, how he goes beyond it to achieve insight, understanding and competence. This volume covers twenty seven articles which have been divided into five sections. The first three sections follow the uses to which information is put "inward", moving from the constructions involved in perceptual recognition to those involved in the higher mental processes and finally "outward" to those involved in converting knowledge to action. The fourth and fifth sections are by and large, descriptions of modes of changes in the child's development and the tailoring of course material in a way that acknowledges this development.

-----, The Process of Education, Cambridge, Harvard University Press, 1969, 97 p.

This book owes its birth to the Woods Hole Conference and its thought and its main ideas had been shaped and aided by a pooling of knowledge of the proponents of the various disciplines at this Conference. Emphasis was laid on learning, that is on the structure of knowledge, on discovery learning and on the curriculum in order to bring out the highest goal in man's achievement.

CARROLL, John (Ed), Language and Thought, Selected Writings of Benjamin Lee Whorf, Massachussets, M.I.T. Press, 1967, pp. 134-172.

The underlying theme of this book is that thought and cognition are determined by the language in a given culture, even though the language structure may influence thought and the manner in which one understands one's environment. This publication provides a theory of language behaviour, including a theory of meaning and a theory of how we learn to comprehend and produce connected discourse.

ELKIN, David, "Piaget's Theory of Perceptual Development: Its Application to Reading and Special Education," Journal of Special Education, Vol. 4, 1967, pp. 357-361.

This author feels that Piaget's theories are of great value for the solution of problems relating to reading because they are based on a consideration of the varied and complex acts a child must perform in his acquisition of reading skills.

GOODMAN, K. (Ed), The Psycho-linguistic Nature of the Reading Process, Michigan, Wayne State University Press, 1968, pp. 1-26.

This first major compilation is a descriptive review of a collection of twelve papers presented at a 1965 symposium on theoretical and empirical investigations of reading as a psycho-linguistic process. Goodman initiates thought with a theoretical scheme showing how the reader attempts to reconstruct a message from the writer.

-----, Psycho-linguistic Universals in the Reading Process, Journal of Typographic Research, Vol. 4 (2), 1970, pp. 103-110.

In this report, Goodman claims that literate speakers in any language have two alternative surface forms which are realizations of the same deep structure and which represent alternate codings of the same meaning. For Goodman's proficient reader, written language becomes parallel to speech and not a secondary representation of it. Listening and reading are processes in which the language user may sample, select and predict from the available signal. Readers are users of language who process graphic, syntactic and semantic information simultaneously. Readers develop strategies for the efficient sampling of the graphic signal in relation to the syntax of their language and the concepts and experiences with which the passage is concerned.

GOODMAN, K., and FLEMING, J. (Eds), Psycho-linguistics and the Teaching of Reading, Newark, Delaware, International Reading Association, 1969, 109 p.

This is the second major work compiled by Goodman. While it is a confirmation, an extension and an elaboration of his first major publication, it lays emphasis on the structural nature of the English language which facilitates prediction in the reading process.

NUNNEY, Derek and Hill, Joseph, "Personalized Educational Programs," Audio-Visual Instruction, Vol. 17, 1972, pp. 10-15.

This is a report of a program in which cognitive style mapping is actually used in developing a method of instruction which is largely suited to the needs of individual needs.

SHANNON, Claude and WEAVER, W., The Mathematical Theory of Communication, Illinois, University of Illinois Press, 1949, p. 3.

This publication emphasises a theory of communication and discusses the level of communication problems inherent in information processing.

STAUFFER, R., "The Language Experience Approach to the Teaching of Reading," New York, Harper and Row, 1970, 301 p.

In this book Stauffer has presented his theory that a reading programme based on the intellectual linguistic and cultural wealth which a child brings to school should provide better results since reading is closely linked to language.

-----, Teaching Reading as a Thinking Process, New York, Harper and Row, 1969, 307 p.

Influenced by Piaget's thought, Stauffer has defined reading as a thinking process strongly affected by maturational, intellectual linguistic and social processes.

SMITH, Frank, Understanding Reading, New York, Holt, Rinehart and Winston, 1971, 239 p.

This publication, emphasises a psycho-linguistic analysis of reading and learning to read. It attempts to shed some light on the fundamental aspects of the complex human skill of reading - linguistic, psychological and physiological - and what is involved in learning to read.

-----, Psycho-linguistics and Reading, New York, Holt, Rinehart and Winston, 1973, 211 p.

The second major work of Smith covers sixteen articles written by theorists and researchers in psycho-linguistics. In the main, this volume presents a brief descriptive introduction to psycho-linguistics and then examines at some length a number of aspects of reading in the light that psycho-linguistics offers.

In fact, it has focussed the readers' attention to new insights into reading, namely, that a small part of the information necessary for reading comprehension comes from the printed page, secondly comprehension must precede the identification of individual words, thirdly, reading is not decoding to spoken language.

STEIN, F., Consistency of Cognitive Interest and Personality Variables with Academic Mastery: A Study of Field-Dependence-Independence, Verbal Comprehension, Self-Perception, and Vocational Interest in Relation to Academic Performance among Male Juniors Attending an Urban University, Unpublished Doctoral Dissertation, New York University, 1968.

An investigative study of the inter-relationship of field-dependence-independence; vocational interest, verbal comprehension and self-perception, to level of academic achievement in college. It ends up by concluding that the development of cognitive skills and receptiveness of learning in the sciences and humanities are related to personality factors.

WITKIN, Herman, H.B. Lewis, M. Hertzman, K. Machover, P.S. Messner and S. Wapner, Personality Through Perception, New York, Harper, 1954, XXV - 571.

In this first major publication, Witkin and his colleagues present the origins of the field-dependence-independence construct and its distinctive characteristics, as well as the results of a vast research project relating style of cognitive functioning to personality variables and idiosyncratic patterns of adaptation.

WITKIN, H.A., R.B. Dyke, H. Faterson, D.R. Goodenough and S.A. Karp, Psychological Differentiation.

The second major work by Witkin and his colleagues is a confirmation and extension of the first, as well as the placing of the total research project within the perspective of a developmental framework under the guiding principle of psychological differentiation.

WITKIN, H., "A Cognitive Style Approach to Cross-Cultural Research," in International Journal of Psychology, Vol. 2, No. 4, 1967, pp. 233-250.

This is an extension of a paper presented at a symposium on Intercultural Studies of Mental Development. It seeks to validate previous studies through evaluating a cognitive-style approach to cross-culture research by way of the global-articulated dimension of cognitive functioning. The newer study has thrown new light on the role of cultural influences on the development of cognitive style in general and on sex differences in particular.

-----, The Role of Cognitive Style in Academic Performance and in Teacher-Student Relations (Research Bulletin), Princeton Educational Testing Service, Feb. 1973, p. 58.

Paper presented at a symposium on Cognitive Styles, Creativity and Higher Education - possibly the most up-to-date and comprehensive statement of Witkin's position. Emphasises the nature of cognitive style, and discusses cognitive style as a factor in academic evolution.

APPENDIX 1

FORMAL APPLICATION TO THE SUPERINTENDENT  
OF THE SEPARATE SCHOOLS OF OTTAWA



March 7, 1975

Mr George Moore,  
Superintendent,  
Separate Schools of Ottawa,  
140 Cumberland Street,  
Ottawa, Ontario.

Dear Mr. Moore:

I am about to embark upon an experimental study to determine whether the reading performance as described by Goodman's good psycholinguistic readers are related to the field-dependent-independent dimension.

That is, readers, who besides sampling the least amount of the available language cues from the printed page, bring their experience and their language and thought development to bear on the reading matter.

A pilot study has already been done with a small sample, but the implications of this study and the generality that may arise therefrom, call for a larger sample of about two hundred and fifty (250) Grade 7 students.

I shall, indeed, be grateful if your Board can give its approval to have the relevant tests done in your schools.

The over all time involved in the administration of the tests will cover a period of forty minutes and this would not require the active participation on the part of the teachers of the respective classes which will be affected thereby

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Dr. André Côté and Dr Gabriel Bordeleau are my joint thesis directors to whom you can refer in the event that any problem arises.

Moreover, I have attached a copy of the proposed Reading Test and also a copy of Thurstone's Closure Flexibility Tests (Form A)

Thanks in anticipation for your early cooperation in this matter.

Yours sincerely,

A handwritten signature in cursive script that reads "Augustus Pierre".

Augustus Pierre  
1170 Fisher Avenue  
Suite 404  
Ottawa K1Z 5R7

AP/fb  
Encl.

APPENDIX 2

REPLY FROM THE SUPERINTENDENT OF  
SEPARATE SCHOOLS OF OTTAWA

The Ottawa Roman Catholic  
Separate School Board

140 Cumberland, Ottawa, Ontario. K1N 7G9—237-5660



Le Conseil des écoles  
séparées catholiques d'Ottawa

March 14, 1975.

Mr. Augustus Pierre,  
1170 Fisher Avenue,  
Suite 404,  
Ottawa, Ontario.  
K1Z 5R7

Dear Mr. Pierre:

Thank you for your letter of March 7th, 1975, addressed to Mr. George Moore, Superintendent, Ottawa Separate Schools, regarding your research study.

I am pleased to inform you that permission has been granted for you to conduct your research study in two of our junior high schools. They are:

St. Patrick Junior High School,  
1485 Heron Road,  
Principal: Mr. J. Knobel  
Telephone: 733-1316

St. Peter Junior High School,  
1480 Heron Road,  
Principal: Mr. D. Sloan  
Telephone: 737-3401

The principals of the above mentioned schools have been contacted and are agreeable to the testing of their Grade 7 students. I would request that you contact the principals concerned to schedule an appropriate time for the testing.

I would also request that you forward us a copy of the results when your testing has been finalized.

If you should have further questions, please do not hesitate to contact my office at your convenience.

Thanking you, I remain,

Yours very truly,

A handwritten signature in dark ink, appearing to read 'P. G. Brady', with a stylized flourish at the end.

P. G. Brady,  
Assistant Superintendent,  
English Schools.

PGB/cg

APPENDIX 3THURSTONE'S CLOSURE FLEXIBILITYTEST (FROM A)

# CLOSURE FLEXIBILITY

## (Concealed Figures)

### (Form A)

Please fill in:

Name \_\_\_\_\_

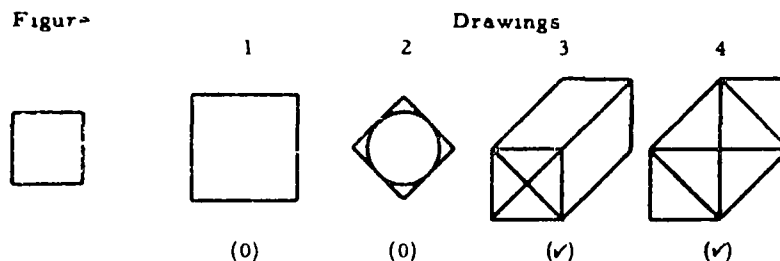
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Occupation \_\_\_\_\_

Developed by L.L. Thurstone, Ph.D. and T.E. Jeffrey, Ph.D. - The Psychometric Laboratory - The University of North Carolina

#### Directions:

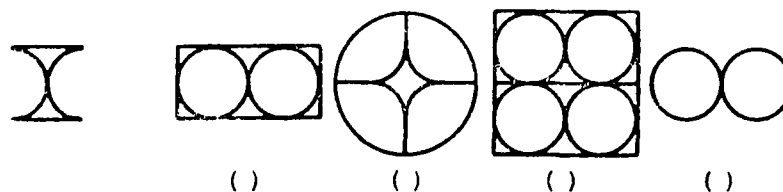
The row of designs below is a sample item of this test. The parts have been labeled to make description easier. These labels do not appear in the test items. The left hand design in each row is the figure. You are to decide whether or not the figure is concealed in each of the four drawings to the right. Put a check mark (✓) in the parentheses under a drawing, if it contains the figure. Put a zero (0) in the parentheses under a drawing, if it does not contain the figure. Look at the row of designs below.



In the row above a zero (0) has been written in the parentheses under drawing 1. The first drawing is a square but it is larger than the figure. A zero (0) has been written under drawing 2. Although the second drawing contains a square of exactly the same size as the figure, it has been turned. Check marks (✓) have been written under the third and fourth drawings since they each contain a square of exactly the same size as the figure and have not been turned. It does not matter that the figure contained in drawings three and four is on a different level from the figure at the left.

#### Sample:

Here is another example for practice. Try it.



You should have placed check marks (✓) in the parentheses under the first and third drawings and zeros (0) in the parentheses under the second and fourth drawings.

WHEN YOU GET THE SIGNAL TO BEGIN, turn the page and mark more problems of the same kind. Work as fast and as accurately as you can, but do not guess. Wrong answers will count against you. You are not expected to finish in the time allowed. You will have exactly ten minutes to do as much as you can.

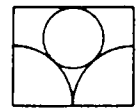
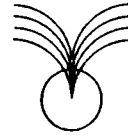
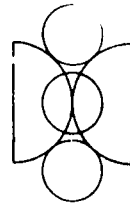
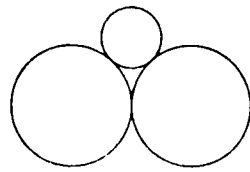
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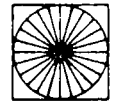
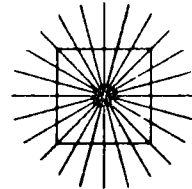
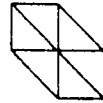
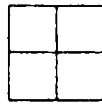
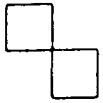


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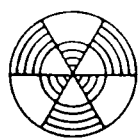
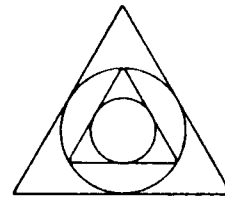
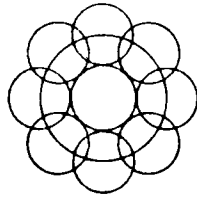
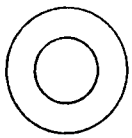


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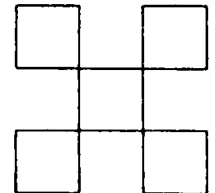
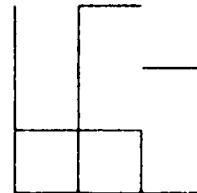
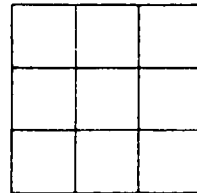
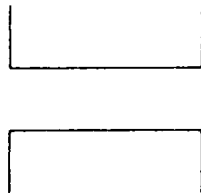
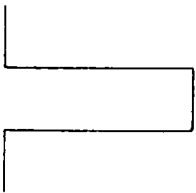


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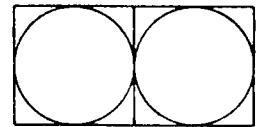
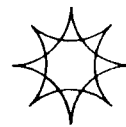
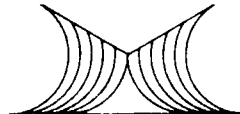
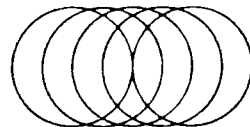
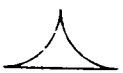


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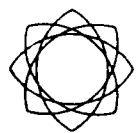
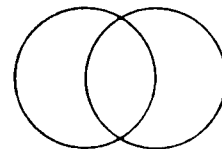
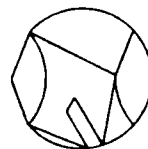
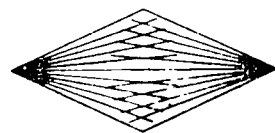


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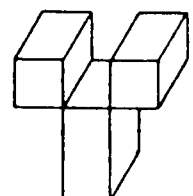
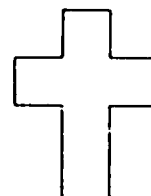
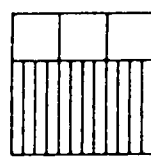
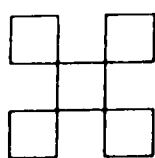
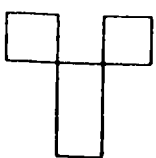


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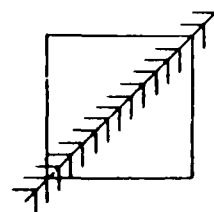
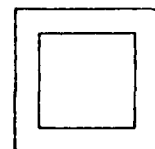
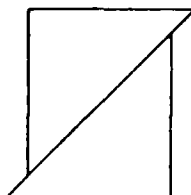
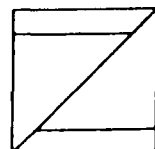
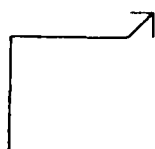
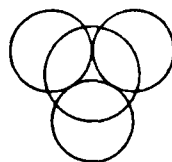
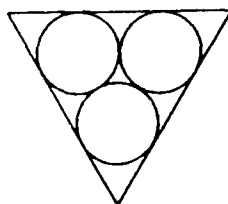
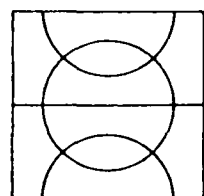
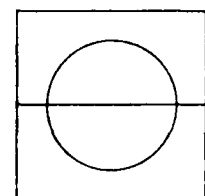
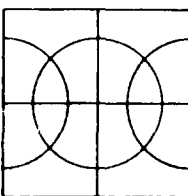
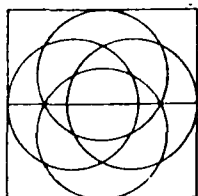
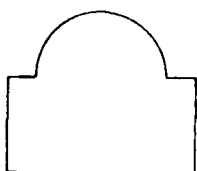
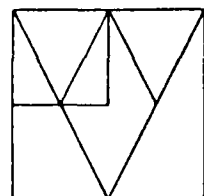
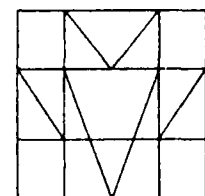
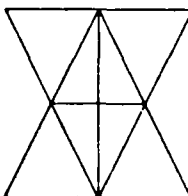
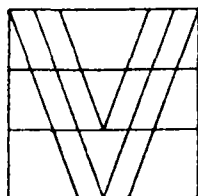
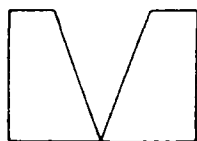
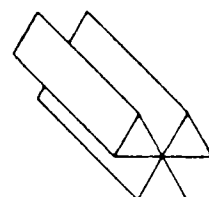
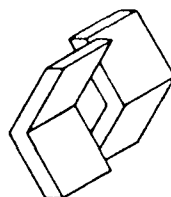
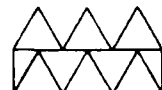
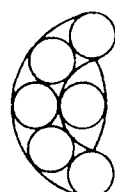
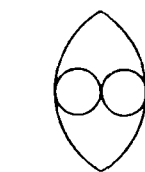
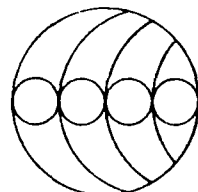
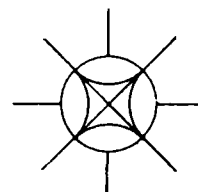
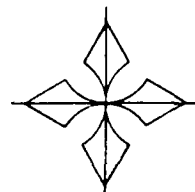
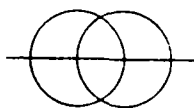
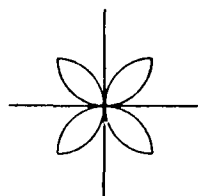
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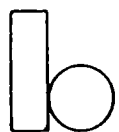
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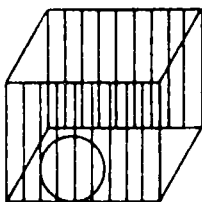
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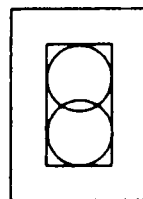




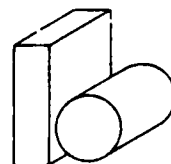
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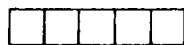
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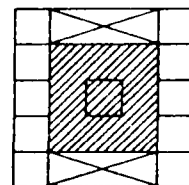
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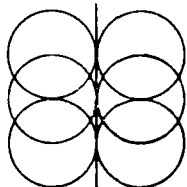
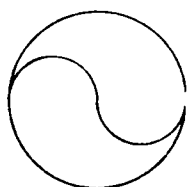
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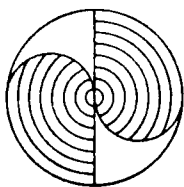
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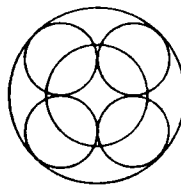
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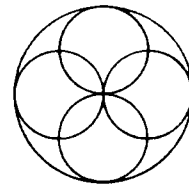
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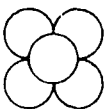
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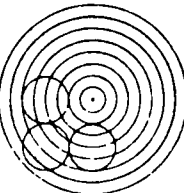
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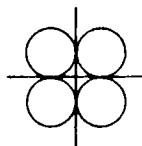
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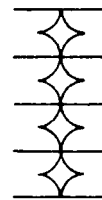
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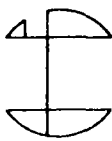
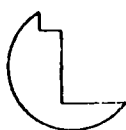
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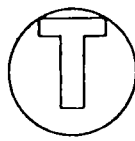
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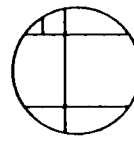
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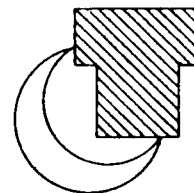
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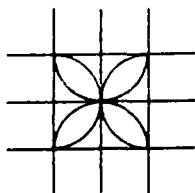
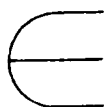
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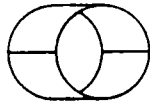
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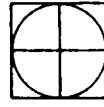
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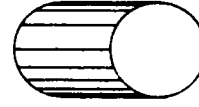
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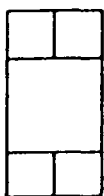
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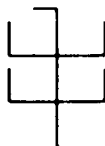
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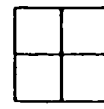
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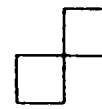
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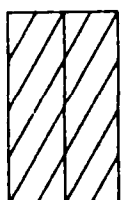
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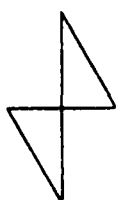
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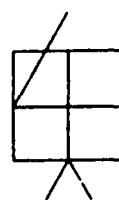
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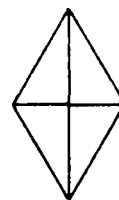
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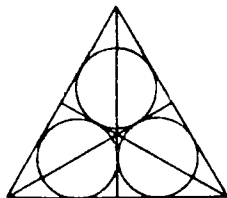
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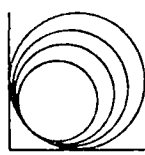
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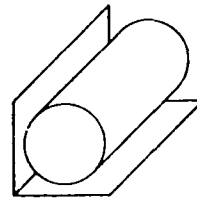
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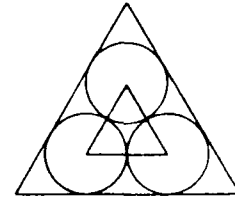
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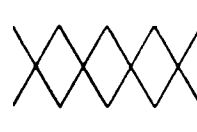
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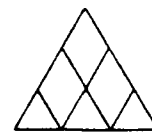
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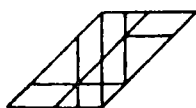
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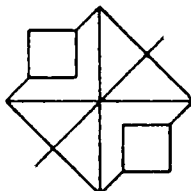
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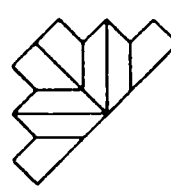
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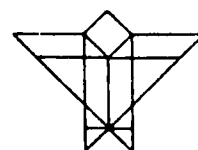
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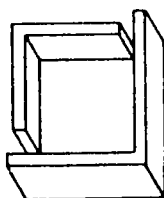
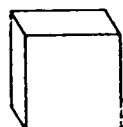
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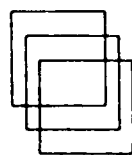
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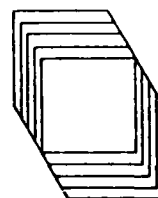
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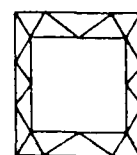
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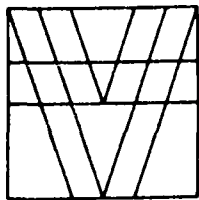
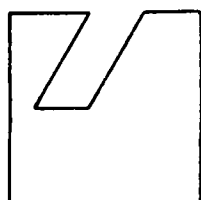
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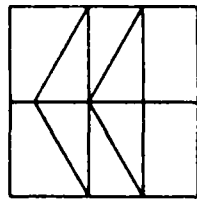
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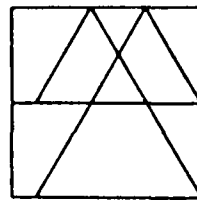
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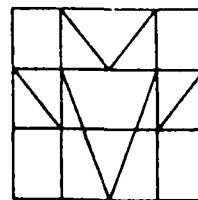
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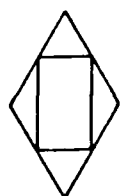
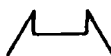
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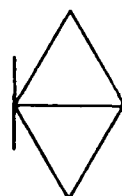
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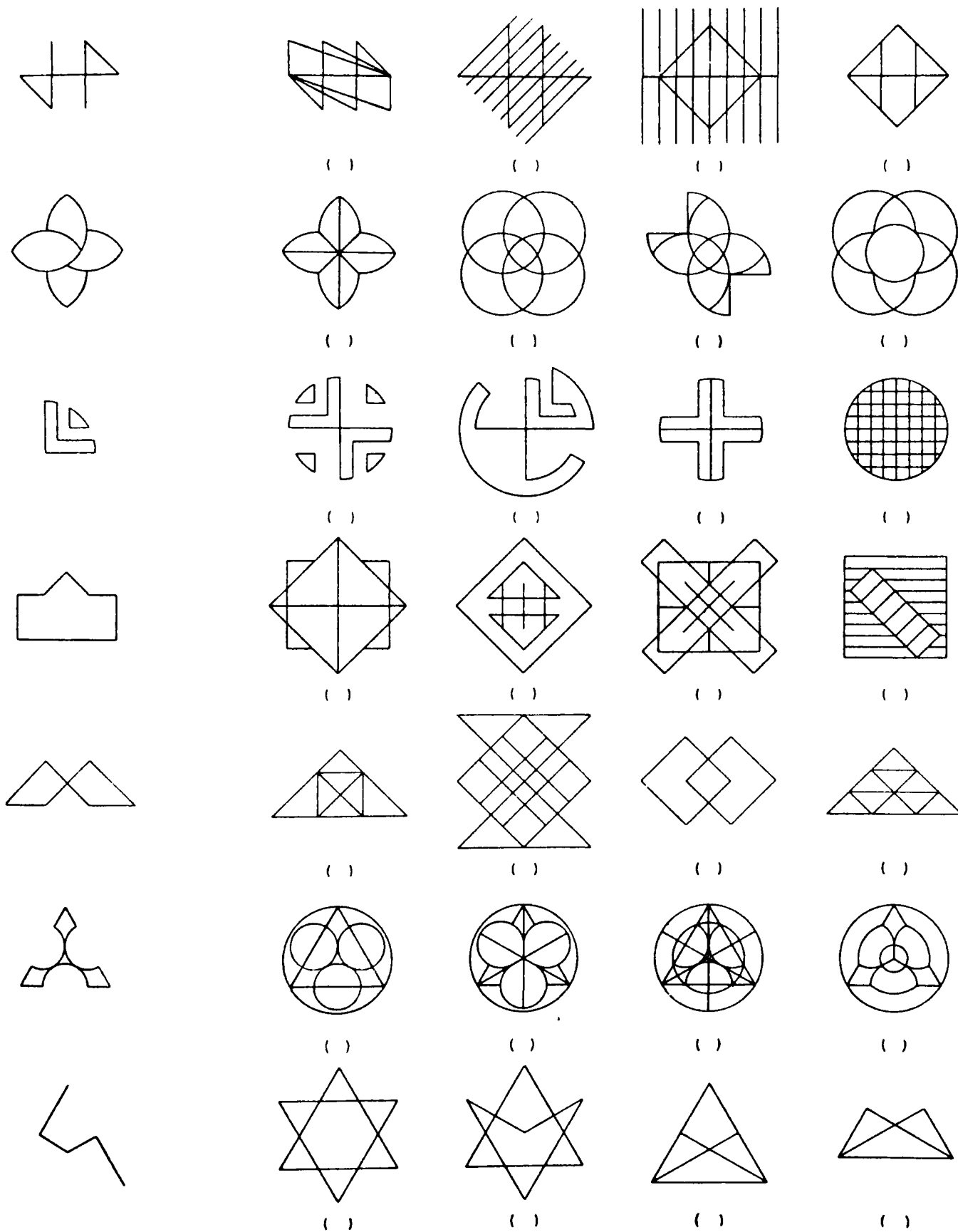


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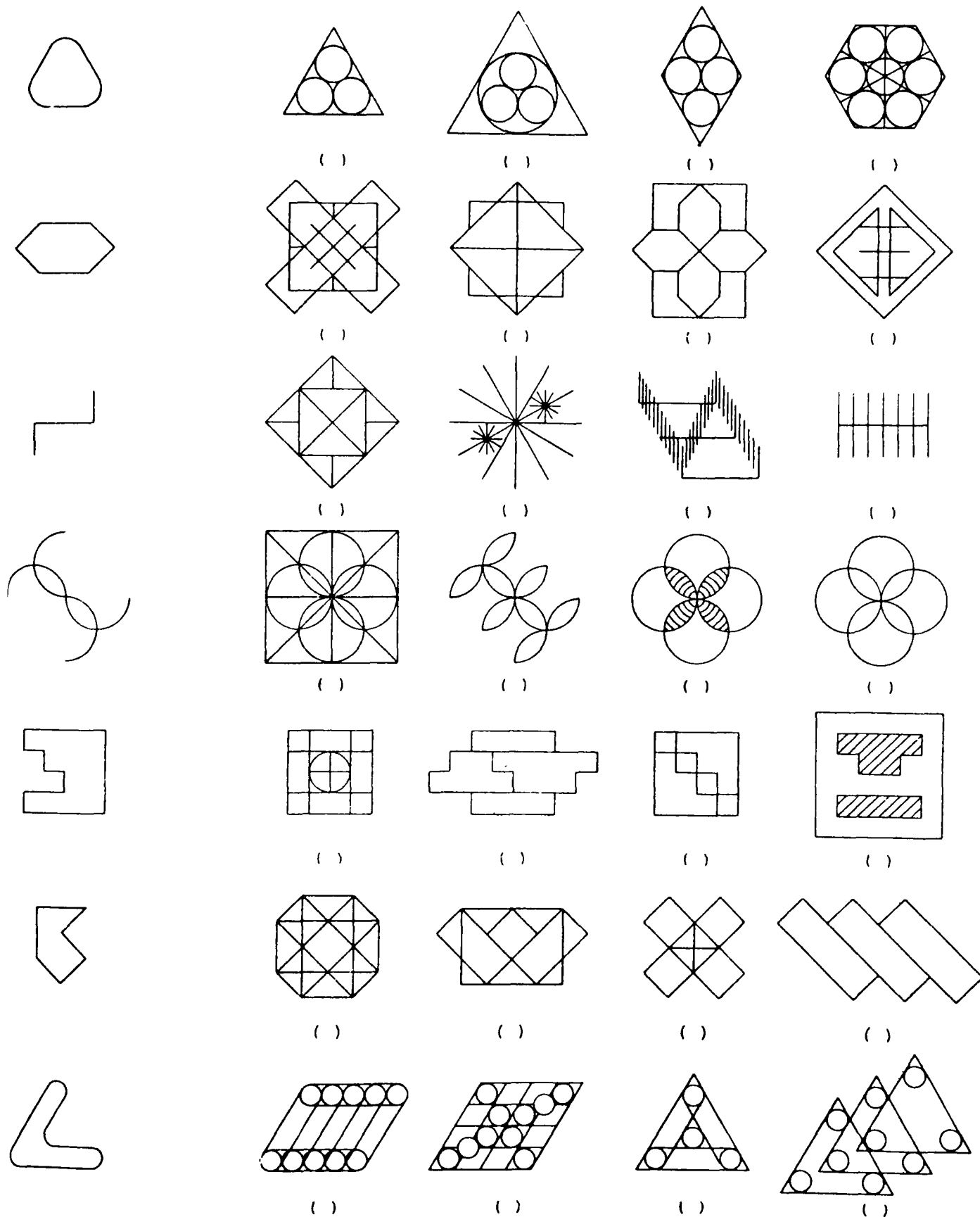


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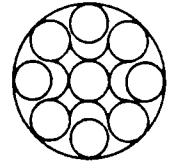
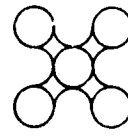
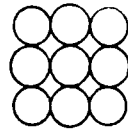
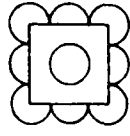
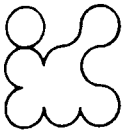
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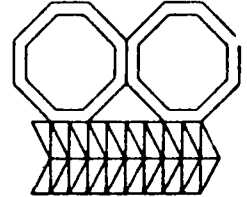
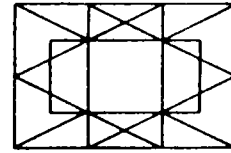
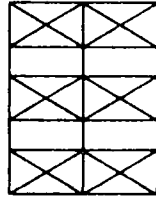
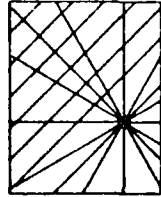


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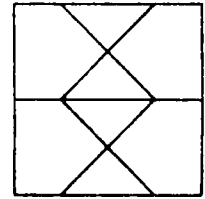
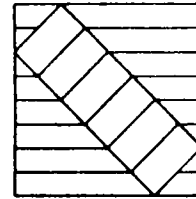
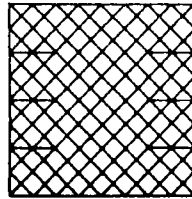
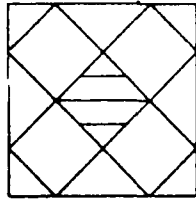
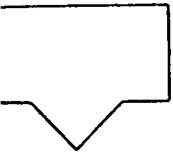


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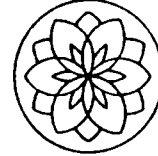
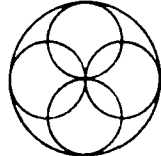


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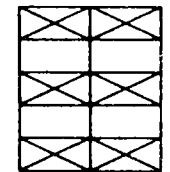
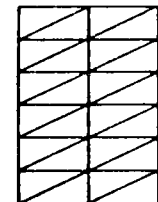
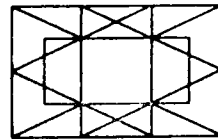
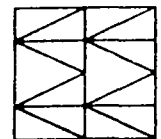
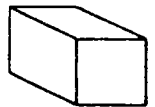


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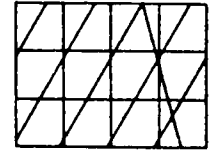
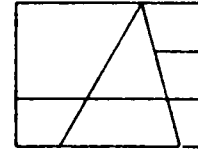
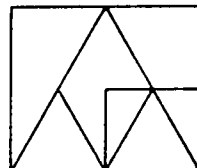
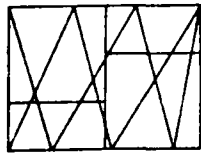
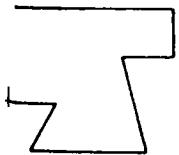


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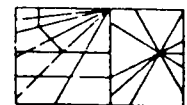
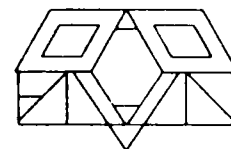
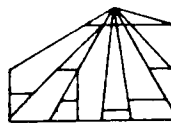
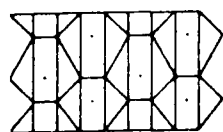


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STOP HERE -- WAIT FOR FURTHER INSTRUCTIONS.

APPENDIX 4

READING COMPREHENSION TEST

CLOZE PROCEDURE

With lead pencil fill in the blank spaces with the most suitable word. In doing this test, you must work as quickly as possible. DO NOT SPEND TOO MUCH TIME ON ANY ONE WORD. Do not worry if you cannot find the correct word for the blank space at the time; skip it and come back to it later, if you have time. You have fifteen minutes to complete this test.

Here is a sample test.

Large groups of people of (1) \_\_\_\_\_ lands  
move about from one (2) \_\_\_\_\_ to another to find  
(3) \_\_\_\_\_ for their roving animals. These  
(4) \_\_\_\_\_ people are called nomads.

Large groups of people of (1) desert lands move about from one (2) place to another to find (3) food for their roving animals. These (4) travelling people are called nomads.

ANIMAL TRACKS

Animal tracks tell many stories. They are like written messages. They (1) \_\_\_\_\_ what kind of animal (2) \_\_\_\_\_ them and in which (3) \_\_\_\_\_ it was going. They (4) \_\_\_\_\_ whether it was frightfully (5) \_\_\_\_\_ to escape an enemy (6) \_\_\_\_\_ stalking its prey.

A (7) \_\_\_\_\_ can learn to discover (8) \_\_\_\_\_ an animal was stealthily (9) \_\_\_\_\_ by closely examining its (10) \_\_\_\_\_.

A good time to (11) \_\_\_\_\_ an animal, to follow (12) \_\_\_\_\_ trail, is after a (13) \_\_\_\_\_. A light snow, not (14) \_\_\_\_\_ enough for sledding, can (15) \_\_\_\_\_ a perfect tracking clue. (16) \_\_\_\_\_ footprints may also be (17) \_\_\_\_\_ in mud, dust and (18) \_\_\_\_\_.

Even tracks left by (19) \_\_\_\_\_ or muddy feet on (20) \_\_\_\_\_ pavement can be very (21) \_\_\_\_\_ in learning about tracking (22) \_\_\_\_\_. At the beach numerous (23) \_\_\_\_\_ of sand-pipers and other (24) \_\_\_\_\_ line birds are often (25) \_\_\_\_\_ fairly close to the (26) \_\_\_\_\_ of the water.

It (27) \_\_\_\_\_ always possible to learn  
(28) \_\_\_\_\_ clues that help in (29) \_\_\_\_\_ wild  
animals by looking (30) \_\_\_\_\_ at the footprints of  
(31) \_\_\_\_\_ dogs and cats.

Tracking is not always easy for a beginner. Few  
tracks are complete or perfect. Snow or dust often falls  
on prints, covering or changing their shapes.

APPENDIX 5

Distribution of Measures of Field-  
Dependence-Independence in  
Raw Scores

| <u>Score</u> | <u>M</u> | <u>F</u> | <u>Total</u> |
|--------------|----------|----------|--------------|
| 104          | 1        | -        | 1            |
| 99           | -        | 1        | 1            |
| 95           | 1        | -        | 1            |
| 93           | 1        | 2        | 3            |
| 92           | -        | 1        | 1            |
| 91           | -        | -        | 0            |
| 90           | 1        | -        | 1            |
| 89           | 2        | -        | 2            |
| 88           | -        | -        | -            |
| 87           | -        | -        | 0            |
| 86           | 2        | 1        | 3            |
| 85           | 1        | -        | 1            |
| 84           | -        | -        | 0            |
| 83           | -        | -        | 0            |
| 82           | -        | -        | 0            |
| 81           | 1        | -        | 1            |
| 80           | 1        | -        | 1            |
| 79           | 1        | -        | 1            |
| 78           | 1        | 1        | 2            |
| 77           | 2        | -        | 2            |
| 76           | 3        | 4        | 7            |
| 75           | 1        | -        | 1            |
| 74           | -        | 2        | 2            |
| 73           | 1        | 1        | 2            |
| 72           | 1        | 1        | 2            |
| 71           | 1        | 2        | 3            |
| 70           | 1        | 3        | 4            |
| 69           | 2        | 3        | 5            |
| 68           | 1        | 3        | 4            |
| 67           | 2        | -        | 2            |
| 66           | 3        | 1        | 4            |
| 65           | 2        | 3        | 5            |
| 64           | 2        | 4        | 6            |
| 63           | 2        | 4        | 6            |
| 62           | <u>5</u> | <u>2</u> | <u>7</u>     |
|              | 42       | 39       | 81           |

APPENDIX 5 - (Contd.)

| <u>Score</u> | <u>M</u> | <u>F</u> | <u>Total</u> |
|--------------|----------|----------|--------------|
| 61           | 3        | 1        | 4            |
| 60           | 3        | 5        | 8            |
| 59           | 1        | 3        | 4            |
| 58           | 4        | 7        | 11           |
| 57           | 5        | 2        | 7            |
| 56           | 2        | 4        | 6            |
| 55           | 1        | 1        | 2            |
| 54           | 5        | 4        | 9            |
| 53           | -        | 6        | 6            |
| 52           | 3        | 1        | 4            |
| 51           | 1        | 4        | 5            |
| 50           | 6        | 3        | 9            |
| 49           | 1        | 2        | 3            |
| 48           | 10       | 5        | 15           |
| 47           | 4        | 3        | 7            |
| 46           | 3        | 2        | 5            |
| 45           | 1        | 4        | 5            |
| 44           | 3        | 2        | 5            |
| 43           | 2        | -        | 2            |
| 42           | 3        | 6        | 9            |
| 41           | -        | 3        | 3            |
| 40           | 7        | 2        | 9            |
| 39           | 5        | 3        | 8            |
| 38           | 1        | 6        | 7            |
| 37           | 3        | 5        | 8            |
| 36           | 5        | 5        | 10           |
| 35           | 3        | 4        | 7            |
| 34           | 3        | 2        | 5            |
| 33           | 6        | 2        | 8            |
| 32           | 2        | 7        | 9            |
| 31           | 2        | 1        | 3            |
| 30           | 5        | 3        | 8            |
| 29           | 2        | 1        | 3            |
| 28           | 5        | 7        | 12           |
| 27           | <u>3</u> | <u>1</u> | <u>4</u>     |
|              | 113      | 117      | 230          |

APPENDIX 5 - (Contd.)

| <u>Score</u> | <u>M</u> | <u>F</u> | <u>Total</u> |
|--------------|----------|----------|--------------|
| 26           | 4        | 1        | 5            |
| 25           | 2        | 1        | 3            |
| 24           | 4        | 1        | 5            |
| 23           | 1        | -        | 1            |
| 22           | 5        | 1        | 6            |
| 21           | -        | 1        | 1            |
| 20           | 3        | 1        | 4            |
| 19           | 2        | -        | 2            |
| 18           | 3        | 1        | 4            |
| 17           | 3        | -        | 3            |
| 16           | -        | 1        | 1            |
| 15           | 1        | -        | 1            |
| 14           | -        | 1        | 1            |
| 13           | 1        | -        | 1            |
| 12           | 2        | -        | 2            |
| 11           | 2        | -        | 2            |
| 10           | 1        | -        | 1            |
| 9            | 1        | -        | 1            |
| 8            | -        | -        | 0            |
| 7            | 1        | 1        | 2            |
| 6            | -        | -        | 0            |
| 5            | -        | 1        | 1            |
| 4            | -        | 1        | 1            |
| 3            | -        | -        | 0            |
| 2            | 1        | -        | 1            |
| 1            | <u>1</u> | <u>-</u> | <u>1</u>     |
|              | 50       | 12       | 50           |

|   | <u>Total</u>    |
|---|-----------------|
| M | 193             |
| F | <u>168</u>      |
|   | 361             |
|   | <u>        </u> |

APPENDIX 6Statistical Information on the  
Cloze Procedure Comprehension Test

| <u>Raw Score</u> | <u>M</u> | <u>F</u> | <u>Total</u> |
|------------------|----------|----------|--------------|
| 31               | -        | -        | 0            |
| 30               | -        | -        | 0            |
| 29               | 3        | 1        | 4            |
| 28               | 2        | 3        | 5            |
| 27               | 3        | 5        | 8            |
| 26               | 1        | 5        | 6            |
| 25               | 6        | 5        | 11           |
| 24               | 9        | 10       | 19           |
| 23               | 6        | 8        | 14           |
| 22               | 10       | 7        | 17           |
| 21               | 11       | 9        | 20           |
| 20               | 6        | 9        | 15           |
| 19               | 10       | 11       | 21           |
| 18               | 11       | 13       | 24           |
| 17               | 15       | 9        | 24           |
| 16               | 5        | 14       | 19           |
| 15               | 15       | 2        | 17           |
| 14               | 12       | 5        | 17           |
| 13               | 12       | 0        | 12           |
| 12               | 6        | 10       | 16           |
| 11               | 6        | 2        | 8            |
| 10               | 4        | 7        | 11           |
| 9                | 8        | 7        | 15           |
| 8                | 7        | 4        | 11           |
| 7                | 6        | 4        | 10           |
| 6                | 5        | 4        | 9            |
| 5                | 4        | 5        | 9            |
| 4                | 4        | 5        | 9            |
| 3                | 1        | 1        | 2            |
| 2                | 2        | 0        | 2            |
| 1                | <u>1</u> | <u>3</u> | <u>4</u>     |
|                  | 193      | 168      | 361          |

APPENDIX 7Distribution of Measures of Field-Dependence-  
Independence in Standard Scores

| <u>Score</u> | <u>M</u> | <u>F</u> | <u>Total</u> |
|--------------|----------|----------|--------------|
| 63           | 1        | -        | 1            |
| 61           | 1        | 1        | 2            |
| 60           | 2        | 3        | 5            |
| 59           | -        | -        | -            |
| 58           | 5        | 1        | 6            |
| 57           | 2        | -        | 2            |
| 56           | -        | -        | -            |
| 55           | 8        | 5        | 13           |
| 54           | -        | -        | -            |
| 53           | 4        | 9        | 13           |
| 52           | 10       | 10       | 20           |
| 51           | -        | -        | -            |
| 50           | 15       | 16       | 31           |
| 49           | -        | -        | -            |
| 48           | 13       | 17       | 30           |
| 47           | 15       | 18       | 33           |
| 46           | -        | -        | -            |
| 45           | 19       | 16       | 35           |
| 44           | 15       | 13       | 28           |
| 43           | -        | -        | -            |
| 42           | 17       | 23       | 40           |
| 41           | -        | -        | -            |
| 40           | 18       | 15       | 33           |
| 39           | 16       | 11       | 27           |
| 38           | -        | -        | -            |
| 37           | 13       | 4        | 17           |
| 36           | 9        | 2        | 11           |
| 35           | -        | -        | -            |
| 34           | 6        | 1        | 7            |
| 33           | -        | -        | -            |
| 32           | 2        | 2        | 4            |
| 31           | <u>2</u> | <u>1</u> | <u>3</u>     |
|              | 193      | 168      | 361          |

Total

M            193

F            168

361

APPENDIX 8

Scores on Thurstone's C.F.T. (Form A) and the  
Cloze Procedure Test for Field-  
Independent Subjects

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| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 1              | 104             | 63              | 27                     |
| 2              | 99              | 61              | 24                     |
| 3              | 95              | 61              | 18                     |
| 4              | 93              | 60              | 23                     |
| 5              | 93              | 60              | 20                     |
| 6              | 93              | 60              | 26                     |
| 7              | 92              | 60              | 24                     |
| 8              | 90              | 60              | 23                     |
| 9              | 89              | 58              | 29                     |
| 10             | 89              | 58              | 9                      |
| 11             | 86              | 58              | 16                     |
| 12             | 86              | 58              | 15                     |
| 13             | 86              | 58              | 19                     |
| 14             | 85              | 58              | 19                     |
| 15             | 81              | 57              | 24                     |
| 16             | 80              | 57              | 22                     |
| 17             | 79              | 55              | 22                     |
| 18             | 78              | 55              | 15                     |
| 19             | 78              | 55              | 26                     |
| 20             | 77              | 55              | 24                     |
| 21             | 76              | 55              | 29                     |
| 22             | 76              | 55              | 25                     |
| 23             | 76              | 55              | 28                     |
| 24             | 76              | 55              | 24                     |
| 25             | 76              | 55              | 16                     |
| 26             | 76              | 55              | 27                     |
| 27             | 76              | 55              | 24                     |
| 28             | 75              | 55              | 11                     |
| 29             | 74              | 53              | 24                     |
| 30             | 74              | 53              | 23                     |
| 31             | 73              | 53              | 24                     |
| 32             | 73              | 53              | 19                     |
| 33             | 72              | 53              | 18                     |
| 34             | 72              | 53              | 21                     |
| 35             | 71              | 53              | 25                     |

APPENDIX 8 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> |            | <u>Standard</u> | <u>Cloze Procedure</u> |            |
|----------------|-----------------|------------|-----------------|------------------------|------------|
|                | <u>Raw</u>      | <u>Raw</u> |                 | <u>Raw</u>             | <u>Raw</u> |
| 36             | 70              | 53         | 53              | 25                     |            |
| 37             | 70              | 53         | 53              | 18                     |            |
| 38             | 69              | 52         | 52              | 16                     |            |
| 39             | 69              | 52         | 52              | 14                     |            |
| 40             | 77              | 55         | 55              | 20                     |            |
| 41             | 71              | 53         | 53              | 23                     |            |
| 42             | 71              | 53         | 53              | 25                     |            |
| 43             | 70              | 53         | 53              | 20                     |            |
| 44             | 70              | 53         | 53              | 13                     |            |
| 45             | 69              | 52         | 52              | 13                     |            |
| 46             | 69              | 52         | 52              | 9                      |            |
| 47             | 69              | 52         | 52              | 17                     |            |
| 48             | 68              | 52         | 52              | 21                     |            |
| 49             | 68              | 52         | 52              | 18                     |            |
| 50             | 68              | 52         | 52              | 16                     |            |
| 51             | 68              | 52         | 52              | 17                     |            |
| 52             | 67              | 52         | 52              | 18                     |            |
| 53             | 67              | 52         | 52              | 14                     |            |
| 54             | 66              | 52         | 52              | 21                     |            |
| 55             | 66              | 52         | 52              | 27                     |            |
| 56             | 66              | 52         | 52              | 19                     |            |
| 57             | 66              | 52         | 52              | 14                     |            |
| 58             | 65              | 52         | 52              | 12                     |            |
| 59             | 65              | 52         | 52              | 26                     |            |
| 60             | 65              | 52         | 52              | 28                     |            |
| 61             | 65              | 52         | 52              | 18                     |            |
| 62             | 65              | 52         | 52              | 21                     |            |
| 63             | 64              | 50         | 50              | 18                     |            |
| 64             | 64              | 50         | 50              | 22                     |            |
| 65             | 64              | 50         | 50              | 23                     |            |
| 66             | 64              | 50         | 50              | 17                     |            |
| 67             | 64              | 50         | 50              | 27                     |            |
| 68             | 64              | 50         | 50              | 19                     |            |
| 69             | 63              | 50         | 50              | 16                     |            |
| 70             | 63              | 50         | 50              | 20                     |            |
| 71             | 63              | 50         | 50              | 19                     |            |
| 72             | 63              | 50         | 50              | 19                     |            |
| 73             | 63              | 50         | 50              | 16                     |            |
| 74             | 63              | 50         | 50              | 27                     |            |
| 75             | 62              | 50         | 50              | 22                     |            |

APPENDIX 8 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 76             | 62              | 50              | 17                     |
| 77             | 62              | 50              | 17                     |
| 78             | 62              | 50              | 20                     |
| 79             | 62              | 50              | 18                     |
| 80             | 62              | 50              | 9                      |
| 81             | 62              | 50              | 25                     |
| 82             | 61              | 50              | 27                     |
| 83             | 61              | 50              | 18                     |
| 84             | 61              | 50              | 24                     |
| 85             | 61              | 50              | 20                     |
| 86             | 60              | 50              | 5                      |
| 87             | 60              | 50              | 24                     |
| 88             | 60              | 50              | 16                     |
| 89             | 60              | 50              | 18                     |
| 90             | 60              | 50              | 12                     |
| 91             | 60              | 50              | 10                     |
| 92             | 60              | 50              | 19                     |
| 93             | 60              | 50              | 21                     |
| 94             | 59              | 48              | 22                     |
| 95             | 59              | 48              | 27                     |
| 96             | 59              | 48              | 26                     |
| 97             | 59              | 48              | 18                     |
| 98             | 58              | 48              | 18                     |
| 99             | 58              | 48              | 23                     |
| 100            | 58              | 48              | 6                      |
| 101            | 58              | 48              | 24                     |
| 102            | 58              | 48              | 15                     |
| 103            | 58              | 48              | 16                     |
| 104            | 58              | 48              | 13                     |
| 105            | 58              | 48              | 18                     |
| 106            | 58              | 48              | 17                     |
| 107            | 58              | 48              | 20                     |
| 108            | 58              | 48              | 0                      |

APPENDIX 9

Scores on Thurstone's C.F.T. (Form A)  
and the Cloze Procedure Test for  
Field-Dependent Subjects

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 109            | 35              | 42              | 7                      |
| 110            | 35              | 42              | 14                     |
| 111            | 35              | 42              | 22                     |
| 112            | 35              | 42              | 4                      |
| 113            | 35              | 42              | 19                     |
| 114            | 35              | 42              | 21                     |
| 115            | 34              | 40              | 21                     |
| 116            | 34              | 40              | 9                      |
| 117            | 34              | 40              | 15                     |
| 118            | 34              | 40              | 27                     |
| 119            | 34              | 40              | 19                     |
| 120            | 33              | 40              | 23                     |
| 121            | 33              | 40              | 25                     |
| 122            | 33              | 40              | 4                      |
| 123            | 33              | 40              | 14                     |
| 124            | 33              | 40              | 23                     |
| 125            | 33              | 40              | 19                     |
| 126            | 33              | 40              | 17                     |
| 127            | 33              | 40              | 12                     |
| 128            | 32              | 40              | 4                      |
| 129            | 32              | 40              | 19                     |
| 130            | 32              | 40              | 25                     |
| 131            | 32              | 40              | 17                     |
| 132            | 32              | 40              | 29                     |
| 133            | 32              | 40              | 5                      |
| 134            | 32              | 40              | 7                      |
| 135            | 32              | 40              | 10                     |
| 136            | 32              | 40              | 4                      |
| 137            | 31              | 40              | 18                     |
| 138            | 31              | 40              | 11                     |
| 139            | 31              | 40              | 12                     |
| 140            | 30              | 40              | 14                     |
| 141            | 30              | 40              | 16                     |
| 142            | 30              | 40              | 21                     |
| 143            | 30              | 40              | 24                     |

APPENDIX 9 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> |                 | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      | <u>Standard</u> | <u>Raw</u>             |
| 144            | 30              | 40              | 13                     |
| 145            | 30              | 40              | 9                      |
| 146            | 30              | 40              | 14                     |
| 147            | 30              | 40              | 22                     |
| 148            | 29              | 39              | 14                     |
| 149            | 29              | 39              | 16                     |
| 150            | 29              | 39              | 8                      |
| 151            | 28              | 39              | 13                     |
| 152            | 28              | 39              | 21                     |
| 153            | 28              | 39              | 5                      |
| 154            | 28              | 39              | 10                     |
| 155            | 28              | 39              | 12                     |
| 156            | 28              | 39              | 20                     |
| 157            | 28              | 39              | 6                      |
| 158            | 28              | 39              | 7                      |
| 159            | 28              | 39              | 12                     |
| 160            | 28              | 39              | 6                      |
| 161            | 28              | 39              | 12                     |
| 162            | 28              | 39              | 17                     |
| 163            | 27              | 39              | 17                     |
| 164            | 27              | 39              | 7                      |
| 165            | 27              | 39              | 10                     |
| 166            | 27              | 39              | 19                     |
| 167            | 26              | 39              | 15                     |
| 168            | 26              | 39              | 13                     |
| 169            | 26              | 39              | 2                      |
| 170            | 26              | 39              | 1                      |
| 171            | 26              | 39              | 17                     |
| 172            | 25              | 39              | 8                      |
| 173            | 25              | 39              | 18                     |
| 174            | 25              | 39              | 9                      |
| 175            | 24              | 37              | 22                     |
| 176            | 24              | 37              | 11                     |
| 177            | 24              | 37              | 15                     |
| 178            | 24              | 37              | 1                      |
| 179            | 24              | 37              | 20                     |
| 180            | 23              | 37              | 14                     |
| 181            | 22              | 37              | 0                      |
| 182            | 22              | 37              | 8                      |
| 183            | 22              | 37              | 10                     |
| 184            | 22              | 37              | 11                     |
| 185            | 22              | 37              | 9                      |

APPENDIX 9 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 186            | 22              | 37              | 9                      |
| 187            | 21              | 37              | 16                     |
| 188            | 20              | 37              | 26                     |
| 189            | 20              | 37              | 8                      |
| 190            | 20              | 37              | 10                     |
| 191            | 20              | 37              | 10                     |
| 192            | 19              | 36              | 19                     |
| 193            | 19              | 36              | 12                     |
| 194            | 18              | 36              | 7                      |
| 195            | 18              | 36              | 16                     |
| 196            | 18              | 36              | 8                      |
| 197            | 18              | 36              | 8                      |
| 198            | 17              | 36              | 17                     |
| 199            | 17              | 36              | 18                     |
| 200            | 17              | 36              | 21                     |
| 201            | 16              | 36              | 4                      |
| 202            | 15              | 36              | 21                     |
| 203            | 14              | 34              | 9                      |
| 204            | 13              | 34              | 5                      |
| 205            | 12              | 34              | 7                      |
| 206            | 12              | 34              | 7                      |
| 207            | 11              | 34              | 12                     |
| 208            | 11              | 34              | 5                      |
| 209            | 10              | 34              | 11                     |
| 210            | 9               | 32              | 13                     |
| 211            | 7               | 32              | 21                     |
| 212            | 7               | 32              | 6                      |
| 213            | 5               | 32              | 15                     |
| 214            | 4               | 31              | 1                      |
| 215            | 2               | 31              | 15                     |
| 216            | 0               | 31              | 9                      |

APPENDIX 10

Scores on Thurstone's C.F.T. (Form A)  
and the Cloze Procedure Test for  
Field-Independent Males

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 1              | 104             | 63              | 27                     |
| 2              | 95              | 61              | 18                     |
| 3              | 93              | 60              | 23                     |
| 4              | 90              | 60              | 23                     |
| 5              | 89              | 58              | 29                     |
| 6              | 89              | 58              | 9                      |
| 7              | 86              | 58              | 16                     |
| 8              | 86              | 58              | 15                     |
| 9              | 85              | 58              | 19                     |
| 10             | 81              | 57              | 24                     |
| 11             | 80              | 57              | 22                     |
| 12             | 79              | 55              | 22                     |
| 13             | 78              | 55              | 15                     |
| 14             | 77              | 55              | 24                     |
| 15             | 76              | 55              | 25                     |
| 16             | 76              | 55              | 28                     |
| 17             | 76              | 55              | 24                     |
| 18             | 75              | 55              | 11                     |
| 19             | 73              | 53              | 19                     |
| 20             | 72              | 53              | 21                     |
| 21             | 69              | 52              | 14                     |
| 22             | 77              | 55              | 20                     |
| 23             | 71              | 53              | 25                     |
| 24             | 70              | 53              | 13                     |
| 25             | 69              | 52              | 17                     |
| 26             | 68              | 52              | 17                     |
| 27             | 67              | 52              | 18                     |
| 28             | 67              | 52              | 14                     |
| 29             | 66              | 52              | 21                     |
| 30             | 66              | 52              | 19                     |
| 31             | 66              | 52              | 14                     |
| 32             | 65              | 52              | 28                     |
| 33             | 65              | 52              | 18                     |
| 34             | 64              | 50              | 17                     |
| 35             | 64              | 50              | 19                     |

APPENDIX 10 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> |  | <u>Standard</u> | <u>Cloze Procedure</u> |  |
|----------------|-----------------|--|-----------------|------------------------|--|
|                | <u>Raw</u>      |  |                 | <u>Raw</u>             |  |
| 36             | 63              |  | 50              | 16                     |  |
| 37             | 63              |  | 50              | 19                     |  |
| 38             | 62              |  | 50              | 22                     |  |
| 39             | 62              |  | 50              | 17                     |  |
| 40             | 62              |  | 50              | 20                     |  |
| 41             | 62              |  | 50              | 9                      |  |
| 42             | 62              |  | 50              | 25                     |  |
| 43             | 61              |  | 50              | 27                     |  |
| 44             | 61              |  | 50              | 18                     |  |
| 45             | 61              |  | 50              | 20                     |  |
| 46             | 60              |  | 50              | 5                      |  |
| 47             | 60              |  | 50              | 24                     |  |
| 48             | 60              |  | 50              | 18                     |  |
| 49             | 59              |  | 48              | 27                     |  |
| 50             | 58              |  | 48              | 18                     |  |
| 51             | 58              |  | 48              | 6                      |  |
| 52             | 58              |  | 48              | 15                     |  |
| 53             | 58              |  | 48              | 0                      |  |

APPENDIX 11

Scores on Thurstone's C.F.T. (Form A) and the  
Cloze Procedure Test for Field-Independent  
Females

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| <u>Subject</u> | <u>C. F. T.</u> |                 | <u>Cloze Procedure</u> |  |
|----------------|-----------------|-----------------|------------------------|--|
|                | <u>Raw</u>      | <u>Standard</u> | <u>Raw</u>             |  |
| 54             | 99              | 61              | 24                     |  |
| 55             | 93              | 60              | 20                     |  |
| 56             | 93              | 60              | 26                     |  |
| 57             | 92              | 60              | 24                     |  |
| 58             | 86              | 58              | 19                     |  |
| 59             | 78              | 55              | 26                     |  |
| 60             | 76              | 55              | 29                     |  |
| 61             | 76              | 55              | 16                     |  |
| 62             | 76              | 55              | 27                     |  |
| 63             | 76              | 55              | 24                     |  |
| 64             | 74              | 53              | 24                     |  |
| 65             | 74              | 53              | 23                     |  |
| 66             | 73              | 53              | 24                     |  |
| 67             | 72              | 53              | 18                     |  |
| 68             | 71              | 53              | 25                     |  |
| 69             | 70              | 53              | 25                     |  |
| 70             | 70              | 53              | 18                     |  |
| 71             | 69              | 52              | 16                     |  |
| 72             | 71              | 53              | 23                     |  |
| 73             | 70              | 53              | 20                     |  |
| 74             | 69              | 52              | 13                     |  |
| 75             | 69              | 52              | 9                      |  |
| 76             | 68              | 52              | 21                     |  |
| 77             | 68              | 52              | 18                     |  |
| 78             | 68              | 52              | 16                     |  |
| 79             | 66              | 52              | 27                     |  |
| 80             | 65              | 52              | 12                     |  |
| 81             | 65              | 52              | 26                     |  |
| 82             | 65              | 52              | 21                     |  |
| 83             | 64              | 50              | 18                     |  |
| 84             | 64              | 50              | 22                     |  |
| 85             | 64              | 50              | 23                     |  |
| 86             | 64              | 50              | 27                     |  |
| 87             | 63              | 50              | 20                     |  |
| 88             | 63              | 50              | 19                     |  |
| 89             | 63              | 50              | 16                     |  |
| 90             | 63              | 50              | 27                     |  |

APPENDIX 11 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 91             | 62              | 50              | 17                     |
| 92             | 62              | 50              | 18                     |
| 93             | 61              | 50              | 24                     |
| 94             | 60              | 50              | 16                     |
| 95             | 60              | 50              | 12                     |
| 96             | 60              | 50              | 10                     |
| 97             | 60              | 50              | 19                     |
| 98             | 60              | 50              | 21                     |
| 99             | 59              | 48              | 22                     |
| 100            | 59              | 48              | 26                     |
| 101            | 59              | 48              | 18                     |
| 102            | 58              | 48              | 23                     |
| 103            | 58              | 48              | 24                     |
| 104            | 58              | 48              | 16                     |
| 105            | 58              | 48              | 13                     |
| 106            | 58              | 48              | 18                     |
| 107            | 58              | 48              | 17                     |
| 108            | 58              | 48              | 20                     |

APPENDIX 12

Scores on Thurstone's C.F.T. (Form A) and the  
 Cloze Procedure Test for  
 Field-Dependent Males

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| <u>Subject</u> | <u>C. F. T.</u> |                 | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      | <u>Standard</u> | <u>Raw</u>             |
| 109            | 35              | 42              | 14                     |
| 110            | 35              | 42              | 22                     |
| 111            | 35              | 42              | 19                     |
| 112            | 34              | 40              | 21                     |
| 113            | 34              | 40              | 9                      |
| 114            | 34              | 40              | 15                     |
| 115            | 33              | 40              | 23                     |
| 116            | 33              | 40              | 25                     |
| 117            | 33              | 40              | 4                      |
| 118            | 33              | 40              | 14                     |
| 119            | 33              | 40              | 19                     |
| 120            | 33              | 40              | 17                     |
| 121            | 32              | 40              | 17                     |
| 122            | 32              | 40              | 29                     |
| 123            | 31              | 40              | 18                     |
| 124            | 31              | 40              | 11                     |
| 125            | 30              | 40              | 16                     |
| 126            | 30              | 40              | 21                     |
| 127            | 30              | 40              | 24                     |
| 128            | 30              | 40              | 9                      |
| 129            | 30              | 40              | 14                     |
| 130            | 29              | 39              | 14                     |
| 131            | 29              | 39              | 8                      |
| 132            | 28              | 39              | 13                     |
| 133            | 28              | 39              | 21                     |
| 134            | 28              | 39              | 6                      |
| 135            | 28              | 39              | 12                     |
| 136            | 28              | 39              | 12                     |
| 137            | 27              | 39              | 7                      |
| 138            | 27              | 39              | 10                     |
| 139            | 27              | 39              | 19                     |
| 140            | 26              | 39              | 15                     |
| 141            | 26              | 39              | 13                     |
| 142            | 26              | 39              | 2                      |
| 143            | 26              | 39              | 17                     |
| 144            | 25              | 39              | 8                      |
| 145            | 25              | 39              | 18                     |

APPENDIX 12 - (Contd.)

| <u>Subject</u> | <u>C. F. T.</u> | <u>Standard</u> | <u>Cloze Procedure</u> |
|----------------|-----------------|-----------------|------------------------|
|                | <u>Raw</u>      |                 | <u>Raw</u>             |
| 146            | 24              | 37              | 22                     |
| 147            | 24              | 37              | 11                     |
| 148            | 24              | 37              | 1                      |
| 149            | 24              | 37              | 20                     |
| 150            | 23              | 37              | 14                     |
| 151            | 22              | 37              | 0                      |
| 152            | 22              | 37              | 8                      |
| 153            | 22              | 37              | 11                     |
| 154            | 22              | 37              | 9                      |
| 155            | 22              | 37              | 9                      |
| 156            | 20              | 37              | 26                     |
| 157            | 20              | 37              | 8                      |
| 158            | 20              | 37              | 10                     |
| 159            | 19              | 36              | 19                     |
| 160            | 19              | 36              | 12                     |
| 161            | 18              | 36              | 7                      |
| 162            | 18              | 36              | 16                     |
| 163            | 18              | 36              | 8                      |
| 164            | 17              | 36              | 17                     |
| 165            | 17              | 36              | 18                     |
| 166            | 17              | 36              | 21                     |
| 167            | 15              | 36              | 21                     |
| 168            | 13              | 34              | 5                      |
| 169            | 12              | 34              | 7                      |
| 170            | 12              | 34              | 7                      |
| 171            | 11              | 34              | 12                     |
| 172            | 11              | 34              | 5                      |
| 173            | 10              | 34              | 11                     |
| 174            | 9               | 32              | 13                     |
| 175            | 7               | 32              | 6                      |
| 176            | 2               | 31              | 15                     |
| 177            | 0               | 31              | 9                      |

APPENDIX 13

Scores on Thurstone's C.F.T. (Form A) and the  
 Cloze Procedure Test for  
 Field-Dependent Females

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| <u>Subject</u> | <u>C. F. T.</u> |                 | <u>Cloze Procedure</u> |  |
|----------------|-----------------|-----------------|------------------------|--|
|                | <u>Raw</u>      | <u>Standard</u> | <u>Raw</u>             |  |
| 178            | 35              | 42              | 7                      |  |
| 179            | 35              | 42              | 4                      |  |
| 180            | 35              | 42              | 21                     |  |
| 181            | 34              | 40              | 27                     |  |
| 182            | 34              | 40              | 19                     |  |
| 183            | 33              | 40              | 23                     |  |
| 184            | 33              | 40              | 12                     |  |
| 185            | 32              | 40              | 4                      |  |
| 186            | 32              | 40              | 19                     |  |
| 187            | 32              | 40              | 25                     |  |
| 188            | 32              | 40              | 5                      |  |
| 189            | 32              | 40              | 7                      |  |
| 190            | 32              | 40              | 10                     |  |
| 191            | 32              | 40              | 4                      |  |
| 192            | 31              | 40              | 12                     |  |
| 193            | 30              | 40              | 14                     |  |
| 194            | 30              | 40              | 13                     |  |
| 195            | 30              | 40              | 22                     |  |
| 196            | 29              | 39              | 16                     |  |
| 197            | 28              | 39              | 5                      |  |
| 198            | 28              | 39              | 10                     |  |
| 199            | 28              | 39              | 12                     |  |
| 200            | 28              | 39              | 20                     |  |
| 201            | 28              | 39              | 7                      |  |
| 202            | 28              | 39              | 6                      |  |
| 203            | 28              | 39              | 17                     |  |
| 204            | 27              | 39              | 17                     |  |
| 205            | 26              | 39              | 1                      |  |
| 206            | 25              | 39              | 9                      |  |
| 207            | 24              | 37              | 15                     |  |
| 208            | 22              | 37              | 10                     |  |
| 209            | 21              | 37              | 16                     |  |
| 210            | 20              | 37              | 10                     |  |
| 211            | 18              | 36              | 8                      |  |
| 212            | 16              | 36              | 4                      |  |
| 213            | 14              | 34              | 9                      |  |
| 214            | 7               | 32              | 21                     |  |
| 215            | 5               | 32              | 15                     |  |
| 216            | 4               | 31              | 1                      |  |

APPENDIX 14

LETTER FROM THE DIRECTOR OF THE  
READING MISCUE RESEARCH CENTRE,  
DETROIT, MICHIGAN



WAYNE STATE UNIVERSITY  
READING MISCUÉ RESEARCH

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COLLEGE OF EDUCATION  
DEPARTMENT OF  
ELEMENTARY EDUCATION

MAILING ADDRESS:  
WAYNE STATE UNIVERSITY  
READING MISCUÉ RESEARCH  
DETROIT, MICHIGAN 48202  
PHONE: 577-1860

CTOR: KENNETH S. GOODMAN

February 12, 1975

Mr. Augustus Pierre  
1170 Fisher Avenue - Suite 404  
Ottawa K1Z5R7  
Ontario, Canada

Dear Mr. Pierre:

As you may know, we use a retelling as the basis for testing comprehension. You might want to consider augmenting that with a cloze test over the passage.

There is a section in the Reading Miscue Inventory (Y. Goodman and C. Burke) that describes the retelling analysis.

Please let me know if I can help in any other way.

I would also like to receive a copy of your proposal. I am trying to keep a file of such studies.

Cordially,

Kenneth S. Goodman

KSG:k

APPENDIX 15

Abstract of  
Psycho-Linguistic Guessing Game and Field-  
Dependence-Independence in Grade 7

The present study is inspired by two theories: the psycho-linguistic theory of reading comprehension postulated by Goodman and his associates on the one hand; the theory of psychological differentiation propounded by Witkin and his colleagues on the other. Its main purpose is to investigate the relationship between achievement in reading comprehension and field-dependence-independence. In this relationship, it was hypothesised that field-independent subjects would be higher achievers in reading comprehension than field-dependent subjects.

The research sample included 361 Grade 7 students (193 boys and 168 girls) chosen from two schools controlled by the Separate School Board of Ottawa.

All the 361 subjects were given Thurstone's Clozure Flexibility Test (Form A) in group form, on the results of which their relative positions on the field-dependence-independence continuum were determined. For statistical computation purposes, the bottom 30% and the top 30% were respectively classified as being field-dependent and field-independent.

Reading comprehension achievement scores were obtained through the administration of the Cloze Procedure Test to all seventh graders during the period 14th to 17th April, 1975.

The results obtained from the analysis of variance (ANOVA) at the .05 level of significance using the group rather than the individual as the experimental unit confirmed the research hypothesis.