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PSYCHOLOGICAL DIFFERENTIATION AND USE OF SYNTACTIC AND SEMANTIC CUES IN READING COMPREHENSION

by

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INTRODUCTION

In recent years the study of psycholinguistics has influenced considerably the teaching of reading. Those who have adopted a psycholinguistic view consider reading to be a complex process of intention, selection and prediction in which the reader plays an active role. Smith, a psycholinguistic reading theorist, has proposed that comprehension is the key to the process and that the use of syntactic and semantic cues is essential in order to comprehend.

Witkin, in his study of cognitive style, has suggested that field-independent subjects are more analytical and better able to overcome the influences of the surrounding environment in selecting cues to which they will respond. In studying the possible relationship of psychological differentiation and reading, Pierre found that field-independent subjects were better comprehenders when the Cloze Procedure was used as a measuring instrument. The Cloze Procedure provides information on differences between individuals' abilities to use syntactic and semantic cues, but it does not measure specifically the extent to which these cues are used by individuals as they read.

Miller has designed a disruptive effect technique to measure the use of syntactic and semantic cues in the reading process and has found that high comprehenders make more use of these cues than low comprehenders. Miller's disruptive effect technique is used in this study in an attempt to determine if one's extent of psychological differentiation is related to one's use of syntactic and semantic cues in reading.

INTRODUCTION

The thesis is organized into three chapters. In the first chapter, Smith's theory of reading and Witkin's theory of psychological differentiation are presented. Pierre's study relating psychological differentiation and reading comprehension and Miller's study relating reading comprehension and use of syntactic and semantic cues are introduced. The chapter is concluded with a statement of the research problem and hypothesis.

The second chapter consists of the experimental design used in the investigation. Considered in the chapter are the measuring instruments, the methods of data collection and data analysis.

In the third chapter, the results of the investigation are presented and discussed. The presentation is made in three parts: The descriptive analysis, the testing of the hypothesis and the discussion of the results.

The report ends with a summary and statement of conclusions, a bibliography, several appendices, and an abstract of the thesis.

CHAPTER I

REVIEW OF THE LITERATURE

In this chapter Smith's psycholinguistic theory of reading and Witkin's theory of psychological differentiation are outlined. Pierre's study in which reading comprehension and psychological differentiation have been related is critically reviewed and limitations are examined. The chapter ends with a brief summary and a statement of the research hypothesis.

1. Smith's Psycholinguistic View of Reading

Smith (1971, 1973, 1975, 1977) has viewed reading as a specialized and complex communication process in which the reader's thoughts interact with written language in reconstructing a message. According to Smith, the purpose of reading is to obtain meaning from print and thereby reduce the reader's uncertainty. The prior knowledge in the reader's brain contributes more information than the visual symbols on the printed page. As in any form of learning, a contact must be made between what the reader is expected to know and what he knows already.

Comprehension is the key to this process. Comprehension means relating new experiences to what is already known; comprehension means 'making sense' (Smith, 1975, p.10). Any learner makes sense by relating the present situation to prior knowledge. Anything that cannot be related in this way will not make sense - it will be nonsense and a hindrance to learning.

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Smith has emphasized the importance of meaning in the reading process:

> Normal reading seems to begin, proceed and end in meaning, and the source of meaningfulness must be the prior knowledge in the reader's head. Nothing is comprehended if it does not reflect or elaborate upon what the reader already knows. (Smith, 1976, p.9)

Smith's work is predicted on three fundamental hypotheses:

i) only a small part of the information necessary for reading comes from the printed page;

ii) comprehension must precede the identification of individual words;

iii) reading is not decoding to spoken language. (Smith, 1973, p.vi)

Smith has stated that Noam Chomsky's work in the area of language development is basic to the psycholinguistic approach to reading. (Smith, 1973, p.3). Chomsky has suggested that there are two distinct levels of language - a surface structure (its physical manifestations) and a deep structure (its underlying meaning or semantics). The bridge between the surface structure and the deep structure is grammar or syntax (i.e. the set of rules that determine how words are organized into sentences). Without syntax there cannot be understanding, because meaning is not directly represented in surface structure. The thoughts that an individual wishes to convey come from his deep structure and are translated into a physical sequence of sounds or letters using a system of

syntactic rules. The deep structure, an abstract conceptualization, cannot always be easily discovered from the surface structure. (Smith, 1973, p.2-5).

Goodman (1968, 1970, 1972), whose theory Smith has accepted and expanded, (Smith, 1973, p.21-22) has suggested that a "psycholinguistic guessing game" parallelling Chomsky's verbal communication theory is involved in reading and that a child will best learn to read in the same way that he has acquired his language.

Goodman has proposed that three basic kinds of information are used simultaneously in the reading process - grapho-phonic (letter-sound correspondence), syntactic (grammar structures) and semantic (meaning). The end product of reading is the meaning obtained from the printed page. The graphic display provides the surface structure; the semantics provide the deep structure. The graphic component serves as a cue stimulus and the resulting meaning is bridged by the grammatical structures. It is through the syntax of the passage that the reader gains meaning from the surface structure. (Smith, 1973, p.25).

According to Goodman (1972) reading is a process of selection and prediction. It is a selective process in that it involves only partial use of the least amount of available language cues. The ability to make the most economical use possible of visual information is a mark of an efficient reader. The graphic cues are selected on the basis of the reader's expectations. These expectations are derived from two sources -

the reader's total prior experience and his language and thought development (Goodman, 1970, p.264).

As the reader proceeds along the printed page, the image formed is partly what he sees and partly what he expects to see. He tests his image against his memory for related syntactic, semantic, and phonological cues and makes a choice consistent with the graphic cues selected. The meaning produced is stored in short term memory while he proceeds. If no guess is possible, he checks the recalled perceptual input and tries again. If a guess is still not possible, he looks again at the text to gather more graphic cues. If he can make a decodable choice, he tests it for semantic and grammatical acceptability. If the tentative choice is not acceptable semantically or syntactically, then the reader regresses until he can find a point in the text that is consistent with this thought predictions, and starts over from there. If the choice is acceptable, meaning is assimilated with prior meaning. New expectations are formed for what lies ahead. (Goodman, 1970, p.269-270).

The basic regularity in the system of syntax of English is a definite asset in the prediction process. Every speaker can generate an almost infinite number of sentences in his language, many of which he has neither spoken nor heard. By the time most children enter school they have internalized responses to systems of language cues - they have acquired skill

in getting meaning from oral language and in using the language as it flows in actual speech or writing. (Smith, Goodman & Meredith, 1970, p.145-154; 247-266).

In the English language four important structure systems place regularity in the way words are put together. (Smith, Goodman, & Meredith, 1970, p.148-150; 253-259). These systems provide syntactic cues to the reader.

Pattern is the most important structure system. Words can be arranged in a sentence in only a limited number of ways. The sentence pattern, subject-verb-object, is the most common, and linguists generally agree that the number of possible alternate sentence patterns is less than ten. Psycholinguists believe that this understanding of order and sequence plays a greater role than knowledge of parts of speech.

The second important structure system is inflection. Inflectional changes in English are generally external. This is done by adding suffixes such as "s", "ed", "d", "ing", "es", etc. to root words. Internal changes (eg. mouse, mice) are minimal in comparison to other languages. Children apparently are not only aware of the existence of these cues, but also know how to use them consistently.

Function words are the third syntactic system giving English regularity. These words, usually composed of only two or three letters, carry little if any meaning of their own accord, but perform key functions as structure cues. These

words, also called empty words, are the articles, conjunctions, auxillary verbs, and prepositions of traditional grammar. An example of empty structure, "The _____ _____ over the _____" contains little meaning of its own, but has definite potential for meaning.

The fourth system of cues is intonation. In written language it is only partially represented through punctuation, but in speech and in reading, pitch, stress, and pause play a vital role. The reader must learn to supply his own intonation by setting what he reads to a familiar tune.

The regular syntactic structure of the English language is believed by psycholinguists to assist the reader in gaining meaning from the inkmarks on the page. Prior knowledge of content and intrinsically learned knowledge of syntactic structure together provide the reader with cues that afford a more efficient selection and prediction process.

Smith has done an analysis of what happens "inside the head" as the reader plays his psycholinguistic guessing game. He speculates as to how syntactic and semantic cues are actually used as reading concepts are developed. In doing so, he has made two basic assumptions concerning the nature of the reading process. (Smith, 1973, p.6-9).

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First, Smith assumes that reading is not primarily a visual process; in reading there is a trade-off between visual and non-visual information. The visual process signifies the graphic component; the non-visual signifies the background of knowledge provided by the reader. The more that is known "behind the eye", the less is required in the text. Conversely, the less familiar the reader is with the subject matter or the written language, the more visual information he will require.

Second, Smith assumes that there is a limit to the amount of information coming through the eye that the visual system can process. The reader, who must rely heavily on visual information, will overload his visual system. That is, the reader, who must concentrate on every word, will lose meaning.

Smith has emphasized that memory plays a vital role in reading. (1971, p.77-79; 1975, p.64-67). As in any cognitive task, three aspects are involved - sensory store, short-term memory, and long-term memory.

Sensory store (also called visual image) retains raw material briefly while a decision is made whether to integrate incoming information with what is already known. This information deteriorates rapidly (probably in less than a second) and is erased by an intake of new information. All information that is not processed through sensory store is called "noise". Noise impedes the selection process. (Smith, 1975, p.64-67).

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Short-term memory serves as a temporary storage area for raw information while it is being processed. It is the working memory for transient information - the bottleneck through which information must pass if one wishes to remember it. Its functional capacity is limited to six or seven items. From here, information must be committed to long-term memory or else be lost completely.

Long-term memory is the relatively permanent accumulation of all our knowledge and beliefs. It appears to have no storage limitations - anything that gets in stays permanently. However, time is required for both input and output. The ease with which one can retrieve from long-term memory depends on the extent to which the desired knowledge is integrated with everything else we know.

In reading, visual information is picked up from the printed page, held briefly in sensory store, then either transferred to short-term memory or necessarily lost. Short-term memory, which has a limited capacity, is able to extend this limit considerably by "chunking" information into larger units. (Smith, 1975, p.71). Chunking involves making use of syntactic and semantic information that is already stored in long-term memory. The information that cannot be meaningfully processed is lost completely. Accepted information must be meaningfully arranged in long-term memory to be used as a reference to future incoming information.

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Smith (1971, p.3-9) has termed the raw material of reading (the inkmarks on the page) "distinctive features" which are elements of the "visual array". He has regarded reading as a process of categorization through one of two alternate methods - an immediate method or a mediated method. He has studied these two methods from two different approaches - word identification and reading comprehension. From Smith's point of view, only the immediate method of reading comprehension is truly efficient reading. However, word identification is presented as well to provide a thorough understanding of what happens in the less efficient form.

In word identification, the reader may go directly from the distinctive features in the visual array to assignment of a category that has a name or he may have to learn a category name, whether by sounding the word out, or by asking someone. In the former instance the information is immediately available in long-term memory; in the mediated method, time is required to retrieve and organize this information.

Once the reader has established the category, future similar arrays can be assigned to this category instantaneously. When this has been accomplished, that is, distinctive features of the visual array of letters have become distinctive features of words, the immediate identification of words can bypass the identification of letters as in Figure 1.

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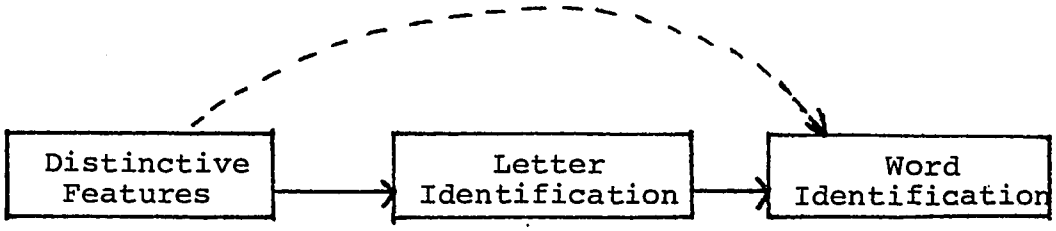

---------- Immediate word identification

_____ Mediated word identification

FIGURE 1: Smith's Illustration of Processes of Immediate and Mediated Word Identification (1971, p.7)

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In reading for comprehension, the two alternate routes exist as well. Mediated comprehension requires prior identification of letters and words; immediate comprehension can be accomplished by going directly from the visual array to meaning as shown in Figure 2.

Only the efficient reader can take the "short-cut", selecting minimal graphic cues as he predicts what will follow. From Smith's viewpoint, ability to put letters together to form words has very little to do with the actual process of reading. Even the ability to identify words loses its importance in reading for meaning. The actual inkmarks on the page are regarded as less important than the knowledge of language that the skilled reader has before he opens the book. The information that passes from the brain to the eye is more important to the reader than the information that passes from the eye to the brain. (Smith, 1971, p.9).

The efficiency with which the reader can utilize the "short-cut" (i.e. use the "chunking process) is dependent on the amount and organization of information "behind the eye" in long-term memory. This prior knowledge determines the degree to which the surrounding cues in the literary passage can be used in predicting which words will follow. The more redundant information that is available, the easier the processing. A reliance on the visual array causes "incomprehension" due to "bottlenecking" in short-term memory. This leads to inaccessibility

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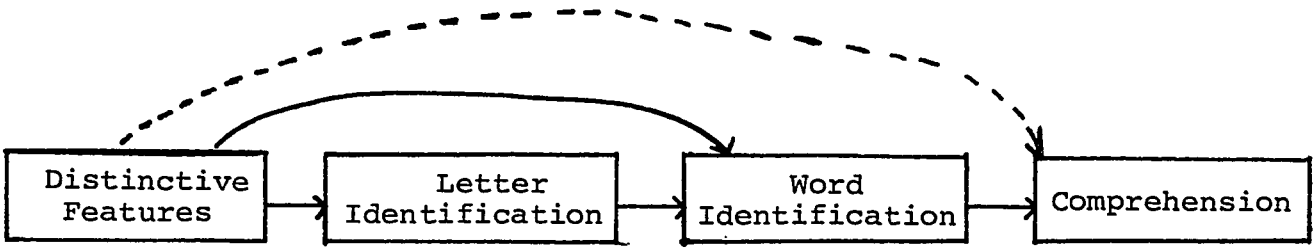

---------- Immediate Comprehension

_____ Mediated Comprehension

FIGURE 2: Smith's Illustration of Processes Titles of Immediate and Mediated Comprehension (1971, p.8)

to the deep structures, hampering the prediction process because the reader is unable to eliminate unlikely alternatives which results in his failure to grasp meaning.

In summary, reading has been discussed as a process of selection and prediction involving maximum use of pre-existing knowledge and minimum use of graphic cues. Use of syntactic and semantic cues is vital to the process if meaning is to be attained. Smith's emphasis on the trade-off of visual and non-visual cues through use of "behind the eye" information and his stress on the role of memory have been explored at length in an attempt to provide an understanding of how these syntactic and semantic cues are used as the reader uses the chunking process and "plays" his "psycholinguistic guessing game."

Witkin's theory of psychological differentiation will now be presented.

2. Witkin's Theory of Psychological Differentiation

Witkin's theory of psychological differentiation has evolved from early studies of the individual's perception of the upright in space. (Asch & Witkin, 1948(a), 1948(b)); Witkin and Asch, 1948(a), 1948(b). His work in perception gradually expanded into the area of personality (1954) and into the intellectual domain (1962/1974). Witkin has recently revised his earlier theoretical model to include cognitive

abilities, that is, those involving perceptual and intellectual tasks simultaneously. (Witkin & Goodenough, 1976).

A discussion of Witkin's concept of psychological differentiation will follow. His 1962 model will be presented and a historical account of the evolution of his concept of field dependence and field independence will be given. Witkin's revised model of differentiation, which permits the inclusion of cognitive style, will then be discussed.

In his theory of psychological differentiation, Witkin has discussed the complexity of a system's structure (1974, p.1) and the nature and source of individuality in psychological growth and development (1974, p.4). He has regarded psychological differentiation as a characteristic way of functioning based on given structural arrangements in personality. (1974, p.8).

Individuals vary considerably but consistently in their extent of differentiation. A less differentiated system is in a relatively homogeneous state; a more differentiated system is in a relatively hetrogeneous state. (1974, p.9). The extent of differentiation can be judged mainly through the way a system functions.

A highly differentiated system is both specialized and integrated (1974, p.11-15; 1976, p.8). It is specialized in that there is clear separation of what belongs to the person from what is external to the person and also clear separation of component areas within the person. It is integrated in that

the component parts, both within the person and between the person and his surroundings, are functioning smoothly together. Witkin has emphasized the need to regard the individual as a closely integrated system whose parts can be understood only in relation to the whole psychological environment.

In his 1962 model, included as Figure 3, Witkin suggested four indicators of psychological differentiation - articulated cognitive functioning, sense of separate identity, articulated body concept, and impulse control and specialized defenses (1974, p.15; 1976, p.9-12, 84). A brief description of each of these indicators will follow, with articulated cognitive function being discussed first and most intensively.

The concept of articulated cognitive functioning evolved from Witkin's early studies of individual differences in perception of the upright. From the scores of three orientation tests - the Rod and Frame Test (RFT), the Body Adjustment Test (BAT), and the Rotating Room Test (RRT), - Witkin concluded that reliance on the field as a primary referent resulted in a different location of the perceived upright than did use of the body as a primary referent. (1974, p.35-58; 1976, p.3-4). The label "field dependent" was adopted to signify those individuals who drew their cues primarily from the external field; "field independent" was adopted to signify those individuals who used bodily cues as a primary source. Field dependent and field independent modes of perception were placed at the two opposing poles of a continuum. It was

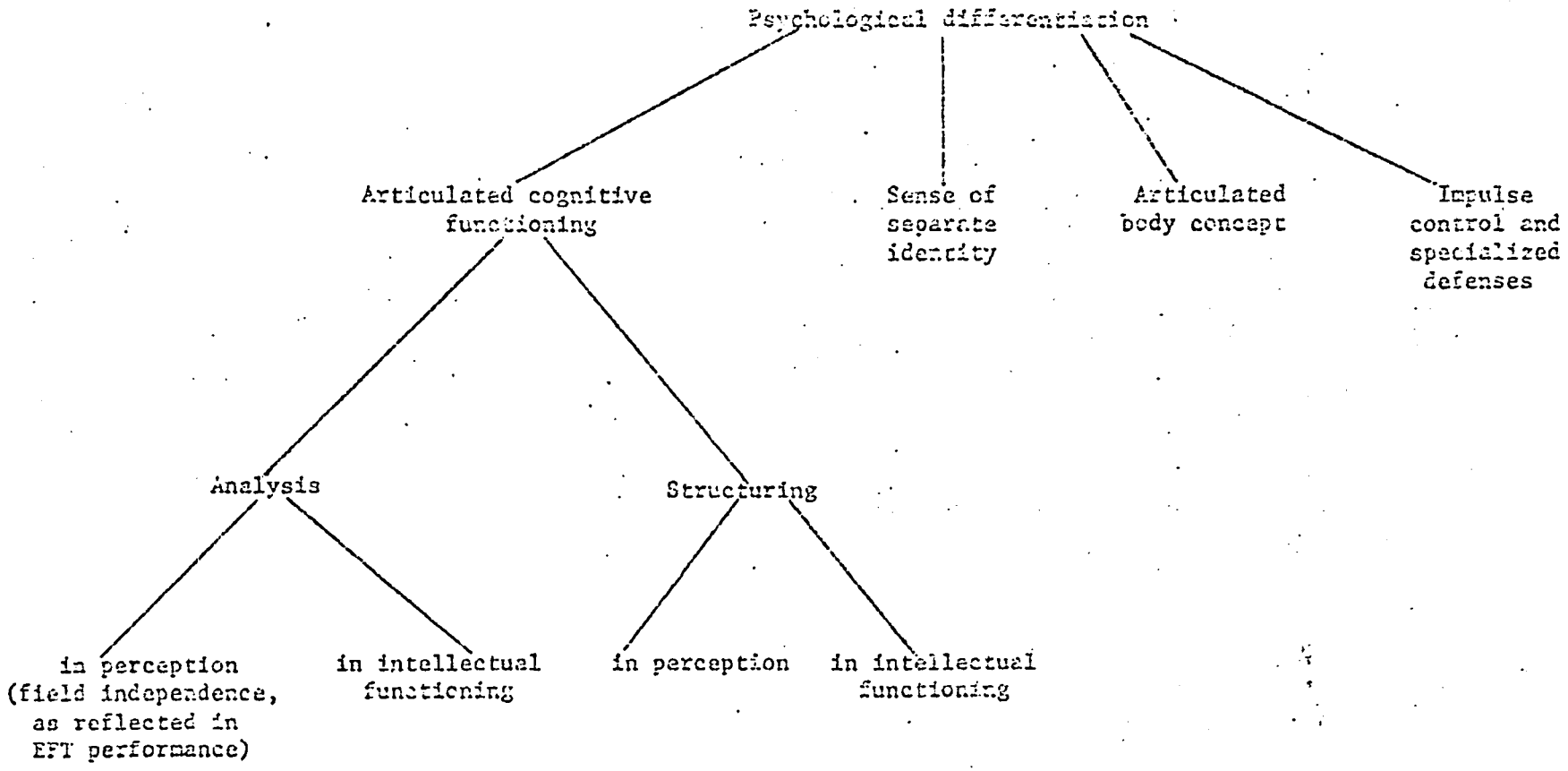

FIGURE 3: Witkin's 1962 Model of Psychological Differentiation (1976, p.84)

not intended to suggest that two distinct kinds of human beings existed but rather that there was a tendency in varying degrees of strength toward one way of perceiving or another. (1974, p.2; 1977, p.7).

Using the Embedded Figures Test (EFT), requiring subjects to locate a simple figure within a complex design by breaking up the field and reorganizing it, Witkin found that subjects who had difficulty separating the hidden part from the complex whole were also unable to keep body and rod separate from room and frame in orientation tasks. The subjects who experienced difficulty were those with a field-dependent perceptual mode of functioning. Witkin concluded that field-independence was an analytical ability which pervaded an individual's perceptual functioning. (1974, p.55; 1976, p.6).

Further comparisons of scores on the RFT, BAT, and EFT, with scores from the Revised Standard Binet and the Wechsler Intelligence Scale for Children (WISC) led Witkin to conclude that analytical ability was a common component in perceptual and intellectual functioning and a feature of problem solving tasks as well as perceptual tasks (1974, p.59-80). Subjects with a field-independent perceptual style were found to be better able to analyze a field, to overcome its organization and restructure it - that is, to use an analytical approach in intellectual tasks. In contrast, subjects with a field-dependent

perceptual style were found to have limited ability to analyze a field having a dominant organization, but tended to adhere to the organization of the field as given - that is, to use a global approach in intellectual tasks. Global field approach and analytical field approach were designated appropriate labels for opposing modes of behaviour on intellectual tasks (1974, p.80).

The same characteristics became evident when subjects were presented with a field lacking inherent organization. (1974, p.81-114). Subjects with a field-independent mode of functioning on perceptual tasks were found to impose structure spontaneously on stimulus materials which lacked it; those with a field-dependent mode were found likely to leave the field "as is".

Subjects with a field-independent perceptual style could both analyze a field more efficiently and impose structure on a field more readily. Since Witkin viewed analysis and structuring as two components of articulation (1974, p.14; 1977, p.9-10), and since he believed cognitive tasks to involve both perceptual and intellectual or problem solving activities (1977, p.9-10), he enlarged his concept of differentiation into the cognitive area, and designated "articulated field approach" and "global field approach" as descriptors of mode of cognitive functioning. The articulated-global dimension was conceived as an ability variable.

A second indicator of psychological differentiation in Witkin's 1962 model was "sense of separate identity" (1974, p.134-156; 1976, p.9-10; 1977, p.13). Here, Witkin studied differences in ways of experiencing the self. He found field-independent subjects to be aware of their own needs, feelings, and attributes as distinct from those of others. Being secure within themselves, they tended to function in a self-directed manner, to be autonomous in interpersonal relationships, and to maintain their own perspective despite social contradiction. They were insensitive to social undercurrents and therefore were termed individualistic. Field-independent subjects were more apt to be interested in the abstract and theoretical and to favour solitary work and work involving abstract content.

In contrast, Witkin found field-dependent subjects to be less dependent on bodily cues and to draw support and direction from others in the environment. They were less aware of their inner needs, feelings, and attitudes and more attuned to those around them. They were found to have a "with people" orientation and to be perceived as warm, tactful, considerate, socially outgoing, and affectionate.

The third indicator of psychological differentiation articulated body concept referred to one's impression of the body as having definite limits or boundaries and the parts within as discrete yet interrelated and formed into a structured whole. Witkin found relatively field-independent persons to have an articulated conception of body. Field-dependent subjects seemed

minimally aware of body parts and of their interrelations and had a more global body concept. (1974, p.115-133; 1976, p.10; 1977, p.14).

The fourth indicator of psychological differentiation was control over impulse expression and use of specialized defenses for coping with potentially disturbing experiences (1974, p.157-176; 1976, p.10, 1977, p.14). Field-independent individuals were found to have relatively structured and specialized controls, reflecting greater differentiation. They used specific defenses such as isolation, intellectualization, and projection. Field-dependent persons had less structured controls and used nonspecific and unspecialized defenses such as repression and denial.

In formulating his 1962 model of psychological differentiation, Witkin hypothesized that measures across the four indicators of differentiation would be self-consistent and results would be significantly interrelated. This expectation, called the differentiation hypothesis, was confirmed. (1974, p.222-228). People were found self-consistent in degree of articulation in approaches to situations.

In the 1962 model, field-dependence and field-independence were not conceived as a broad dimension of cognitive style. They were attached exclusively to competence in overcoming an embedded context or to analytical functioning in perception. The most broad dimension in this model had been

located at the level of degree of articulation. When Witkin began to study cognitive style (1964, 1965, 1967), he applied it to the articulated-global field-approach dimension because this dimension had the following broad characteristics of cognitive styles:

(1) it was concerned with individual differences in process rather than content;
(2) it was a pervasive dimension of individual functioning, showing itself in perceptual, intellectual, personality, and social domains but also connected with the development of the whole organism;
(3) it showed stability over time. (1976, p.11, p.42).

However, the value-neutral characteristic traditionally regarded as essential to cognitive style, was not evident in the articulated-global dimension. (Witkin, 1976, p.45-48). In Witkin's work up to 1974, articulation had been described as an ability dimension. Cognitive styles are understood to be value-neutral in that the two opposing poles have equal value.

In the abundance of literature generated by Witkin's theory, a second distinction was lost as well. Authors, including Witkin himself, began to write about field-dependent and field-independent cognitive styles. Although a correlation had been found between extent of field-dependence in perceptual functioning and mode of field approach in cognitive functioning in a variety of situations, (1974, p.59-80), field-dependence and field-independence had been established only as modes of perceptual functioning, and had not been expanded into the broader dimension of cognitive functioning. (See Figure 3).

Two designations that were intended as different, i.e. perceptual style (the field-dependent, field-independent dimension) and cognitive style (the articulated, global dimension), began to be combined unjustifiably in the literature. (1976, p.10-11).

In an attempt to overcome these problems, Witkin has re-examined and revised his model. In doing so, he has found that "articulated cognitive functioning" and "sense of separate identity" both appear to have the same underlying ability - the ability to segregate what belongs to self from what is external to self and to use the self as a primary referent. (1976, p.12). Field-independent subjects have consistently rated higher in tasks on both these indicators. The same ability has been evidenced in "articulation of body concept" and "impulse control and specialized defenses". Field-independent subjects have shown superior ability on the Sophistication of Body Concept Scale and were also found to use cues from within the self in controlling impulse expression (1976, p.14).

Witkin, therefore, has recently proposed a revision in his model which provides for the problems noted above. He has retraced the development of his theory to the early results of orientation tasks (RFT, BAT, and RRT) in which the degree of reliance on cues from within the body and cues from the field had been examined. Field-independent subjects had been shown to use cues from within the body as primary referents;

field-dependent subjects drew primarily on cues from the field. (1976, p.43-45). Witkin noted that cognitive restructuring and personal autonomy, evidenced by field-independent subjects on cognitive functioning tasks and sense of separate identity tasks respectively, both had the same underlying basis. They were both expressions of availability and use of internal referents rather than reliance on external cues. (1976, p.45-46). Field-independent subjects had consistently shown greater restructuring skill, drawing cues from within the self; field-dependent subjects had shown greater social skill, taking cues from the environment. This suggested bipolarity of self-nonself segregation, with field-independent subjects taking cues from within the self and excelling on restructuring tasks and field-dependent subjects taking cues from outside the self and excelling in interpersonal situations. This bipolarity makes the self-nonself dimension value-neutral with each pole having its value in different circumstances. The self-nonself dimension, therefore, appears to possess all four characteristics of cognitive style:

(1) it is a process variable; (2) it is pervasive; (3) it is stable over time; (4) it is bipolar and value-neutral. (1976, p,48).

Because the labels field-dependence and field-independence had been used#widely in connection with cognitive style, Witkin has chosen to transfer these terms to the higher level dimension of self-nonself segregation from its earlier location as a perceptual disembedding ability. (1976, p.48).

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The field-dependent-independent cognitive style dimension, which may now be correctly used, is represented within the larger concept of differentiation, and is illustrated within the dotted lines in Figure 4.

Autonomy in interpersonal relations includes the following specific first order dimensions: independence on external social referents, inattention to social cues, preference for impersonal situations, social distancing, and limited social skills. Field-independent people are more autonomous in all areas of interpersonal relationships. Field-dependent people are more sensitive to those around them. This autonomy construct, by giving a prominent role to whether one draws information from others or from internal sources in finding answers, actually suggests a cognitive basis for differences in social behaviour. (1976, p.21-28).

Restructuring is an ability which requires a subject to act on a field by going beyond the information given. It requires an active approach rather than a passive acceptance of the field "as is". Restructuring includes flexibility of closure, perceptual consistency, reversible perspective, closure speed, functional fixity, conservation, hypothesis testing, set breaking, perspectivism, etc. Each of these referents has been found to be consistently characteristic of field-independent subjects in a variety of situations. (1976. p.28-38). Field-independent people are not responsive to dominant properties of a field and are able to restructure stimulus cues so as to

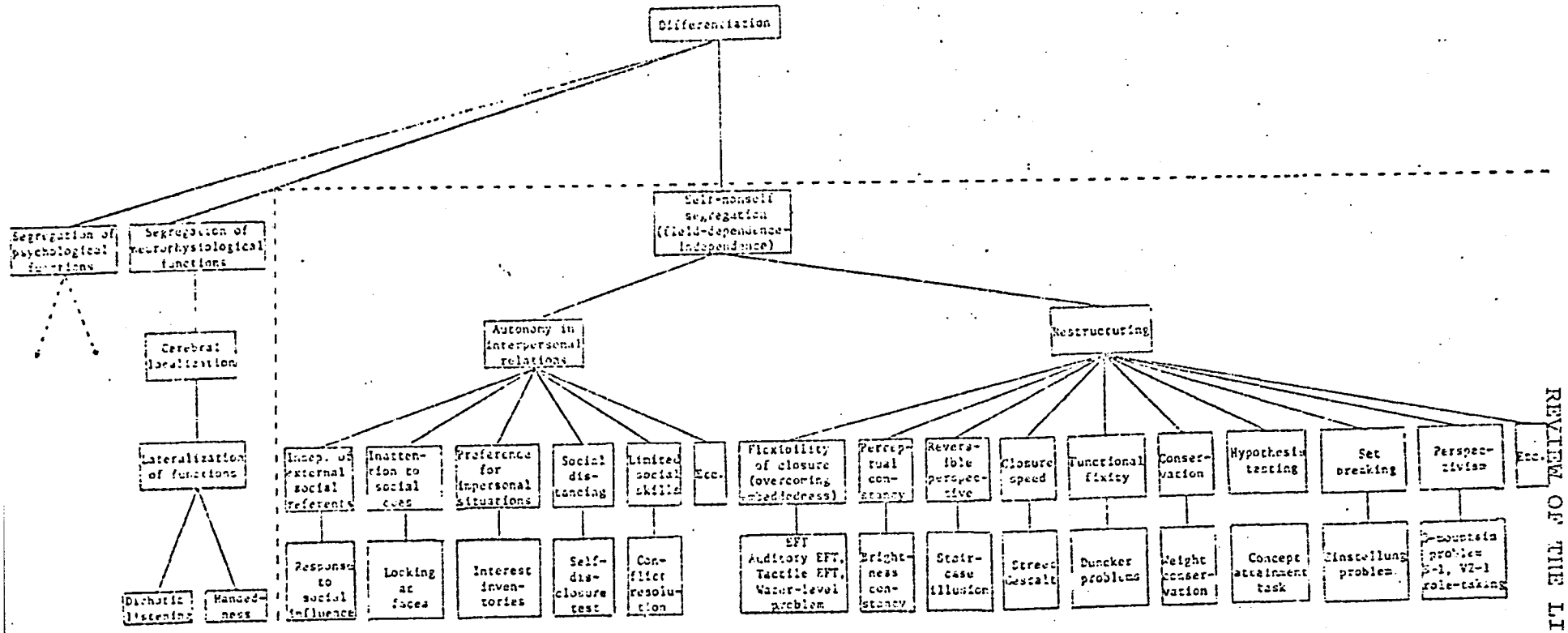

FIGURE 4: Witkin's Revised Model of Differentiation (1976, p.85)

make use of less prominent attributes (1976, p.31). Field-dependent people, in contrast, are very responsive to the dominant properties of the field and tend to accept the field "as is" without restructuring it.

Witkin's theory has been outlined, tracing its historical evolution. His early concept of field-dependence-independence as a mode of functioning on perceptual tasks has been traced through to his current conception of field-dependent-independent cognitive style, now located at the broad level of self-nonself differentiation. The accompanying revision of his model has been presented.

3. Psychological Differentiation and Psycholinguistic Reading

Pierre (1975) examined the relationship between Witkin's theory of psychological differentiation and Goodman's psycholinguistic theory of reading. He found that Witkin's field-independent subjects tended to be Goodman's guessers. Field-independent subjects achieved higher reading comprehension scores than field-dependent subjects. In his study, the following characteristics common to Witkin's field-independent subjects and Goodman's good guessers were specified. (Pierre, 1975, p.25-34).

1. Goodman's good guessers are not constrained by the graphic display. They bring their background of experience

to bear on the printed page. They look beyond the printed page by using their deep structures in reading.

Witkin's field-independent subjects are not constrained by the visual context. They make their adjustments independent of the prevailing stimuli and in relation to cues from within themselves.

2. Goodman's good guessers are more discriminating in their selection from the printed page. They rely on simultaneous use of phonographic, syntactic, and semantic information in their selection of minimal relevant cues in the reading process.

Witkin's field-independent subjects possess a greater faculty to perceive distinctions and to see relationships within the stimulus field. They attend to relevant stimuli while inhibiting attention to irrelevant or distracting stimuli.

3. Goodman's good guessers are able to structure or reconstruct a message given by the writer or speaker. Witkin's field-independent subjects are able to impose structure on the environment or can restructure the whole environmental field.

Since Smith has adopted (1973, p.21-22) and extended (1973, 1975, 1977) Goodman's theory, Goodman's "good guessers" could reasonably be replaced by Smith's "fluent readers" in these comparisons.

REVIEW OF THE LITERATURE

According to Smith, the reading process is a concept development task which requires cognitive strategies to select the most productive cues in reconstructing the message encoded by the writer. (1973, p.26). The efficient reader uses the graphic display as stimulus material and depends on the semantic and syntactic knowledge already in his head to formulate strategies and predict what will follow. The more semantic and syntactic knowledge available from within, the less graphic cues are required from without. That is, the more cues available "behind the eye" (self), the less cues will be required "in front of the eye" (nonself). The efficient reader relies primarily on cues from within the self in formulating strategies which yield the most reliable prediction with minimal use of available graphic information. The less efficient reader relies primarily on visual cues (nonself).

Three implications for understanding reading stated in Smith's earliest book are of importance to this cognitive task - the reader has to be fast; the reader has to be selective; the reader must use prior knowledge. (1971, p.94). Efficient selection of cues requires analytical ability in which field-independent subjects excel; efficient organization of new ideas with prior knowledge requires constant restructuring of information in the memory systems. People with field-independent cognitive styles excel on restructuring tasks. (Witkin, 1976, p.28-34). Children with field-independent cognitive styles could, therefore, be expected to make efficient

simultaneous use of graphic, syntactic, and semantic cues and to utilize syntactic and semantic information from within themselves more fully. Children with field-dependent cognitive styles, being unable to overcome the structure of the visual field, could be expected to rely to a greater extent on graphic cues from the nonself and to have difficulty restructuring syntactic and semantic cues. Readers with a field-independent cognitive style should be the more efficient readers; readers with a field-dependent cognitive style should be the less fluent readers.

In his study, Pierre used the Cloze Procedure as a reading measure to identify Goodman's good guessers. In this procedure, every fifth word was deleted systematically from the selected reading passage. The reader was required to replace the missing word based on his prior experience, his knowledge of language, and contextual cues.

Miller (1975, p.200) has suggested that the Cloze Procedure indicates that the reader does use syntactic and semantic cues to supply a missing word in context. However, no definitive information on individual differences in the extent to which these cues are used can be obtained using this procedure. To alleviate this limitation, Miller has devised a "disruptive effect technique" to study the use of syntactic and semantic cues. (1974(a), 1975, 1976, 1977).

Using his disruptive effect technique, Miller has found that good comprehenders make greater use of syntactic and semantic cues than low comprehenders do. (1976).

In this experiment, the use of these cue systems will be studied by using Miller's disruptive effect technique to eliminate syntactic and semantic cues in the reading stories on which the subjects will be tested. An attempt will be made to demonstrate that field-independent subjects, found by Pierre to achieve better reading comprehension scores, will also make greater use of syntactic and semantic cues in achieving these scores.

4. Summary and Research Hypothesis

In the foregoing pages, Smith's psycholinguistic theory of reading and Witkin's theory of differentiation have been presented at length. Pierre's study, relating psycholinguistic reading and psychological differentiation has been examined and the use of the Cloze Procedure as a measure of reading comprehension has been discussed. A limitation has been noted, in that it does not indicate the degree of individual use of syntactic and semantic cues. Miller's disruptive effect technique has been suggested as a measure of sensitivity to these cues.

REVIEW OF THE LITERATURE

The key points considered may be summarized as follows:

1. Smith has viewed reading as a cognitive task involving simultaneous use of graphic, syntactic, and semantic cues. Efficient readers are able to use all three cue systems simultaneously, using the syntactic and semantic cues from within their existing cognitive structures as primary referents. Inefficient readers use graphic cues as primary referents. They are unable to overcome the graphic constraints in order to make use of internal syntactic and semantic cues.

2. Witkin has established that subjects with field-independent cognitive styles tend to use cues from within the self as primary referents on cognitive tasks (self cues). Subjects with a field-dependent cognitive style tend to use cues from within the environment as primary referents on cognitive tasks (nonself cues).

3. Pierre has found that field-independent subjects tend to be good comprehenders while field-dependent subjects tend to be poor comprehenders.

4. Miller has found that good comprehenders tend to make greater use of syntactic and semantic cues than field-dependent subjects.

In view of the above, it seems reasonable to postulate that readers with field-independent cognitive styles will make greater use of syntactic and semantic cues in reading than will field-dependent readers. In an attempt to test this postulate, the following hypothesis is formulated:

> In reading, the difference between scores on test items on disrupted and non-disrupted stories will be greater for field-independent subjects than for field-dependent subjects.

CHAPTER II

EXPERIMENTAL DESIGN

In this chapter the procedures used to test the null hypothesis are presented. The Sophistication of Body Concept Scale is presented as the measuring instrument of psychological differentiation. Miller's disruptive effect technique is described as the means to be used in eliminating syntactic and semantic cues in reading comprehension. Two ten item, multiple choice reading tests - a "Groundhog Test" and a "Woodpecker Test" - designed by the experimenter for use in this study are presented and methodology used in the construction of the tests is outlined. A description of the research sample, the method of data collection and the method of data analysis is then provided.

1. Measuring Instruments

The Sophistication of Body Concept Scale

The Sophistication of Body Concept Scale (SBCS) (Witkin, 1974, p.118-129), a measure of articulation of body concept, was selected as the measure of psychological differentiation. In this test subjects are asked to draw a human figure and, when finished, to draw a figure of the opposite sex. These drawings are then assigned a single rating from 1 to 5, with 1 representing the most sophisticated drawings and 5 representing the most primitive and infantile drawings. Three main headings are considered in rating: form level, extent of identity of sex differentiation, and level of detailing.

EXPERIMENTAL DESIGN

In its origin, scores of 23 ten year-old boys on the sophistication scale were found to correlate .71 ($P<.01$) with perceptual index scores, i.e. scores that are a composite of the means of the separate indices for the RFT, BAT, and EFT (Witkin, 1974, p.122). When the sophistication scale was applied to a second group of 30 ten year-old boys, a correlation of .57 ($P<.01$) was obtained.

Using two groups of 12 year-old boys as subjects Silberman (cited in Witkin, 1974, p.123) obtained correlations of .76 ($P<.01$) and .44 ($P<.05$) between sophistication scale and EFT scores.

In comparing scores of the 30 boys on the sophistication scale with full-scale WISC IQ scores, Witkin found a correlation of .55 ($P<.01$). When performance and verbal scores on the WISC were considered separately, Witkin found sophistication of body concept scale correlated .54 ($P<.01$) with the performance scores, while correlation with verbal scores was not significant. In examining the same relationship with 2 groups of 12 year-old boys, Silberman (cited in Witkin, 1974, p.127) found sophistication scores correlated .79 ($P<.01$) and .53 ($P<.01$) with performance scores. He, too, found correlation with verbal scores insignifcant for both groups.

When comparing scores on sophistication of body concept to scores on the Goodenough Draw-a-Man Scale (a test of non-verbal intelligence), Witkin found a correlation of .74 ($P<.01$).

EXPERIMENTAL DESIGN

Witkin concluded that sophistication scores relate particularly to performance on intellectual tests which feature analytical ability, that the scale focuses on aspects of figure drawings which reflect articulation of body concept, and that extent of articulation of body concept, as reflected in figure drawings, is related to style of field approach. Children who demonstrate an articulated body concept tend to show an analytical field approach while those whose drawings demonstrate an unarticulated body concept tend to show a global field approach.

To operationally define the field-independent and field-dependent groups in this investigation, two pairs of teachers who had been given a training session by the experimenter on the rating of human figure drawings using the Sophistication of Body Concept Scale discussed each subject's two drawings in terms of the three headings specified in the sophistication scale -- form level, extent of identity of sex differentiation and level of detailing. The characteristics of drawings reflecting primitive features and sophisticated features within each of these three headings are included as Appendix 1. The rating scale based on these characteristics is included as Appendix 2.

A single score, ranging from 1 to 5, was assigned by each pair of teachers to each subject's drawings. The scores provided by the two pairs were then added together to produce a single score ranging from 2 to 10. The field-independent subjects were defined as those with an SBCS total score of 5 or less. The field-dependent subjects were defined as those with an SBCS score of 7 or more.

EXPERIMENTAL DESIGN

The Development of the "Groundhog Test" and the "Woodpecker Test"

To measure the extent of use of syntactic and semantic cues in reading comprehension, a modification of Miller's disruptive effect technique was used. The disruptive effect technique was established by Miller as a technique for indexing internal processing during reading. In three separate studies (Miller, 1974(b); Miller, 1975, Miller & Isakson, 1976), confusing elements injected into the normal text were used. The degree of resulting disruption as measured by an increase in oral reading errors on the immediately surrounding context was indexed. The three studies differed in the types of confusing elements used (adjectives, nouns, verbs), the position of the sentences where elements were injected, and the word position at which disruption was introduced. The first two studies were completed primarily for the purpose of establishing the existence of disruptive effect, while the third utilized the effect in a more specific way.

In the third study, grade four subjects read sentences with verbs disrupted to determine whether sensitivity to syntactic and semantic cues differs between good and poor comprehenders. (Miller, 1976(b)). It was expected that good comprehenders would display an increasing number of oral reading errors from non-disrupted sentences (Type A) to sentences with semantic constraints (Type B) and from Type B to sentences with both semantic and syntactic constraints (Type C). It was further hypothesized that poor comprehenders would show no such increase in number of errors across sentence types.

EXPERIMENTAL DESIGN

Each subject read 4 sentences from each of the three types counterbalanced for order of presentation. Subjects were tested individually and the experimental situation was tape recorded to insure accuracy in scoring. Errors due to omissions, substitutions, insertions, and repetitions were noted.

Results indicated that high comprehenders displayed an increase in errors from normal sentences to sentences with syntactic and semantic violations. The low comprehenders did not exhibit this same increasing number of errors. Significantly, more errors ($p<.05$) were made on Type C sentences than on the other two sentence types. The difference between Type A and Type B was not significant.

In the present study, Miller's technique was modified in that a paper and pencil multiple choice test was designed to measure the use of syntactic and semantic cues. Silent reading in a group situation rather than oral reading on an individual basis was studied.

The original intent was to design a written group test on the material used orally by Miller in his grade 4 study. This material was requested and received. However, since individual unrelated sentences rather than a story paragraph provided the content, Miller's material was felt to be ineffective for the purpose of this research. Therefore stories, with content, vocabulary, and reading difficulty appropriate for grade four children were created.

EXPERIMENTAL DESIGN

Three separate yet similar stories were written at the mid-grade four level (as rated by Fry's readability formula) - one about a woodpecker, one about ships, and a third about a garbage strike. All three stories were 12 sentences long. In all sentences, the subject was placed at the first, followed by the verb, and then the object. All words in the passages contained three syllables or less. Stories were balanced for number of syllables per 100 words and number of sentences per 100 words. A ten item multiple choice test was drafted to accompany each of these three stories.

The task of devising ten multiple choice test items, each with five distractors, so that one question or part of it did not provide clues to other questions proved to be difficult to accomplish with 12 sentence stories. Therefore, pupil assistance was elicited. Forty-three grade five pupils were asked to write multiple choice questions on the passages. The pupil ideas generated through this exercise proved very useful in establishing the content used in the first test draft.

In order to insure that the stories and the test items were suitable, four groups of three children from grades three and four, known for their ability in critical appraisal and their honesty in expressing their thoughts, were identified by their classroom teachers. In groups of 3, these children read orally the three passages which had been created and the accompanying test items. Their oral reading omissions,

repetitions, substitutions, and deletions were noted. An analysis of the miscues suggested the need for some revision so that vocabulary chosen would be compatible with the children's language structures and thought patterns. For example, "A little woodpecker landed on a rotting tree", was changed to "A little woodpecker landed on a rotten tree"

For each of the test items the children discussed why each of the five possible responses could or could not be correct. Limitations in the distractors were identified and were rectified in the woodpecker and the garbage strike tests.

Because the story about the ships presented many difficulties in its structure as determined from the oral reading analysis and also in the composition of ten appropriate multiple choice test items, this passage was deleted. A replacement story about a groundhog was created and the above outlined procedure for validation was replicated for the new story attempt.

A group of twenty-seven grade six students then read each of the three stories and responded to the test questions. Each student wrote the reason for his choice beside the item. Revisions were made again on the basis of their explanations.

EXPERIMENTAL DESIGN

The three stories - about a woodpecker, a groundhog, and a garbage strike - were then disrupted in a systematic way. Subject nouns and main verbs were modified in alternating sentences so that only one word per sentence was changed. As in Miller's study, three story types were drafted. Stories of Type A (non-disrupted sentences), Type B (sentences violated semantically only) and Type C (sentences violated semantically and syntactically) were used. To provide for any difference that might result from whether a noun or a verb was disrupted initially in the paragraph, both sequences were used in each of Type B and Type C stories. Table 1 on the next page is included to demonstrate the story versions designed to be used.

To accomplish semantic disruption of subject nouns in Type B stories, nonsense words which are phonetically possible, but non-existent in the English language were created. The number of syllables in the "pseudo" words were balanced with the number of syllables in the subject nouns being replaced, so that the paragraph difficulty would not be altered in the disrupted version. For example, woodpecker was changed to dorzirbler; groundhog to plurdip; and toes to bimps.

In Type C stories the syntax as well as the semantics of subject nouns was violated by adding the suffix s to all disrupted nouns being used in a singular sense and by deleting the s from all disrupted subject nouns being used in a plural sense. For example, "A little woodpecker landed on a rotten tree" became "A little dorzirblers landed on a rotten tree".

EXPERIMENTAL DESIGN

TABLE 1

STORY VERSIONS USED AS READING MATERIAL FOR FIRST TEST DRAFTS

Type of Disruption	Identifying Code			Description of Disruption
	Woodpecker	Groundhog	Garbage Strike	
TYPE A Non-disrupted	W1	G1	S1	No disruption
TYPE B Semantic disruption	W2	G2	S2	Nouns disrupted in odd numbered sentences. Verbs disrupted in even numbered sentences.
	W3	G3	S3	Verbs disrupted in odd numbered sentences. Nouns disrupted in even numbered sentences.
TYPE C Syntactic/semantic disruption	W4	G4	S4	Nouns disrupted in odd numbered sentences. Verbs disrupted in even numbered sentences.
	W5	G5	S5	Verbs disrupted in odd numbered sentences. Nouns disrupted in even numbered sentences.

EXPERIMENTAL DESIGN

Semantic disruption of main verbs was accomplished in Type B stories by replacing transitive verbs with verbs that can be used only as intransitive verbs, and conversely, intransitive verbs with verbs that always require a direct object, i.e. transitive verbs. For example, "A little woodpecker landed on a rotten tree" became "A little woodpecker assigned on a rotten tree".

Main verbs in Type C stories were altered both semantically and syntactically. Verb endings, such as s, ed and ing were interchanged on the already semantically disrupted verbs from Type B sentences. For example, "A little woodpecker landed on a rotten tree" was changed to "A little woodpecker assigning on a rotten tree". The same test items accompanied each of the Type A, Type B and Type C story versions on the same theme. That is, only 3 tests were used - a "Woodpecker Test", a "Groundhog Test", and a "Garbage Strike Test". Eighty-four grade four students were given the test drafts. Each pupil read one story of each of Types A, B, and C. Each subject read a paragraph about a woodpecker, a groundhog, and a garbage strike. (See Table 1). The multiple choice items were completed on each of the paragraphs. The test items were not disrupted. Students were allowed to refer to the passage when responding. The frequencies of responses to distractors and correct responses are included as Appendices 3,4, and 5 for the "Woodpecker Test", "Groundhog Test", and "Garbage Strike Test" respectively.

EXPERIMENTAL DESIGN

A study of the frequency of these responses showed that the story about the garbage strike was totally unsuitable as compared to the woodpecker and groundhog stories. The difficulty was believed to be at least partially due to the fact that the story was about an inanimate object, while the other two paragraphs were about animate objects. A decision was made to continue with only the stories about the woodpecker and the groundhog.

Because the story content was now limited to two themes and because Miller in his work had found significant differences only between Type A and Type C sentences, it was decided to study only differences between non-disrupted stories and stories disrupted both syntactically and semantically. The study of the effect of disruption of semantic cues only (Type B sentences) was deleted from this investigation. Only two test drafts remained - the "Woodpecker Test" draft and the "Groundhog Test" draft.

A study of the frequency of responses to distractors and correct responses demonstrated need for a number of changes in the test items. In the questions on the woodpecker story only two items were found suitable for use exactly as they had appeared in the test draft (#2, #3), two items appeared to contribute nothing to the test and needed replacements (#5, #8), and six items required revision of some form, whether by re-wording the stem, replacing or rewording a distractor, or

reorganizing the sequence of distractors. An analysis of the groundhog questions showed that two questions were suitable as drafted (#2, #10), three questions seemed to contribute nothing (#6, #7, #8) and therefore needed replacements, and the five other questions required revisions in rewording of the stem, and/or replacing or rewording or reorganizing distractors.

When the necessary changes had been made, the revised test was given to a group of 24 grade three and grade four children. Story versions used with this group are included in Table II.

Each student was asked to read two stories - one about a woodpecker, the other about a groundhog - and then respond to 10 multiple choice test items immediately following the reading of each story. Students were allowed to refer to the passages in selecting appropriate answers. Approximately half the sample read the woodpecker story in non-disrupted form (W1), completed the "Woodpecker Test", then read one of the two disrupted versions of the groundhog story (G2 or G3) and completed the "Groundhog Test". The other half of the sample read the groundhog story in its original form (G1), did the "Groundhog Test", then read the woodpecker story in one of its two disrupted forms (W2 or W3) and did the "Woodpecker Test". Each of the following sequences was therefore read by approximately one fourth of the sample: W1 and G2, W1 and G3, G1 and W2, G1 and W3.

EXPERIMENTAL DESIGN

TABLE II

STORY VERSIONS USED AS READING MATERIAL
FOR SECOND TEST DRAFTS

Type of Disruption	Identifying Code		Description of Disruption
	Woodpecker	Groundhog	
TYPE A Non-disrupted	W1	G1	No disruption.
TYPE C Semantic/syntactic disruption	W2	G2	Nouns disrupted in odd numbered sentences. Verbs disrupted in even numbered sentences.
	W3	G3	Verbs disrupted in odd numbered sentences. Nouns disrupted in even numbered sentences.

EXPERIMENTAL DESIGN

An analysis of the frequency of responses to distractors and correct responses on items is included as Appendix 6. A study of the distractor choices on the groundhog story revealed a need for rewording in items #4, #6, #9, and #10. Because item choices appeared in alphabetical order, a change in sequence of the distractors was made. Similarly, a rewording of distractors in items #8 and #9 in the woodpecker story produced a change in sequence.

Twenty grade four pupils then responded to the third test drafts to determine if modifications had been effective. On the basis of their responses, distractors in items #8 and #9 on the groundhog test were reworded and items #8 and #9 on the woodpecker test were modified to reduce distractor length. An analysis of the frequency of responses to distractors is included as Appendix 7.

It was concluded that the passage should be removed while the questions were being answered. It appeared that in many instances the correct response could be achieved by going back to the passage and from clues given in the item determining the word replaced by the "pseudo" word.

The semantic disruption of main verbs was then scrutinized carefully to insure that transitive verbs were in fact being replaced by verbs that could be used only intransitively and vice-versa. Care was taken, also, to insure that words substituted were verbs that were used by children of

this age group. Consequently, some changes in main verbs were made in the disrupted story versions.

The revised test was given to a validation sample of 87 grade three, four and five pupils. Stories were removed while the test items were being completed. Analysis of the results suggested that the test was appropriate for research use. The frequency of responses by the validation sample to the distractors and correct responses to items for the high group (N = 30) and the low group (N = 30) was charted for the "Groundhog Test" and the "Woodpecker Test". The resulting table is included as Appendix 8. Item difficulty and discrimination indices for each of the tests on non-disrupted and disrupted stories are shown in Table III.

The test was reproduced for use in the experiment. The instruction page from a student test booklet is found in Appendix 9. The instructions for administration of the reading tests read by the experimenter to each of the five groups in the research sample constitutes Appendix 10. In Appendices 11 and 12 are found the three story versions that accompanied the "Groundhog Test" and the three story versions that accompanied the "Woodpecker Test". The "Groundhog Test" may be found in Appendix 13 and the "Woodpecker Test" in Appendix 14.

EXPERIMENTAL DESIGN

TABLE III

ITEM DIFFICULTY AND ITEM DISCRIMINATION FOR "GROUNDHOG" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS FOR VALIDATION SAMPLE (N = 87)

ITEM	GROUNDHOG				WOODPECKER			
	Non-disrupted		Disrupted		Non-disrupted		Disrupted	
	Diff.	Disc.	Diff.	Disc.	Diff.	Disc.	Diff.	Disc.
1	.5681	.6106	.6511	.1933	.8604	.2682	.5909	.3942
2	.7272	.4712	.4651	.2311	.7441	.5714	.5681	.4867
3	.6818	.6250	.5831	.4664	.5813	.3488	.3636	.1346
4	.6818	.6250	.6279	.3950	.7441	.5714	.5909	.3317
5	.8963	.2500	.5116	.3488	.8604	.2857	.7272	.4230
6	.8181	.3125	.6511	.2563	.7674	.3571	.6590	.5625
7	.7727	.3125	.3953	.4328	.8372	.3698	.7955	.0961
8	.5454	.5962	.2790	.1513	.6046	.5253	.4090	.2065
9	.2045	.6154	.2558	.0087	.5116	.2900	.2954	.0577
10	.6136	.4712	.3720	.3866	.5813	.5967	.4772	.1010
Mean	.6509	.4889	.4792	.2870	.7092	.4184	.5477	.2794

EXPERIMENTAL DESIGN

2. The Research Sample & Data Collection

The research sample included 158 grade four students from five schools of the Protestant School Board of Greater Hull. In each of the groups that were tested, approximately one-fourth of the children were randomly assigned each of the following story sequences: W1 and G2; W1 and G3; G1 and W2, G1 and W3. Each pupil first read a story in non-disrupted form, responded to the 10 test items on that story, then read a disrupted story about the other theme and responded to the 10 test items on that story. After the reading tests were completed, each child was asked to draw a person, and, when finished to draw a person of the opposite sex. All testing was done by the experimenter.

The reading tests were timed. Three minutes were allotted for the reading of each of the stories. A ten minute maximum was allowed for responding to each of the reading tests. All students finished within the time limit.

The Sophistication of Body Concept Scale was not timed. Each child was granted as much time as he needed to complete the two figure drawing tasks to his satisfaction. Total test administration time, therefore, was approximately 45-50 minutes.

EXPERIMENTAL DESIGN

3. Analysis of Data

The research hypothesis was tested in the null form by means of a repeated measures analysis of variance as described by Keith (1972, p.165-170) with level of significance set at $p<.05$. Field dependence-independence and disruption and non-disruption of syntactic and semantic cues were defined as the independent variables. Scores on reading tests were defined as the dependent variables.

CHAPTER III

PRESENTATION AND DISCUSSION OF RESULTS

In this chapter the results of the investigation described in the preceding chapter are presented and discussed under the following headings: (1) descriptive analysis of data, (2) testing of hypothesis, and (3), discussion of results.

1. Descriptive Analysis of Data

The raw scores from the "Groundhog Test" and the "Woodpecker Test" were converted to Z-scores to allow for a difference in test difficulty. Scores were then converted to T-Scores so that negative numbers would not be involved in the statistical analysis. The raw scores and T-scores for the tests on non-disrupted and disrupted stories as well as scores on the SBCS are included in Appendix 15.

Since the reading test had been designed by the experimenter, an item analysis was made on the responses of all 158 subjects. The item difficulty and the item discrimination (calculated as the correlation between item score and the total test score) were determined for each test item. These are reported for the "Groundhog Test" and the "Woodpecker Test" for each of the non-disrupted and disrupted story versions in Table IV.

As shown in Table IV, the "Groundhog Test" was both more difficult and more discriminating than the "Woodpecker Test". No item had a discrimination index below .2. However,

on three test items the discrimination index was less than .3 - item #4 on the non-disrupted "Groundhog Story", item #1 on the non-disrupted "Woodpecker Story", and item #5 on the disrupted "Woodpecker Story". One could reasonably expect these low discrimination values for items with extreme difficulties of .8250, .9231, and .8125 respectively.

The Kuder-Richardson Formula 20 reliability coefficient was calculated on non-disrupted and disrupted story versions for the "Groundhog Test" and the "Woodpecker Test" and for the total group on the "Groundhog Test" and the total group on the "Woodpecker Test". The results, reported in Table V indicate lower reliabilities than desired. However, these were judged to be acceptable.

The T-scores on the "Groundhog Test" and the "Woodpecker Test" for each of the non-disrupted and disrupted story versions were identified for the subjects defined as field-independent (N = 47) and the subjects identified as field-dependent (N = 72). The means and standard deviations of test scores on the non-disrupted and disrupted story versions for the field-independent and field-dependent groups are presented in Table VI.

PRESENTATION AND DISCUSSION OF RESULTS

TABLE IV

ITEM DIFFICULTY AND ITEM DISCRIMINATION FOR "GROUNDHOG TEST" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS FOR RESEARCH SAMPLE (N = 158)

ITEM	GROUNDHOG				WOODPECKER			
	Non-disrupted		Disrupted		Non-disrupted		Disrupted	
	Diff.	Disc.	Diff.	Disc.	Diff.	Disc.	Diff.	Disc.
1	.7250	.5101	.5769	.4194	.9231	.2381	.7250	.3268
2	.7750	.4672	.5128	.4607	.8462	.5803	.5000	.4908
3	.7875	.6402	.6538	.4158	.7308	.4077	.4375	.4721
4	.8250	.2222	.7051	.4469	.7682	.6475	.6625	.4315
5	.8875	.4510	.5385	.5658	.9105	.4995	.8125	.2690
6	.9125	.5102	.6154	.5981	.8077	.5594	.6750	.2998
7	.6750	.6457	.4872	.5036	.8718	.5219	.6250	.4457
8	.4875	.5683	.1538	.3369	.5385	.4189	.4375	.3091
9	.1500	.3469	.1795	.3086	.5385	.3913	.4875	.4303
10	.6375	.6614	.3333	.4185	.6026	.4030	.6500	.5309
Mean	.6863	.5023	.4756	.4474	.7538	.4668	.6012	.4006

PRESENTATION AND DISCUSSION OF RESULTS

TABLE V

KUDER-RICHARDSON FORMULA 20 RELIABILITY ESTIMATES FOR READING COMPREHENSION TESTS

SOURCE	r_{tt}
Groundhog Test - Non-disrupted Groundhog Story (N = 80)	.6834
Groundhog Test - Disrupted Groundhog Story (N = 78)	.5738
Groundhog Test - Total Group (N = 158)	.6920
Woodpecker Test - Non-disrupted Woodpecker Story (N = 78)	.5876
Woodpecker Test - Disrupted Woodpecker Story (N = 80)	.5838
Woodpecker Test - Total Group (N = 158)	.6140

PRESENTATION AND DISCUSSION OF RESULTS

TABLE VI

MEANS AND STANDARD DEVIATIONS FOR FIELD-DEPENDENT AND FIELD-INDEPENDENT SUBJECTS ON DISRUPTED AND NON-DISRUPTED READING COMPREHENSION TESTS

	Non-disrupted	Disrupted
FI	n = 47 M = 56.57 SD = 7.15	n = 47 M = 47.04 SD = 9.22
FD	n = 72 M = 52.51 SD = 10.09	n = 72 M = 45.16 SD = 9.04

PRESENTATION AND DISCUSSION OF RESULTS

2. Testing of Hypothesis

It was hypothesized that in reading comprehension, students who are field-independent would make more use of syntactic and semantic cues than students who are field-dependent. The use of these cues was measured as the difference between scores on reading tests on a non-disrupted story and scores on reading tests on a story in which syntactic and semantic cues had been systematically disrupted. This difference in test scores was expected to be greater for the field-independent group than for the field-dependent group. This, of course, implies an interaction between psychological differentiation and extent of disruption.

The research hypothesis was tested in the null form by means of a repeated measures analysis of variance with the level of significance set at .05. The results are presented in Table VII.

Significant differences were found between the test scores of the field-independent and field-dependent groups ($F = 4.54$) and between the reading test scores on non-disrupted stories and stories in which syntactic and semantic cues had been disrupted, ($F = 74.59$). These findings are consistent with the expectations previously mentioned and will be discussed later in the chapter.

PRESENTATION AND DISCUSSION OF RESULTS

There was no significant difference in the use of syntactic and semantic cues between the field-independent group and the field-dependent group. The difference between the reading test scores on the non-disrupted stories and the reading test scores on disrupted stories was greater for field-independent subjects than for field-dependent subjects, but this interaction was not significant. The F- value for the interaction of extent of psychological differentiation and use of syntactic and semantic cues was found to be 1.28, a non-significant value at the .95 level ($_{.95}F_{(1,117)} = 3.92$). Accordingly, the null hypothesis was not rejected.

3. Discussion of Results

Although the results of the study were in the direction hypothesized, no significant difference was found in use of syntactic and semantic cues between field-independent and field-dependent subjects. Weaknesses in the measuring instruments and testing procedures permit the suggestion of at least four possible explanations for non-significant results.

First, it is possible that subjects were inappropriately assigned to field-independent and field-dependent groups on the sole basis of the Sophistication of Body Concept Scale. In this test, one of the three areas scrutinized is extent of identity of sex differentiation. (See Appendix 1). Within the "unisex"

PRESENTATION AND DISCUSSION OF RESULTS

TABLE VII

TWO-FACTOR REPEATED MEASURES ANALYSIS OF VARIANCE FOR FIELD-INDEPENDENT AND FIELD-DEPENDENT SUBJECTS ON NON-DISRUPTED AND DISRUPTED READING PASSAGES

SOURCE		df	SS	MS	F
Between Subjects					
Psych. Diff.	A	1	504.75	504.75	4.54*
Error	S:A	117	12996.38	111.08	
Within Subjects					
Dis-Non-dis.	B	1	4016.54	4016.54	74.59*
	AB	1	68.66	68.66	1.28
	SB:A	117	6300.21	53.84	

*p<.05

world" of the past decade, it seems understandable that even the more articulated nine and ten year-old subjects would fail to discriminate between the sexes in their drawings in a way viewed as adequate to the adult raters using the guidelines of the scale.

When asked to draw a person, some children were observed making the decision as to sex only after being requested to draw a second person of the opposite sex. Differentiation was then made on the basis of minor details added after original completion. From the viewpoint of adult raters, sex discrimination on such drawings was inadequate. Possibly, the sample designated field-independent was restricted for this reason.

Second, it is possible that the dimension of psychological differentiation being measured by this scale is not closely enough related to the dimensions of cognitive functioning involved in reading tasks. The Sophistication of Body Concept Scale is a measure of articulated body concept, not a measure of articulated cognitive functioning. Articulated body concept and articulated cognitive functioning are two of the four indicators of psychological differentiation identified in Witkin's 1962 model (See Figure 3). The EFT is indicated as a measure of cognitive functioning in this model. In 1961, before the "unisex era" began, Silberman found correlations of only .76 ($P<.01$) and .44 ($P<.05$)

between the Sophistication of Body Concept Scale and the Embedded Figures Test (Witkin, 1974, p.123). Similarly, Witkin found the scale correlated .71 ($P<.01$) with perceptual index scores. (1974, p.122). In the discussion of field-dependence-independence as a cognitive style (Witkin & Goodenough, 1976, p.41-49), the EFT was suggested as a valuable measuring instrument because (1) it is standardized, (2) it has considerable construct validity and (3) its relation to tests of other constructs is well documented. (1976, p.49).

The EFT was considered as a more suitable measure of psychological differentiation for use in this research and an attempt was made to obtain the group-administered form suitable for use with nine and ten year-old children. The recently designed Children's Group Embedded Figures Test (Stone et al, 1977), validated with grade four and five subjects, was not available for use when requested from the publisher. Since the Sophistication of Body Concept Scale is a group-administered measure of articulation appropriate for use with the age group being studied, the decision to use this test was made for the sake of expedience. It is possible that the CGEFT, a test of restructuring ability, would have contributed to significant results. It is possible also that the Children's Embedded Figures Test (CEFT) would have been a superior alternative to the

Sophistication of Body Concept Scale, although individual administration would have been required.

Third, the reliabilities of the experimenter designed reading tests were considerably lower than what would have been acceptable for a standardized reading test. The Kuder-Richardson Formula 20, calculated for each of the reading tests, estimated a reliability of .6920 for the "Groundhog Test" and .6140 for the "Woodpecker Test". These reliabilities are low, but can be understood from a study of the item analyses for the tests. (See Table 4.)

On the "Groundhog Test", item #9 was more difficult when used with the non-disrupted story than when used with the disrupted story. Also, items #4, #5 and #6 were more discriminating with the disrupted story than with the non-disrupted story.

On the "Woodpecker Test", item #10 was more difficult when accompanying the non-disrupted story than when accompanying the disrupted one. Items #1, #3, #9 and #10 were more discriminating when used with the disrupted version.

One item on each of the reading tests appears to have been totally inappropriate. Had item #9 on the "Groundhog Test" and item #10 on the "Woodpecker Test" been discarded, it is possible, since results were in the direction hypothesized, that the interaction of psychological differentiation and use of syntactic and semantic cues might have been modified to a significant level.

Fourth, the difference in use of syntactic and semantic cues between field-independent and field-dependent subjects could possibly have been reduced due to the form of reading tests used. Field-independent subjects, found by Witkin to be more analytical (1974, p.59-80), better able to structure their experiences (1974, p.81-114) and to make superior use of such mediational processes as analyzing and structuring in cognitive tasks (1977, p.21) can be expected to be more "test wise", better able to recognize and utilize any cues apparent to them in the tests, and better able to use their inferential skills in "fitting the pieces back together again" in order to answer test items, than are field-dependent subjects. These restructuring skills would be especially helpful to FI subjects in answering the test items on the disrupted stories. The difference in use of syntactic and semantic cues that may have been experienced during the reading of the non-disrupted and disrupted stories may have been much less for field-independent subjects due to the form of testing used. Such a reduction is not expected for field-dependent subjects, who, lacking analytical and structuring abilities, make less use of test wise cues in information processing (Witkin et al., 1977). The difference between the field-dependent and field-independent groups in use of syntactic and semantic cues may have been camouflaged by the intervention of other factors when a written test was used.

PRESENTATION AND DISCUSSION OF RESULTS

Smith is highly critical of reading tests:

> ... tests are poor indicators of reading ability, partly because they are limited in what they measure, but largely because they are almost invariabily based on a total misunderstanding of what reading involves... The purpose of reading is not to score high on reading tests...(1973, p. 192-193).

It is possible that Smith's concern that reading tests are limited in what they measure is justified. Perhaps in using convenient group-administered paper-and-pencil reading tests, some validity was sacrificed for expedience in test administration. It could be that, had Miller's oral reading technique been used with the disrupted and non-disrupted "Groundhog" and "Woodpecker" stories, the desired results might have been achieved.

However, Smith's statement that tests are poor indicators of reading ability because they are invariably based on a total misunderstanding of what reading involves is not warranted in this research. Smith, himself, has emphasized that syntactic and semantic cues are vital to the reading process. In this study, syntactic and semantic cues were eliminated when the reading passages were disrupted. When the same reading tests were used with the non-disrupted and disrupted story versions, a very high F- ratio of 74.59 was obtained. While this finding supports Smith's theory that these cue systems are used extensively in reading, it also leads one to question his harsh criticism that reading tests are invariably based on a total misunderstanding of what reading involves.

PRESENTATION AND DISCUSSION OF RESULTS

While the question of difference in reading comprehension scores between FI and FD subjects was not a primary concern in this study, support was found for Pierre's conclusion regarding the superior comprehension ability of FI subjects (1975). In spite of the possible limitations of the measuring instruments, significant results were achieved when using the disruptive effect technique and the Sophistication of Body Concept Scale with grade four subjects instead of the Cloze Procedure and Thurstone's Closure Flexibility Text with grade seven subjects.

SUMMARY AND CONCLUSIONS

In this study the difference in the use of syntactic and semantic cues in reading between field-independent and field-dependent subjects was examined. It was hypothesized that field-independent subjects would show a greater difference between scores on disrupted and non-disrupted stories than would field-dependent subjects.

Smith's theory of reading was considered in terms of use of syntactic and semantic cues to bridge the gap between the graphic display and the meaning obtained - between the surface structure and the deep structure. Witkin's theory of psychological differentiation was outlined and the characteristics of field-independence and field-dependence were discussed.

In order to support the hypothesis, the work of Pierre in linking psychological differentiation and reading and the work of Miller in establishing the disruptive effect technique as a means of measuring use of syntactic and semantic cues were examined.

To test the hypothesis, the Sophistication of Body Concept Scale was used to define field-independent and field-dependent subjects. To measure reading comprehension, two reading passages were created by the researcher and syntactic and semantic cues in these passages were eliminated using Miller's disruptive effect technique. Two group-administered multiple choice reading tests - the "Groundhog Test" and

SUMMARY AND CONCLUSIONS

the "Woodpecker Test" - also designed by the researcher, were administered with the non-disrupted and disrupted story versions. Use of syntactic and semantic cues was measured as the difference in reading test scores on these disrupted and non-disrupted story versions.

The research sample consisted of 158 grade four pupils from five schools within the Greater Hull area. A repeated measures analysis of variance was used to analyze the data. The interaction of psychological differentiation and use of syntactic and semantic cues was in the direction hypothesized, but the research hypothesis was not supported at the .05 level of significance.

As a possible reason for non-significant results, inadequacies in measurement, rather than limitations in Witkin's theory of psychological differentiation or Smith's theory of reading, were suggested. Possible limitations in using the Sophistication of Body Concept Scale and the "Groundhog Test" and "Woodpecker Test" were specified. Before the possibility of interaction of these theories is totally rejected, it is suggested that the hypothesis be tested again using a measure of cognitive functioning to identify the field-dependent and field-independent subjects and the "Groundhog Test" and the "Woodpecker Test", each with only nine items, having discarded the item identified as inappropriate from each test. It is concluded, also, that the possible relationship of extent of psychological differentiation to "test wise" performance should be investigated.

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APPENDIX 1

CHARACTERISTICS REFLECTING LEVEL OF SOPHISTICATION OF FIGURE DRAWINGS IN SOPHISTICATION OF BODY CONCEPT SCALE

APPENDIX 1

A. Form level

1. Primitive features -

a. Circles or ovals for body and limbs
b. Triangular or rectangular body with limbs stuck on
c. Other forms lacking attempt at human shape (e.g., absence of waist, shoulders, etc.)
d. Limbs in form of sticks or ovals, shapeless, ending in pronglike or clawlike fingers; no shaping of hands; pronglike or clawlike toes
e. Contact point of limbs to trunk involving overlapping or transparent joining; limbs stuck on or detached (as opposed to integrated body parts)
f. Grossly unequally sized arms, legs, ears, fingers, etc., combined with primitive form, uncontrolled lines
g. Indiscriminately attached or misplaced body parts (e.g., arms attached at center of trunk)

2. Sophisticated features -

a. Definite, shaped body outline; head, neck, shoulders well integrated into body outline and lead into trunk and appendages
b. Attempt at humanlike shape, proportioning
c. Adequate profiling (e.g., trunk and legs facing in same direction, etc.)

B. Identity and sex differentiation

1. Primitive features -

a. Objectively interchangeable male and female figures
b. Difference between figures only in hair and/or hat treatment
c. Minimal inadequate trunk differentiation (i.e., triangle trunk for female, oval for male, but otherwise identical; or belt for male and buttons for female as only difference)

2. Sophisticated features - marked and adequate role assignment, expressed in clothing and/or shape (also expressed in hair, features, appropriate accessories, uniforms, etc.)

C. Level of detailing

1. Primitive features -

a. Body parts omitted (e.g., absence of neck, nose, ears, or eyebrows; fingers attached directly to arms with hands omitted)
b. No clothing indicated

C. Cont'd

c. Facial features expressed by dots or ovals
d. Inadequate or inconsistent clothing (e.g., buttons but no neckline, cuffs or hemline; hat, but not other clothing; toes shown in otherwise clothed figure; tie, but no neckline, etc.)

2. Sophisticated features -

a. Consistent, well-rationalized detailing; clothing; facial expression; shoes
b. Figure cast in role with good attempt at presentation of action
c. Figure cast in role with presentation of accessories consistent with this role (e.g., cowboy with smoking gun, etc.)

APPENDIX 2

SOPHISTICATION OF BODY CONCEPT RATING SCALE FOR FIGURE DRAWINGS

APPENDIX 2

1. Most sophisticated drawings: These manifest high form level (e.g., waistline, hips, shoulders, chest or breasts, shaped or clother limbs, etc.); appendages and details represented in proper relation to body outline, with some sophistication in mode of presentation; appropriate, even imaginative, detailing (e.g., successful profiling, as young girl in evening clothes, well-dressed man with cigarette, etc.).

2. Moderately sophisticated drawings: Drawings which show a definite attempt at role assignment (with regard to age, activity, occupation, etc.) through adequate detailing, shaping, clothing; with continuity of outline (i.e., integration of parts) attempted.

3. Drawings intermediate in level of sophistication: Drawings in which identification of sex is evident, attempts at shaping and a fair level of integration of parts are manifest and a minimum of detailing is present.

4. Moderately primitive drawings: Drawings which essentially still lack features of differentation through form, identity, or detailing; however, these drawings show slightly more complexity in some respect (e.g., presence of one body part that is unusual in most primitive drawings, such as the neck).

5. Most primitive and infantile drawings: These manifest a very low level of form (ovals, rectangles, sticks stuck on to each other); no evidence of role or sex identity (same treatment of male and female with, at most, difference in hair treatment, no facial expression, little shaping or clothing).

APPENDIX 3

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "WOODPECKER TEST"

APPENDIX 3

TABLE VIII

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "WOODPECKER TEST"

ITEM	STORY TYPE	FREQUENCY OF SELECTIONS A	B	C	D	E
1	A	2	20*	1	0	4
	B	1	25	0	2	0
	C	2	17	2	2	1
2	A	1	25*	0	1	0
	B	2	19	1	6	0
	C	3	15	0	2	4
3	A	3	12	16*	3	2
	B	10	7	10	0	1
	C	4	13	13	1	2
4	A	2	1	0	10*	6
	B	4	2	4	13	5
	C	3	3	1	11	5
5	A	8*	3	2	14	0
	B	11	0	0	17	0
	C	10	0	0	12	0
6	A	0	0	1	1	26*
	B	0	0	1	0	27
	C	0	0	3	1	18
7	A	2	2	0	20*	3
	B	0	2	1	24	1
	C	1	2	3	17	2
8	A	12	4	2*	5	4
	B	11	3	0	6	7
	C	7	6	1	4	4
9	A	2	8	0	8	9*
	B	1	7	1	11	8
	C	0	8	2	10	2
10	A	1	6	15*	1	3
	B	3	4	12	5	4
	C	3	0	10	3	5

* Indicates correct response

APPENDIX 4

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "GROUNDHOG TEST"

APPENDIX 4

TABLE IX

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "GROUNDHOG TEST" (N = 80)

ITEM	STORY TYPE	FREQUENCY OF SELECTIONS A	B	C	D	E
1	A	0	21*	3	5	0
	B	0	18	1	3	2
	C	0	19	1	6	1
2	A	0	4	23*	2	0
	B	4	0	17	0	3
	C	2	4	15	1	4
3	A	0	3	0	0	26*
	B	0	1	3	1	19
	C	3	1	2	2	19
4	A	1	1	0	9	18*
	B	1	4	0	4	15
	C	2	1	1	8	15
5	A	0	0	0	26*	2
	B	3	2	1	13	5
	C	1	4	1	15	6
6	A	0	13	3	1	11*
	B	0	10	0	3	11
	C	0	14	1	0	12
7	A	8*	18	0	1	0
	B	5	14	2	2	1
	C	13	11	1	2	0
8	A	9	6*	0	13	1
	B	3	7	0	13	1
	C	2	5	0	19	1
9	A	9	3	1	13*	3
	B	8	4	3	4	5
	C	9	2	2	9	5
10	A	5	12*	6	3	2
	B	2	6	3	9	4
	C	4	6	3	6	8

* Indicates correct response

APPENDIX 5

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "GARBAGE STRIKE TEST"

APPENDIX 5

TABLE X

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN FIRST TEST DRAFT ON "GARBAGE STRIKE TEST" (N = 80)

ITEM	STORY TYPE	FREQUENCY OF SELECTIONS A	B	C	D	E
1	A	5	0	2	15*	2
	B	8	1	5	12	1
	C	7	1	2	14	5
2	A	1	0	0	0	22*
	B	1	2	2	3	19
	C	2	1	0	3	22
3	A	3	19*	1	0	1
	B	1	21	0	2	3
	C	3	21	1	0	4
4	A	1	2	2	16*	3
	B	1	3	4	15	4
	C	1	3	3	19	3
5	A	14*	0	4	1	5
	B	11	3	6	0	6
	C	7	4	7	1	10
6	A	1	19*	0	2	0
	B	2	20	4	1	0
	C	1	22	2	2	1
7	A	3	1	12*	7	0
	B	6	1	13	6	1
	C	4	1	20	4	0
8	A	3	1	9	2	9*
	B	0	1	13	4	9
	C	2	1	14	1	10
9	A	11*	0	1	3	8
	B	18	1	2	4	2
	C	18	0	4	2	5
10	A	1	4	5*	1	11
	B	1	4	10	2	10
	C	1	2	10	0	16

* Indicates correct response

APPENDIX 6

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN SECOND DRAFT ON "GROUNDHOG TEST" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS

APPENDIX 6

TABLE XI

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN SECOND DRAFT OF "GROUNDHOG TEST" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS (N = 24)

ITEM	STORY VERSION	FREQUENCY OF RESPONSES GROUNDHOG					WOODPECKER				
		A	B	C	D	E	A	B	C	D	E
1	Non-disrupt.	1	9*	1	0	1	0	0	1	11*	0
	Disrupt.	0	7	1	1	2	3	1	1	7	0
2	Non-disrupt.	3	1	6*	0	2	1	8*	0	1	2
	Disrupt.	0	3	5	1	2	1	4	0	4	3
3	Non-disrupt.	2	1	1	0	8*	7"	3	0	1	1
	Disrupt.	0	0	0	0	10	5	1	3	2	1
4	Non-disrupt.	9*	0	0	0	3	1	0	1	8*	2
	Disrupt.	6	1	0	0	4	2	1	2	5	2
5	Non-disrupt.	0	0	11*	0	1	1	11*	0	0	0
	Disrupt.	1	0	6	1	3	4	5	2	0	1
6	Non-disrupt.	2	0	1	0	9*	0	0	0	0	12*
	Disrupt.	1	3	0	0	7	1	2	2	0	7
7	Non-disrupt.	1	0	8*	2	1	1	0	11*	0	0
	Disrupt.	2	1	6	2	0	1	0	9	1	1
8	Non-disrupt.	0	1	0	1	10*	3	1	0	7*	1
	Disurpt.	0	1	3	6	1	4	2	2	3	1
9	Non-disrupt.	1	1	3*	0	6	0	5	6*	0	1
	Disrupt.	4	0	3	0	4	1	5	3	2	1
10	Non-disrupt.	3	1*	1	1	6	0	3	1	1	6*
	Disrupt.	3	0	9	1	7	3	3	2	1	3

*Indicates correct response

APPENDIX 7

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN THIRD DRAFT OF "GROUNDHOG TEST" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS

APPENDIX 7

TABLE XII

FREQUENCY OF RESPONSES TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS IN THIRD DRAFT OF "GROUNDHOG TEST" AND "WOODPECKER TEST" ON NON-DISRUPTED AND DISRUPTED STORY VERSIONS (N = 20)

ITEM	STORY VERSION	FREQUENCY OF RESPONSES									
		GROUNDHOG					WOODPECKER				
		A	B	C	D	E	A	B	C	D	E
1	Non-disrupt.	1	7*	1	1	0	0	0	0	10*	0
	Disrupt.	2	7*	0	1	0	0	1	1	7	1
2	Non-disrupt.	0	0	7"	1	1	0	10*	0	0	0
	Disrupt.	0	0	6	1	3	3	4	0	2	1
3	Non-disrupt.	0	0	0	0	10*	6*	3	0	0	1
	Disrupt.	1	1	3	0	5	5	1	1	0	3
4	Non-disrupt.	0	1	0	0	9*	0	3	0	7*	0
	Disrupt.	0	1	0	1	8	3	1	0	4	2
5	Non-disrupt.	0	0	9*	0	1	0	10*	0	0	0
	Disrupt.	1	0	5	1	3	1	8	1	0	0
6	Non-disrupt.	9*	0	0	1	0	0	0	0	0	10*
	Disrupt.	8	1	0	0	1	0	2	1	1	6
7	Non-disrupt.	0	1	7*	2	0	0	0	10*	0	0
	Disrupt.	4	0	4	1	1	2	1	5	1	1
8	Non-disrupt.	6	0	3	1*	0	7*	0	2	1	0
	Disrupt.	7	1	0	1	1	7	1	1	1	0
9	Non-disrupt.	2	1	1	3*	3	0	2*	8	0	0
	Disrupt.	5	1	0	4	0	0	4	4	2	0
10	Non-disrupt.	1	3*	2	2	2	0	0	0	2	7*
	Disrupt.	1	1	1	1	6	1	3	1	0	5

* Indicates correct response

APPENDIX 8

FREQUENCY OF RESPONSES BY VALIDATION SAMPLE TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS ON "GROUNDHOG TEST" AND "WOODPECKER TEST" FOR HIGH GROUP AND LOW GROUP

APPENDIX 8

TABLE XIII

FREQUENCY OF RESPONSES BY VALIDATION SAMPLE TO DISTRACTORS AND CORRECT RESPONSES TO ITEMS ON "GROUNDHOG TEST" AND "WOODPECKER TEST" FOR HIGH GROUP (N = 30 AND LOW GROUP (N = 30)

ITEM	GROUP	FREQUENCY OF SELECTIONS GROUNDHOG					WOODPECKER				
		A	B	C	D	E	A	B	C	D	E
1	High	1	25*	1	0	3	0	2	2	25*	1
	Low	1	13	5	7	4	1	5	7	16	1
2	High	6	3	21*	0	1	1	27*	0	1	1
	Low	3	6	11	0	10	4	11	2	7	6
3	High	2	0	1	0	27*	17*	8	1	3	1
	Low	8	1	8	2	11	9	11	2	1	7
4	High	0	2	0	1	27*	1	1	0	27*	1
	Low	3	3	1	11	12	5	3	4	13	5
5	High	0	1	25*	1	3	1	29*	0	0	0
	Low	2	3	17	4	4	2	19	7	2	0
6	High	2	3	2	1	22*	0	0	0	0	30*
	Low	4	3	2	1	20	2	9	2	1	16
7	High	1	1	24*	3	1	2	0	27*	0	1
	Low	2	1	14	12	1	6	1	20	1	2
8	High	3	1	10	16*	0	3	3	0	21*	3
	Low	6	2	12	6	4	12	5	2	9	2
9	High	3	0	13*	3	11	1	10	15*	3	1
	Low	3	0	4	7	15	2	11	9	6	2
10	High	0	20*	4	1	5	2	1	2	3	22*
	Low	3	8	7	2	10	4	1	3	11	11

* Indicates correct response

APPENDIX 9

INSTRUCTION PAGE FROM
STUDENT'S TEST BOOKLET

APPENDIX 9

INSTRUCTION PAGE FROM STUDENT'S TEST BOOKLET

This is a test of a special kind of reading ability. It is a test to find out if you use more than the sounds of letters when you read.

First you will read one paragraph. Then you will do 10 "choose the right answer" questions about this paragraph. You will choose the one answer that you think is best by drawing a line under it.

Next you will read a second paragraph and do 10 "choose the right answer" questions about that paragraph. You will underline the one answer in each question that you think is best. In the second paragraph, you will find some words that you have never seen before. Do not worry about these strange words -- your friends have never seen them before either. They are just words that have been made up. Do your best to read them anyway.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 10

INSTRUCTIONS FOR ADMINISTRATION OF READING TESTS

APPENDIX 10

INSTRUCTIONS FOR ADMINISTRATION OF READING TESTS

Read the instruction sheet (front page) aloud to the children while they follow along.

After turning the instruction page please read the instructions at the top and bottom of the page aloud to the children. "Read the story. If you have time, you may read it over again. Do not turn the page until you are asked to do so."

Allow a maximum of 30 minutes for silent reading of the story. Then say, "When you turn the page you will have 10 "choose the right answer" questions to do on the paragraph you have just read. You will draw a line under the answer that you think is the best for each one. Choose only one answer for each question. You must choose the answer from memory. Do not look back in the story to find the answers. The questions take up two pages. When you finish number 5, just turn the page and do numbers 6-10 on the next page. When you have finished number 10 do not turn the page. Wait until I ask you to do so. Turn the page and do the 10 questions now."

Allow 10 minutes to answer the questions. Then say, "When you turn the page you will find another story. This is the story in which you will find words you have never seen before. Try to figure these nonsense words out as you read. Turn the page now.

APPENDIX 10

INSTRUCTIONS FOR ADMINISTRATION OF READING TESTS

Read the story. If you have time you may read it over again. But do not turn the page again until you are asked to do so."

Allow 3 minutes for silent reading.

Then say, "On the next two pages you will find 10 questions on the story you have just read. Underline the best answer. Do not look back in the story to find the answers. When you finish number 5 just turn the page and do numbers 6-10. When you have finished #10 please wait to be told what to do next. You may turn the page and begin now."

Allow 10 minutes.

APPENDIX 11

"GROUNDHOG STORIES"

APPENDIX 11

"GROUNDHOG STORIES" G-1

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

An old groundhog poked his nose out into the frosty air. His doorway seemed much larger now than when he entered it in November. His growling stomach reminded him that his last dinner had been three long months ago. The slim old groundhog crawled out into the snow-covered field. His two ears stiffened in the still crisp air. His twenty toes tingled as he looked around. Then the groundhog noticed it lying on the snow. His big black shadow lay right at his feet. The grounhog darted right back into his cozy little home. The hungry old fellow dozed as he thought about his short cold trip outdoors. Six weeks more sleep sounded like a great idea to him now. A tasty dinner would be awaiting him when he crawled out again.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 11

"GROUNDHOG STORIES" G-2

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

An old plurdips poked his nose out into the frosty air. His doorway clipping much larger now than when entered it in November. His growling yiphills reminded him that his last dinner had been three long months ago. The slim old groundhog delivering out into the snow-covered field. His two oog stiffened in the still crisp air. His twenty toes wiping as he looked around. Then the plurdips noticed it lying on the snow. His big black shadow spearing right at his feet. The plurdips darted right back into his cozy little home. The hungry old fellow heaping as he thought about his short cold trip outdoors. Six zill more sleep sounded like a great idea to him now. A tasty dinner would be quacked him when he crawled out again.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 11

"GROUNDHOG STORIES" G-3

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

An old groundhog going his nose out into the frosty air. His gliplogs seemed much larger now than when he entered it in November. His growling stomach consenting him that his last dinner had been three long months ago. The slim old plurdips crawled out into the snow-covered field. His two ears sifting in the still crips air. Hiw twenty gaig tingled as he looked around. Then the groundhog frowning it lying on the snow. His big black dibborps lay right at this feet. The groundhog planning right back into his cozy little home. The hungry old hacpids dozed as he thought about his short cold trip outdoors. Six weeks more sleep preventing like a good idea to him now. A tasty karrips would be awaiting him when he crawled out again.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 12

"WOODPECKER STORIES"

APPENDIX 12

"WOODPECKER STORIES W-1

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

A little woodpecker landed on a rotten tree. His sharp toes helped him climb up the tree by digging into the wood. His stiff pointed tail feathers propped him up. The woodpecker used his tough bill like a chisel to dig his food. The many grubs out of the tree tasted very delicious.

A young boy with crutches hopped along just outside the school door. The boy listened to the rat-a-tat-tat noise. His two eyes searched the nearby bush for a red-headed bird. Then the boy noticed it clinging to the rotten old tree. The red-headed bird was propping itself up with its tail as it worked. The boy wished that he had feet and a tail like the woodpecker. Then his left leg would not have broken.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 12

"WOODPECKER STORIES" W-2

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

A little dorzirblers landed on a rotten tree. His sharp toes slaving him to climb up the trunk by digging into the wood. His stiff pointed tail vipper propped him up. The woodpecker coming his tough bill like a chisel to dig his food. The many rowp out of the tree tasted very delicious.

A young boy with crutches slapping along just outside the school door. The cails listened to the rat-a-tat-tat noise. His two eyes squeaking the nearby bush for the rotten old tree. Then the cails noticed it clinging to the rotten old tree. The red-headed bird was fizzed itself up with its tail as it worked. The cails wished that he had feet and a tail like the woodpecker. Then his left leg would not have hiring.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 12

"WOODPECKER STORIES" W-3

READ THE STORY. IF YOU HAVE TIME YOU MAY READ IT OVER AGAIN.

A little woodpecker assigning on a rotten tree. His sharp bimp helped him to climb up the trunk by digging into the wood. His stiff pointed tail feathers fizzing him up. The dorzirblers used his tough bill like a chisel to dig his food. The many grubs out of the tree assigning very delicious.

A young cails with crutches hopped along just outside the school door. The boy drawing to the rat-a-tat-tat noise. His two wib searched the nearby bush for a red-headed bird. Then the boy arriving it clinging to the rotten old tree. The red-headed plarfs was propping itself up with its tail as it worked. The boy frowning that he had feet and a tail like the woodpecker. Then his left mips would not have broken.

DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 13

"GROUNDHOG TEST"

APPENDIX 13

"GROUNDHOG TEST"

DRAW A LINE UNDER THE BEST ANSWER.

1. The groundhog had crawled into his hole

   A. one month before this story happened
   B. three months before this story happened
   C. six months before this story happened
   D. six weeks before this story happened
   E. when the weather became warmer.

2. The doorway seemed larger now because

   A. it got smaller in the cold weather
   B. the groundhog had dug it so much bigger
   C. the groundhog had lost weight
   D. the snow made it slippery
   E. something had tried to get through the door.

3. During the winter months the groundhog like to

   A. crawl out into the snow
   B. eat regular meals
   C. get fresh air often
   D. get lots of exercise
   E. sleep

4. Which <u>one</u> did the groundhog <u>not</u> want to do?

   A. doze in his hole
   B. eat a tasty dinner
   C. get his toes and ears warmed up again
   D. go back to sleep
   E. stay outdoors

5. What did the groundhog see in the snow outside the groundhog hole?

   A. a growling dog
   B. another groundhog sleeping
   C. his shadow
   D. someone lying on the ground
   E. something good to eat.

PLEASE TURN THE PAGE AND DO QUESTIONS 6-10 NOW.

APPENDIX 13

"GROUNDHOG TEST"

6. We know the groundhog was hungry because

   A. he ate something he found in the snow
   B. he darted into his hole to eat his dinner
   C. he stamped his feet and growled
   D. he was eating snow
   E. his somtach was growling.

7. The groundhog rushed back into his hole because

   A. another animal chased him
   B. he found something good to eat
   C. he saw his shadow
   D. his feet and ears were cold
   E. the sun was not shining.

8. When the groundhog was outdoors his toes felt

   A. like darts
   B. like spears
   C. stiff
   D. tingly
   E. warm.

9. When the groundhog went outdoors the weather was

   A. cloudy
   B. raining
   C. sunny
   D. warm
   E. windy

10. The groundhog will find something to eat

   A. tommorrow
   B. in six weeks
   C. in three months
   D. in six months
   E. in November

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 14

"WOODPECKER TEST"

APPENDIX 14

"WOODPECKER TEST"

PLEASE UNDERLINE THE BEST ANSWER.

1. The woodpecker can hold on to a tree trunk because

   A. he has a red head
   B. he has a stiff beak
   C. he has large toes
   D. his toes dig into the wood
   E. the tree trunk is round and rough.

2. Woodpeckers like to eat

   A. bark
   B. grubs
   C. leaves
   D. rotten trees
   E. wood.

3. The woodpecker could hold onto the tree while he was eating because

   A. he balanced himself on his tail feathers
   B. he had a stiff bill like a chisel
   C. he stopped making the rat-a-tat-tat noise
   D. he was a tough old bird
   E. the trunk of the tree was rough.

4. Which <u>one</u> did the woodpecker <u>not</u> do?

   A. climb up the side of the tree trunk
   B. dig a hole in a tree with its tough pointed bill
   C. find something to eat
   D. search the nearby bush for a red-headed bird
   E. prop itself up with its tail feathers.

5. The woodpecker landed on the rotten tree because

   A. he was very tired
   B. he wanted to find food
   C. he wanted to make a rat-a-tat-tat noise
   D. he was looking for another bird
   E. he wanted to clean his feathers.

PLEASE TURN THE PAGE AND DO QUESTIONS 6-10 NOW.

APPENDIX 14

"WOODPECKER TEST"

6. The woodpecker thought his food tasted

   A. like wood
   B. not so bad
   C. rotten
   D. yucky
   E. yummy.

7. Where was the boy when he noticed the woodpecker?

   A. climbing a tree in the schoolyard
   B. lying in bed
   C. near the door of the school
   D. playing ball with his friends
   E. running across the schoolyard.

8. When the boy noticed the woodpecker it was

   A. near the school door
   B. on a tree branch
   C. on the ground
   D. on the side of a tree trunk
   E. underneath a bush.

9. From this story we can tell that

   A. the boy climbed trees carefully
   B. the boy had never seen a woodpecker before
   C. the boy knew a lot about woodpeckers
   D. the boy liked being on crutches
   E. the woodpecker wanted to show the boy how to climb

10. How did the boy break his leg?

   A. he fell into a hole that someone had dug
   B. he fell near the school door
   C. he was searching for grubs in the bush
   D. his foot slipped when he stepped on a chisel
   E. his foot slipped when he was climbing a tree.

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE ASKED TO DO SO!

APPENDIX 15

RAW SCORES AND T-SCORES ON NON-DISRUPTED AND DISRUPTED READING TESTS, AND SOPHISTICATION OF BODY CONCEPT SCALE SCORES FOR RESEARCH SAMPLE

APPENDIX 15

RAW SCORES AND T-SCORES ON NON-DISRUPTED AND DISRUPTED READING TESTS, AND SOPHISTICATION OF BODY CONCEPT SCALE SCORES FOR RESEARCH SAMPLE (N = 158)

SUBJECT	DISRUPTED STORY	READING TEST SCORES RAW SCORES Non-disr.	Disr.	T-SCORES Non-disr.	Disr.	SBCS SCORES TEAM 1	TEAM 2	TOTAL SCORE
1	Woodpecker	7	7	55.13	51.48	2	2	4
2	Woodpecker	2	3	33.79	32.77	3	3	6
3	Groundhog	9	6	60.84	50.86	2	2	4
4	Groundhog	5	4	42.13	42.33	2	3	5
5	Woodpecker	6	8	50.86	56.16	4	4	8
6	Woodpecker	6	4	50.86	37.45	3	3	6
7	Groundhog	9	5	60.84	46.60	3	3	6
8	Groundhog	9	3	60.84	38.06	2	2	4
9	Woodpecker	9	10	63.67	65.51	4	4	8
10	Woodpecker	9	7	63.67	56.16	2	2	4
11	Groundhog	10	3	65.51	38.06	5	4	9
12	Groundhog	9	6	60.84	50.86	3	3	6
13	Woodpecker	5	3	46.60	32.77	3	3	6
14	Woodpecker	7	6	55.13	46.80	2	2	4
15	Groundhog	8	4	56.16	42.33	3	2	5
16	Groundhog	8	9	56.16	63.67	4	3	7
17	Woodpecker	9	7	63.67	51.48	2	2	4
18	Woodpecker	9	5	63.67	42.13	3	3	6
19	Groundhog	9	6	60.84	50.86	4	4	8
20	Groundhog	9	6	60.84	50.86	2	2	4
21	Woodpecker	6	7	50.86	51.48	5	3	8
22	Woodpecker	8	9	59.40	60.84	2	2	4
23	Groundhog	5	2	42.13	33.70	5	4	9
24	Groundhog	9	9	60.84	63.67	5	4	9
25	Woodpecker	9	6	63.67	46.80	4	4	8
26	Woodpecker	3	6	38.06	46.80	4	3	7
27	Groundhog	9	6	60.84	50.86	4	4	8
28	Groundhog	8	8	56.16	59.40	2	3	5
29	Woodpecker	8	5	59.40	42.13	2	2	4
30	Woodpecker	9	4	63.67	37.45	2	2	4
31	Groundhog	3	1	32.77	29.53	4	3	7
32	Groundhog	3	2	32.77	33.79	3	2	5
33	Woodpecker	9	6	63.67	46.80	4	3	7
34	Woodpecker	7	6	55.13	46.80	1	1	2
35	Groundhog	8	6	56.16	50.86	3	3	6
36	Groundhog	8	6	56.16	50.86	4	3	7
37	Woodpecker	7	7	55.13	51.48	2	3	5
38	Woodpecker	7	6	55.13	46.80	3	3	6
39	Groundhog	8	5	57.16	46.60	3	3	6
40	Groundhog	9	3	60.84	38.06	2	3	5
41	Woodpecker	8	7	59.40	51.48	3	2	5
42	Woodpecker	7	5	55.13	42.13	3	3	6
43	Groundhog	9	8	60.84	59.40	5	4	9
44	Groundhog	8	3	56.16	38.06	4	3	7
45	Woodpecker	9	1	63.67	23.42	3	3	6
46	Woodpecker	7	4	55.13	37.45	4	3	7

APPENDIX 15

RAW SCORES AND T-SCORES ON NON-DISRUPTED AND DISRUPTED READING TESTS, AND SOPHISTICATION OF BODY CONCEPT SCALE SCORES FOR RESEARCH SAMPLE (N = 158)

SUBJECT	DISRUPTED STORY	READING TEST SCORES RAW SCORES Non-disr.	Disr.	T-SCORES Non-disr.	Disr.	SBCS SCORES TEAM 1	TEAM 2	TOTAL SCORE
47	Groundhog	10	6	65.51	50.86	3	3	6
48	Groundhog	5	5	52.13	46.60	2	2	4
49	Woodpecker	4	5	42.33	42.13	3	3	6
50	Woodpecker	6	4	50.86	37.45	2	2	4
51	Groundhog	9	3	60.84	38.06	4	3	7
52	Groundhog	3	3	32.77	38.06	4	3	7
53	Woodpecker	9	7	63.67	51.48	3	2	5
54	Woodpecker	7	6	55.13	46.80	4	4	8
55	Groundhog	9	5	60.84	46.60	4	4	8
56	Groundhog	5	4	42.13	42.33	5	4	9
57	Woodpecker	5	3	46.60	32.77	3	3	6
58	Woodpecker	6	5	50.86	42.13	3	3	6
59	Groundhog	9	5	60.84	46.60	5	4	9
60	Groundhog	9	8	60.84	59.40	2	3	5
61	Woodpecker	8	5	59.40	42.13	2	2	4
62	Woodpecker	9	7	63.67	41.48	1	1	2
63	Groundhog	7	5	51.48	46.60	3	3	6
64	Groundhog	9	4	60.48	42.33	3	2	5
65	Woodpecker	8	7	59.40	41.48	4	4	8
66	Woodpecker	5	3	46.60	32.77	5	4	9
67	Groundhog	4	4	37.45	42.33	4	3	7
68	Groundhog	8	4	56.16	42.33	4	3	7
69	Woodpecker	8	6	59.40	46.80	3	3	6
70	Woodpecker	10	9	67.93	60.84	2	3	5
71	Groundhog	9	4	60.84	42.33	4	3	7
72	Groundhog	8	5	46.16	46.60	5	4	9
73	Woodpecker	5	6	46.60	46.80	4	4	8
74	Woodpecker	7	4	55.13	37.43	4	3	7
75	Groundhog	8	3	56.16	38.06	2	2	4
76	Groundhog	7	9	51.48	63.67	4	3	7
77	Woodpecker	4	7	42.33	51.48	4	4	8
78	Woodpecker	7	5	55.13	42.13	4	3	7
79	Groundhog	8	3	56.16	38.06	1	1	2
80	Groundhog	7	5	51.48	46.60	4	4	8
81	Woodpecker	9	8	63.67	56.16	3	3	6
82	Woodpecker	9	8	63.67	56.16	3	3	6
83	Groundhog	10	8	65.51	59.40	3	3	6
84	Groundhog	9	4	60.84	42.33	3	2	5
85	Woodpecker	1	4	29.53	37.45	4	4	8
86	Woodpecker	9	8	63.67	56.16	4	3	7
87	Groundhog	8	4	56.16	42.33	4	3	7
88	Groundhog	7	5	51.48	46.60	3	2	5
89	Woodpecker	9	6	63.67	46.80	4	3	7
90	Woodpecker	8	7	59.40	51.48	3	3	6
91	Groundhog	7	3	51.48	38.06	4	3	7
92	Groundhog	10	7	65.51	55.13	3	3	6

APPENDIX 15

RAW SCORES AND T-SCORES ON NON-DISRUPTED AND DISRUPTED READING TESTS, AND SOPHISTICATION OF BODY CONCEPT SCALE SCORES FOR RESEARCH SAMPLE (N = 158)

SUBJECT	DISRUPTED STORY	READING TEST SCORES RAW SCORES Non-disr.	RAW SCORES Disr.	T-SCORES Non-disr.	T-SCORES Disr.	SBCS SCORES TEAM 1	SBCS SCORES TEAM 2	SBCS SCORES TOTAL SCORE
93	Woodpecker	5	9	46.60	60.84	4	3	7
94	Woodpecker	6	5	50.86	42.13	3	3	6
95	Groundhog	7	1	51.48	29.53	3	3	6
96	Groundhog	7	4	51.48	42.33	4	4	8
97	Woodpecker	6	7	50.86	41.38	5	5	10
98	Woodpecker	6	7	50.86	51.48	2	1	3
99	Groundhog	7	3	51.48	38.06	3	2	5
100	Groundhog	9	5	60.84	46.60	5	4	9
101	Woodpecker	3	1	38.06	23.42	4	4	8
102	Woodpecker	8	5	59.40	42.13	5	4	9
103	Groundhog	7	7	51.48	55.13	5	4	9
104	Groundhog	1	5	23.42	46.60	4	4	8
105	Woodpecker	6	5	50.86	42.13	4	4	8
106	Woodpecker	9	7	63.67	51.48	3	3	6
107	Groundhog	8	7	56.16	55.13	4	4	8
108	Groundhog	8	1	56.16	29.53	4	3	7
109	Woodpecker	8	9	59.40	60.84	4	3	7
110	Woodpecker	4	4	42.33	39.45	4	3	7
111	Groundhog	5	8	42.12	42.33	3	2	5
112	Groundhog	6	4	46.80	59.40	2	3	5
113	Woodpecker	4	2	42.33	28.09	4	4	8
114	Woodpecker	8	7	59.40	51.48	2	3	5
115	Groundhog	7	5	51.48	46.60	4	4	8
116	Groundhog	9	4	60.84	42.33	4	4	8
117	Woodpecker	7	8	55.13	56.16	3	3	6
118	Woodpecker	2	5	33.79	42.13	5	5	10
119	Groundhog	9	6	60.84	50.86	4	4	8
120	Groundhog	8	2	56.16	33.79	3	3	6
121	Woodpecker	6	7	50.86	51.48	3	3	6
122	Woodpecker	7	6	55.13	46.80	3	4	7
123	Groundhog	9	4	60.84	42.33	2	2	4
124	Groundhog	6	6	46.80	50.86	3	3	6
125	Woodpecker	9	7	63.67	51.48	3	3	6
126	Woodpecker	9	7	63.67	51.48	4	3	7
127	Groundhog	9	8	60.84	59.40	3	3	6
128	Groundhog	7	7	51.48	55.13	2	3	5
129	Woodpecker	9	7	63.67	51.48	3	3	6
130	Woodpecker	8	6	59.40	46.80	5	5	10
131	Groundhog	5	4	42.13	42.33	3	3	6
132	Groundhog	9	4	60.84	42.33	2	2	4
133	Woodpecker	9	10	63.67	65.51	3	2	5
134	Woodpecker	8	5	59.40	42.13	3	2	5
135	Groundhog	8	8	56.16	59.40	2	3	5
136	Groundhog	6	2	46.80	33.79	2	2	4
137	Woodpecker	8	1	59.40	23.42	2	1	3
138	Woodpecker	6	4	50.86	37.45	1	2	3

APPENDIX 15

RAW SCORES AND T-SCORES ON NON-DISRUPTED AND DISRUPTED READING TESTS, AND SOPHISTICATION OF BODY CONCEPT SCALE SCORES FOR RESEARCH SAMPLE (N = 158)

SUBJECT	DISRUPTED STORY	READING TEST SCORES RAW SCORES Non-disr.	Disr.	T-SCORES Non-disr.	Disr.	SBCS SCORES TEAM 1	TEAM 2	TOTAL SCORE
139	Groundhog	3	1	32.77	29.53	5	5	10
140	Groundhog	9	2	60.84	33.70	3	4	7
141	Woodpecker	4	7	42.33	51.49	3	4	7
142	Woodpecker	7	2	55.13	28.09	3	3	6
143	Groundhog	10	8	65.51	59.40	3	2	5
144	Groundhog	8	4	56.16	42.33	4	3	7
145	Woodpecker	9	4	63.67	37.45	4	4	8
146	Woodpecker	6	7	50.86	51.48	3	3	6
147	Groundhog	8	3	56.16	38.06	3	2	5
148	Groundhog	9	3	60.84	38.06	4	4	8
149	Woodpecker	9	9	63.67	60.84	3	2	5
150	Woodpecker	6	6	50.86	46.80	4	4	8
151	Groundhog	5	1	42.13	29.53	3	3	6
152	Groundhog	9	4	60.84	42.33	5	4	9
153	Woodpecker	8	5	59.40	42.13	4	3	7
154	Woodpecker	1	3	29.53	32.77	4	4	8
155	Groundhog	6	2	46.80	33.79	3	3	6
156	Groundhog	8	5	56.16	46.60	3	3	6
157	Woodpecker	7	7	55.13	51.58	4	5	9
158	Woodpecker	7	6	55.13	46.80	3	3	6

APPENDIX 16

T-SCORES OF FIELD-INDEPENDENT SUBJECTS FOR READING TESTS ON NON-DISRUPTED AND DISRUPTED STORIES

APPENDIX 16

T-SCORES OF FIELD-INDEPENDENT SUBJECTS FOR READING TESTS ON NON-DISRUPTED AND DISRUPTED STORIES (N = 47)

SUBJECT NUMBER	NON-DISRUPTED SCORE	DISRUPTED SCORE
1	55.13	51.48
3	60.84	50.86
4	42.13	42.33
8	60.84	38.06
10	63.67	56.16
14	55.13	46.80
15	56.16	42.33
17	63.67	51.48
20	60.84	50.86
22	59.40	60.84
28	56.16	59.40
29	59.40	42.13
30	63.67	39.45
32	32.77	33.79
34	55.13	46.80
37	55.13	51.48
40	60.84	38.06
41	59.40	51.48
48	42.13	46.60
50	50.86	37.45
53	63.67	51.48
60	60.84	59.40
61	59.40	42.13
62	63.67	51.48
64	60.84	42.33
70	67.93	60.84
75	56.16	38.06
79	56.16	38.06
84	60.84	42.33
88	51.48	46.60
98	50.86	51.48
99	51.48	38.06
111	42.12	42.33
112	46.80	59.40
114	59.40	51.48
123	60.84	42.33
128	51.48	55.13
132	60.84	42.33
133	63.67	65.51
134	59.40	42.13
135	56.16	59.40
136	46.80	33.79
137	59.40	23.42
138	50.86	37.45
143	65.51	59.40
147	56.16	38.06
149	63.67	60.84

APPENDIX 17

T-SCORES OF FIELD-DEPENDENT SUBJECTS FOR READING TESTS ON NON-DISRUPTED AND DISRUPTED STORIES

APPENDIX 16

T-SCORES OF FIELD-DEPENDENT SUBJECTS FOR READING TESTS ON NON-DISRUPTED AND DISRUPTED STORIES

(N = 72)

SUBJECT NUMBER	NON-DISRUPTED SCORE	DISRUPTED SCORE
5	50.86	56.16
9	63.67	65.51
11	65.51	38.06
16	56.16	63.67
19	60.84	50.86
21	50.86	51.48
23	42.13	33.79
24	60.84	63.67
25	63.67	46.80
26	38.06	46.80
27	60.84	50.86
31	32.77	29.53
33	63.67	46.80
36	56.16	50.86
43	60.84	59.40
44	56.16	38.06
46	55.13	37.45
51	60.84	38.06
52	32.77	38.06
54	55.13	46.80
55	60.84	46.60
56	42.13	42.33
59	60.84	46.60
65	59.40	51.48
66	46.60	32.77
67	37.45	42.33
68	56.16	42.33
71	60.84	42.33
72	56.16	46.60
73	46.60	46.80
74	55.13	37.43
76	51.48	63.67
77	42.33	51.48
78	55.13	42.13
80	51.48	46.60
85	29.53	37.45
86	63.67	56.16
87	56.16	42.33
89	63.67	46.80
91	51.48	38.06
93	46.60	60.84
96	51.48	42.33
97	50.86	51.48
100	60.84	46.60
101	38.06	23.42
102	59.40	42.13

APPENDIX 16

T-SCORES OF FIELD-DEPENDENT SUBJECTS FOR READING TESTS ON NON-DISRUPTED AND DISRUPTED STORIES

(N = 72)

SUBJECT NUMBER	NON-DISRUPTED SCORE	DISRUPTED SCORE
103	51.48	55.13
104	23.42	46.60
105	50.86	42.13
107	56.16	55.13
108	56.16	29.53
109	59.40	60.84
110	42.33	37.45
113	42.33	28.09
115	51.48	46.60
116	60.84	42.33
118	33.79	42.13
119	60.84	50.86
122	55.13	46.80
126	63.67	51.48
130	59.40	46.80
139	32.77	29.53
140	60.84	33.79
141	42.33	51.49
144	56.16	42.33
145	63.67	37.45
148	60.84	38.06
150	50.86	46.80
152	60.84	42.33
153	59.40	42.13
154	29.53	32.77
157	55.13	51.48

ABSTRACT OF
Psychological Differentiation and Use
of Syntactic and Semantic Cues
in Reading Comprehension

An attempt was made to relate Smith's psycholinguistic theory of reading and Witkin's theory of psychological differentiation to determine if the use of syntactic and semantic cues in reading is related to one's extent of field-dependence. It was hypothesized that FI subjects would make more use of syntactic and semantic cues than would FD subjects.

The Sophistication of Body Concept Scale and experimenter designed paper-and-pencil adaptions of Miller's disruptive effect technique, composed of a "Woodpecker Test" and a "Groundhog Test", were used to measure the interaction of the two variables.

The scores of 158 grade four subjects were used to determine the reliability of the reading tests. The scores of 119 subjects identified as FI (N = 47) and FD (N = 72) were analyzed by a repeated measures analysis of variance. Differences were found to be in the direction hypothesized, but statistically non-significant at the .05 level. Significant differences were noted, however, in reading scores between the FI and FD groups and between scores on non-disrupted and disrupted reading material.

The failure to reject the null hypothesis was attributed to limitations in the measuring devices used and suggestions were made for replication.