AN INVESTIGATION OF READING AND
CONCEPTUAL TEMPO MEASURES

by

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ABSTRACT

This study gathered empirical data concerning the requirements of tasks utilized to measure reading in relation to the requirements of tasks utilized to measure conceptual tempo. The administration of the Matching Familiar Figures Test (MFFT) indicates either a reflective or an impulsive conceptual tempo. In order to investigate the possible relationship between conceptual tempo and reading, all subjects, impulsives and reflectives, were presented with reading tasks that approximated the MFFT in problem solving demands, and with reading demands that did not, i.e. some tasks with similar distractors and some with dissimilar distractors. The influence of the difficulty of the material was also investigated. The study employed both word recognition and comprehension tasks.

One hundred and sixty-eight grade two students in New Westminster, British Columbia were administered the MFFT and the eight reading tasks. Second language learners and special education students were not included in the data analysis. The sample was identified as having middle socio-economic status by teachers and principals.

The data were analyzed in a one-way MANOVA with conceptual tempo constituting the single independent variable. Impulsives and reflectives were compared across all the reading tasks in order to identify significant differences between the two groups. An alternate analysis of the data, a 2x2x2 MANOVA with repeated measures, was also performed. The dependent variables were comprehension and word recognition.

The multivariate analysis of variance for conceptual tempo was found to be significant $F(8/88)=2.976$, $p=.005$. In the word recognition tasks, when the distractors were similar, an effect of conceptual tempo is apparent, $F(1)=5.384$, $p=.021$, $F(1)=5.997$, $p=.016$. When the distractors

were dissimilar, no effect of conceptual tempo is apparent, $F(1)=2.523$, $p=.111$, $F(1)=.001$, $p=.930$. In the comprehension tasks, impulsives made more errors on both the similar and dissimilar tasks. Overall, the impulsives made more errors than the reflectives in reading tasks having similar distractors and impulsives made as many as or more errors than reflectives in reading tasks having dissimilar distractors. The results of the 2x2x2 MANOVA were similar to the one-way MANOVA.

Thesis Supervisor

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CHAPTER I: THE PROBLEM

Educators, in their commitment to improve the learning environments of students, have frequently utilized the findings of related disciplines in co-ordinated research efforts. Some of the most productive insights frequently arise from the "interplay and friction between the differences of disparate disciplines." The interest of many researchers in cognitive styles reflects just such a tendency. The term itself may be described as "a term that refers to stable individual differences in mode of perceptual organization and conceptual organization of the external environment" (Kagan, Moss & Sigel, 1963, p. 24). The "individual difference" of interest to this research paper is the tendency of certain children to act impulsively or reflectively when attempting to solve problems in which a degree of high response uncertainty exists. This particular psychological dimension is called conceptual tempo.

A number of investigations of conceptual tempo have been reported in the literature and variables of educational concern have been identified, namely, reading readiness factors, visual perception, and personality attributes. Of major interest to this researcher are the investigations into the correlations between the measurement of reading and conceptual tempo. These empirical studies argue that there is indeed a significant relationship between reading ability and conceptual tempo (Kagan, 1965a, 1965b). Broadly stated, the literature suggests that impulsive students will have difficulty with reading while reflective students will not.

In light of the fact that the implications of these generalizations could influence classroom teaching practice, it may be necessary to carefully analyze the nature of the tests that form the basis of these

inferences. The first of these tests is the Matching Familiar Figures Test, (Note 1), the most widely used measure of conceptual tempo. The test requires the subject to respond to a forced-choice task by choosing from among six similar figures, one matching the stimulus figure. The tests used to measure reading often have requirements that approximate the task requirements of the MFFT. For example, in the Durrell (1965) Test of Visual Discrimination, the subject is asked to select the correct word (according to specified criteria) from among similar distractors. In this test the teacher holds up a word on a flashcard for three seconds and the child is directed to draw a circle around the same word on his paper. To illustrate, given the word last, the student selects an answer from slot, last, lost, lot, blast, or again, given the word secure the choices are sure, obscure, scare, secure, second, server, cure. Similarly, in the Gates MacGinitie Reading Test (1978), the students are presented with a picture and four words. They are to underline the word that describes the picture. When presented with a picture of four children singing, subjects must choose from the words, sign, sin, sing, sink. Given a picture of a baseball bat, they must choose from the words, bet, bait, bat, bit. Given a picture of a car tire, they must choose from the words, tear, tore, tire, tour.

The main difference between reading tasks of this sort and the tests for conceptual tempo lies in the fact that the former focus on words while the latter direct the subject to differentiate among line drawings. When the reading task characteristics closely approximate the task characteristics of the test for conceptual tempo there is a strong possibility that correlations between the results of the two tests are primarily due to their structural similarity.

The foregoing is the central concern of this study, namely, that the

task demands (or demand characteristics of the tasks) oftentimes determine the manner in which the child will respond to that task. That is to say, the demand characteristics of some reading tasks could influence the reader to respond in an impulsive rather than a reflective manner. If this is so, then inferences about relationships between conceptual tempo and reading ability need to be re-examined.

Statement of the Problem

Current research literature suggests that reading is influenced by personal inclination towards reflective or impulsive behavior. Yet, most empirical studies of conceptual tempo and reading do not demonstrate a distinction between task-specific responses and non-task-specific responses. They have generally failed to take into account the possibility that significant relationships could have arisen from the similarity of task requirements of the tests rather than from any real relationship between the tests. The present study proposes to examine the task requirements used to measure conceptual tempo in relation to those used in the measurement of selected reading tasks. It asks, can the relationship between conceptual tempo and reading in part be explained by characteristics of the reading measurements used rather than by the cognitive aspects of the reading act per se?

Conceptual tempo is measured by forced choice problems with high response uncertainty, such as in the MFFT (Appendix A). Subjects are required to choose the standard from among six similar figures, e.g., houses, giraffes, cowboys. The standard is provided on one page and the matching figure, along with five similar distractors, is presented on a page next to the standard. Some reading tests utilize problems of similar design to measure reading. When the task characteristics of the reading test approximate the task characteristics of the MFFT, there are likely to

be more errors in both tests for subjects who respond impulsively (quickly but with low accuracy), and fewer errors in both tests for subjects who respond reflectively (slowly but with high accuracy). Thus, in order to investigate the possible relationship between conceptual tempo and reading it is necessary to present all subjects (impulsive and reflective) with two kinds of reading tasks, some that approximate the MFFT in problem-solving demands, and some that do not, i.e., some with similar distractors and others with dissimilar distractors.

Another variable discussed in the literature on conceptual tempo and reading is the difficulty of the reading material. Subjects tend to exhibit more impulsive behavior (i.e., quick response and high errors) as the material reaches the frustration level of readability. When, however, the material is at the subject's independent level, 99% word recognition, 90% comprehension (Betts, 1946), there is greater likelihood of reflective responses (slow response, low errors). This study plans to investigate the role of readability in reading tasks and the impulsive-reflective dimension, but since the central focus is on measurement, readability (or easy and hard vocabulary) will be studied under conditions of high response uncertainty utilizing both similar and dissimilar distractors.

Studies of reading ability, like standardized reading tests, are usually in two parts, a word recognition section and a comprehension section. Kagan (1965a, 1965b), using standardized instruments, tested children's reading and drew conclusions about conceptual tempo and reading based on these tests. In order, then, to investigate the subjects' responses to task specific tests of reading and conceptual tempo, this study employs both word recognition and comprehension tests.

In summary, the following variables will enter into this study, 1) word recognition and comprehension reading tasks, 2) easy and hard

vocabulary of reading tasks, 3) similar and dissimilar distractors in the reading task, and 4) conceptual tempo.

Objectives of the Study

The major objectives of this study are to answer the following questions:

1. In easy vocabulary word recognition tasks, will reflectives respond differently than impulsives when the reading task is similar in task requirements to the test for conceptual tempo?
2. In easy vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
3. In hard vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
4. In hard vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
5. In easy vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
6. In easy vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
7. In hard vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
8. In hard vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is not similar in

task requirements to the test for conceptual tempo?

Hypotheses

The following hypotheses will be tested:

1. In an easy vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores.
2. In an easy vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
3. In a hard vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores.
4. In a hard vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
5. In an easy vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores.
6. In an easy vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
7. In a hard vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores.
8. In a hard vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.

Definitions of Terms Used

For this study, these terms were defined as follows:

1. Comprehension is an ability measured by the accuracy of response to the

correct word among three alternatives replacing every fourth or fifth word in a passage of approximately 165 words.

2. Conceptual tempo is a psychological construct that describes an individual's tendency to react impulsively or reflectively in problem situations where a high degree of response uncertainty exists.
3. Dissimilar distractors are defined as those words that greatly differ in grapho-phonemic features from the stimulus word.
4. Easy vocabulary is defined as grade two reading level.
5. Hard vocabulary is defined as grade four reading level.
6. Impulsive is defined as responding to a problem situation of high response uncertainty with fast response time and high errors.
7. Reflective is defined as responding to a problem situation of high response uncertainty with slow response time and low errors.
8. Similar distractors are defined as those words closely approximating the stimulus word in grapho-phonemic features.
9. Word recognition is an ability measured by the accuracy of response to tasks that require the selection of a dictated word from among four choices.

Pilot Study

Two pilot studies were carried out in suburban areas of Vancouver to identify any unexpected points of difficulty in administering the tests and to establish such factors as approximate length of time for each test, willingness of students to complete the tests, and the most appropriate method of recording measures for scoring. One further purpose was to establish the suitability of the comprehension passages for the sample. A complete discussion of the pilot study and its findings is included in chapter three.

Significance of the Study

There is a considerable body of literature devoted to the relationship between conceptual tempo and school performance, in particular, reading difficulties, learning disabilities, and failure. As well, certain "clinical syndromes" have been shown to be related to impulsivity-reflectivity, e.g., hyperactivity and mental retardation (Messer, 1976). Since much of the research on conceptual tempo is based upon the studies of Kagan, Moss & Sigel (1963) and Kagan, Rosman, Day, Albert, & Phillips (1964), it is reasonable to conclude that these early studies influenced the form and focus of later investigations. The following, from a study by Kagan (1966) of conceptual tempo and visual matching, is an example of a point of view that has been influential in the design of remedial reading programs:

The brain-damaged child, as well as the reading retarded child, is more prone to be impulsive than reflective and his inferior intellectual performances are more often the result of impulsivity than inadequate verbal or knowledge resources. Therapeutic regimes for these children should consider the potential value of training reflection as a specific conceptual habit, independent of the specific substantive content of the material to be mastered. (p. 24)

If the present study confirms the supposition put forward in the Statement of the Problem section, then implications for the teaching of beginning reading will be different from those expressed by Kagan. Impulsives, as identified by the MFFT, may not necessarily react in an impulsive and hence non-productive manner to all reading tasks. It may very well be the case that the impulsive child has difficulty only with those reading tasks that approximate the cognitive requirements of the test for conceptual tempo. If this is the case, a remedial program for a child with an impulsive disposition should take into account the cognitive demands of the task to be mastered and be structured accordingly.

It is possible that the implications for reading instruction drawn by Kagan are based on a concept of reading that is different from that of this research paper. A brief explanation of current theories of reading may be useful in understanding the conceptual grounds of this study. Gough's theory (cited in Lapp & Flood, 1978) approaches reading from a "bottom-up" point of view. Reading proceeds letter-by-letter to word formation and phonemic representations. Guessing strategies are not adopted in order to facilitate comprehension. Gough's theory is in contrast to that proposed by Goodman and by Smith (cited in Lapp & Flood, 1978). For the latter, reading is a "top-down" process and is viewed in the light of psycholinguistic as well as psychological and philosophical contributions. Reading is a complex skill requiring more than letter or word identification. Briefly, fluent reading is being able to make reasonable predictions from the information acquired through mediated (an indirect way of reducing uncertainty) identification.

Learning to read and fluent reading require two criteria (Smith, 1971): 1) that children be willing to "make mistakes" and 2) that they have a tolerant teacher who is willing to accept the mistakes. In this manner, children can test their personal rules of reading in much the same way that very young children test their rules of language.

Rumelhart's interactive theory (cited in Lapp & Flood, 1978) provides for both "top-down" and "bottom-up" processing. "The theory predicts that a reader begins with graphic input to guide the extraction of meaning. The reader can assume features and proceed with meaning first and then move to verification of feature and word patterns" (Lapp & Flood, 1978, p. 289).

A concern of this present study is the outcome of the interactive process between reader and materials. According to Kagan's line of thought, a diagnosis of an impulsive disposition may influence a teacher to

thwart mistake making, a 'bottom-up" point of view. According to Smith's model of reading acquisition, a program of negative sanctions on mistake-making can create reading problems rather than reduce them, a "top-down" point of view. It may very well be that the tendency to react impulsively to problem situations with response uncertainty is linked specifically to tasks that replicate the cognitive demands of the MFFT, an "interactive" point of view. The results of the problem being investigated in this study will, it is hoped, lead to more flexible ways of working with "impulsive" children.

CHAPTER II: REVIEW OF THE LITERATURE

The review of the literature is organized around two main areas of interest. It reviews literature relevant to this study in:

1. Theory and research related to conceptual tempo.
2. Theory and research related to the nature of the task in the measurement of reading and conceptual tempo.

Theory and Research Related to Conceptual Tempo

One cannot fully discuss the emergence of conceptual tempo as a dimension of cognitive style without first examining:

- a. egocentric and stimulus centered orientations,
- b. field dependence and field independence dispositions, and
- c. cognitive controls.

Two basic orientations and three conceptual classes developed during investigations of analytic attitudes (Kagan et al., 1963). This study, focusing on analyzing adult responses to stimulus arrays, revealed that orientations were either egocentric or stimulus centered. Further, it indicated that the conceptual categories of these orientations were analytic-descriptive, rational, and inferential-categorical. Briefly described, egocentric orientation responses relate to the subject's personal reactions, while stimulus centered responses are those based purely on external stimuli. To test for the three conceptual categories, Kagan et al. (1963) presented subjects with an array of pictures of people performing different actions. Subjects were then asked to classify the pictures into groups according to whatever criteria they wanted. A subject falling into the analytic-descriptive category would group under specific sub-elements and might choose, for example, only those people wearing hats.

The second type, in the relational-contextual category, might only look for relationships among the stimuli and choose, for example, the stages in the life of a person. A subject falling into the inferential-categorical category would group members of major occupations and might choose, for example, only medical people. The emergence in the research of a preference for different ways of categorizing in adults (and further research with children as well) is related in some degree to studies of field dependence and field independence (Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954).

The results of a series of research experiments using the Rod and Frame and the Embedded Figures tests (Witkin, Dyk, Paterson, Goodenough & Karp, 1962) indicated that the cognitive styles of field dependent and field independent play an important part in personal adaptation to the environment. The field independent person is able to separate an object from its surrounding field and has an analytic point of view. The field dependent person is more global in his view of the world yet may have difficulty separating an object from its surrounding field.

The dimension of field independence is closely related to one of six postulated types of cognitive control. Gardner (1953) and Gardner, Holzman, Klein & Spence (1959) were concerned with descriptive analysis of preferential methods of organizing experience. These strategies have been termed perceptual attitudes or styles of cognitive control.

Egocentric and stimulus centered orientations, field dependent and field independent dispositions, and cognitive controls, three approaches to the examination and identification of cognitive style, were all influential in directing the focus of the studies that resulted in the emergence of conceptual tempo as a dimension of cognitive style. The investigations of Kagan et al. (1963) into analytic style were designed primarily to identify

behavioral correlates. Twenty-one children, matched on I.Q. and social class, were observed. Analysis of their behavior in nursery school and later in the classroom was the basis for ascribing behavioral correlates to analytic and nonanalytic personality types. This research into cognitive styles led to the realization that "an analytic style is associated with a reflective attitude, a tendency to differentiate experience, the ability to resist the effects of distracting stimuli on on-going behavior. The non-analytic child tends to be impulsive, more reactive to external stimuli and less likely to differentiate complex stimulus conditions" (Kagan et al., 1963, p. 101). Here then is the beginning of a series of studies influenced by the early work in cognitive styles and progressing towards the refinement and description of the dimension of reflection-impulsivity.

Kagan et al. (1963, 1964) worked on a number of instruments to measure analytic attitudes. The first one, the Conceptual Style Test (CST) consisted of 30 cards having three drawings of familiar figures. The subject was required to select two of the drawings that "were alike or went together in some way" (Kagan et al., 1963). Results indicated that an analytic response was associated with a reflective approach to conceptual tasks while a non-analytic response was associated with an impulsive approach to conceptual tasks.

Two other instruments designed to measure the dimensions of reflection-impulsivity were the Hidden Figures Test (HFT) and the Design Recall Test (DRT) (Kagan et al., 1964). In the HFT the subject is requested to locate a familiar figure that has been blended into a patterned background. In the DRT the subject is presented a geometric design for 15 seconds only and then asked to identify the design from among variants in the standard. Findings from these exploratory studies

suggested that an antecedent of analytic thinking is the tendency to delay the reporting of a solution in order to secure the correct response. Response time and number of errors were thus identified as the important factors in defining the reflection-impulsivity dimension.

However, performance on these measurements, CST, DRT, and HFT, was found to be moderately related to I.Q. as measured by the California Test of Mental Maturity. Thus, although these measurements provided information as to the nature of the reflection-impulsivity dimension, they were not accurate identifiers of individual inclinations. In an attempt to reduce the relationship between the measure of reflection-impulsivity and intelligence, the Matching Familiar Figures Test (MFFT) was designed. This test used familiar figures (trees, houses, dresses, etc.) rather than geometric designs and allowed the subject to view the standard for comparison with the alternatives. In these ways (familiar figures, viewing of standard along with alternatives), possible memory difficulties would be reduced. Using 120 third graders, Kagan et al. (1964) investigated the CST, the DRT, and the MFFT with a test for I.Q. and found that of the three, the Matching Familiar Figures Test had the lowest correlation with intelligence. Thus the MFFT emerged as the best measure of the reflection-impulsivity dimension from the series of tests developed by Kagan.

Kagan's (1964) studies of the MFFT demonstrated a reliability coefficient of .52 for girls and .48 for boys in a test-retest situation over one year. A second study discussed in that paper yielded a reliability coefficient of .62 for both boys and girls retested after a one year period.

Validity measures indicate that reflectives and impulsives tend to remain reflective or impulsive in test situations that contain response uncertainty (Denny, 1973; Kagan et al., 1964; Kagan et al., 1966; Mann,

1973; Yando & Kagan, 1970). The key point to be emphasized is that the construct of reflection-impulsivity is borne out in response uncertainty situations, if the subjects are interested in the task (Mann, 1973) and if the task is not too easy (Denny, 1973).

The MFFT is scored on two variables. The variables of response latency and number of errors are recorded. A median score is then established for each variable. Those subjects above the median on errors and below the median on response latency are designated Impulsive. Those subjects below the median on errors and above the median on response latency are called Reflective.

Theory and Research Related to Measurement of Reading and Conceptual Tempo

Kagan (1965a) investigated reflection-impulsivity and the reading performance of primary grade children. One hundred and thirty first and second graders were administered the MFFT and a series of reading subtests. In the word recognition test, the subject was asked to choose one word read aloud by the experimenter from among a row of five words. A sample question from the test is,

Words Read by E

Moon

The

Words on Card

noon moon boom soon mean

toe eat tie the tea

(Kagan, 1965a, p. 615)

Kagan found that in this test the reflective child made fewer errors than the impulsive child. Another word recognition test resembling the previous one but administered six months later, yielded similar results. In these studies, there was a high correlation between reflection-impulsivity and reading scores.

One year later, the same subjects were administered four paragraphs to read aloud. Every error or omission was recorded by the examiner. Error

types were classified as impulsive or reflective. One of the impulsive error types was termed partial identity substitution, i.e., "S. substitutes a word that has partial graphemic similarity to the original, usually similarity in the first letter or first or last syllable (e.g., 'nose' for 'noise,' 'truck' for 'trunk,' 'upon' for 'upward')" (Kagan, 1965a, pp. 620-621). There was a positive relation between the MFFT errors in grade 1 and partial-identity substitution reading errors in the second grade (average $r = .39$, $p < .01$ for boys; average $r = .34$, $p < .01$ for girls). Kagan writes in his paper that the empirical data "implicate the role of impulsivity in reading ability. It is suggested that diagnostic evaluation of children with reading problems include an assessment of this dimension" (Kagan, 1965a, p. 627). Kagan further adds, "It is also likely that the training of reflection in kindergarten reading-readiness programs will be of value" (Kagan, 1965a, p. 627).

Since the publication of Kagan's research, there have been many studies of conceptual tempo and reading in young children. Some of these studies have maintained the same point of view as Kagan but others have not. One example of the former type is found in the work of Roberts (1979). She tested seven year olds on the MFFT and the Salford Sentence Reading Test. Reading age, time to first response, and number of errors were intercorrelated. Kagan's (1965) findings were confirmed in that there was a tendency for reading ability to be associated negatively with the making of mistakes and positively with the taking of time. Roberts suggests that as impulsivity appears to be negatively related to reading success, teachers should be alerted to this aspect of behavior. Yet, in the report of this study, Roberts fails to identify the type of errors that were recorded and thus raises doubts as to the conclusions of her quantitative analysis of reading behavior.

In an investigation into convergent and divergent validity of conceptual tempo, Hall and Russell (1974) developed an instrument, the Word Recognition Test (WRT), patterned after a test developed by Kagan. Hall and Russell hypothesized that high error scores on the MFFT predicted high word-error scores on the WRT. In their study, they created 20 test items having one of four types of stimuli: a) words in which the initial phonemes were similar, e.g., shone, shore; b) words in which the final phonemes were identical, e.g., bang, rang; c) multi-syllable words with same final phoneme, e.g., quagmire, quartile; and d) multi-syllable words with the same final phoneme, e.g., reflective, additive. The relationship between errors and latency was not significant so the researchers suggest that the words were not enough alike to produce sufficient response uncertainty. It is possible, though, that the data obtained from the error scores of all four different types of items erased any possibility of significant response differences between the two conceptual tempo groups. These studies of conceptual tempo and the measurement of word recognition ability provide strong evidence for the need to carefully examine the reading task in all studies investigating the relationships between reflection-impulsivity and reading.

A number of researchers have reported the results of the Kagan study in articles that summarize research studies. Blanton and Bullock (1973) discuss cognitive style and reading behavior and conclude that a high degree of relationship exists between reflection-impulsivity and reading achievement. Davey (1976) discusses research in this area and concludes that conceptual tempo is linked to several aspects of reading behavior. Farr (1969), in discussing the predictive validity of personality tests for forecasting reading improvement, states, "Kagan (1965) found that measures of reflection-impulsivity gathered in the first grade were predictive of

reading improvement one year later. In general, children classified as impulsive in the first grade had the highest reading error scores at the end of the second year" (Farr, 1969, p. 192).

Yet, other studies of conceptual tempo and reading provide different points of view. Oral reading errors of reflective and impulsive children have been examined by a number of researchers. Hood and Kendall (1974) looked at oral reading errors among second grade impulsives and reflectives. Oral reading errors were noted as the subjects read both an easy and a difficult story. The difference between reflective and impulsive mean scores was not statistically significant, although results indicated that there were

(a) more reflective than impulsive subjects with low error scores but insignificant differences in mean number of errors, (b) proportionately more graphically similar errors for reflectives than for impulsive subjects but no significant differences in any other category, (c) more corrections by reflective subjects overall and within the categories of graphically dissimilar errors and errors appropriate to the preceding but not the following context, and (d) no significant differences between reflective and impulsive subjects in number of repetitions, rate of reading, nor in comprehension scores. (p. 269).

So, when graphically similar errors and graphically dissimilar errors were noted by the examiner, the results differed from those of Kagan (1965a, 1965b).

The Goodman Taxonomy of Miscues, often referred to as the Reading Miscue Inventory (Goodman, 1969), has been used to analyze oral reading errors generated by grade four (Waltz, 1977) and grade two (Butler, 1972) impulsive and reflective children. In the Butler (1972) study 15 impulsives and 15 reflectives were subjected to a psycholinguistic analysis of their oral reading behavior. His results are similar to those of Hood and Kendall's (1975) investigation of oral reading errors in that his reflective boys corrected proportionately more errors and made more

repetitions than impulsive boys. However, contrary to Kagan's research there was no significant difference between groups in mean number of errors. Instead, Butler notes that a wide variation was observed from individual to individual within each group on each of the dependent variables.

Waltz's (1977) results were not conclusive either. Her results only approached significance at the .05 level on the following two hypotheses: a disposition towards reflection-impulsivity does not affect oral reading miscues and a disposition towards reflection-impulsivity does not affect reading comprehension. In her study, contrary to Hood and Kendall (1975) and Butler (1977), there was little difference between mean scores of the two groups in the areas of graphic similarity, sound similarity, grammatical similarity, grammatical function, correction and grammatical acceptance. Strong differences between impulsives and reflectives in mean error scores (15 or more points) showed up in the areas of semantic acceptability, meaning change, comprehending, and grammatical relationship pattern. Waltz argues that response uncertainty is more of a factor in the area of comprehension than it is in the areas of graphic, phonemic and grammatical skills.

Denny (1974), Margolis (1976), and Margolis, Peterson and Leonard (1978) reported no significant correlations between MFFT latency and error scores and reading test scores. Eighty children from second to fifth grade were the subjects of Denny's (1974) study of the relationship between conceptual tempo and reading. The results of three reading tests were analyzed. These were the Gilmore Oral Reading Test, four subtests of the Peabody Picture Vocabulary Test, and the McKillop Reading Diagnostic Test. Denny found no significant correlations between MFFT latency scores and reading measures. MFFT error scores correlated significantly with

accuracy, comprehension, and rate on the Gilmore for the total sample but not for separate samples of older and younger children. Eleven other correlations between reading and conceptual tempo measures failed to attain significance. Denny concluded that conceptual tempo data failed to distinguish between good and poor readers and he questions the importance of this dimension to reading ability.

In an investigation of reading readiness and conceptual tempo, Margolis (1976) failed to find a significant difference between impulsive and reflective kindergarteners on the Metropolitan Readiness Test. Margolis suggested the following as accounting for his results:

In many instances on the Metropolitan, the child is not actually faced with a situation in which he must seriously consider several alternatives. Success on five of the six subtests depends primarily upon recalling previously acquired knowledge, distinguishing among familiar material, or copying increasingly more complex configurations without having to make a choice among other configurations. Possession of the requisite knowledge on four of the six subtests often eliminates the need seriously to consider the other response alternatives. In essence, many Metropolitan subtests and items do not provide the child with a response uncertainty situation in which he must actively consider several alternatives. (p. 187)

In a study of conceptual tempo as a predictor of first-grade reading achievement, Margolis, Peterson, and Leonard (1978) applied t-tests to their data and failed to find significance at the .05 level between the scores of impulsive and reflective children on the Vocabulary or Comprehension subtest of the Gates MacGinitie Reading Tests, Primary Form A. The implication derived from the research of Denny and Margolis is that impulsives as well as reflectives can be either good or poor readers.

However, Margolis and Brannigan (1978) examined identical predictor scores for impulsive and reflective kindergarten children to see if the scores were indicative of reading readiness and first grade reading achievement scores. Their findings strongly suggest that conceptual tempo

should be considered a dimension for classifying and examining children when predicting performance. The results of this study are in obvious contrast to the two previous studies in which the senior author was involved (Margolis, 1976; Margolis, Peterson & Leonard, 1978). In addition to providing an opposing point of view to other investigations in this research area, Margolis and Brannigan's report of their study only partially agrees with another study of reading readiness and conceptual tempo (Shapiro, 1976).

In an investigation of reading readiness test performance and conceptual tempo, Shapiro (1976) administered the MFFT and the Gates MacGinitie Readiness Skills Test to 67 first grade boys. Although reflectives scored significantly better on six of the eight subtests, Shapiro does not argue that conceptual tempo is an indicator of a reading readiness problem.

On the subtest of Auditory Discrimination, in which there were only two alternatives presented to a standard, and on the subtest of Auditory Blending, which apparently contained little response uncertainty, there were no significant differences in performance. However on subtests which presented at least three alternative solutions, the reflective subjects had significantly superior scores. These findings indicate that when a high degree of response uncertainty exists, it is the nature of the presentation of the tasks which influences performance by impulsive subjects and not the tasks themselves. (p. 86)

Shapiro cautions teachers to be sensitive to the nature of the presentation of the tasks and to make sure that supposed deficiencies in readiness skills are evaluated by tests that examine many different cognitive processes. He further adds that incorrect diagnoses of reading problems could be caused by the similarity of the items on the Gates MacGinitie Readiness Skills Test to tasks presented in reading readiness and beginning reading materials.

It appears from the research presented above that two opposing points

of view have emerged: one, that reading behavior is predictable from measures of impulsivity-reflectivity, and two, that reading behavior is independent of conceptual tempo. It is highly probable that these differing points of view are due to the fact that tasks that require different cognitive processes are being equated. Tasks measuring achievement which utilize similar distractors are not being differentiated from tasks that measure responses to dissimilar distractors. Thus a problem has arisen because researchers have failed to recognize the importance of identifying the nature of the task involved in the reading measures. This problem was recognized by Tuinman and Kendall (1979) in their synthesis of the research on conceptual tempo and the measurement of reading. They suggest that there are dangers in generalizing from available research to classroom practice (Blanton & Bullock, 1973; Sawyer, 1974; Davey, 1976), because of the inaccuracies in the measurement of the reading task. Tuinman and Kendall recommend an investigation of the measurement of conceptual tempo and the measurement of reading that would take into account a variety of types of reading tasks, i.e., independent and frustration reading levels and types of distractors.

A review of the literature of distractor types and reading difficulty levels indicates the prominence of these variables in the investigation of the cognitive processes of certain reading tasks and the measurement of conceptual tempo.

Erickson and Otto (1973) administered the MFFT to 80 kindergarten children. These subjects were then taught a list of either similar (mate, meat, tame, team) or dissimilar (bond, cage, jump, list) words. Impulsive children performed on this word recognition task in much the same way that they performed on the MFFT. In a high response uncertainty task with similar distractors reflective boys and girls had more correct word

identification responses than impulsive boys and girls, $p < .05$. Hartly (1976), in a study of first, third, and fifth graders' perceptual salience, concluded that perceptual features of the stimulus can markedly influence impulsives' performance. Another investigation into the importance of graphic similarity among distractors was conducted by Biemiller (1970). He concluded that graphic information was more significant than contextual clues for students who are learning to read.

The second variable, vocabulary level, consists of easy or hard vocabulary (high or low readability). Egeland (1974) investigated the training of impulsive children in the use of more efficient scanning techniques and noted that on easy problems children used a reflective approach but when children perceived the task as too difficult, they resorted to an impulsive response mode. Thus he suggests that children respond impulsively only when the task appears difficult. For an investigation of conceptual tempo and oral reading errors, Waltz (1977) presented grade four boys with a story at the fifth grade difficulty level. A grade level higher than the subjects' grade level was chosen in order to ensure some degree of response uncertainty. Hood and Kendall (1975) were also interested in making sure that there would be response uncertainty. They asked grade two students to read passages at a low grade two readability level and a high grade three readability level.

A review of the literature of conceptual tempo and reading would not be complete without including studies of problem-solving strategy in reflective and impulsive children. It is important to include these studies as they provide information necessary to understand the results of the research conducted in this dissertation.

The report of a three year study of problem-solving strategy in reflective and impulsive children (McKinney, Haskin, & Moore, 1977)

suggests that reflection-impulsivity is related to task-oriented and social behavior in the classroom. This investigation led to the proposal that future research ought to examine the manner in which children process task information and those factors that account for competent strategy. For, if reflectives are simply more competent problem solvers than impulsives, then they may be better able to adapt their approach to the different requirements of different tasks. These theories are based on the data obtained from four separate tasks which had been selected to enable the researchers to analyze the hypothesis-testing strategies in sequential problem solving.

The possibility that reflective children have a tendency for detailed analysis whereas impulsive children process information more globally has been investigated by Zelniker (1975) and Zelniker, Bentler and Renan (1977). On the basis of the results of children tested on new MFFT-type problems it was proposed that reflective children analyze spatial information in small "chunks" while impulsive children analyze such information in large "chunks" and take less time to do so. Thus, although response latency is an important and stable indicator of conceptual tempo, accuracy varies according to the degree of compatibility between the subject's strategy of analysis and task requirements. Their research suggests that response latencies are related to the strategy of information processing, i.e., the extent to which children tend to analyze stimuli into component details, while accuracy scores are related to the type of task and stimuli employed.

Summary

The intent of the first section of this chapter was to present a broad historical outline of the development of conceptual tempo as a component of cognitive style. Studies of the Hidden Figures Test, the Design Recall

Test, and the Conceptual Styles Test provided preliminary information about the psychological dimension of impulsivity-reflectivity, and revealed that the two most important factors in measuring this dimension were the tendency to delay a conceptual decision and the number of incorrect solutions offered by the subject. This information provided the basis for the development of the Matching Familiar Figures Test (Kagan, et al. 1964). This test has been accepted in the literature as the most widely used indicator of the tendency to act in an impulsive or reflective manner in situations that elicit alternative solutions. The MFFT has been used to investigate the role of conceptual tempo in many areas of study, e.g. humour, mother-child interactions, hyperactive children; but the one of major interest to this study is reading behavior. There exists in the literature the suggestion that reading is linked to conceptual tempo, a finding that is discussed in the second part of the present chapter.

In contrast to the historical approach of the first section of this chapter, the intent of the second section was to provide support for the way in which the research problem presented in this dissertation has been structured. Differing points of view toward reading and conceptual tempo were isolated. Briefly, they are: those that support the idea that there is a relationship between conceptual tempo and reading and those that partially or completely disagree with this idea.

Kagan, the author and leading proponent of the MFFT, represents the first point of view, namely, that conceptual tempo is a predictor of reading success (Kagan et al., 1963; Kagan, 1965a). An investigation by Roberts (1979) further supports this idea. In addition, Kagan's view has been disseminated through summary articles on research in reading which have quoted his findings (Blanton & Bullock, 1973; Farr, 1969). Eventually, teachers of reading were being advised to be cognizant of the

effects of conceptual tempo on reading behavior (Davey, 1979; Sawyer, 1974).

The other point of view toward the relationship between conceptual tempo and reading is represented by studies by Butler (1972), Hood and Kendall (1974), and Waltz (1977). Although their studies indicated that oral reading error analysis reported a difference between impulsives' and reflectives' responses to the reading task, there was reason to question the results. Further, Margolis (1976) Margolis, Peterson and Leonard (1978), and Shapiro (1976) investigated kindergarten children and reflection-impulsivity as a predictor of first grade reading achievement but could not find sufficient evidence to warrant any strong conclusions. But, these researchers noted that similarity of task items might function to inflate error scores for impulsives. Denny (1974) reported no significant correlations between MFFT latency and error scores and reading test scores.

The review of the literature has presented abstracts of findings that range from conclusive reports to nonsignificant results. It is highly probable that these differing points of view resulted from the fact that different types of reading tasks were being equated. It may well be that tasks that approximated the cognitive requirements of the MFFT were being equated with tasks that did not approximate these demands.

In order to provide a basis for the design of the present study, this chapter has also reported on the literature which has to do with studies of variables of grapho-phonemic similarity (Biemiller, 1970; Erickson and Otto, 1973; Hartley, 1976) and difficulty of reading materials (Egeland, 1974; Hood & Kendall, 1975; Waltz, 1977). The literature has suggested that these variables can influence subjects' responses to test questions and thus ought to be carefully examined. The suggestions from all these

research studies have been instrumental in the decision to include easy-to-read and hard-to-read materials, similar and dissimilar distractors, and word recognition and comprehension tasks as the variables in this study.

CHAPTER III: DESCRIPTION OF THE STUDY

Pilot Study

MacGinitie (1975-76), in his analysis of research literature points out the importance of investigating the cognitive operations that children perform in learning to read. He suggests that it is necessary to analyze current instructional materials, to assess the range of cognitive demands, to locate the most frequently required operations, and to compare the demands of different materials. These suggestions were seriously followed in the design of this study's reading tasks. The factors that were manipulated in the construction of the tasks were: readability levels, similarity of distractors, word recognition, type of task, comprehension tasks, and similarity in form to "current instructional material." By fulfilling these conditions, it was possible to "compare the demands of different materials." The first step involved the administration of reading tasks, the second step was to give the MFFT, and the last stage was to investigate the impulsivity-reflectivity dimension in relation to the scores on the reading exercises.

Pilot Samples

Pilot Sample 1. In April 1980, a pilot study was carried out in Burnaby, British Columbia. Thirty-three grade three students (boys and girls) were administered all eight reading tasks and were individually tested on the MFFT. Analysis of the error scores indicated that the tasks were too easy for the sample. This led to a pilot study being conducted with grade two students.

Pilot Sample II. The second pilot investigation was carried out in Richmond, British Columbia. The subjects were two intact classes of grade

two boys and girls. The principal and the two classroom teachers described these groups as middle-socio-economic status. In addition the teachers identified six students as second language learners or as learning-disabled. These six were not included in the data analysis. Thus, 38 students were administered all the reading tasks and the MFFT but only 32 students remained in the study.

The Reading Tasks

Each task (Appendix B) seeks unique information about student response to the reading process. The reading tasks are:

1. Easy vocabulary similar distractors word recognition task.
2. Easy vocabulary dissimilar distractors word recognition task.
3. Hard vocabulary similar distractors word recognition task.
4. Hard vocabulary dissimilar distractors word recognition task.
5. Easy vocabulary similar distractors comprehension task.
6. Easy vocabulary dissimilar distractors comprehension task.
7. Hard vocabulary similar distractors comprehension task.
8. Hard vocabulary dissimilar distractors comprehension task.

Half of these eight reading tasks were devised to approximate the problem solving conditions of the MFFT. Thus, four of the tasks had similar distractors while four had dissimilar distractors. Those tasks with similar distractors presented a problem with several possible alternatives, each alternative having similar grapho-phonemic characteristics to the standard. The purpose of the pilot study was to investigate instruments and procedures to measure reflective and impulsive children's responses to reading task demands that approximated the demands of the MFFT and to reading task demands that did not approximate the demands of the MFFT. The eight reading tasks described below are included in Appendix B.

Word Recognition Tasks

All the words in the four word recognition tasks were chosen from A Canadian Word List (Strothers et al., 1950). The task was to identify the key word among four choices. The key word was read aloud and the student had two seconds to respond by circling the word. Each task had 16 rows of four words. Four of the key words were nouns, four were verbs, four were modifiers, four were function words. Table 1 presents a summary of the four word recognition passages.

Table 1

Description of Word Recognition Passages

Number of Task	Source of Word List	Test Items	Grade Level	Type of Distractor
1	A Canadian Word List	16	2	similar
2	A Canadian Word List	16	2	dissimilar
3	A Canadian Word List	16	4	similar
4	A Canadian Word List	16	4	dissimilar

1. Easy vocabulary similar distractor word recognition task. All words were at the grade two level of difficulty. All four words in each row were grapho-phonemically similar having the same initial consonant plus other letters of similar configuration and, where possible, the same letters.
2. Easy vocabulary dissimilar distractors word recognition task. All words were at the grade two level of difficulty. All four words in each row were grapho-phonemically dissimilar having different initial consonants and dissimilar configurations.
3. Hard vocabulary similar distractor word recognition task. All words were at the grade four level of difficulty. All four words in each row were grapho-phonemically similar having the same initial consonant plus other letters of similar configurations and, where possible, the same letters.
4. Hard vocabulary dissimilar distractor word recognition task. All words were at the grade four level of difficulty. All four words in each row were grapho-phonemically dissimilar having different initial consonants and dissimilar configurations.

Comprehension Tasks

The comprehension tasks were modelled after Guthrie's (1973) maze technique. Briefly described, this is a comprehension task based on a running passage of approximately 170 words, in which every fourth or fifth word is replaced with three choices. One of the choices is the correct answer; another is syntactically acceptable, but semantically inappropriate; the third choice is both syntactically and semantically inappropriate. In a report of a study of seven maze passages and the Gates-MacGinitie Reading Test, Guthrie established the validity of this procedure with correlations of .85 for vocabulary and .82 for

comprehension. The reliabilities for the seven passages ranged from .90 to .93. In the present study, Guthrie's maze procedure was replicated using content from Canadian basals. Table 2 presents a summary of the four comprehension passages.

The grade two (easy vocabulary) passages were from Out and Away (Thorn, 1970). The grade four (hard vocabulary) passages were from Flying Free (Thorn, 1966). Each passage was approximately 165 words long and had 28 replacements, seven each of noun, verb, modifier, and function word. Among the two distractors one was of the same syntactic category as the standard or correct word, e.g., noun replacing noun or verb replacing verb, and the other was chosen from a different syntactic category, e.g., noun replacing verb. All the distractors were chosen from A Canadian Word List (Stothers et al., 1950).

The Gage reading series, The Language Experience Program, was chosen because it is a Canadian series and thus the vocabulary and syntax would be within the reader's background (McConnell, 1978). The 1966 publication date of this series would make it highly unlikely that the students would be familiar with the passages.

Table 2-
Description of Comprehension Passages

No. of Task	Text	No. of Words	Test Items	Spache Readability	Type of Distractor
5 (Alexander)	Out and Away	158	28	1.76	similar
6 (Lucky Pennies)	Out and Away	173	28	1.41	dissimilar
7 (The Kite and the Wind)	Flying Free	166	28	4.08	similar
8 (Peabody Property)	Flying Free	177	28	4.07	dissimilar

5. Easy vocabulary similar distractors comprehension task. Application of the Spache (1968) readability test showed this passage to be at the grade 1.8 level of difficulty. The distractors were chosen from grade two or earlier words. The distractors were grapho-phonemically similar to the correct word. All three words (key word and two distractors) had the same initial consonant plus other identical and/or similar letter configurations.
6. Easy vocabulary dissimilar distractors comprehension task. Application of the Spache (1968) readability test showed this passage to be at the grade 1.4 level of difficulty. The distractors were chosen from grade two or earlier words. The distractors were grapho-phonemically dissimilar to the correct word. All three words (key word plus two distractors) had different initial consonants and dissimilar configurations.
7. Hard vocabulary similar distractors comprehension task. Application of the Spache (1968) readability test showed this passage to be at the grade 4.1 level of difficulty. The distractors were chosen from grade three or four words. The distractors were grapho-phonemically similar to the correct word. All three words (key word plus two distractors) had the same initial consonant plus other identical and/or similar letter configurations.
8. Hard vocabulary dissimilar distractors comprehension task. Application of the Spache (1968) readability test showed this passage to be at the grade 4.1 level of difficulty. The distractors were chosen from grade three or four words. The distractors were grapho-phonemically dissimilar to the correct word. All three words (key word plus two distractors) had different initial consonants and dissimilar configurations.

The Matching Familiar Figures Test

The MFFT (Appendix A) is the instrument most often used to measure conceptual tempo, the predisposition to act in an impulsive or reflective manner when solving a problem with high response uncertainty. "Tasks used to measure reflection-impulsivity generally present the subject with several highly plausible alternatives, only one of which is correct. Thus experimental subjects (usually children) who respond quickly often err (impulsives), whereas those who pause to reflect on response alternatives are more often correct (reflectives)" (Messer, 1976).

The test format involves simultaneous presentation of a figure and six facsimilies, five of which are different in one or more details. There are 12 items in the test and two samples. The subject is asked to select from the alternatives the one that exactly matches the standard. Two variables are recorded: response latency to the first choice and number of errors made before exact identification.

Order of Presentation of Reading Tasks

Each student was presented with an eight-page booklet of the reading tasks. On each page was a different task. The first two were word recognition tasks, followed by two comprehension, followed by two word recognition, and ending with two comprehension.

General pedagogical theory supports the notion that interest in work will be enhanced if the introductory tasks are easy to complete. With this in mind, all initial sessions started with tasks one and two, the easy vocabulary word recognition exercise. As Table 3 illustrates, the first two tasks in each session were word recognition and the order of these tasks over the two sessions was always #1, #2, #3, and #4.

The comprehension tasks were organized so that one quarter of the sample took tasks ordered #5, #6, #7, and #8 over the two sessions, one

quarter of the sample took tasks ordered #6, #7, #8, and #5 over the two sessions, one quarter of the sample took tasks ordered #7, #8, #5, and #6 over the two sessions, and one quarter of the sample took tasks ordered #8, #5, #6, and #7 over the two sessions.

Table 3

Order of Reading Tasks (four possibilities)

Session One				Session Two			
order of presentation				order of presentation			
I	II	III	IV	I	II	III	IV
1	2	5	6	3	4	7	8
1	2	6	7	3	4	8	5
1	2	7	8	3	4	5	6
1	2	8	5	3	4	6	7

Procedure of the Pilot Study

All testing took place in the classrooms during regular school hours. The eight reading tasks were administered by the examiner-investigator to the whole class over two testing sessions. The sessions were at 9:00 o'clock in the morning and were one week apart. Each session consisted of four reading tasks, two word recognition, and two comprehension and took approximately 30 minutes.

At the beginning of the testing session, the examiner-investigator explained, "I am interested in learning about grade two reading ability and would like your assistance in finding out what kind of things are easy for grade twos and what kind of things are hard for grade twos. And so, some of the tasks will be easy and some will be hard but please do your best on all of them and don't worry if some are difficult."

After this preamble, tasks 1 and 2 were administered. To begin, the students were presented two sample rows on the blackboard. They were:

1. boy girl cat tree
2. love load lost lone

Then the examiner-investigator instructed the students to circle the word that she called out, e.g., row 2, "cat" row 2, "lost". In this manner the student was taught to respond to the examiner's oral dictation by circling one word in each row. During the actual testing situation the examiner-investigator called out the key word, paused for two seconds and then continued on to the next row. For example, the examiner-investigator said "Row 1, 'saw' (two second pause), row 2, 'boy' (two second pause), row 3, 'house' (two second pause)", and so on for all 16 rows. After task number one was completed, the examiner-investigator led the students through task number two.

The next two pages in the booklet were the comprehension passages.

The students were first given a sample of the type of problem they would encounter and then they were instructed to proceed and complete the next two pages of comprehension passages. The example used to teach the students was:

	time		lap
"Once upon a	go	there was a little old	look."
	minute		lady

The students were directed to read the passage and circle the word that made sense from among the three choices.

The subjects completed four reading tasks at each session, two word recognition and two comprehension. Each session took approximately 30 minutes. The teachers were not in their classrooms during that time.

The MFFT was administered individually by the examiner-investigator. There was a screen set up between the examination table and the rest of the class. The examiner-investigator and the subject sat side by side at a table in the classroom. The subject was shown a standard line drawing and was asked to choose an identical one to the standard from among six similar line drawings. Two examples of the procedure were given to the subject. The actual testing did not begin until the subject had demonstrated understanding of the procedure. The subject was then presented with a series of 12 figures, one by one, and was asked to choose an identical one to the standard from among six similar drawings. The examiner-investigator recorded the length of response to the subject's first choice and the number of responses until the identical drawing was identified, i.e., if the child's first choice was incorrect, he was asked to choose again and again, until he identified the exact duplication.

Scoring of Pilot Study

The variables of response latency and number of errors on the MFFT were recorded. A median score was established for each variable. Kagan (1964) indicated that those subjects above the median on error scores and below the median on response latency can be designated impulsive. Those subjects below the median on error scores and above the median on response latency can be designated reflective.

Error scores on all eight reading tasks were calculated. Table 4 presents the error scores and means from the pilot study.

Table 4

Pilot Study
Error Scores and Mean Error Scores

	Word Recognition Tasks				Comprehension Tasks			
Reflectives	1	2	3	4	5	6	7	8
1.	0	0	0	0	0	1	1	3
2.	0	0	0	0	0	1	3	5
3.	2	0	7	1	3	1	8	9
4.	6	0	11	6	9	16	7	10
5.	0	0	2	0	2	1	0	8
6.	1	0	0	0	0	2	0	2
7.	0	0	3	0	1	1	2	4
8.	0	0	4	0	3	3	6	10
	1.25	0	3.37	.875	2.25	3.25	3.37	6.37
<u>Impulsives</u>								
1.	0	0	1	0	6	3	3	11
2.	9	0	5	0	5	2	12	12
3.	0	0	4	0	0	9	1	9
4.	6	0	8	0	4	3	6	6
5.	2	1	8	0	2	1	4	7
6.	0	0	4	0	2	0	5	6
7.	.3	0	5	1	1	0	7	6
8.	7	0	10	5	13	12	10	13
	3.37	0	5.625	.75	4.25	3.75	6	8.75

Analysis and Interpretation of Data from Pilot Study

Error and latency scores on the MFFT were noted. The latency scores ranged from 56 seconds to 296 seconds. The median score was 121 seconds. The error scores ranged from 16 errors to 37 errors. The median score was 22. Subjects above the median on response time and below the median on errors were called reflective. Subjects below the median on response time but above the median on errors were called impulsive. The median split on the negatively correlated measures defines a 2 x 2 matrix in which reflectives and impulsives fall in the two diagonal cells. According to the established criteria no consideration is given to the fast-accurate or slow-inaccurate cells. From the results of the testing, eight students were classified as reflectives and eight were classified as impulsives.

Table 4 notes the number of errors each of these 16 subjects made in the eight reading tasks and the means of each group.

A study of the error means leads to the suggestion that impulsives make more errors than reflectives in some but not all reading tasks. A comparison of task one shows the impulsives making three times as many errors as the reflectives. This is a similar distractor task. Yet, task two does not indicate any differences between impulsives and reflectives. Task two is a dissimilar distractor task. Both task one and task two are easy readability tasks. The differences in error means indicate that it is necessary to look at the type of task being presented to the reader. A study of the error means of tasks three and four, tasks five and six, and tasks seven and eight further supports the value of pursuing this line of research. Note that error scores on similar distractors tend to double for impulsives while there is little difference between impulsives and reflectives on error scores on dissimilar distractors tasks.

Objectives of the Study

The major objectives of this study are to answer the following questions:

1. In easy vocabulary word recognition tasks, will reflectives respond differently than impulsives when the reading task is similar in task requirements to the test for conceptual tempo?
2. In easy vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
3. In hard vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
4. In hard vocabulary word recognition tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
5. In easy vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
6. In easy vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?
7. In hard vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is similar in task requirements to the test for conceptual tempo?
8. In hard vocabulary comprehension tasks, will reflectives respond differently than impulsives, when the reading task is not similar in task requirements to the test for conceptual tempo?

Selection of Subjects

In selecting subjects for the study, three major criteria were established. One, only grade two students would participate. Two, second language learners and special education students would not be included in the data analysis. Three, the students would be identified as middle socio-economic status by the teachers and principals.

The sample was chosen from the grade two population of New Westminster, British Columbia. One hundred and sixty-eight students from ten classrooms participated in the study. Arrangements to conduct the study were made with the assistance of the Elementary Consultant for the New Westminster School Board.

Procedure

The procedure was identical to that described in the pilot study except for two changes. The first change involved arranging to administer the MFFT outside the classroom so as to ensure a quiet non-distracting test condition. The second change involved organizing the two visits to each classroom so that they would take place within a two or three day period. This was done in order to maintain enthusiasm for the test situation.

The Reading Tasks

All students in the ten grade two classrooms completed the eight reading tasks described in the pilot study during two one-half hour sessions. All the reading testing took place in the morning, before recess. The examiner-investigator began the first session by instructing the students how to complete the word recognition tasks. Test booklets were then distributed, the children were directed to write their name on the back of their booklet, and the two word recognition tasks were administered.

The examiner-investigator next instructed the students how to complete

the comprehension tasks. The students were then directed to complete the two following comprehension tasks. The same set of examples as used in the pilot study was presented to the students for both the word recognition and the comprehension tasks.

The second session proceeded as the first, except that in this second meeting, the examiner-investigator did not need to pre-teach the tasks. Instead, the booklets were distributed according to the names on the backs and the two word recognition tasks were administered right away. Next, the students were directed to complete the two remaining comprehension tasks. The order of the tasks in the booklets was identical to that described in the second pilot study.

The examiner-investigator remained in the classroom during the reading tests. The classroom teachers all complied with a request to leave during this time.

The Matching Familiar Figures Test

The Matching Familiar Figures Test was administered to each subject by the examiner-investigator. The testing took place in an empty room, or in the hall. The procedure of this test followed that described in the second pilot study.

The MFFT was administered after the group reading tests. The order of the subjects was either random, determined by the teacher according to a seating plan, or alphabetical. All the testing for conceptual tempo occurred in the morning, before or after recess, but never during recess or any special activity, e.g., art, physical education, French, music.

The children appeared to enjoy this test as they came to the test situation with enthusiasm and voiced disappointment when they realized that they had completed the task.

Hypotheses

The following hypotheses will be tested:

1. In an easy vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores.
2. In an easy vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
3. In a hard vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores.
4. In a hard vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
5. In an easy vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores.
6. In an easy vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.
7. In a hard vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores.
8. In a hard vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores.

Analysis of Data

Three techniques were used for the statistical analysis of the data. The first, a 2-way multi-variate analysis of variance, MANOVA, was conducted with sex and conceptual tempo as independent variables. The

resulting inequality of the group sizes was instrumental in the decision to ignore sex as a factor. A one-way MANOVA, with conceptual tempo as the independent variable, was then performed. The dependent variables were the eight reading tasks.

An alternate statistical analysis was executed. The data were analyzed by means of a 2x2x2 (conceptual tempo x readability x distractor type) multivariate analysis of variance with repeated measures on the last two factors. The dependent variables were comprehension and word recognition.

Summary

Chapter three begins with a description of the pilot study and a discussion of the instruments and procedures used in both the pilot and final investigations. It includes a description of the procedures followed, together with an analysis and discussion of the findings of the pilot testing. The objectives of the study are restated followed by a description of the subjects used in the final investigation. A description of the tests and procedures used to carry out the experimental study is next presented. A restatement of the hypotheses and a discussion of the analysis of the data conclude the chapter.

CHAPTER IV: RESULTS AND DISCUSSION

Analysis of the data

This chapter presents descriptive data and the results of the statistical analyses of the data relevant to the eight hypotheses tested in this investigation.

One hundred and sixty-six grade two students were administered the Matching Familiar Figures Test (MFFT). The variables recorded were the response latency to the initial selection of each item and the number of errors made on each item. A median score was established for each variable and the subjects were grouped according to the procedure proposed by Kagan (1965). Those subjects whose scores were above the median on error scores and below the median on response latency were termed impulsive. Those subjects whose scores were below the median on error scores and above the median on response latency were called reflective. The median latency time for the entire population was 8.125 seconds while the median error score was 15.500. The response latencies and the error scores for each subject are presented in Appendix C. The administration and the scoring of the MFFT resulted in the classification of 46 impulsive subjects and 51 reflective subjects. The eight reading tasks in the present study were administered to all subjects. Seventeen failed to complete the tasks and were discarded from the study.

Prior to the main analysis, the possible influence of sex as a significant factor was investigated in a two-way multivariate analysis of variance (MANOVA). Sex was found not to be significant, $F(1,93) = 1.051$, $p = .4000$. As maintaining sex as a variable engendered considerable cell inequality, it was ignored in further analysis. Interaction effects

between sex and conceptual tempo also proved not to be significant, $F(1,93) = .5655$, $p = .8033$, which further supported the decision to ignore the influence of sex.

The data were analyzed in a one-way MANOVA with conceptual tempo (impulsives, reflectives) constituting the single independent variable. ANOVAs on combined variables followed the main analysis. There were eight dependent variables, the error scores based on the eight reading tasks given to all subjects. Wilk's Lambda (Bock, 1975) was the procedure used to test the multivariate statistic. The data were analyzed using ANOVAR, a packaged univariate and multivariate analysis computer program.

Table 5 shows the mean error scores and standard deviations for all eight tasks for impulsive and reflective subjects. As can be seen, the impulsives made more errors than the reflectives on 7 of the 8 dependent variables. This was further confirmed by the one-way MANOVA (Table 6). There was a statistically significant difference between the error scores of impulsives and reflectives on the eight dependent variables.

To provide further explanation of the multivariate analysis, Tables 7 to 14 show univariate analysis of variance for each dependent variable. The information presented in these tables is pertinent to the discussion of the hypotheses.

Hypothesis One:

Easy vocabulary word recognition task with similar distractors

Hypothesis one proposes that in an easy vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores. Clearly this was the case. The mean error score for the impulsive subjects was 2.63 but only 1.18 for the reflectives. As Table 7 indicates, impulsives made more errors than reflectives in this reading task, $F(1) = 5.384$, $p = .021$. Thus hypothesis

one was supported.

Hypothesis Two:

Easy vocabulary word recognition task with dissimilar distractors

Hypothesis two, that on an easy vocabulary word recognition task with dissimilar distractors there will not be a difference between impulsives' and reflectives' scores failed to be rejected. As Table 8 shows, when the distractors are dissimilar, no effect of conceptual tempo is apparent, $F(1) = 2.523$, $p = .111$.

When reading tasks were easy, impulsives made more errors on similar distractor tasks than reflectives. However, this was not the case for dissimilar distractor tasks. The results of these two contrasting hypotheses only partially agree with the conclusions reported by Kagan (1965) and Hall and Russell (1974). Only when the reading task was similar in task requirements to the MFFT (similar distractor task) was there a conceptual tempo reaction. When the distractors were not alike the subjects did not exhibit differences of conceptual tempo. These data strongly suggest that impulsive children respond to certain reading tasks in a manner similar to that they apply to the MFFT.

Hypothesis Three:

Hard vocabulary word recognition task with similar distractors

Hypothesis three, that on a hard vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores was supported. Table 9 reveals a difference between the error scores of reflectives and impulsives, $F(1) = 5.997$, $p = .016$. The impulsive mean of 4.58 was almost double that of the reflectives, 2.53. This reading task was difficult for all subjects, as evidenced by the large mean error scores, yet the impulsives made more errors than the reflectives.

Table 5

Mean Error Scores and Standard Deviations for the
Dependent Variables

Dependent Variables	Impulsives		Reflectives	
	<u>M</u> (n=51)	<u>SD</u>	<u>M</u> (n=46)	<u>SD</u>
Word Recognition Task Easy, Similar Distractor	2.63	3.73	1.18	2.35
Word Recognition Task Easy, Dissimilar Distractor	.80	2.27	.26	.94
Word Recognition Task Hard, Similar Distractor	4.58	4.68	2.53	3.60
Word Recognition Task Hard, Dissimilar Distractor	.72	1.34	.73	1.98
Comprehension Task Easy, Similar Distractor	8.17	6.90	3.88	4.45
Comprehension Task Easy, Dissimilar Distractor	7.26	6.97	3.92	5.97
Comprehension Task Hard, Similar Distractor	8.22	5.97	4.97	4.98
Comprehension Task Hard, Dissimilar Distractor	11.02	5.82	8.28	5.79

Table 6

Multivariate Analysis for Conceptual Tempo

Independent Variable	Wilks Lambda	<u>df</u>	Approx F	Probability
Conceptual Tempo	.787	8/88	2.976	.005

Table 7

Analysis of Variance for Dependent Variable
Easy Vocabulary Similar Distractors Word Recognition Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> Value	<u>F</u> Prob.
Conceptual Tempo	1	51.128	51.128	5.384	.021
Error	95	902.129	9.496		
Total	96	953.257			

Table 8

Analysis of Variance for Dependent Variable
Easy Vocabulary Dissimilar Distractors Word Recognition Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> Value	<u>F</u> Prob.
Conceptual Tempo	1	7.301	7.301	2.523	.111
Error	95	274.925	2.894		
Total	96	282.227			

Table 9

Analysis of Variance for Dependent Variable
Hard Vocabulary Similar Distractors Word Recognition Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> Value	<u>F</u> Prob.
Conceptual Tempo	1	102.389	102.389	5.997	.016
Error	95	1621.858	17.072		
Total	96	1724.247			

Table 10

Analysis of Variance for Dependent Variable
Hard Vocabulary Dissimilar Distractors Word Recognition Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F Value</u>	<u>F Prob.</u>
Conceptual Tempo	1	.001	.001	.001	.930
Error	95	277.482	2.921		
Total	96	277.480			

Table 11

Analysis of Variance for Dependent Variable
Easy Vocabulary Similar Distractors Comprehension Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F Value</u>	<u>F Prob.</u>
Conceptual Tempo	1	445.437	445.437	13.520	.001
Error	95	3129.903	32.950		
Total	96	3575.340			

Table 12

Analysis of Variance for Dependent Variable
Easy Vocabulary Dissimilar Distractors Comprehension Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F Value</u>	<u>F Prob.</u>
Conceptual Tempo	1	269.691	269.691	6.456	.012
Error	95	3968.556	41.774		
Total	96	4238.247			

Table 13

Analysis of Variance for Dependent Variable
Hard Vocabulary Similar Distractors Comprehension Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> Value	<u>F</u> Prob.
Conceptual Tempo	1	318.543	318.542	10.647	.002
Error	95	2842.179	29.918		
Total	96	3160.722			

Table 14

Analysis of Variance for Dependent Variable
Hard Vocabulary Dissimilar Distractors Comprehension Task

Independent Variable	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> Value	<u>F</u> Prob.
Conceptual Tempo	1	182.535	182.535	5.421	.021
Error	95	3199.135	33.675		
Total	96	3381.670			

Hypothesis Four:

Hard vocabulary word recognition task with dissimilar distractors.

Hypothesis four, that on a hard vocabulary word recognition task with dissimilar distractors there will not be a difference between impulsives' and reflectives' scores failed to be rejected. As Table 10 shows, when the distractors are dissimilar, no effect of conceptual tempo is apparent, $F(1) = .001$, $p = .930$.

The results of these two contrasting hypotheses are similar to those of the first set, even though the reading tasks were harder for the subjects. All subjects made more errors on the hard vocabulary tasks than on the easy ones, which was anticipated since the vocabulary was difficult. However, impulsives made significantly more errors on the similar distractor task. The lack of differentiation of impulsives and reflectives on the task with dissimilar distractors strongly supports the argument of this study and challenges the recommendations of Kagan (1965) and Hall and Russell (1974). It is suggested that those articles that rely uncritically on Kagan's study of conceptual tempo and reading need to be re-evaluated (e.g., Blanton & Bullock, 1973; Davey, 1976; Farr, 1969).

As anticipated from the review of research given by Tuinman and Kendall (1979), the relationship of conceptual tempo and reading is dependent on the task requirements of the reading test. This is supported by the results of the data analysis of the contrasting pairs, hypothesis one and two, and hypothesis three and four.

Hypothesis Five:

Easy readability comprehension task with similar distractors.

Hypothesis five, that in an easy readability comprehension task with similar distractors, there will be a difference between impulsives' and reflectives' scores, was supported (Table 11). In this task the impulsive

mean was 8.17 and the reflective mean was 3.88 indicating that the impulsives made more errors than the reflectives, $F(1) = 13.520$, $p = .001$

Hypothesis Six:

Easy readability comprehension task with dissimilar distractors.

Hypothesis six proposes that in an easy readability comprehension task with dissimilar distractors there will not be a difference between impulsives' and reflectives' scores (Table 12). In this task the impulsive mean was 7.26 and the reflective mean was 3.92, indicating that the impulsives made more errors than reflectives, $F(1) = 6.456$, $p = .012$. Thus, hypothesis six was rejected. This finding was unanticipated in terms of the argument of this study. It was expected that in a task having dissimilar distractors, there would not be a difference between mean error scores of impulsives and reflectives as was evidenced in the word recognition tasks. A possible explanation of these results will be discussed in chapter 5.

The results of these two contrasting hypotheses (five and six) are not immediately recognized as supporting the point of view of the study. Yet, it is noteworthy that the impulsives made proportionately more errors than the reflectives on the similar distractor task than they did on the dissimilar distractor task. It appears that in this case the work of Kagan (1965), Waltz (1977), and Roberts (1979) is supported. Studies which failed to find significant correlations between conceptual tempo and reading (Denny, 1974; Margolis, 1976; Margolis, Peterson & Leonard, 1978) need to be re-examined in the light of the results of this data analysis.

Hypothesis Seven:

Hard readability comprehension task with similar distractors.

Hypothesis seven, that on a hard readability comprehension task with similar distractors, there will be a difference between impulsives' and

reflectives' scores, was supported (Table 13). In this task the impulsive mean error score was 8.22 and the reflective mean error score was 4.59 indicating that the impulsives made more errors than the reflectives, $F(1) = 10.647$, $p = .002$.

Hypothesis Eight:

Hard readability comprehension task with dissimilar distractors.

Hypothesis eight, that in a hard readability comprehension task with dissimilar distractors, there will not be a difference between impulsives' and reflectives' error scores was rejected (Table 14). In this task the impulsive mean error score was 11.02 and the reflective mean error score was 8.28 indicating that the impulsives made more errors than the reflectives, $F(1) = 5.421$, $p = .021$. This finding was unexpected in terms of the study. It was anticipated that the effect of conceptual tempo on error scores would have the same pattern as on the error scores of the word recognition tasks. Thus, tasks having dissimilar distractors would not show large differences in error scores for impulsives and reflectives.

These two contrasting hypotheses are similar to the previous set of contrasts except that the reading tasks were set at the grade four instead of the grade two reading level. Once again, as in the previous set of contrasts, impulsives made more errors on both the similar and dissimilar distractors task. These findings agree with those studies that report a significant relationship between conceptual tempo and reading (Kagan, 1965; Roberts, 1979; Margolis & Brannigan, 1978) and disagree with the investigations that failed to find a significant relationship (Denny, 1974; Margolis, 1976; Margolis, Peterson & Leonard, 1978).

Alternative Analysis of the Data

There are grounds to conceptualize the study presented here in terms of two dependent variables, word recognition and comprehension. An

ambivalence exists in measuring reading performance because of the somewhat arbitrary relationship between stimulus passages and questions (Tuinman, 1978). Consideration of this relationship led to an alternate analysis of the data. The study can be viewed in terms of three independent variables, conceptual tempo, distractor type, and difficulty of stimulus, each having two levels. Under that conceptualization the design reduces to a 2x2x2 MANOVA with Repeated Measures on two of the factors, difficulty of stimulus and distractor type. Conceptual tempo is a fully-crossed between-subjects factor. As it is a somewhat contentious conceptualization, this analysis is presented here as an alternative and secondary analysis, but in the opinion of the author it represents a reasonable view.

The results of the 2x2x2 MANOVA (Table 15) indicated that all three main effects (tempo, reading difficulty levels, and distractor types) were significant at the .001 level. The interactions of conceptual tempo and distractor types were significant at the .05 level. The significant main effect of conceptual tempo was as suggested by the literature, that reflectives respond differently from impulsives in reading tasks. The analysis of these interactions demonstrates the influence of the different variables.

A detailed picture of the data analysis is provided by Tables 15 to 31. These tables show the multivariate analysis and the means for each of the levels of the independent variables (conceptual tempo, reading difficulty level, and distractor type) for the dependent variables, word recognition and comprehension.

Table 15

Multivariate Analyses of Dependent Variables, Word Recognition and Comprehension Tasks MANOVA-2x2x2 with Repeated Measures

Independent Variables	<u>df</u>	<u>F</u>	Prob.
Tempo (A)	2/89	5.498	.005
Readability (B)	2/89	35.606	.000
Distractors (C)	2/89	45.645	.000
AB	2/89	.466	.629
AC	2/89	5.208	.007
BC	2/89	33.677	.000
ABC	2/89	1.623	.203
Error A	180/177	7.082	.000
Error B	180/177	1.353	.022
Error C	180/177	1.460	.006

Table 16

Analysis of Variance of Dependent Variable, Word Recognition Tasks (n=92)

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	Prob.
<u>Between subjects</u>				
A (Tempo)	1	86.098	4.133	.043
error A	90	20.834	7.355	
<u>Within subjects</u>				
B (Readability)	1	76.696	17.289	.000
AB	1	.043	.010	.884
error B	90	4.436	1.566	.017
C (Distractors)	1	409.087	72.100	.000
AC	1	50.261	8.858	.004
error C	90	5.674	2.003	.001
BC	1	45.924	16.213	.000
ABC	1	9.141	3.227	.072
error BC	90	2.833		
Total	367			

Table 17

Mean Error Scores for Independent Variable,
Conceptual Tempo, in Word Recognition Tasks

Independent Variable	<u>M</u>
Impulsives	2.19
Reflectives	1.22

Table 18

Mean Error Scores for Independent Variable,
Difficulty Level, in Word Recognition Tasks

Independent Variable	<u>M</u>
Easy Vocabulary	1.25
Hard Vocabulary	2.16

Table 19

Mean Error Scores for Independent Variable,
Distractor Type, in Word Recognition Tasks

Independent Variable	<u>M</u>
Similar Distractors	2.76
Dissimilar Distractors	.65

Table 20

Mean Error Scores for Independent Variables,
Conceptual Tempo and Difficulty Level, in
Word Recognition Tasks

	Easy Vocabulary	Hard Vocabulary
Impulsives	1.72	2.65
Reflectives	.77	1.66

Table 21

Mean Error Scores for Independent Variables,
Conceptual Tempo and Distractor Type, in
Word Recognition Tasks

	Similar Distractors	Dissimilar Distractors
Impulsives	3.61	.76
Reflectives	1.90	.53

Table 22

Mean Error Scores for Independent Variables,
Distractor Types and Difficulty Levels, in
Word Recognition Tasks

	Similar Distractors	Dissimilar Distractors
Easy Vocabulary	1.95	.54
Hard Vocabulary	3.57	.75

Table 23

Mean Error Scores for Independent Variables,
Conceptual Tempo, Difficulty Levels and
Distractor Types, in Word
Recognition Tasks

	Similar Distractors	Dissimilar Distractors
<u>Impulsives</u>		
Easy Vocabulary	2.63	.80
Hard Vocabulary	4.59	.72
<u>Reflectives</u>		
Easy Vocabulary	1.26	.28
Hard Vocabulary	2.54	.78

Table 24

Analysis of Variance of Dependent Variable,
Comprehension Task (n=92)

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	Prob.
<u>Between subjects</u>				
A (Tempo)	1	1198.087	10.291	.002
error A	90	116.418	16.486	.000
<u>Within subjects</u>				
B (Readability)	1	443.522	52.519	.000
AB	1	7.924	.938	.337
error B	90	8.445	1.196	.199
C (Distractors)	1	156.522	21.052	.000
AC	1	11.837	1.592	.208
error C	90	7.435	1.053	.404
BC	1	384.272	49.320	.000
ABC	1	.696	.099	.749
error BC	90	7.061		
Total	367			

Table 25

Mean Error Scores for Independent Variable,
Conceptual Tempo, in Comprehension Tasks

Independent Variable	<u>M</u>
Impulsives	8.67
Reflectives	5.06

Table 26

Mean Error Scores for Independent Variable,
Difficulty Level, in Comprehension Tasks

Independent Variable	<u>M</u>
Easy Vocabulary	5.77
Hard Vocabulary	7.96

Table 27

Mean Error Scores for Independent Variable,
Distractor Type, in Comprehension Tasks

Independent Variable	<u>M</u>
Similar Distractors	6.21
Dissimilar Distractors	7.52

Table 28

Mean Error Scores for Independent Variables,
Conceptual Tempo and Difficulty Level, in
Comprehension Tasks

	Easy Vocabulary	Hard Vocabulary
Impulsives	7.72	9.62
Reflectives	3.82	6.30

Table 29

Mean Error Scores for Independent Variables,
Conceptual Tempo and Distractor Type, in
Comprehension Tasks

	Similar Distractors	Dissimilar Distractors
Impulsives	8.20	9.14
Reflectives	4.23	5.89

Table 30

Mean Error Scores for Independent Variables,
Distractor Type and Difficulty Level, in
Comprehension Tasks

	Similar Distractors	Dissimilar Distractors
Impulsives	6.09	5.45
Reflectives	6.34	9.59

Table 31

Mean Error Scores for Independent Variables,
Conceptual Tempo, Distractor Type and
Difficulty Level, in Comprehension Tasks

	Similar Distractors	Dissimilar Distractors
<u>Impulsives</u>		
Easy Vocabulary	8.17	7.26
Hard Vocabulary	8.22	11.02
<u>Reflectives</u>		
Easy Vocabulary	4.00	3.63
Hard Vocabulary	4.46	8.15

The analysis of the word recognition tasks (Table 16) shows there is a significant main effect for conceptual tempo, reading difficulty levels, and distractor type. The tables of means (Table 17 to Table 23) show these differences to lie in the fact that impulsives made more errors than reflectives, and as per a priori criteria, hard tasks were more difficult than easy ones, similar distractors caused more problems than dissimilar distractors.

Table 16 shows a significant interaction of conceptual tempo and distractor type and interaction of reading difficulty level and distractor type. The tables of means show that impulsives make more errors than reflectives on both similar and dissimilar distractor tasks. Yet the impulsives make about twice (52%) as many errors as reflectives when the distractors are similar but only 30% more errors when the distractors are dissimilar. The analysis of the interaction of distractors and reading difficulty level is similar. With similar distractors, hard to read tasks are 55% more difficult than easy to read tasks. But with dissimilar distractors, hard to read tasks are only 10% more difficult than easy to read tasks. It appears that the difference between easy and hard reading levels is determined by the nature of the distractors, and that difficulty per se is a rather impotent factor. Here again, in the analysis of the word recognition tasks, the major hypothesis of this study is borne out. Impulsives make more errors than reflectives on tasks of similar distractors but not on tasks of dissimilar distractors.

The analysis of the comprehension tasks shows that there is a significant main effect for conceptual tempo, reading level, and distractor type. The tables of means (Tables 25 to 31) indicate that this difference stems from the fact that impulsives make more errors than reflectives, hard tasks are more difficult than easy ones, and dissimilar distractors cause

more problems than similar distractors. This information is not in accord with the major thesis of this study: that similar distractors will cause more difficulty for impulsive children than dissimilar distractors. It is possible that in reading comprehension tasks visual similarity becomes less important than the cognitive aspects of reading, e.g., the story grammar, the interest level, the concepts of the passage. Any one or a combination of these unaccounted for variables could cancel out the effect of distractor type for both impulsive and reflective children. Further elaboration of this interpretation is provided in chapter 5. The results of this second, alternative analysis, although unanticipated in terms of some of the objectives of this study, are nevertheless consistent with the primary analysis.

Summary

The first hypothesis of a difference between impulsives and reflectives on an easy reading level word recognition task with similar distractors was supported. The second hypothesis of no difference between impulsives and reflectives on a word recognition task having easy reading level and dissimilar distractors failed to be rejected. This contrasting pair, differing only in distractor type, indicates that conceptual tempo is responsive to the text of this task.

The next two hypotheses also form a contrasting pair. Both tasks were at the grade four reading level but one had similar distractors and one had dissimilar distractors. The third hypothesis of a difference between error scores of reflectives and impulsives on a hard reading level word recognition task with similar distractors was supported. The fourth hypothesis of no difference between error scores of reflectives and impulsives on a hard reading level word recognition task with dissimilar distractors failed to be rejected. Here again, as in hypotheses one and

two, it appears that conceptual tempo may be affected by task characteristics. Impulsives made more errors than reflectives when the demands of the reading task approximated the task demands of the Matching Familiar Figures Test.

Hypothesis five was supported and the contrasting hypothesis, six, was rejected. Impulsives made more errors than reflectives in similar and dissimilar distractor easy reading level comprehension tasks. The fact that impulsives made approximately twice as many errors as reflectives in a task with dissimilar distractors suggests the possibility that in a comprehension reading task there are other cognitive factors at work beside the variables identified in this study.

Hypotheses seven and eight are a contrasting pair. Hypothesis seven, that there will be a difference between impulsives' and reflectives' error scores in a hard readability comprehension task with similar distractors was supported. Hypothesis eight, that there will be no difference between impulsives' and reflectives' error scores in a hard readability comprehension task with dissimilar distractors was rejected.

In this study, a sample of 97 students, whose conceptual tempo had already been identified, was given eight reading tasks. Overall, the impulsives made more errors than the reflectives in reading tasks having similar distractors and impulsives made as many as or more errors than the reflectives in reading tasks having dissimilar distractors.

The decision to undertake a second and alternate analysis was determined by the realization that the form and content of a reading task must be considered in the analysis of the data. The data were analyzed in a 2x2x2 MANOVA with repeated measures on two factors. The results were similar to the one way-MANOVA repeated earlier in this chapter. The advantage of the second alternative analysis has been one of the

completeness in data interpretation. The investigation of the data would not be considered thorough unless subjected to the second design strategy.

CHAPTER V: SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

The purpose of this study was to gather empirical data concerning the requirements of tasks utilized to measure reading in relation to the requirements of tasks utilized to measure conceptual tempo. There is considerable evidence in the literature indicating that there is a significant relationship between reading ability and conceptual tempo. The literature suggests that impulsives may have more difficulty with reading than reflectives. This investigation predicted that when the reading task characteristics closely approximate the task characteristics of the test for conceptual tempo, the relationships between the task results may be due to individual responses to task situations and hence may not accurately measure reading proficiency. In order to investigate the possible relationship between conceptual tempo and reading, all subjects, impulsives and reflectives, were presented with reading tasks that approximated the Matching Familiar Figures Test (MFFT) in problem-solving demands, and with reading tasks that did not, i.e., some tasks with similar distractors and some with dissimilar distractors. The study employed both word recognition and comprehension tasks in the investigation of the measurement of reading.

The influence of the difficulty of the material in terms of readability was also investigated. Tasks employing easy and hard vocabulary levels were investigated under conditions of high response uncertainty, utilizing similar and dissimilar distractors.

Procedures

One hundred and sixty-eight grade two students, almost the entire grade two population of New Westminster, British Columbia, were administered the

Matching Familiar Figures Test and eight reading tasks. Second language learners and special education students were not included in the data analysis.

All the reading tasks were administered in the children's classrooms during regular school hours. The eight reading tasks were administered by the examiner-investigator over two testing sessions. Each session consisted of four reading tasks, two word recognition and two comprehension, and took approximately 30 minutes. The teachers were not in their classrooms during the test-taking. Error scores on each reading task were noted.

The MFFT was administered individually by the examiner-investigator. The subject was shown a line drawing and was asked to choose an identical one to the standard from among six similar line drawings. The examiner-investigator recorded the response latency to the subject's first choice and the number of responses until the identical drawing was identified. The administration of the MFFT yielded 97 children with either a reflective or an impulsive conceptual tempo.

Analysis of Data and Hypotheses

The data were analyzed in a one-way MANOVA, with conceptual tempo as the independent variable. Impulsives and reflectives were compared across all the eight reading tasks in order to identify significant differences between the two groups. An alternate analysis of the data was also performed. The data were analyzed in a 2x2x2 MANOVA with repeated measures on two factors. The dependent variables were comprehension and word recognition. The independent variables were conceptual tempo (impulsive x reflective), difficulty of material (easy x hard), and distractor type (similar x dissimilar).

Eight hypotheses were tested. These are listed below. Following each

is an indication of the statistical finding.

1. In an easy vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores. (Supported, $p = .021$)
2. In an easy vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores. (Failed to be rejected)
3. In a hard vocabulary word recognition task with similar distractors there will be a difference between impulsives' and reflectives' scores. (Supported, $p = .016$)
4. In a hard vocabulary word recognition task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores. (Failed to be rejected)
5. In an easy vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores. (Supported, $p=.001$)
6. In an easy vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and significant reflectives' scores. (Rejected, $p=.012$)
7. In a hard vocabulary comprehension task with similar distractors there will be a difference between impulsives' and reflectives' scores. (Supported, $p=.002$)
8. In a hard vocabulary comprehension task with dissimilar distractors there will be no difference between impulsives' and reflectives' scores. (Rejected, $p=.021$)

Conclusions

This study has demonstrated that the reflection-impulsivity dimension is related to some reading tasks but not others. In particular it was

found that not all word recognition tasks are affected by conceptual tempo. Thus to some extent the evidence presented in this study challenges previous research on word recognition skills. Kagan's (1965) argument that impulsives experience more difficulty than reflectives on word recognition tasks was supported, but only under certain conditions. If the reading task is similar to the task demands of the MFFT, then impulsives make more errors than reflectives, but when the reading task is not similar in task demands to the MFFT impulsives do not make more errors. The conclusions of the study presented here are drawn from this information.

Kagan (1965) and Hall and Russell (1974) examined subjects' responses to word recognition tasks that had some degree of grapho-phonemic similarity. Since they examined word recognition ability only with words that approximated the task requirements of the MFFT, their conclusions about the predictive value of the MFFT on reading ability are only partially valid. The study presented here demonstrates that it is necessary to test children on a variety of reading tasks and not just those that require the same cognitive skills as the test for conceptual tempo.

Denny (1974) and Margolis (1976) found no significant correlations between MFFT error scores and response latency and reading test scores. Results from the present study suggest that their findings should be re-examined in order to ascertain how closely the reading tasks they used approximated the demands of the MFFT. It may be that the design of the reading tests presented to their subjects significantly influenced the results. Shapiro (1975) argued in favour of acknowledging the importance of the reading task when he pointed out the necessity of examining other cognitive processes besides conceptual tempo. The data presented in this study provide further strength for his argument.

It will be of value at this point to return for a moment to the

introductory remarks of this study. In chapter one, examples were provided of popular standardized diagnostic reading tests that use similar distractor tasks to measure reading. It should be noted that formal reading tests are not the only place where these types of questions are to be found. Basal reader workbooks (e.g., Ginn 720 series, 1980) include exercises that are modelled on the similar distractor type of question:

We'll ride in the _____.

yet jet bet

Ben _____ Lad.

red fed bed

(Ginn 720 series, level 2, p. 39)

This study has shown that there is no significant difference between impulsives and reflectives on tasks of dissimilar distractors. These results were borne out for both easy and hard reading levels. Even when the vocabulary is two grades above the grade level of the students and the problem is one in which a high response uncertainty exists (this last point is in direct reference to a quote by Kagan in the introductory statement of chapter 1), there is no significant difference of conceptual tempo. It can thus be strongly stated that a serious error in judgement is being made if educators believe that tasks of similar distractors are doing much more than measuring conceptual tempo. The analysis of error scores of the word recognition tasks presented in chapter 4 of this study illustrates the need to provide dissimilar distractors in reading tasks if the aim is to measure reading ability or to teach reading.

In contrast to the evidence derived from the word recognition tasks, this study has revealed that, on comprehension tasks, impulsives differ from reflectives in response to both similar and dissimilar distractors.

However it is essential to examine the differences in error scores between impulsives and reflectives in order to interpret the results of the data analyses. In the one-way MANOVA the results showed that for both levels of passages, easy and hard, there was a greater disparity in error scores between impulsives and reflectives when the distractors were similar than when they were dissimilar.

The importance of the distractor types was further confirmed in 2x2x2 MANOVA data analysis. In this examination of the data the interactions of conceptual tempo and distractor type and of reading level and distractor type were significant at the .05 level. Distractor type was thus shown to be an important variable in the measurement of reading tasks.

One unanticipated finding was that in the word recognition tasks, impulsives scored the same as reflectives on dissimilar distractor tasks, whereas on the comprehension tasks they did not. Nevertheless it is apparent from both the word recognition and comprehension results that tasks similar in cognitive demands to the MFFT yield stronger levels of statistical significance than tasks that are different from the MFFT. This fact leads to the conclusion that although the connection between conceptual tempo and reading is not as strong as Kagan has suggested, there clearly is some relationship. This last point is more evident in the results of comprehension tasks than word recognition tasks. And since comprehension tasks may be considered a more realistic measure of reading skills, conceptual tempo is evidently a factor to be considered in the measurement of reading.

Variables to be Considered in the Measurement of Reading

In a study of the measurement of reading it is worthwhile to consider other cognitive processes besides conceptual tempo that could account for the reflectives' success at these reading tasks. After mastering graphic

skills the child is able to turn his attention to the content and structure of the passage he is reading (Biemiller, 1970). By the end of grade two, students are generally fluent in graphic skills and able to use syntactic and semantic cues to identify words in a passage. In the present study both impulsives and reflectives may have been using such context aides to derive meaning from the story. If this is the case, impulsives as well as reflectives would have been influenced by both the style and the content of the reading task. Their answers would not only reflect their decoding ability, but would also indicate their interest in the story and their ability to understand the story grammar. Given these many difficulties to overcome it may be that reflectives did better because they are better problem solvers than impulsives (McKinney, Haskin, & Moore, 1975). The comprehension tasks necessitated that the subjects adapt their approach to the requirements of the particular task. According to Zelniker (1975) and Zelniker, Bentler, and Renan (1977), if the impulsives view the task in large "chunks" and the reflectives in small "chunks" then it is possible that when the task involves many cognitive strategies the impulsives' strategy of analysis is not compatible with the task requirements. In the reading comprehension task the subjects would have had to respond to many more stimuli than just the type of distractor. Semantic and syntactic appropriateness as well as story grammar, e.g., fable, mystery, tall tale, would have to be taken into account. It is possible that impulsives made more errors than reflectives because of the manner by which they process complex information rather than because of the way they respond to distractor type.

To conclude, the intent of this study was to investigate the measurement of conceptual tempo and the measurement of reading. The results of the error scores on all comprehension tasks differentiated

impulsives and reflectives. The results of the error scores on the word recognition tasks only differentiated impulsives and reflectives when the distractors were similar. A possible explanation of the results of the comprehension tasks is that impulsives are resorting to strategies of analysis that are not compatible with the requirements of the task. These results suggest the necessity of critically examining the task requirements of all reading tests before embarking on remedial reading programs and before over-generalizing results from research studies of conceptual tempo and the measurement of reading.

Implications of the Study

Classroom Implications

It is common practice in many classrooms to judge students' reading ability by the scores obtained in reading tests. Misjudgement of reading skills can occur if the diagnostic tests are limited to ones that produce excessive impulsive or reflective behavior. A child may be influenced by the cognitive demands of the test and resort to an impulsive incorrect guess and yet may respond correctly when the cognitive demands are altered in his favour. For example, a child may be a competent reader of meaningful passages and still do poorly in a test that presented grapho-phonemically similar distractors. For these reasons it is advised that teachers examine reading tests to see if they discriminate against impulsives.

As well, overly reflective behavior can create an illusion of a reading disability. Faced with a similar distractor task, the child may take a very long time to choose an answer. In this instance the student may be demonstrating a reluctance to take risks rather than a lack of mastery of the requisite reading skills. Tests ought to be closely inspected to make sure that they are measuring reading ability and not

conceptual tempo.

It is suggested that exercises in workbooks and other teaching materials be carefully examined to make sure that they include instruction and practice in a variety of reading skills. In some basal programs, (e.g., Ginn 720, Nelson Language Development Reading Program) it is possible to find practice exercises and criterion tests that reinforce impulsive and reflective behavior. In such exercises the student is not receiving instruction in developmental reading. Instead, impulsive behavior is being encouraged and resulting task errors may mistakenly be viewed as reading problems.

When a decision has to be made among alternatives presented simultaneously or in close temporal contiguity and having strong grapho-phonemic similarities, then impulsives should be taught to respond more reflectively and reflectives should be taught to respond more decisively. The development of the ability to control conceptual tempo (Barstis & Ford, 1977; Denny, 1973; Egeland, 1974) would improve performance in the early years of school when this cognitive style is most apparent (Messer, 1976; Salkind, 1978).

It is suggested that educators inform publishers of test and teaching materials as well as writers of educational syllabi of the need to include a variety of tasks in their curriculum. These people should be made aware of the fact that reading materials which contain a high degree of response uncertainty may only serve to reinforce the inaccurate processing and responding behavior of impulsive children.

Research Implications

The results of this study favour the advisability of a content analysis of the vocabulary and comprehension sections of standardized reading tests. The indications are that when children are required to

solve problems in which a degree of high response uncertainty exists and similar distractors are presented as answer choices, then reflective children will be favoured. Content analysis of reading tests would systematically describe and count recurring categories. The formulation, definition, and differentiation of categories would reflect the types of problems posed in the test. This type of analysis would investigate bias against impulsive students in standardized tests.

Another study suggestion is to replicate this study with passages at an instructional level (comprehension 75% and word recognition 95% accuracy) (Betts, 1946) in order to investigate the effect of conceptual tempo on material that a child is able to read with the teacher's assistance. It may be the case that there is less difference in reading error scores between impulsives and reflectives when responding to instructional level material than to frustration level material.

Attitude toward the passages may be a factor in the response to the task. Administration of an attitude scale, e.g., Estes Attitude Scale, is suggested to investigate the role of affect in the measurement of reading and conceptual tempo.

The design of a study may be a factor in influencing subjects' responses. It is suggested that alternate versions of the comprehension passages be prepared in order to investigate the effect of conceptual tempo on both similar and dissimilar distractor versions of each passage.

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1. MFFT developed by Jerome Kagan, Harvard University, William James Hall, Cambridge, MA 02138.

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Appendix A

MATCHING FAMILIAR FIGURES

Answer Sheet

Elementary

Note: First two items are practice

Item

1. house. . . . 1
2. scissors. . . . 6
3. phone. . . . 3
4. bear. . . . 1
5. tree. . . . 2
6. leaf. . . . 6
7. cat. . . . 3
8. dress. . . . 5
9. giraffe. . . . 4
10. lamp. . . . 5
11. boat. . . . 2
12. cowboy. . . . 4

DIRECTIONS FOR MATCHING FAMILIAR FIGURES

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

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

It is necessary to have a stand to place the test booklet on so that both the stimulus and the alternatives are clearly visible to the S at the same time. The two pages should be practically at right angles to one another.

Note: It is desirable to enclose each page in clear plastic in order to keep the pages clean.

1	2	

1	2	3

1	2	

1	2	3

1	2	3

1	2

Appendix B

1. say	sag	sat	saw
2. state	stand	start	stare
3. came	call	cake	cane
4. fine	fire	five	find
5. upset	upstairs	upon	up
6. became	beautiful	become	because
7. island	inch	into	inside
8. under	unless	upon	unite
9. honest	home	honey	horse
10. bow	bowl	box	boy
11. give	girl	gift	giant
12. boot	born	book	bone
13. song	some	sold	soon
14. fish	first	fire	five
15. which	where	when	wheel
16. found	fort	four	fork

Stimulus Words -- Task 1

1. saw
2. stand
3. came
4. find
5. upon
6. because
7. into
8. under
9. home
10. box
11. girl
12. book
13. soon
14. first
15. where
16. four

1.	while	able	colour	dance
2.	cover	drive	than	half
3.	gentle	both	knee	took
4.	rag	past	instead	until
5.	cannot	made	fail	had
6.	other	roof	could	across
7.	look	cellar	know	jar
8.	yard	run	zoo	pan
9.	feather	house	pin	down
10.	broom	chair	mother	face
11.	frog	hair	school	mud
12.	mix	plow	people	inch
13.	change	big	act	fall
14.	last	owl	noon	delight
15.	stream	bone	queen	away
16.	march	suit	pretty	knit

Stimulus Words -- Task 2

1. while
2. than
3. both
4. until
5. made
6. could
7. look
8. run
9. house
10. mother
11. school
12. people
13. big
14. last
15. away
16. pretty

1. western	whimper	whether	whiskers
2. tourist	towel	toward	township
3. thy	thus	thud	these
4. perform	perfume	perfect	perhaps
5. possess	postage	position	possible
6. hover	however	household	howl
7. vocal	voice	volume	volt
8. preside	president	pretend	preserve
9. powder	poverty	poultry	power
10. uncle	until	under	unfurl
11. consent	constant	consider	considerate
12. rodeo	rodent	rogue	rode
13. product	proclaim	produce	problem
14. support	supply	supper	suppose
15. singe	singular	since	sink
16. wither	without	witch	withdraw

Stimulus Words -- Task 3

1. . whether
2. toward
3. thus
4. perhaps
5. possible
6. however
7. voice
8. president
9. power
10. uncle
11. consider
12. rode
13. produce
14. supply
15. since
16. without

1. juice	among	kneel	rocky
2. keen	either	continued	agent
3. rather	yield	ostrich	nudge
4. muss	zebra	otter	whose
5. often	youth	notion	lain
6. nutmeg	wriggle	major	several
7. eager	public	dusk	halter
8. system	wrist	content	decay
9. charm	express	aunt	fringe
10. bulletin	human	confuse	mourn
11. increase	announce	chamber	brace
12. bargain	glimpse	stood	halves
13. method	smile	admit	bracelet
14. ace	kept	outline	noble
15. decide	important	ripple	still
16. contain	knight	during	fake

Stimulus Words -- Task 4

1. among
2. either
3. rather
4. whose
5. often
6. several
7. public
8. system
9. aunt
10. human
11. increase
12. food
13. smile
14. kept
15. still
16. during

"Martin," said Martin's mother once day. "tomorrow your cousin is closing colour
one coming

to stay. Cousin Alexander. He lives in than city. He has never been
them behind

walks fast apples
His mother wand him to see the farm and all the farm answers. He will stay all
wants father animals

sugar hire one
summer if he is happy. I hope that Alexander will be happy on the farm."
sudden hoop or

hardy
"He will be happen, Mother," said Martin.
happy.

"Then than gentle
"The farm is much better then the city!" He has glass Alexander was
"Ten them glad

hurt waited than
coming. He hoped he would stay all summer. He waded and waited for tomorrow toe
hear wand to

soft while
come. Tomorrow came and so did Alexander. He came wish Father, riding in the
sold with

trunk hide thank
truck. Martin ran to meet hill. Alexander was smaller than Martin, and paler.
truth him that

had the him
He hand on a suit and a tie. He had a watch on his arm.
has tide hit

smelled alone
"Hello Alexander," said Martin. He smiled. "I hope you will stay almost
smoke all

happy
summer. I hope you will be happen on the farm."
handy

Every morning Elizabeth ran to^{ago} meet the mailman. Sometimes cake^{blow} gave her some
on he

Body factory east
letters. Sometimes he gave her a caught. Elizabeth gave them to her mother.
Careful magazine rich

right poor
One morning a different kind of letter came. Two run shiny pennies showed
she bright

the hide
through to envelope. "Look, Mother," Elizabeth said, "two gold pennies!"
queen rug

valentine listen across
They are from a man who zoo to sell me something," Mother said. "You may
torn wants castle

ice to
have enter." And she gave them with Elizabeth. "Thank you," said Elizabeth."
them yard

I hour trick
Pocket think gold pennies are lucky pennies. I'm going to she them." She ran
has round keep

She chose cone
outside. Ugly showed them to Billy Bangs who once next door. "Are they really
Owl lived fourth

take sure
gold?" asked Billy Bangs. "They wrong like gold," Elizabeth said. They are
look come

lucky
lucky pennies." Why are they cherry?" asked Billy Bangs. "What can you buy
dry

the drum to
with two cents?" "I'm not going with buy anthing. I'm going on keep them,"
drop to dress

evening the
Elizabeth answered. Billy's father backed the car out of with garage, and Billy
move mouth

got in. "Tell me if the pennies bring you good luck." Billy called through the
car window.

T H E K I T E A N D T H E W I N D

Once upon a time, not ^{very} vain long ago, there was a kite ^{than} that belonged to a ^{thaw} veil

^{bold} little ⁱⁿⁿ boy and girl living near Vancouver in a small town by ^{the} then sea. It ^{into} ^{thee}

happened to ^{bet} be the only kite in ^{they} the village, so it was ^{someone} something lonely. ^{sometimes}

But the wind ^{tool} told it all kinds of ^{stirring} strainers, and the best were about the ^{other} otter ^{orderly} toil stories

kites in the world. "Every ^{cough} council has kites," said the wind, and it ^{desired} delicious ^{described} country

the Chinese kites, whose bamboo ^{paid} pipes make music when they ^{foe} fly, and the ^{flee} pines

Japanese kites, ^{shares} shaped like birds or flowers or ^{red} reed fish with open mouths. ^{reap} ^{shamed}

Oh, the lonely kite was eager ^{three} to ^{thaw} see them all! "But perhaps ^{they would} these ^{toe}

laugh at a plain ^{lighter} little kite like me," ^{whispered} he whittled. But the wind said no. ^{litter} ^{whiskers}

"For ^{are} arms not all of you ^{kinky} kites together? You are brothers, ^{western} wherever you come ^{whimper} ^{ark} ^{kinds}

from." This gave ^{they} than kite courage. He determined to find ^{his} high brothers ^{hiss} the

from other lands, and the ^{wine} wind promised to help him. ^{wipe}

Beany and Ted were waiting at the ^{sent} evening. We went along Main Street, ^{corner}

^{soaping} resting a few windows, to make it ^{cry} look as if we were out on ^{train} whether ordinary ^{cow} ^{room} ^{an}

Halloween jaunt. But brother kept right on going ^{we} toward ^{town} when we reached the edge of bird. ^{fell} ^{arm} ^{eleven}

Mr. Peabody lived about rather a mile out, in an ancient red-brick house that ^{swim} ^{whose} ^{half} ^{age}

had a several ^{sagging} wooden veranda circling the front ^{company} half. Two long lines of ^{evergreen} whole ^{teacher} ^{quite} ^{fill}

trees made the lane ^{continue} a ^{least} black alleyway, and we ^{finish} close together as ^{among} ^{kept}

^{sneaked} we became up to the house. ^{farm}

There ^{either} was a light in a ^{back} dark window. We stole around ^{the} toward house ^{son} ^{swim} ^{lady}

to peek in. We couldn't ^{see} feed anyone inside, just part ^{bird} among a walnut sideboard ^{train} ^{of}

and the table with some ^{several} flowered oilcloth on it. ^{hair}

"I don't see Mr. Peabody in there", I ^{whispered} fell to Beany. ^{husband}

"Keep quiet," ^{egg} he ^{possible} muttered, and drew a piece of ^{fish} line from his pocket, ^{wait} ^{talk}

to which a milk ^{nail} was tied. He stuck the nail into the ^{however} grade around the window, ^{drop} ^{putty}

letting ^{the} plant head of the nail ^{finish} ice against the glass. ^{whether} ^{rest}

Appendix C

Matching Familiar Figures Test
Latency Response and Error Scores

	Total Latency Response Time	Total Error Scores
<u>Impulsives</u>		
1	83	17
2	93	19
3	97	19
4	50	18
5	53	16
6	43	22
7	93	18
8	85	16
9	73	17
10	87	19
11	71	18
12	61	16
13	47	22
14	65	29
15	86	18
16	64	22
17	86	16
18	53	25
19	97	20
20	52	28
21	52	22
22	84	24
23	42	24
24	86	18
25	60	23
26	70	16
27	86	18
28	71	19
29	57	29
30	65	16
31	32	19
32	62	17
33	70	16
34	68	16
35	85	29
36	76	18
37	73	26
38	70	17

Appendix C (cont.)

	Total Latency Response Time	Total Error Scores
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Impulsives (cont.)

39	48	18
40	58	16
41	74	21
42	53	16
43	53	17
44	66	23
45	58	26
46	47	23

Reflectives

1	114	12
2	113	14
3	135	11
4	126	12
5	197	5
6	147	14
7	157	9
8	156	13
9	142	10
10	134	6
11	132	11
12	118	11
13	259	8
14	118	8
15	144	11
16	123	13
17	103	13
18	164	10
19	111	12
20	142	6
21	138	12
22	187	8
23	121	6
24	189	8
25	280	13
26	141	8
27	142	9
28	115	9
29	140	15

Appendix C (cont.)

	Total Latency Response Time	Total Error Scores
--	--------------------------------------	--------------------------

Reflectives (cont.)

30	148	15
31	102	11
32	167	5
33	137	9
34	113	15
35	145	12
36	120	8
37	364	9
39	99	13
39	113	15
40	148	9
41	117	9
42	176	11
43	138	9
44	102	6
45	151	11
46	187	13
47	110	7
48	181	12
49	102	12
50	144	12
51	210	9

Others

98	139	17
99	90	14
100	69	11
101	137	19
102	55	9
103	119	18
104	79	13
105	85	12
106	109	21
107	36	14
108	85	6
109	106	21
110	101	17
111	138	19
112	126	22

Appendix C (Cont.)

	Total Latency Response Time	Total Error Scores
<u>Others(cont.)</u>		
113	72	7
114	99	20
115	98	23
116	404	20
117	71	7
118	83	12
119	93	9
120	100	16
121	165	18
122	83	10
123	59	7
124	73	13
125	130	17
126	100	21
127	121	18
128	102	21
129	81	13
130	72	13
131	92	13
132	126	22
133	93	9
134	72	12
135	97	10
136	79	10
137	100	20
138	98	30
139	151	21
149	117	18
141	61	13
142	61	13
143	76	11
144	55	12
145	108	17
146	93	14
147	171	18
148	72	13
149	56	10
150	45	17
151	92	17
152	70	16

Appendix C (Cont.)

	Total Latency Response Time	Total Error Scores
<hr/>		
<u>Others (cont.)</u>		
153	86	16
154	51	17
155	77	16
156	66	22
157	82	16
158	57	26
159	87	17
160	142	7
161	120	10
162	187	9
163	230	10
164	116	14
165	254	7
166	142	13

Appendix D

Kuder- Richardson Formula 21 Reliabilities of Reading Tasks

Dependent Variables	Impulsives	Reflectives
Word Recognition Task Easy, Similar Distractor	.80	.75
Word Recognition Task Easy, Dissimilar Distractor	.80	.67
Word Recognition Task Hard, Similar Distractor	.82	.80
Word Recognition Task Hard, Dissimilar Distractor	.91	.77
Comprehension Task Easy, Similar Distractor	.86	.80
Comprehension Task Easy, Dissimilar Distractor	.86	.86
Comprehension Task Hard, Similar Distractor	.83	.81
Comprehension Task Hard, Dissimilar Distractor	.85	.83