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ABSTRACT
                The purpose of this study was to examine the
interrelationships among five measures of aided reading comprehension
(reading to each subject while he silently reads or follows along),
intelligence, and three measures of cognitive style variables in
first grade children. Thirty-four first graders, 13 boys and 21
girls, served as subjects. It was concluded that cognitive style
tests can provide useful information to a reading teacher. The role
which cognitive style variables play in terms of current conceptual
and theoretical models of reading comprehension processed should
continue to be examined. (Author/RB)

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THE INFLUENCE OF COGNITIVE STYLE AND INTELLIGENCE VARIABLES IN AIDED READING COMPREHENSION

Report from the Project on Conditions of
School Learning and Instructional Strategies

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STATEMENT OF FOCUS

Individually Guided Education (IGE) is a new comprehensive system
of elementary education. The following components of the IGE system
are in varying stages of development and implementation: a new
organization for instruction and related administrative arrangements;
a model of instructional programing for the individual student; and
curriculum components in prereading, reading, mathematics, motivation,
and environmental education. The development of other curriculum
components, of a system for managing instruction by computer, and of
instructional strategies is needed to complete the system. Continuing
programmatic research is required to provide a sound knowledge base for
the components under development and for improved second generation
components. Finally, systematic implementation is essential so that
the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and
implementation components of its IGE program in this sequence:
(1) identify the needs and delimit the component problem area;
(2) assess the possible constraints--financial resources and availability
of staff; (3) formulate general plans and specific procedures for
solving the problems; (4) secure and allocate human and material
resources to carry out the plans; (5) provide for effective communication
among personnel and efficient management of activities and resources;
and (6) evaluate the effectiveness of each activity and its contri-
bution to the total program and correct any difficulties through
feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in
each participating elementary school, i.e., one which is less dependent
on external sources for direction and is more responsive to the needs
of the children attending each particular school. In the IGE schools,
Center-developed and other curriculum products compatible with the
Center's instructional programing model will lead to higher morale
and job satisfaction among educational personnel. Each developmental
product makes its unique contribution to IGE as it is implemented in
the schools. The various research components add to the knowledge of
Center practitioners, developers, and theorists.

ACKNOWLEDGEMENTS

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ABSTRACT

The purpose of this study was to examine the interrelationships between five measures of aided reading comprehension (read to each subject while he silently read or followed along), intelligence and three measures of cognitive style variables in first grade children. The Wisconsin Tests of Reading Skill Development, Level B-Comprehension (WTRSD-B-C) yielded the five aided reading comprehension measures:

1. Identifying a paragraph topic or main idea (WTRSD-PT).

2. Determining sequence or recalling events that happened just before or just after another event in a short paragraph (WTRSD-BA).

3. Using logical reasoning in predicting outcomes (WTRSD-O).

4. Using logical reasoning in synthesizing information or judging cause and effect (WTRSD-CE).

5. Reading for details or selectively attending to and recalling details in a short paragraph (WTRSD-D).

The three measures of cognitive style variables utilized in the study included:

1. Field Dependence-Independence, sometimes referred to as global-analytic style, was measured with the Children's Embedded Figures Test (CEFT).

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2. Style of Categorization, sometimes referred to as concep-
   tual style, was measured with the Sigel Cognitive Styles
   Test (SCST).

3. Reflectivity-Impulsivity, sometimes referred to as concep-
   tual tempo, was measured with the Matching Familiar Fig.res
   Test (MFFT).

The Wechsler Intelligence Scale for Children (WISC) served as
the intelligence measure. Four scores were utilized as variables in the
study: Full Scale, Verbal, Performance and Analytic Index, which in-
cludes the subtests of Block Design, Picture Completion and Object As-
sembly.

Thirty-four first graders, 13 boys and 21 girls, served as sub-
jects. The WISC, MFFT, CEFT and MFFT were indiviJually administered and
the WTRSD-B-C were administered in group situations. Ten specific ques-
tions were formulated to guide the examination of interrelationships
among the test scores.

Significant relationships were found as follows:

1. CEFT and WTRSD-D, witn intelligence controlled, for females
   and the total sample (p<.01).

2. MFFT-Errors and WTRSD-D, with intelligence controlled, for
   females and the total sample (p<.01).

3. SCST-DPW (Descriptive Part-Whole percentage of total re-
   sponses) and the WTRSD-PT for females (p<.10).

4. Forty-four of the sixty coefficients between the four WISC
   measures and the WTRSD-B-C. The WTRSD-BA was significantly

correlated with all four WISC measures with males, females and total sample.

5. CEFT and SCST-RC (Relational-Contextual percentage of total responses), for females (p<.024).

6. MFFT-average response times and SCST-DPW for males (p<.017) and the SCST-RC for males (p<.025) and the total sample (p<.037).

7. MFFT errors and SCST-DPW for females (p<.087) and the SCST-RC for females (p<.089).

8. CEFT and MFFT-errors for males (p<.024), females (p<.001) and total sample (p<.000).

A common factor appeared to be measured by the CEFT, MFFT errors and WISC-AI which seemed significantly related to WTRSD-D, or the finding and recalling of details in a short paragraph.

Some difficulty in the traditional interpretation of SCST results was found. The author suggested a procedure in which various response patterns on the SCST may be used in examining the relationship between aided reading comprehension skills and other cognitive style variables.

It was concluded that cognitive style tests can provide useful information to a reading teacher. Also the role which cognitive style variables play in terms of current conceptual and theoretical models of reading comprehension processed should continue to be examined.

CHAPTER 1

RATIONALE FOR THE STUDY

General Problem

The search for measurable individual difference variables

which affect a student's ability to learn specific academic skills

has been a central concern of psychologists and educators for over

65 years. Since reading has been one of the major academic skills

emphasized in the schools, it is not surprising to find considerable

research exploring the thinking processes involved in learning to

read and reading to learn. In 1908, Huey (1968) wrote:

> And so to completely analyze what we do when we read
> would be the acme of a psychologist's achievements,
> for it would be to describe very many of the most
> intricate workings of the human mind, as well as to
> unravel the tangled story of the most remarkable
> specific performance that civilization has learned
> in all its history. (p. 6)

This is just as true today as it was then, even though the

disciplines of experimental and educational psychology, linguistics,

psycholinguistics and educational measurement have isolated and mea-

sured many different information-processing variables implicated in

the differential acquisition of a student's learning skills and abili-

ties. In recent years, the cognitive and affective processes that are

utilized while reading have been placed in the broader context of a

general communication model by Athey (1971), Geyer (1972), Goodman

(1968, 1970), Ruddell and Bacon (1972) and Venezky and Calfee (1970)

among others.

Information processing variables subsumed under the construct

of cognitive styles are of central importance to the present study.

A wide variety of constructs or skills referred to as cognitive styles

(Coop and Sigel, 1971; Santostefano, 1969; Bruner, Goodenough and

Austin, 1956) are found in the literature. For this study, cognitive

style variables are divided into three types:

1. Field Dependence-Independence, sometimes referred to as a

    global-analytic style, was developed by Witkin (1949, 1950,

    1965) and Witkin, et al.(195., 1962) and measured in this

    study by the Children's Embedded Figures Test (Karp and

    Konstadt, 1971). This variable refers to the ability to

    focus on small parts of a complex figure rather than on the

    figure as a whole.

2. Style of Categorization, sometimes referred to as conceptual

    style, was developed by Kagan, Moss and Sigel (1963) and

    Sigel, Jarman and Hanesian (1963) and measured in this study

    by the Sigel Cognitive Styles Test (Sigel, 1967). This

    variable refers to the manner in which a subject selects

    pairs of objects from a set of three which go together and

    are similar in some way.

3. Reflection-Impulsivity, sometimes referred to a conceptual

    tempo, was developed by Kagan, Rosman, Day, Albert and

    Phillips (1964) and measured in this study by the Matching

Familiar Figures Test (Kagan, 1965a). This variable refers

to a subject's tendency to wait and reflect on the choice.

With the increased emphasis on individualized instruction, edu-

cators and psychologists are searching for those identifiable and fairly

stable information processing variables which influence a student's abil-

ity to learn. Additional research needs to focus on the identification

and the reliable measurement of cognitive styles variables as they relate

to the acquisition of specific academic skills. More precise prescrip-

tive teaching styles can then be developed and appropriately utilized.

Further analysis of the cognitive style variables is essential

for our increased understanding of the various models and conceptual

frameworks proposed to explain the process of reading. Jenkinson (1969)

states

> "... a model which deals with the reading process as such,
> which includes the cognitive interactions, the impact of
> language and linguistic considerations in the affective
> as well as in the cognitive domain, and will then attempt
> to relate these reading operations to other aspects of
> thinking, is perhaps most urgently needed." (pp. 14-15)

The more precisely we examine the similarities and differences

of various cognitive or intellectual process variables, as they relate

to skills and processes implicated in reading comprehension, the more

useable data we obtain to help formulate the partial reading process

models and conceptual framework called for by Jenkinson and others.

This study focuses in part, then, on the informational pro-

cessing variables referred to as cognitive styles as they relate to the

thinking processes involved in reading comprehension. A study of this

kind will provide additional information useful to those concerned with

the development of theoretical models of the reading process. For
example, do cognitive styles play a different role than those processes
subsumed under intelligence when a person recalls and identifies details
from a story after he reads it?

Statement of the Problem

In this study the interrelationships between intelligence and
aided reading comprehension and cognitive styles were explored. Speci-
fically examined were the intercorrelations of three cognitive style
variable measures, a measure of intelligence and five measures of aided
reading comprehension in first grade males and females.

The first cognitive style test, Children's Embedded Figures
Test (CEFT), is a measure of field dependence-independence or the ability
to find a figure hidden in a larger and more complex figure. The second
cognitive style test, Sigel Cognitive Style Test (SCST), is a measure of
one's style of categorization, sometimes referred to as conceptual style.
In the SCST the subject selects, from a series of three item sets, pairs
of items which go together or are alike in some way and explains why he
made that choice. These choices are then classified as being either
Descriptive Part-Whole, (DPW), Descriptive Global (DG), Relational-
Contextual (RC) or Categorical-Inferential (CI). The third cognitive
style measure, Matching Familiar Figures Test (MFFT), is a measure of
reflection-impulsivity, sometimes referred to as conceptual tempo. The
MFFT examines the manner in which a subject responds, in terms of errors
and response time, when matching a familiar figure to an identical one in

a field of six slightly different variations. Examples of these cognitive style tasks are included in Appendices A-C.

Intelligence was measured by the Wechsler Intelligence Scale for Children (WISC). Four scores were used as variables: Full Scale (FS), Verbal (V), Performance (P) and Analytical Index (AI). The AI is derived by combining the scaled scores of three of the Performance subtests (Block Design, Picture Completion and Object Assembly).

The five aided reading comprehension tests taken from the Wisconsin Tests for Reading Skill Development, Level B--Comprehension (WTRSD-B-C), examine the following variables: identifying a paragraph topic, determining sequence, using logical reasoning in predicting outcomes, using logical reasoning in synthesizing information and reading for details. For this study, the term aided reading comprehension is used, because each test item is read orally to the students while they read it silently to themselves. These tests, therefore, emphasize a somewhat different variety of skills and processes than tests that require the subject to rely exclusively on his own reading skills for the visual input of information. This is discussed in a subsequent section of this chapter.

Four features make this study different from the majority of the relatively few correlational studies examining the interrelationships between various cognitive styles, intelligence, and reading variables. First, to the best of the author's knowledge, no other study has included all three of the major cognitive style measures in a single study. Secondly, the four intelligence variables utilized in this study are derived from the individually administered WISC which has been proven

to be more reliable and precise than many of the abbreviated and/or
group administered intelligence measures (Nunnally, 1959). Thirdly,
this study utilized first grade students who represent a younger subject
pool than is usually found (Serafica and Sigel, 1970; Cohn, 1968;
Annesley, 1971; and Davey, 1971). Cognitive styles may play a much dif-
ferent role when a student is learning to read than when a student is
reading to learn. Finally, because of their age, the present subjects
had mastered fewer word attack reading skills than the older subjects
usually utilized in studies involving reading and cognitive style vari-
ables. Because the thrust of this study is on the interaction of various
intelligence and cognitive style variables implicated in the reading
process, word attack skills have been controlled by the use of the aided
reading comprehension measures.

The purpose of this study was to examine the intercorrelations,
for first grade boys and girls, between intelligence, aided reading com-
prehension and cognitive styles. To that end, 16 variables were identi-
fied:

1. Children's Embedded Figures Test (CEFT)

2. Matching Familiar Figures Test-Errors (MFFT-E)

3. Matching Familiar Figures Test-Reaction Time (MFFT-RT)

4. Sigel Cognitive Style Test-Description Part Whole Percentage
    (SCST-DPW)

5. Sigel Cognitive Style Test-Description Global Percentage
    (SCST-DG)

6. Sigel Cognitive Style Test-Relational-Contextual Percentage
    (SCST-RC)

7. Sigel Cognitive Style Test-Categorical-Inferential Percentage
    (SCST-CI)

8. Wechsler Intelligence Scale for Children-Full Scale (WISC-FS)

9. Wechsler Intelligence Scale for Children-Verbal (WISC-V)

10. Wechsler Intelligence Scale for Children-Performance (WISC-P)

11. Wechsler Intelligence Scale for Children-Analytic Index (WISC-AI)

12. Wisconsin Tests for Reading Skill Development-Paragraph Topics (WTRSD-PT)

13. Wisconsin Tests for Reading Skill Development-Before and After (WTRSD-BA)

14. Wisconsin Tests for Reading Skill Development-Outcomes (WTRSD-O)

15. Wisconsin Tests for Reading Skill Development-Cause-Effect (WTRSD-CE)

16. Wisconsin Tests for Reading Skill Development-Detail (WTRSD-D)

Another abbreviation used throughout the present study is WTRSD-B-C which refers to the Wisconsin Tests for Reading Skill Development, Level B-Comprehension and includes all five of the above mentioned tests (WTRSD-PT, WTRSD-BA, WTRSD-O, WTRSD-CE and WTRSD-D).

Questions

Specifically, the following questions were answered by this study:

1. a. To what degree is field dependence-independence (CEFT) associated with performance of the following aided reading comprehension skills (WTRSD-B-C):

    1) Identifying a paragraph topic (WTRSD-PT)

    2) Determining Sequence (WTRSD-BA)

    3) Using logical reasoning in predicting outcomes (WTRSD-O)

        4) Using logical reasoning in synthesizing information
        (WTRSD-CE)

        5) Reading for details (WTRSD-D)

  b. To what degree is field dependence-independence (CEFT),
     with total intelligence (WISC-FS) controlled, associated
     with performance of the aided reading comprehension
     skills cited previously in 1) through 5)?

2. a. To what degree is reflection-impulsivity (MFFT-E,
     MFFT-RT) associated with performance of the aided
     reading comprehension skills cited previously in 1)
     through 5)?

  b. To what degree is reflection-impulsivity (MFFT-E,
     MFFT-RT), with total intelligence (WISC-FS) controlled,
     associated with performance of the aided reading com-
     prehension skills cited previously in 1) through 5)?

3. a. To what degree is style of categorization (SCST-DPW,
     SCST-DG, SCST-RC, SCST-CI) associated with performance
     of the aided reading comprehension skills cited pre-
     viously in 1) through 5)?

  b. To what degree is style of categorization (SCST-DPW,
     SCST-DG, SCST-RC, SCST-CI), with total intelligence
     (WISC-FS) controlled, associated with performance of the
     aided reading comprehension skills cited previously
     in 1) through 5)?

4. To what degree is verbal intelligence (WISC-V) associated
with performance of the aided reading comprehension skills
cited previously in 1) through 5)?

5. To what degree is nonverbal intelligence (WISC-P) associated
with performance of the aided reading comprehension skills
cited previously in 1) through 5)?

6. To what degree is total (verbal and nonverbal) intelligence
(WISC-FS) associated with performance of the aided reading
comprehension skills cited previously in 1) through 5)?

7. To what degree is the Analytic Index (WISC-P subtests:
Block Design, Object Assembly and Picture Completion) asso-
ciated with performance of the aided reading comprehension
skills cited previously in 1) through 5)?

8. To what degree is style of categorization (SCST-DPW, SCST-DG,
SCST-RC, SCST-CI) associated with field dependence-indepen-
dence (CEFT)?

9. To what degree is style of categorization (SCST-DPW, SCST-DG, SCST-RC, SCST-CI) associated with reflection-impulsivity (MFFT-E, MFFT-RT)?

10. To what degree is reflection-impulsivity (MFFT-E, MFFT-RT) associated with field dependence-independence (CEFT)?

Cognitive Style Construct

Before examining the cognitive style variables of field dependence-independence, style of categorization and reflection-impulsivity, mention should be made of another strand of research closely related to cognitive styles but which was not explored in depth in this study. This research led to the development of "cognitive control principles". Principal investigators carrying out this research were Klein (1954, 1958), Gardner (1953, 1962) and Gardner, et al. (1959, 1960, 1968).

> Specifically, cognitive controls are defined as mech-
> anisms or principles which: (1) govern and determine
> the amount and organization of information which becomes
> available to an individual perceiver, (2) are activated
> by specified classes of stimuli which cause the individual
> to experience some intention to use and adapt to the in-
> formation, (3) vary in the extent to which they operate
> in the cognitive functioning of individuals, (4) evolve,
> in part, as a function of maturation and life experiences
> and become independent . . . from their origin of develop-
> ment, (5) mediate the influence of personality and motiva-
> tion in the individual's cognitive encounters with the
> environment and (6) become enduring aspects of an indi-
> vidual's cognitive functioning and adaptive style, and,
> thus, give shape to his subsequent cognitive experiences.
> (Santostefano, 1969, pp. 295-6)

Klein classified the resulting variables from his work into four cognitive control principle dimensions: focusing-scanning, constricted-flexible, leveling-sharpening and equivalence range. The second dimension, contricted-flexible, is identical to that of Witkin's field dependence-independence. For a complete review of the evolution

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of cognitive controls and their relationship to cognitive styles, see

Santostefano (1969).

Santostefano, Rutledge and Randall (1965) utilized the cognitive

controls dimensions of focusing-scanning, constricted-flexible and

leveling-sharpening in three experiments dealing with 24 boys (ages 8-13)

selected by teachers as having a reading disability. Only the con-

stricted-flexible dimension was implicated in reading disability. Be-

cause of the similarity of the constricted-flexible dimension to Witkin's

field dependence-independence, Santostefano, Rutledge and Randall's

(1965) non-significant results with regard to the other two cognitive

styles and cognitive controls, the latter were not included in the

present study.

Field Dependence-Independence

Witkin, Dyk, Faterson, Goodenough and Karp (1962) state that:

The person with a more field-independent way of perceiving
tends to experience his surroundings analytically, with
objects experienced as discrete from their backgrounds.
The person with a more field-dependent way of perceiving
tends to experience his surroundings in a relatively glo-
bal fashion, passively conforming to the influence of
the prevailing field or context. (p. 35)

There have been two different methods of assessment used in

identifying the field dependent-independent cognitive style. The first

can be classified as examining a subject's ability to orient an object

in space. Witkin's (1949) early work involved the use of tasks in-

volving a tilting room and/or chair. The subject's task was to evaluate

the position of his body and of the surrounding field in relation to the

upright. A modified version widely used today is the Rod and Frame Test

(Witkin, Lewis, Hertzman, Machover, Meissner and Wapner, 1954). This
task requires the subject to adjust a luminous rod attached within a
luminous square frame to a vertical position thus measuring the subject's
perception of an item in a field.

The second approach to identifying field dependence-independence
is developed from the work of Witkin (1950) and Goodenough and Eagle
(1963) who emphasized the overcoming of an embedding context in per-
ception. Here the task involves looking at a complex geometric figure
and finding or disembedding a simpler one. Several tests have been devel-
oped: Embedded Figures Test (EFT) (Witkin, 1950), a shortened form of
EFT (Jackson, 1956), an easier version of EFT for younger children (CHEF)
(Goodenough and Eagle, 1963), the Children's Embedded Figures Test (CEFT)
(Karp and Konstadt, 1971), a Group Embedded Figures Test (GEFT) (Witkin,
Ottman, Raskin and Karp, 1971) and the Hidden Figures Test (HFT) (Educa-
tional Testing Service, 1962). After consideration, the author chose to
use the CEFT in the present study because it appears to be the most valid
measure of field dependence-independence developed for the age group of
the present subjects.

Research suggests that the trait is relatively stable over time
(Witkin, 1949; Goodenough and Karp, 1969), a single trait is validly and
reliably measured by the two different assessment methods (Witkin, 1949;
Busch and Simon, 1972), precision increases developmentally with age at
varying rates (Busch and Simon, 1972; Witkin, 1949; Witkin, Goodenough and
Karp 1967) and males between 8-17 appear to be more field independent than
females (Witkin et al., 1967; and Witkin, 1949). No correlational dif-
ference was found between EFT test and Rod and Frame Test performance

for 5-7 year olds (Busch and Simon, 1972). Nelson (1972, p. 29), after

reviewing related literature, concluded

> that field-independent subjects are superior to field-
> dependent subjects in situations requiring the acquisi-
> tion of concepts, but that field-dependent persons are
> more sensitive to social cues. There is no such gener-
> alization which can be made concerning personality traits
> and the tendency to be field-independent or dependent.

For an extensive review of the wide range of research dealing with field

dependence-independence see Kagan and Kagan (1970), Witkin, Dyke,

Faterson, Goodenough and Karp (1962) and Santostefano (1969). Validity

and reliability information on each of the cognitive style tests used

in the present study are presented in Chapter 2.

Twelve studies were located which examine the relationship be-

tween field independence-dependence and various reading-related variables.

Only the first of these studies used the Children's Embedded Figures

Test. Watson (1969) examined field dependence-independence as measured

by the CEFT with first, second and third grade boys as it related to the

reading portion of the Stanford Achievement Test and the Draw-a-Person

Test. In her rationale for the study she relies heavily on the factor

analytic perceptual studies of Thurstone (1944, 1949), Botzum (1951) and

Pemberton (1952) and Goins' (1958) work on visual perception. A common

factor in these studies was found to be quite similar to Witkin's (1962)

conception of field dependence. Watson (1969, p. 11) points out that

this factor, which deals with perceptual closure, or overcoming an em-

bedding context, was examined in detail because "decoding from graphic

to phonic patterns was shown to be the major task in early reading. The

critical factor in the decoding and transfer process was found to be a

graphic unit with an invariant relationship to a phonemic unit." In her

first grade sample, product-moment correlation coefficients between the

CEFT and the SAT (1964 revision) subtests were as follows: Word Reading,

.54; Paragraph Meaning, .57; Word Study Skills, .64; and Vocabulary, .66.

Correlation coefficients were significant at the .01 level for Paragraph

Meaning, Word Study Skills and Total Reading. In short, Watson (1969, p.

43) found "that field independent boys in grades one through three are

better readers than field dependent boys of the same age."

Wineman (1971), using 4th, 5th and 6th grade subjects, examined

field dependence-independence by evaluating human figure drawings using

a method described by Witkin, et al. (1962). They used the California

Reading Test-Elementary (CRT) in grades 4 and 5 and used the California

Achievement Test-Elementary (CAT) in grade 6. Significant ($p < .05$) cor-

relation coefficients were found between the CRT scores for male and

female 4th grade subjects and the human drawing analysis but this was

not found for 5th grade subjects. Significant ($p < .01$) correlations were

found between the two CAT scores (Reading Vocabulary and Reading Compre-

hension) of both males and females in the 6th grade. Fiebert (1967)

found a low-level relationship between field independence and reading

ability for deaf girls but not for deaf boys. Stuart (1967) also found

that field independence may be related to better reading skills. The

latter two studies were cited by Wineman.

Keogh and McG. Donlon (1972) found that twenty-seven boys clas-

sified as having severe learning disorders and 25 boys with mild hearing

disorders were significantly ($p < .01$) more field dependent than norms

would suggest as measured by the Portable Rod and Frame Test. They

found that boys with severe learning disorders were also impulsive as measured by the MFFT (Kagan, 1965a). Their work suggests that when field dependence and impulsivity are combined in a single subject, the degree of learning disability was more severe. The present study examined this interrelationship further.

Boersma, et al. (1969) presented anagram tasks to field dependents and independents and then examined their corneally reflected eye movements. Field independent subjects made more shifts in fixations, although neither group performed more successfully than the other on the tasks. Males made more shifts than females and field independent males attended to more letters in each problem than did dependent males. For females, this later finding was reversed.

Nadien, Schaeffer and Schmeidler (1969) compared field dependence and independence and reading scores from the Nelson-Denny Reading Tests of 35 college students with regard to strong eye dominance and the subject's mood. For subjects indicating a negative mood, field dependence was associated with weak eye dominance and poor comprehension, while in a positive mood situation, weak eye dominance was associated with slower reading and a strong correlation between reading speed and comprehension. In short, field dependence was found to be related to weak ocular dominance only for subjects indicating a negative mood.

Higgins and Gage (1968) utilized the EFT and Nelson-Denny Reading Test with 12 college students. Reading was pre- and post-tested. While the group which was more field independent made a greater gain, no relationship between field dependence-independence and reading ability was apparent before instruction. Also using the EFT with high school

students, Peterson and Magaro (1969) failed to confirm the following two hypotheses: (1) Scores on the EFT will be significantly correlated with reading achievement (Wide Range Achievement Test) when intelligence is partialled out, and (2) In the learning of a reading related task, increased embeddedness will have a more retarding effect on the learning rate of field dependent than independent subjects.

Cohn (1968) dealt in some depth with the relationship between field dependence-independence and reading comprehension in 6th grade subjects. He utilized the EFT, the Lorge Thorndike Intelligence Test and the Sangren-Woody Reading Test. His results can be summarized as follows:

1) A significant positive relationship existed between EFT and four reading subtests: Details ($p < .05$), Main Ideas ($p < .01$), Sequence ($p < .01$) and a Total Score ($p < .05$).

2) A significant positive relationship existed between verbal intelligence and all 8 reading measures of reading comprehension.

3) A significant positive relationship existed between non-verbal intelligence and all 8 measures of reading comprehension.

4) A significant positive correlation existed between total intelligence and all 8 measures of reading comprehension.

5) There was no significant correlation between sex and all 8 measures of reading comprehension.

Cohn (1968) points out that

. . . field independence was positively and significantly correlated with those aspects of comprehension that required reorganization of a field to solve a problem, apparently when the solution had to be found through new cognitive activity rather than through reliance upon experience and external authority. This study is the first one known to this writer which links specific aspects of reading comprehension and perception together. (pp. 2-3)

Having reviewed these studies, it was apparent to the author
that there is a need to confirm the relationship between reading com-
prehension variables and field dependence-independence at an earlier
grade level than Cohn's sample. Intelligence variables need also to
be examined in this context. The interrelationship between MFFT scores
(reflection-impulsivity) and field dependence-independence also needs
further exploration which is, in part, the purpose of the present
study.

Style of Categorization

Sigel, Jarman and Hanesian (1967, p.2) describe four classifica-
tion categories used to identify a style or "preferential mode of cate-
gorization expressed in a situation where alternatives are possible."
Using sorting or matching tasks in which the subject expresses his rea-
sons for pairing two objects, Kagan, Moss and Sigel (1963) and Sigel
(1967) have identified the following styles of categorization:

1. Descriptive--similarities identified on the basis
   of manifest objective attributes.

   a. Descriptive part-whole--responses denoting
      observable parts of an item; e.g. classify-
      ing human figures as similar "because they
      all have hats," or "because they are hold-
      ing an object in their hands"; or a group of
      objects "becuase they all have wooden handles,"
      or a table and chair "because they have four
      legs."

   b. Descriptive-global--similarities based on
      the total objective manifestations of the
      stimuli; e.g. classification of human figures
      as similar "because they are nurses," or
      "because they are female," or "because they
      are young".

2. <u>Relational-contextual</u>--responses denoting function-
al or thematic interdependence between the ele-
ments in a grouping. The interdependence is par-
ticular to that situation and not generalizable.
The meaning of any one stimulus in the grouping
is defined by its relationship to other stimuli;
e.g. a horse and a stagecoach go together "be-
cause the horse pulls the stagecoach," or a table
and chair are selected "because you sit on the
chair to eat at the table." The items may be re-
lated in time and place in a particular context.
Also, relationships may be organized along a them-
atic basis; e.g. "the mother is feeding the baby."

3. <u>Categorical-inferential</u>--items classified on the
basis of inferred characteristics of the stimuli.

a. Functional--items grouped on the basis of in-
ferred use; e.g. a bed and a cradle are grouped
because "these are things to sleep in," or a
stagecoach and jeep are selected because
"these are things to ride in," or a hammer and
saw go together because "they are used in build-
ing."

b. Class-naming--classification on the basis of
class membership; e.g. a cow and a horse are
grouped because "they are vertebrates," "they
are animals," or bananas and grapes are se-
lected because "they are foods."

c. Attribute selection--where a specific non-mani-
feste attribute is inferred; e.g. an orange
and a banana are grouped together because
"they grow," or ("they have seeds."

d. Location--inference as to where an item belongs
geographically; e.g. a cow and sheep are grouped
together because "they live on a farm," or a
bed and chest because "they are found in the
bedroom." (Sigel, Jarman and Hanesian, 1967, p.7)

Three major assessment procedures are used by researchers to

examine these styles of categorization. The first, a figure sorting

task (Kagan, Moss and Sigel, 1963), is geared to adults and consists of

selecting from a group of three pictures of people the two which go to-

gether on some common basis. Thirty-two response choices are possible,

each of which is scored as belonging to one of two orientations (egocentric or stimulus centered) and one of the three general style categories of analytic-descriptive, relational or inferential-categorical.

The second test, the Conceptual Style Test (CST) (Kagan, Moss and Sigel, 1963), is for children and consists of 30 sets of three black-and-white drawings. The child selects two of the drawings and tells why they go together. The content of the test drawings lends itself mainly to descriptive and analytical responses.

The third assessment procedure is the Sigel Cognitive Style Test (SCST) (Sigel, 1967). It was utilized in the present study. There are two forms, one for boys and one for girls. Scoring and classification of the responses was outlined at the beginning of this section as described by Sigel, Jarman and Hanesian (1967). This test differs from the CST in the addition of the Descriptive-Global category.

Three studies provide the bulk of stability and developmental trend data concerning styles of categorization (Kagan, Moss and Sigel, 1963, Kagan et al., 1964 and Sigel, 1953). Generally, descriptive responses increase with age while relational responses decrease. People using a descriptive or analytic style in their response appear to attend better to factual detail in concept acquisition. Lee, Kagan and Rabson (1963) found that boys using a more descriptive response style learn more rapidly concepts requiring pictorial stimuli analysis. Those classified as analytic or descriptive in their response style scored better on performance tests than on verbal tests (Kagan et al., 1964). Additional studies dealing with concept learning and styles of categorization include: Nelson, 1972; Beller, 1967; Davis, 1967; Lee, Kagan and

Rabson, 1963; Ohnmacht, 1966; Frederick, 1968 and Elkind, Koegler and Go, 1963. Those subjects found to be non-analytic however, tend to score better on verbal tests and tend to be more impulsive than analytical subjects on conceptual tempo tasks like the MFFT. (Kagan, Moss and Sigel, 1963; and Kagan et al., 1964). Coop and Brown (1970) point out that there does not appear to be a significant difference between analytic and non-analytic subjects in terms of total IQ scores. Scott (1972) found that analytical can be developed and enhanced through the use of the Inquiry Process training which had lasting effects over a five to six year period. All three major styles or categorization (descriptive, relational and inferential) can be found at all levels of development from pre-school through adolescence (White, 1971; Kagan, Moss and Sigel, 1963 and Sigel, Jarman and Hanesian, 1967).

Five studies were found that related styles of categorization to various reading related variables. Garrettson (1971) examined the interrelations between the CST, five Piagetian tasks and reading achievement as measured by the Metropolitan Reading Achievement Test, Primary I Battery. The CST and reading achievement test correlation coefficient (r=.18) was not significant for her sample of second grade boys.

Serafica and Sigel (1970) state:

> The concept of cognitive styles implies that each child approaches the task of learning to read with his own established patterns for coping with environmental stimuli. Certain modes of categorization may facilitate the reading process whereas others may be disfunctional for the task requirements. (p. 106)

Kagan, Moss and Sigel (1963) felt that an analytic attitude may aid in early reading mastery. Serafica and Sigel (1970) go on to state:

> Noticing the differences between such words as "cat" and
> "bat" and "dog" and "bog" requires differentiation and
> analysis of the stimulus. Such cognitive operations call
> for reflection. The child who is restless and impulsive is
> less likely to be analytic and will therefore be more apt to
> encounter difficulty in learning to read than his peer who
> possesses greater capacity and/or tolerance for delay.
> Furthermore, preference for a relational-contextual approach
> which involves passive acceptance of the entire stimulus
> as a figure without background elements and a tendency to
> establish associations based on global impressions or idio-
> syncratic experience is likely to mislead the child as he
> endeavors to make sense out of the maze of symbols on the
> printed page. (p. 106)

For them, reading is an active, perceptual-cognitive process
involving differentiated perception, organization and integration. A
student scans his memory system for relevant cues and then distinguishes
them from irrelevant cues. This can be easier for the student with an
analytic style of categorization. Relevant characteristics can be cate-
gorized, which aid the student in the forming of class relationships and
finally make it possible to deal meaningfully with larger information
units. Making inferences then should facilitate comprehension.

Specifically Serafica and Sigel (1970) compared a group of 24
boys (ages 8-10) who were functioning at least one year below grade level
and who had a history of reading disability with a control group without
identified reading problems. The SCST was given to both groups. The
nonreaders used significantly more relational-contextual responses. Sig-
nificantly higher mean scores for descriptive whole responses and two of
the categorical-inferential response categories were obtained by the non-
readers. They concluded that readers and nonreaders differed in their
conceptual and integrative abilities. Boys who could read used their
analytic ability to selectively attend to specific descriptive features

to help with the forming of concepts, while nonreaders stopped at analysis.

Davey (1971) used Goodman's Oral Reading Inventory and scored it according to the Goodman Taxonomy of Oral Reading Errors. She also gave the SCST. She examined differences between 38 fourth grade boys who were either achievers or underachievers in reading and either analytic or non-analytic in their cognitive style.

> Significant findings ($p < .05$) resulting from analyses of variance for twenty-eight categories of oral reading errors included: (1) achievers and underachievers differed in errors resulting in minimal meaning change and in noncorrected errors resulting in extensive meaning change; (2) boys of an analytic style differed significantly from boys of a non-analytic style in punctuation errors and in errors of high syntactic acceptability with low graphic acceptability; (3) analytic achievers and non-analytic achievers differed in punctuation errors and errors of high syntactic acceptability with low graphic acceptability; (4) analytic achievers and analytic underachievers differed in noncorrected errors resulting in extensive meaning change; (5) non-analytic achievers and non-analytic underachievers differed in errors with low syntactic acceptability; and (6) analytic underachievers and non-analytic underachievers differed in errors of high syntactic acceptability with low graphic acceptability. (Davey, 1971)

Annesley (1971) examined the relationships between the SCST, the Slosson Intelligence Test (SIT, 1965) and reading achievement in 80 fifth grade boys. Reading achievement was evaluated by an elaborate screening of subjects utilizing the Iowa Test of Basic Skills, teacher evaluations and an informal reading inventory which resulted in below average, average and above average ratings. He found:

1. No significant difference in the frequency of the use of RC responses for various reading levels.

2. Above average readers used more descriptive DPW responses than below average readers and average readers. Average

and below average readers showed no significant differences on DPW responses.

3. Below average and above average readers cannot be differentiated in their use of CI responses.

4. RC increases as does IQ with below average intelligence subjects showing significantly lower response rates than those with either average or above average intelligence.

5. IQ levels are not related to DPW responses.

6. CI is not a function IQ.

Taken as a whole, these studies imply that styles of categorization can play an active role in a student's ability to read. To find out specifically what this role involves will require considerable research with regard to the interaction of intelligence skills, reading related variables and various patterns of these styles of categorization. One of the specific focuses of the present study was the examination of the various styles of categorization as they relate to the WISC, MFFT, CEFT and WTRSD-B-C.

Reflection-Impulsivity

Kagan (1966) states that:

The reflection-impulsivity dimension describes the degree to which a child reflects upon the differential validity of alternative solution hypotheses in situations where many response possibilities are available simultaneously. In these problem situations the children with fast tempos impulsively report the first hypothesis that occurs to them, and this is typically incorrect. The reflective child, on the other hand, delays a long time before reporting a solution hypothesis and is usually correct. (p. 119)

There are three assessment tests usually utilized in measuring this reflection-impulsivity variable, sometimes referred to as conceptual tempo. These measures record two scores for each subject: reaction time before the first response and the number of errors. They include

the Haptic Visual Matching (HVM) test, the Design Recall test (DRT), and the Matching Familiar Figures test (MFFT) (Kagan et al., 1964). The HVM involves tactually feeling a three-dimensional wooden geometric form or a familiar object which the subject can't see. Then the subject must select the form from a five variant visual array. Time taken to explore the form is also recorded. The DRT involves looking at a geometric de-sign 15 seconds, and then finding it in an array of several variants of the design. The MFFT involves a similar task where the figures viewed are meaningful figures (houses, trees, dresses) instead of geometric designs. Response time to the nearest half-second for the first response of each of 12 sets of pictures and total number of errors are recorded. Those subjects scoring above the median of total errors and below the average response time median are classified as Impulsive. Those subjects with low errors and high response time are classified as Reflective. Re-search suggests low to moderate stability. Lewis, Rousch, Goldberg and Dodd (1968) found no sex differences on a MFFT-like test in a group of three and four year-old subjects. Bosserman (1971) found response times and errors to be more highly correlated in boys than in girls. Meichen-baum and Goodman (1969) found girls in kindergarten had significantly longer RT's than boys.

The Reflection-Impulsivity variable has been tied to a wide variety of educationally related variables. These include body build (Kagan, 1966) anxiety on mirror tracing (Barratt, 1959), verbal control of motor behavior (Meichenbaum and Goodman, 1969), inductive reasoning (Kagan, Pearson, and Welch, 1966), and a wide variety of concept learning studies (Nelson, 1972). Messer (1970) found that impulsive subjects were

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more prevalent in a group who repeated grades. After reviewing studies
dealing with attempts to train impulsive subjects to be more reflective
by modeling behaviors, Nelson (1972) found that while response times
could be increased, number of errors could not be decreased. Also, when
training in reflective techniques did succeed in reducing the subjects'
errors on the MFFT, their response times were not increased.

There are four studies which relate MFFT variables to a variety
of reading-related variables. Yando and Kagan (1968) examined 80 first
grade boys and 80 first grade girls from 10 classrooms with impulsive and
10 with reflective female teachers. Subjects were tested with the MFFT
in the fall and in the spring. Among the variables intercorrelated were
the MFFT errors and MFFT response times both for fall and spring, the
Metropolitan Reading Readiness Test, socioeconomic class and teacher eval-
uation of the child. Significant relationships were found between: the
MFFT-E (Fall and Spring) and Metropolitan for girls; and the MFFT-RT
(Spring) and the Metropolitan for girls.

Ault, Crawford and Jeffrey (1972) examined the visual scanning
strategies of nine year-olds by counting eye movements as they performed
a MFFT-like task. They found that reflective and fast-accurate subjects
(those subjects below the median on RT and also on E's) were more system-
atic and made a greater proportion of these comparisons than impulsive
and slow-inaccurate subjects (those above the median on RT and E's).

Erickson (1972), using kindergarten boys and girls, administered
the MFFT and two word recognition tasks involving intra-list similarity.

> The data indicated that although the high similarity word
> list took many more trials to learn and tended to enhance
> the word recognition skill of reflective children more than

impulsive children, it did not clearly provide a signifi-
cantly better payoff in word recognition skill than the
similar word list. (p. 3)

Kagan (1965b) gave the HVM, DRT, and MFFT to each of 130 end of

first grade children and again at the end of the second grade. At the

end of the first grade, he administered the Vocabulary and Information

subtests from the Verbal section of the WISC. He also gave a reading

type measure in which he recorded errors made as the subject read the

letters of the alphabet from a random list of cards with the letters

on them. A word recognitive task was administered where the examiner

read to the subject one word in a five-word array on a card and the sub-

ject picked it out. Response times and errors were recorded.

At the end of grade 2 he administered the MFFT again and each

subject was given a paragraph to read to the examiner. Ten error types

were recorded. In summary, Kagan (1965b) states:

> Children who were impulsive, in contrast to reflective in
> the selection of response alternatives in design matching
> tests (i.e. made many errors and displayed fast decision
> times) made more recognition errors in reading English words
> presented singly or in a prose selection. The relation be-
> tween fast decision times and reading errors was better for
> high verbal than for low verbal subjects. The measures of
> impulsivity on design matching tests gathered in grade one
> were positively correlated with reading errors one year
> later, with fast response times being the better predictor
> for boys and with high error scores being the better pre-
> dictor for girls. It was suggested that the child's tendency
> to make fast decisions in problems with response uncertainty is
> a determinant of quality of reading performance, and reme-
> dial programs in reading should acknowledge the relevance of
> this disposition. (pp. 627-628)

In summary, no study has focused on the aided reading compre-

hension variables used in the present study in relation to MFFT variables.

Other studies have dealt primarily with word attack skill. When intel-

ligence is controlled, what is the relationship between the WTRSD-B-C

and the MFFT-E and MFFT-RT? Also of interest to the author in the pre-

sent study is the relationship between MFFT-E, MFFT-RT and CEFT scores

as they relate to each other. Do the MFFT and CEFT overlap in the vari-

ables which they measure?

Intelligence

Belmont and Birch (1966), in a very complete summary of intel-

ligence, as measured by the WISC, and its relation to reading retardation,

emphasized the significant correlations between reading difficulties and

the Verbal scale of the WISC. Retarded readers did better on the Per-

formance section (WISC-P) and little difference was found in terms of

WISC-FS. This lends support to the fact that reading is largely a lan-

guage-related function, rather than primarily a perceptual-related func-

tion. This is especially true of reading comprehension skills and of the

aided reading comprehension measures utilized in the present study. Most

correlation coefficients reported in the literature range from .4 to .7

in terms of the relationship between intelligence and reading skills.

Some mention has been made of the relationship between the vari-

ous cognitive style measures and the variables measured by intelligence

tests. In terms of the SCST, Sigel, Jarman and Hanesian (1963) found

that for high test-anxious children, performance on intelligence is in-

fluenced by the Categorical-Inferential (CI) categorization style. Scott

(1972) found no significant correlation between intelligence and the use

of CI responses or between intelligence test and achievement scores in

science. He found that cognitive style (style of conceptualization) was a better predictor of a science concept test than the intelligence measure. Summarizing the relation between intelligence measures and the WISC test philosophy of scoring, Annesley (1971) found support for the idea that intelligence test results are a function of cognitive style.

In terms of the MFFT and intelligence, the relationship is not at all clear. Kagan, et al., (1964, Study 2) found that WISC-V scores are not related to MFFT-E and MFFT-RT scores. They did find some low negative correlations between MFFT-E, HVM and DRT and IQ as measured by the California Test of Mental Maturity but not with MFFT-RT's. Kagan, Pearson and Welch (1966a) found a negative correlation between MFFT and HVM and WISC-V but RT scores were independent of WISC-FS. Meichenbaum and Goodman (1969), utilizing the Primary Mental Abilities Tests, Ward (1968), utilizing the Peabody Picture Vocabulary Test, and Lewis, Rousch and Goldberg (1968), utilizing the Stanford-Binet, all found somewhat confusing and inconsistent results. Nelson (1972) suggests two reasons why this occurs. First, the conceptual tempo-IQ relationship is dependent on the nature of the test used. Secondly, most cognitive style tests are utilized with younger children. Intelligence measures, especially those which are short-forms, picture oriented and group administered are relatively less reliable than a longer more complete measure like the WISC or Stanford-Binet. The WISC was selected for the present study because it controls for some of the variability found in other measures, even though it takes longer to administer.

The early work of Witkin, et al. (1962) dealt with a factor called an Analytic or Perceptual Index. It is comprised of three sub-tests of the WISC-P (Block Design, Picture Completion and Objective Assembly). Much of the factor analytic work by Thurstone (1944, 1949) and Witkin, et al. (1962 pp.66-68) led to a view of intelligence as a wide variety of skills which could be divided into three factors: verbal comprehension, attention-concentration and analytic field approach. This latter factor was found to relate to the EFT and other disembedding tasks. As one looks at the various intercorrelations between those intelligence or thinking variables, or perhaps, skills which are utilized in comprehending spoken and written language, the question arises as to their relationship to cognitive style variables like the CEFT, the MFFT, the SCST, and the Wisconsin Tests for Reading Skill Development—Level B-Comprehension. For that reason the WISC-AI was included in the present study. If thinking involves a wide variety of skills, which of these are similar to, if not the same, as specific cognitive styles? And then, how do these styles relate to those aided reading comprehension variables implicated in our understanding of the reading processes and conceptual models?

Comprehension

Reviews of the early work in reading comprehension generally start with the work of Thorndike (1917) and proceed through the work of Richards (1929), Berry (1931), Dewey (1935), Feder (1938), Traxler (1941) and Harris (1948). These correlational studies began to explore the

various components of comprehension working on the understanding that reading comprehension is not a unitary process. Davis' (1944) major factor analytic study of comprehension dealt with nine factors though these were reduced somewhat in a later factor analytic study (Davis, 1968). In the latter study he found that the largest percentage of unique variance clusters on a skill called "memory for word meaning". The next largest percentage of unique variance was referred to as "drawing inferences from context". Other skills, in order, included "following the structure of the passage"; "recognizing a writer's purpose, attitude, tone and mood"; and "finding answers to questions asked explicitly or in paraphrase".

Chester (1971), Smith (1970) and Davis (1972) outline in some detail the growing trend of a multi-skill theory of comprehension. While all skills involved in comprehension may not be measureable or even identifiable, those which can be measured and dealt with by teachers in practice are focused upon by those selected in the Wisconsin Tests for Reading Skill Development-Comprehension. The five skills measured by the WTRSD-B-C are based on historical, empirical and logical importance. The literal and inferential skills dealt with seem most related to the kinds of skills measured by intelligence variables and, perhaps, those variables referred to in the present study as cognitive style. While considerable further study will be required in order to deal with reading comprehension measures which are not aided (orally read to subject), the WTRSD-B-C tests do provide a logical and natural tie between listening comprehension and reading comprehension. They also provide a clear focus on aided

reading comprehension skills by controlling for the wide variability in various word attack skills in first grade subjects. In fact, nearly the same WTRSD-B-C tests are given at Level C in the sequence except that the items are not read to the subject. Reliability coefficients and additional details on the selection of the WTRSD-B-C are reported in Chapter 2. Directions and sample items of the tests appear in Appendices D-H.

CHAPTER 2

METHOD

Subjects

Subjects were selected from first grade classes in one school in
each of two cities in Southern Wisconsin with populations of less than
5,000. In one school a complete classroom of 25 subjects (10 boys, 15
girls) was utilized, in the other, six students were randomly picked from
each of two classrooms with a combined total of 50 students. The total
sample size, then, was 37 subjects (16 boys, 21 girls). It was found
that three of the boys (one from the first school and two from the se-
cond) had previously been referred for psychological testing and had been
given part or all of the WISC. In order not to introduce inter-tester
variability with regard to the WISC, it was decided to drop these three
subjects. The final sample, then, consisted of 34 subjects (13 boys,
21 girls).

The sample represented a wide range of socio-economic levels and
classifications ranging from low to upper-middle classes. All subjects
were Caucasian. One female subject was from a bilingual home.

Subjects were all first graders with a mean age of 87.3 months
(SD = 4.6 months) at the time of the testing during May. WISC Full Scale
Intelligence scores ranged from 89 to 142, with a mean score of 112.1

and a standard deviation of 12.3. Additional descriptive data are dis-
cussed in Chapter 3 as each of the 16 variables is examined.

Procedure

The first tests given to each subject were those dealing with
cognitive styles: the Children's Embedded Figures Test (CEFT), the
Matching Familiar Figures Test (MFFT), and the Sigel Cognitive Styles
Test (SCST). Each of these was randomly rotated with each subject. The
author gave two tests and usually the third in one sitting unless it
appeared that fatigue or attention span would affect the performance.
All three tests were administered by the author to one subject at a time.
This testing was done in small familiar rooms near the subjects' class-
room. As with all the other measures, testing was scheduled so that it
did not interfere with recesses, noon breaks or special class activities.
Administration time for all three of these measures together varied from
30 to 60 minutes.

The next test administered to each was the Wechsler Intelligence
Scale for Children (WISC). A qualified psychometrist, assisting the
author, gave and interpreted all 34 of these tests. The testing took
place under conditions identical to those described for the cognitive
style measures. Administration time varied from about 30 to 60 minutes.
Once the individual testing was completed in each school, the five aided
reading comprehension tests comprising the Wisconsin Tests for Reading
Skill Development, Level B-Comprehension (WTRSD-B-C) were given in two
settings to the entire group in each school. The author read each item
to the group while they read it silently to themselves or followed along.

The psychometrist assisted by making sure each subject understood the
task and marked a response for each question. In the school with 25
subjects at a sitting, the classroom teacher also assisted the psycho-
logical examiner. In each school, three subjects missed one of the
group testing sessions. In these cases the author gave the missed tests
individually. The first sitting, involving the WTRSD-B-C, Tests 1-3,
took approximately 40 minutes. The second sitting, involving the WTRSD-
B-C, Tests 4-5, took approximately 30 minutes. The group testing occurred
in the classroom of the 25 subjects in one school and in a familiar
classroom in the second school.

<div align="center">Instruments</div>

Children's Embedded Figures Test

The CEFT (Karp and Konstadt, 1971) was administered individually
by the author. The task involves finding a small "tent" and "house"
shaped figure in a larger more complex picture. Directions and an ex-
ample of the CEFT items are included in Appendix A. There are 25 possi-
ble items and the subject's score is the number correct. The higher
the score, the more field independent the subject. In classifying the
subjects, the median score is used. Those above the median are classed
as field independent; those below the median are classed as field de-
pendent.

The CEFT was standardized on 160 randomly selected children rang-
ing from 5-12 years of age in two Brooklyn, New York schools with a wide
variety of ethnic, religious and racial groups. Witkin, Ottman, Raskin
and Karp (1971) report a significant age effect with subjects becoming

more field independent. Age and sex interactions were not signifi-
cant. Internal consistancy reliability estimates ranged from .83 to
.90 for 7-8 year old subjects. These were consistent with similar
CHEF studies estimates found for 9-10 and 11-12 year old subjects. A
test retest correlation of .87 was also reported for 5 year old child-
ren retested 5-6 months later. These reliability correlation relate
favorably to those reported for the EFT.

A wide variety of validity coefficients are also reported in
Witkin, Ottman, Raskin and Karp (1971). Because the EFT is too diffi-
cult for younger children comparisons with CEFT are difficult to make.
Validity coefficients for 11-12 year old subjects ranged from .83 to
.86. CEFT-EFT product moment coefficients for 9 year old subjects
ranged from .70 to .73. When correlated to account for reliability, the
validity coefficients at age nine reached .80. Face validity, high EFT-
CEFT validity coefficients and the significant age effect suggest that
the CEFT is an adequate measure of field dependence at this age level.

Sigel Cognitive Style Test

The SCST, Forms M and F (Sigel, 1967) measure the style of cate-
gorization a subject employs when asked to select pairs of figures from
a series of plates with three familiar figures on each and state the
reason for the choice. See Appendix B for directions and an example of
the items. These reasons are then classified as Descriptive Part-Whole
(DPW), Descriptive Global (DG), Relational-Contextual (RC) and Cate-
gorical-Inferential (CI). Each of these categories is described in
Chapter 1. Scores recorded for purposes of analysis were the percent
of total responses in each of these categories. As in the Serafica and

Sigel (1970) study, several of the responses in the present study could
not be classified as one of the four mentioned above (DPW, DG, RC, or
CI). A "negative" classification was used to denote a response which
referred to a pair explicitly selected as not being like the third one
(eg., This one and this one are not round like the third one). A
"disjunctive" classification was used to denote a response in which dif-
ferences in the chosen pair were explicitly stated (eg., This one is
black and this one is white).

Reliability studies dealing with the SCST are reported in a
variety of studies. Annesley (1971), in a pilot study for his main study,
found 80% test and retest agreement on overall mean percent agreement
after 10 days. Kagan, et al. (1964) reported a corrected split-half
reliability coefficient of .94 based on 300 protocols. This was based,
however, on DPW responses only. Scott and Sigel (1965) reported odd-even
coefficients ranging from .45 to .83 for the range of six subcategories
with a .71 coefficient for the overall test. Scott (1971) analysed the
35 original SCST stimulus cards in elementary schools and found that both
boys and girls answered some plates in the same way. In order to im-
prove reliabilities he created one form for boys with 20 plates and one
form for girls with 16 items. Resulting split-half reliability coeffi-
cients for the girls on the overall test were .85 and for boys the over-
all test coefficient was .63. Given to a group of high school boys and
girls, the resulting split-half coefficients were .74 and .81 respectively.
Davis (1971) administered a shorted group version of the SCST to fifth,
eighth, and eleventh grades and college subjects. Mean test-retest re-
liability coefficients of .66 and .63 were reported for response fre-

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quencies and percentages, respectively. He also noted that there
were no sex differences and that the four grade levels yielded devel-
opmental trends inconsistent with previous studies. Basically his
concern centered around the fact that the use of total response fre-
quencies based on unlimited free responses. In the present study,
percentages of the four response categories are used and a frequency
percentage pattern analysis procedure is suggested to deal with this
problem.

Matching Familiar Figures Test

The MFFT (Kagan, 1965a) measures a subject's response time (RT)
and number of errors (E). The tasks involve selecting 12 figures from
12 arrays of six similar figures. Those subjects scoring above the
median in terms of total errors and below the median in terms of aver-
age response times are classified as Implusive. Conversely, those sub-
jects with fewer errors and longer response times are classified as Re-
flective. For specific directions and an example of an item, see Ap-
pendix C.

In terms of reliability studies, Yando and Kagan (1968) found RT
for first grade girls to be stable (.70), but lower for boys over a 9
month period. Messer (1970) found significant test-retest correlations
for first grade boys 2-1/2 years later. Siegelman (1969) found a test-
retest correlation of .73 for 4th grade boys over a short period of
time. Yando and Kagan (1969) found test-retest reliability coefficients
for second grade children over a 10 week period of .68 ($p < .01$) for errors
and .73 ($p < .01$) for response time. Kagan (1965b) found similar results
for both boys and girls tested at the end of first grade and again at the

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end of second grade.

In terms of validity correlations Messer (1970) found significant coefficients between HVM and MFFT in first graders. These results were substantiated by Kagan, Pearson, and Welch (1966) and Kagan (1966). Kagan, et al. (1964) found positive correlations between DRT, HVM, and MFFT for third graders.

Wechsler Intelligence Scale for Children

The WISC was individually adminstered in a standard fashion to each subject and scored by a qualified psychological examiner according to the WESC manual (Wechsler, 1949). Three scores were recorded: Full Scale, Verbal and Performance. The scores were based on the following subtests:

Verbal	Performance
General Information	Picture Vocabulary
General Comprehension	Picture Arrangement
Arithmetic	Block Design
Similarities	Object Assembly
Vocabulary	Coding

In this study, an additional score, Analytic Index, was derived. This score is a composite of the scaled scores derived from three WISC subtests: Block Design, Object Assembly and Picture Completion. This measure has been found to correlate substantially with the field dependence-independence variable (Goodenough and Karp, 1961 and Witkin et al., 1962) as discussed in Chapter 1, page

Adequate reliability and validity coefficients for the WISC have been widely reported and recognized (Nunnally, 1959). While some questions have been raised in the literature about the validity of the WISC with various ethnic and socioeconomic groups, it should be pointed out

that the present sample included 33 white children and closely matched
the urban-rural and parental occupation ratios reported in the stan-
dardization data.

Wisconsin Tests of Reading Skill Development, Level B-Comprehension

The WTRSD-B-C is a set of five aided reading comprehension tests
which were given in two settings to the entire group of subjects in each
school. As discussed in Chapter 1, these tests were developed by the
Wisconsin Design for Reading Skill Development staff at the Wisconsin
Research and Development Center for Cognitive Learning at the University
of Wisconsin-Madison.

This set of competency based aided reading comprehension instru-
ments measures five specific skills:

> Test 1--Paragraph Topics. The subject identifies the
> topics of paragraphs. Topics are expressed as
> single words or as phrases.

> Test 2--Before or After. After hearing a four-event
> story, the subject selects the picture that shows
> what happened either just before or just after
> the event specified by the examiner.

> Test 3--Outcomes. The subject selects the one of four
> pictures that shows the action likely to fol-
> low a three-part event described in a sentence
> read to him by the examiner.

> Test 4--Cause-Effect. The subject indicates whether
> pairs of events are causally related.

> Test 5--Detail. The subject answers questions about
> stories. The questions require the subject to
> identify specific nouns, adjectives and verbs as
> well as antecedents of pronouns. (Otto, 1973, p.4)

In Tests 1, 4 and 5 the author read each item to the group while
they read it silently to themselves. In Tests 2 and 3, the author read
each item to the group while they examined sets of either three or four

drawings. Directions and an example of the items in each of the five tests are included in Appendices D-H. General theoretical and empirical support for the five skills measured are discussed in Chapter 1.

While data are still being collected on the Comprehension section of the Wisconsin Design for Reading Skill Development, the reliability and validity estimates appear to be well within acceptable ranges. In terms of inter-test correlation, Table 1, based on N = 279, is offered.

TABLE 1.

INTER-TEST CORRELATIONS OF THE WTRSD-B-C
AND TOTAL WORD ATTACK SKILLS

TEST	1	2	3	4	5	6
1. Word Attack	---					
2. Paragraph Topics, Form I	.567	---				
3. Before or After	.493	.506	---			
4. Outcomes	.435	.401	.544	---		
5. Cause-Effect, Form I	.474	.394	.517	.532	---	
6. Detail, Form I	.584	.495	.555	.522	.497	---

Stewart (1973), in a personal communication, pointed out that the intercorrelation coefficients in Table 1 and the following estimated internal-consistency reliability coefficients "were obtained from reruns of data with some test items omitted" and are to be considered as "preliminary data only." She goes on to say that "although we have found that our estimates tend to work well, you must be aware of their limitations." Reported estimated internal consistency reliabilities are: Main Idea, Form I, .87; Sequence, .69; Outcomes, .80; Cause-Effect, Form I, .73; and Detail, Form I, .84.

TABLE 2.

DESCRIPTIVE STANDARDIZATION DATA[1]
INCLUDING THE PRESENT SUBJECT POOL[2]

TEST	N. OF ITEMS	MEAN RAW S	MEAN %	MASTERS[3] N	%
1. Main Idea	30(15)	21.49(13.24)	71.6(88.3)	115(30)	50.0(88.2)
2. Sequence	12(12)	8.26(9.21)	68.8(76.8)	76(17)	33.0(50.0)
3. Outcomes	12(12)	6.37(7.59)	53.1(63.3)	49(12)	21.3(35.3)
4. Cause-Effect	26(24)	20.12(19.26)	77.4(80.3)	79(21)	59.0(61.8)
5. Detail	40(20)	29.71(15.35)	74.3(76.8)	103(20)	44.8(58.7)
			Total	126(7)	54.8(20.6)

1--N = 230
2--N = 34
3--This term applies to those students who have scored 80% or better on
   one of the WTRSD tests as outlined in the Rationale and Guidelines of
   the Wisconsin Design for Reading Skill Development by Wayne Otto and
   Eunice Askov, 1970.

Standardization studies of the WTRSD-B-C are summarized in Table

2. Data from the present study are in parentheses so that data from both

groups can be compared.

Scoring

The CEFT, MFFT and SCST were all hand scored and summarized by

the author. The CEFT and MFFT are straightforward in their scoring.

The subject either finds the embedded form on the CEFT or he doesn't.

The same is true on the MFFT and, in addition, a stop watch is used to

measure response time.

The SCST requires a certain amount of judgment in that once the

subject selects various pairs of figures and gives a reason for that

choice the reasons must be classified into four categories by standards

set out in Sigel (1967). For that reason three intact and unused protocols were scored independently by the author and two other raters who were not involved in the study. One rater had nearly completed and one had just completed a doctoral degree in Reading at the University of Wisconsin-Madison. Results of the interrater agreement are summarized in Table 3. Sufficient agreement was found to place adequate confidence in the author's scoring of the SCST.

TABLE 3.

INTERRATER AGREEMENT BETWEEN THREE JUDGES
ON CLASSIFICATION OF RESPONSE ON THE SCST

	TOTAL RESPONSES	DISAGREE	AGREE	% AGREEMENT
Test A	89	5	84	94.4%
Test B	113	6	107	94.7%
Test C	41	1	40	97.6%
Total	243	12	231	95.1%

When these results are interpreted utilizing a cumulative binomial distribution, they indicate that a total percentage agreement of this magnitude (95.1%) significantly differs from chance (p $<.10^{-9}$).

As mentioned earlier, all WISC protocols were administered and interpreted by a trained psychometrist. Four scores were obtained: WISC Full Scale, WISC Verbal, WISC Performance and the AI which is the total scaled scores from the Block Design, Object Assembly and Picture Completion subtests.

The WTRSD-B-C, tests 1-5, were handscored by the author using the straightforward directions outlined in the Test Adminstrator's Manual, Level B (Otto, 1973).

<center>Data Analysis</center>

As outlined in the Statement of the Problem section of Chapter 1, the author used 10 sets of questions to examine the intercorrelations between field dependence-independence, styles of categorization, re-flectivity-impulsivity, four intelligence variables and five aided reading comprehension variables. To that end, 16 variables from the SCST, CEFT, MFFT, WISC and WTRSD-B-C were included on three intercorrelation matricies: one for males, one for females and a combination of both. In order to examine the relationship between the cognitive style vari-ables (SCST, CEFT and MFFT) and the aided reading comprehension variables (WTRSD-B-C, Tests 1-5) with intelligence (WISC-FS) controlled, three sets of partial correlations were run.

Since research in the area of cognitive style, and, in this case, the WTRSD-B-C, is still formative, the level of significance accepted in this study is .10. The degree of the levels of significance for corre-lation coefficients obtained from the intercorrelation of cognitive style, intelligence and aided reading comprehension measures are important in analyzing the present data with regard to other studies in the literature. Therefore, in the present study all correlation coefficients of $p < .10$ and above are reported in the Tables and discussions in Chapters 3 and 4.

CHAPTER 3

RESULTS AND DISCUSSION

Sixteen variables derived from the Children's Embedded Figures Test (CEFT), the Sigel Cognitive Styles Test (SCST), the Matching Familiar Figures Test (MFFT), the Wisconsin Intelligence Scale for Children (WISC), and the Wisconsin Tests for Reading Skill Development, Level B-Comprehension (WTRSD-B-C) were intercorrelated using the DSTATZ Program in the STATJOB SYSTEM maintained by the Madison Academic Computing Center. Partial correlations and their levels of significance were computed utilizing procedures outlined by Hays (1963, pp. 530-31, 574-76). Descriptive data on each of the above five tests are presented followed by a discussion of the intercorrelational data as they pertain to each of the 10 questions raised in the present study.

Descriptive Data

Children's Embedded Figures Test

The ranges, means and standard deviations of the 21 females and 13 males in the study are summarized in Table 4. Witkin, Oltman, Raskin and Karp (1971) present similar means and standard deviations for their 7-8 year old age group: male, 11.4 and 6.2; female, 9.8 and 4.8; and total, 10.6 and 5.6. Watson (1969) also found similar results with 25 first grade boys: range, 3-21; mean 11.16 and standard deviation 4.90.

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TABLE 4.

SUMMARY OF CEFT RANGES,
MEANS AND STANDARD DEVIATIONS

	RANGE	MEAN	SD
Male	4-22	11.077	5.499
Female	3-18	10.381	4.620
Total	?-22	10.647	4.904

Sigel Cognitive Styles Test

The ranges, means and standard deviations for each of the four
major styles of categorization percentages for males and females on the
SCST are summarized in Table 5. These styles include: Descriptive Part-
Whole (DPW), Descriptive Global (DG), Relational-Contextual (RC), and
Categorical-Inferential (CI). Negative and Disjuctive response per-
centage ranges and means are also presented though they comprise a sub-
stantially smaller percentage of total responses. Females had a higher
percentage of DG responses, while males had a higher percentage of RC
responses. Considerable variability was found with RC response per-
centages for both males and females. No norms were reported by the
author (Sigel, 1967). No data were found describing first grade student
performance on the SCST.

Matching Familiar Figures Test

The ranges, means and standard deviations for the two variables
measured by the MFFT, response time (RT) and errors (E) are summarized

TABLE 5.

SUMMARY OF SCST CATEGORY
PERCENTAGE RANGES, MEANS AND
STANDARD DEVIATIONS

		RANGE	MEAN	SD
DPW%	Male	8.70-85.37	41.600	25.938
	Female	13.04-86.30	43.743	22.115
	Total	8.70-86.30	42.924	23.284
DG%	Male	0-35.71	11.062	10.688
	Female	1.37-42.86	16.843	9.914
	Total	0-42.86	14.632	10.452
RC%	Male	0-65.22	13.100	17.063
	Female	0-29.41	8.371	9.702
	Total	0-65.22	10.179	12.975
CI%	Male	14.63-55.77	30.169	12.306
	Female	6.56-55.56	28.586	13.521
	Total	6.56-55.77	29.191	12.903

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in Table 6. No sex differences were found with either MFFT or MFFT-E.
All subjects were classified as being either Reflective, those falling
above the MFFT-RT median and below the MFFT-E median, or Impulsive,
those falling below the MFFT-RT median and above the E median. Reflec-
tive subjects (N = 11) had a mean MFFT-RT of 18.17 and a mean MFFT-E
of 7.09; while Impulsive subjects (N = 12) had a mean of 8.13 and 19.00
respectively. These mean scores for Reflective and Impulsive subjects
are similar to those reported by other studies examining first grade
subjects (Kagan, 1965a; Yando and Kagan, 1968; Kagan, Pearson and Welch,
1966b).

TABLE 6.

SUMMARY OF MFFT RANGES,
MEANS AND STANDARD DEVIATIONS

		RANGE	MEAN	SD
RT	Male	6.96-30.00	14.354	7.130
	Female	4.67-24.25	11.629	5.188
	Total	4.67-30.00	12.671	6.050
E	Male	6-29	13.615	7.205
	Female	5-21	13.143	4.597
	Total	5-29	13.324	5.634

Wechsler Intelligence Scale for Children

The ranges, means and standard deviations of the four variables derived from the WISC are summarized in Table 7. These variables include: Full Scale (FS), Verbal (V), Performance (P) and the Analytic Index (AI). No substantial differences between males and females were apparent in any of the four measures, except for the WISC-V in which the males' mean is somewhat higher than the females' mean.

Wisconsin Tests for Reading Skill Development, Level B-Comprehension

The ranges, means and standard deviations of the five tests included in the WTRSD-B-C are summarized in Table 8. The tests include: Paragraph Topic (PT), Before or After (BA), Outcomes (O), Cause-Effect (CE), and Detail (D). No sex differences were apparent for any of the five measures. Comparisons of the present sample to that used in standardizing the WTRSD-B-C were presented earlier in Table 2 (Chapter 2).

Questions

Through the analysis of the data, 10 questions were examined in the present study. Each of the questions is discussed in order.

1. a. To what degree is field dependence-independence (CEFT) associated with performance of the following aided reading comprehension skills (WTRSD-B-C)?

    1) Identifying a paragraph topic (WTRSD-PT)

    2) Determining sequence (WTRSD-BA)

    3) Using logical reasoning in predicting outcomes (WTRSD-O)

    4) Using logical reasoning in synthesizing information (WTRSD-CE)

TABLE 7.

SUMMARY OF WISC RANGES,
MEANS AND STANDARD DEVIATIONS

		RANGE	MEAN	SD
FS	Male	100–142	114.38	11.67
	Female	89–138	110.62	12.69
	Total	89–142	112.06	12.27
V	Male	97–138	112.62	10.63
	Female	82–135	105.00	14.05
	Total	82–138	107.91	13.22
P	Male	97–139	113.54	12.29
	Female	89–135	114.90	12.29
	Total	89–139	114.38	12.12
AI	Male	25–52	37.85	7.34
	Female	25–48	36.00	6.61
	Total	25–52	36.71	6.85

TABLE 8.

SUMMARY OF WTRSD-B-C RANGES,
MEANS AND STANDARD DEVIATIONS

		RANGE	MEAN	SD
PT	Male	4-15	13.154	2.911
	Female	3-15	13.286	2.795
	Total	3-15	13.235	2.796
BA	Male	4-12	9.308	2.496
	Female	5-12	9.143	1.852
	Total	4-12	9.206	2.086
O	Male	2-11	6.692	3.401
	Female	4-11	8.143	2.287
	Total	2-11	7.588	2.808
CE	Male	11-24	19.154	4.705
	Female	10-23	19.333	4.487
	Total	10-24	19.265	4.501
D	Male	10-20	14.462	3.455
	Female	5-20	15.905	3.604
	Total	5-20	15.353	3.567

5) Reading for details (WTRSD-D)

b. To what degree is field-dependence-independence (CEFT), with total intelligence (WISC-FS) controlled, associated with performance of the aided reading comprehension skills cited previously in 1) through 5)?

TABLE 9.

INTERCORRELATION SUMMARY OF
CEFT AND WTRSD-B-C

			WTRSD-B-C		
	PT	BA	O	CE	D
Male	.306	.314	.224	.128	.520(.068)
Female	.080	.309	.217	.346	.612(.003)
Total	.174	.312(.071)	.194	.250	.544(.001)

Level of significance, two-tailed, for $p<.10$ is listed in parentheses following each coefficient.

The intercorrelation between the CEFT and each of the five measures from the WTRSD-B-C are summarized in Table 9. Significant correlation coefficients were found between the number of correct responses on the WTRSD-D and CEFT for males, females and total subjects. This implies that the more field independent a subject is, the better his ability to focus on and recall details from a paragraph. However, when intelligence (WISC-FS) was controlled, this was not found to be the case with male subjects. This partial correlation coefficient, with WISC-FS controlled, for females was .611 ($p < .01$) and, for the total sample, was .480 ($p < .01$). Another significant relationship, ($p < .071$), was found for the total sample between the CEFT and the WTRSD-BA; how-

ever, the coefficient was not significant when intelligence (WISC-FS) was controlled.

Watson (1969) found a significant ($p < .01$) correlation coefficient of .57 for first grade boys on the CEFT and Stanford Achievement Test-Paragraph Meaning subtest. Intelligence was not controlled. In the present study a significant coefficient ($p < .068$) of .520 was found between WTRSD-D and CEFT when intelligence was not controlled. The specific comprehension skills measured by the SAT-Paragraph Meaning are not clear; however, selectively attending to details appears to be one of them.

Cohn (1968), found that, for sixth grade males and females, significant positive relationships existed between the EFT and four tests of the Sangren – Woody Reading Test: Details ($p < .05$), Main Idea ($p < .01$), Sequence ($p < .01$) and a Total score ($p < .05$). In the present study, similar results were found using the CEFT and the WTRSD-D ($p < .001$), WTRSD-BA, which measures sequencing skills, ($p < .071$). The WTRSD-PT test measures those skills most highly related to those usually described as finding the main idea. Eighty-eight percent of the subjects in the present sample were masters of the WTRSD-PT, therefore, one can neither question nor support Cohn's findings with regard to identifying the main idea in a story. In general, similar results were found between skills implicated in reading comprehension and field dependence-independence for first grade and sixth grade subjects.

   2. a. To what degree is reflection-impulsivity (MFFT-E, MFFT-RT) associated with performance of the aided reading comprehension skills cited previously 1) through 5)?

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b. To what degree is reflection-impulsivity (MFFT-E, MFFT-RT), with total intelligence controlled, associated with performance of the aided reading comprehension skills cited previously 1) through 5)?

The intercorrelations between the MFFT-RT (average response time) and MFFT-E (errors) variables and the five aided reading comprehension measures from the WTRSD-B-C are summarized in Table 10. No significant correlation coefficients were found for the MFFT-RT variable with either male or female subjects. However, four significant negative coefficients were found between MFFT-E and WTRSD-D (finding details): Males (p $<$ .027), females (p $<$ .006) and total sample (p $<$ .001). When intelligence (WISC-FS) was controlled, only the significant correlation coefficients between WTRSD-D and MFFT-E for females and total sample remained significant (p $<$ .01). These results are consistent with those found for Question 1, which indicated a significant relationship between CEFT and WTRSD-D. The similarity between the CEFT and MFFT-E performances are discussed with the results related to Question 10. Another significant relationship (p $<$ .077) was found for the total sample between MFFT-E and WTRSD-O (predicting logical outcomes); however, when intelligence (WISC-FS) was controlled, the relationship was not significant.

Yando and Kagan (1968) found that a significant relationship existed between MFFT-E and the Metropolitan Reading Readiness Test for first grade male and females subjects. In their study intelligence was not controlled. These results were confirmed by findings of the present study. Yando and Kagan (1968) also found a significant relationship between MFFT-RT and the CEFT for first grade females. Other studies have reported significant relationships between reflection-impulsivity,

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TABLE 10.

INTERCORRELATION SUMMARY OF
MFFT AND WTRSD-B-C

			WTRSD-B-C		
	PT	BA	O	CE	D
MFFT-RT					
Male	.116	.217	-.137	.283	.358
Female	-.080	-.154	.309	-.065	.229
Total	.005	.049	.003	.089	.224
MFFT-E					
Male	-.072	-.178	-.359	-.109	-.605(.027)
Female	.012	-.085	-.235	-.119	-.573(.006)
Total	-.030	-.135	-.307(.077)	-.112	-.567(.001)

Level of significance, two-tailed, for $p < .10$ is listed in
parentheses following each coefficient.

various word attack skills, and word learning tasks (Erickson, 1972;

Kagan, 1965b). Visual scanning (Ault, Crawford and Jeffrey, 1972) has

also been shown to be affected by one's disposition toward either

reflection or impulsivity. The present study shows that even when

dependence on the visual variables is controlled to some degree, the

MFFT-E variable is significantly related to some aspects of aided read-

ing comprehension in male and female first grade subjects, even when,

in the case of females, intelligence is controlled.

3. a. To what degree is style of categorization (SCST-DPW,
SCST-DG, SCST-RC, SCST-CI) associated with performance
of the aided reading comprehension skills cited pre-
viously in 1) through 5)?

b. To what degree is style of categorization (SCST-DPW,
SCST-DG, SCST-RC, SCST-CI), with total intelligence
(WISC-FS) controlled, associated with performance
of the aided reading comprehension skills cited pre-
viously in 1) through 5)?

The intercorrelations between the WTRSD-B-C and the percentage

of total responses on the SCST for each of the four major response cate-

gories are summarized in Table 11. These categories include: Descrip-

tive Part-Whole (DPW), Descriptive Global (DG), Relational-Contextual

(RC) and Categorical-Inferential (CI). Each of these categories is

described in Chapter 1. None of the interrelationships was significant

for male subjects and only two were significant for females: WTRSD-PT

(finding a paragraph topic) and SCST-DPW percentage, $(p < .040)$ and

WTRSD-O (predicting outcomes) and SCST-CI percentage, $(p < .061)$. Of

these two interrelationships, only the WTRSD-PT and SCST-DPW percentage

coefficient was significant $(p < .10)$ when intelligence (WISC-FS) was

controlled.

TABLE 11.

INTERCORRELATION SUMMARY OF
SCST AND WTRSD-B-C

	WTRSD-B-C				
	PT	BA	O	CE	D
SCST-DPW%					
Male	.377	−.004	.268	−.152	−.254
Female	−.449(.040)	−.195	−.179	.107	.335
Total	−.099	−.103	.059	−.002	.105
SCST-DG%					
Male	−.061	.062	−.220	.237	.374
Female	.307	.306	−.054	.167	−.006
Total	.159	.173	−.055	.193	.186
SCST-RC%					
Male	−.257	.067	−.260	−.035	−.074
Female	.187	−.068	−.036	−.156	−.348
Total	−.048	.018	−.209	−.091	−.229
SCST-CI%					
Male	−.456	−.193	−.111	.094	.108
Female	.349	.125	.414(.061)	−.180	−.187
Total	.056	−.007	.152	−.081	−.096

Level of significance, two-tailed, for $p < .10$ is listed in
parentheses following each coefficient.

As pointed out in Chapter 2, Davis (1971) raised questions regarding the use of raw score frequencies based on unlimited free responses. In the present study, percentages of responses by category were used. While one interpretation of the results presented in Table 2 might center around the lack of interrelationship between the skills being measured on the two tests, a second interpretation is also possible. It has been pointed out that few subjects have a consistent specific categorical response, such as Descriptive Part-Whole or Relational-Contextual, which yields over 50 percent of his responses in the SCST (Davis, 1971). Following a conversation with Dr. Sigel, Davis (pp. 1456-1457) suggested that a more valid utilization of the SCST may be to look at "patterns of responses."

The present author developed some descriptive tables which appear to be useful in analyzing SCST response patterns as they relate to the other variables examined in this study. Of the 24 possible combinations of the SCST-DPW percentage, SCST-DG percentage, SCST-RC percentage and SCST-CI percentage, variables ranked in order from highest to lowest percentages, only 14 combinations were utilized by subjects in the present study. The frequency of each of these response patterns is given in Table 12. Special note should be taken that in many cases the subject had tied percentages of two of the four SCST categorical response types. In these cases each of the two resulting response patterns are presented.

The frequency distributions of SCST response patterns as they relate to the WTRSD-B-C, WISC-FS, and WISC-AI are summarized in Tables 13-15. The number of these tied response patterns are listed in each table. Because of the low frequencies of various SCST response patterns and the

TABLE 12.

FREQUENCY DISTRIBUTION OF SCST RESPONSE PATTERNS

Frequency Pattern	Male	Female	Total
DPW-CI-DG-RC	4	9	13
DPW-CI-RC-DG	5	0	5
CI-DG-DPW-RC	1	3	4
DG-CI-DPW-RC	1	2	3
RC-CI-DPW-DG	1	2	3
CI-RC-DPW-DG	0	3	3
DPW-DG-CI-RC	0	2	2
CI-DPW-DG-RC	1	1	2
CI-DG-RC-DPW	2	0	2
CI-RC-DG-DPW	1	1	2
DPW-RC-DG-CF	0	1	1
DG-DPW-CI-RC	0	1	1
DG-CI-RC-DPW	1	0	1
RC-CI-DG-DPW	0	1	1
Total	17	26	43
N	13	21	34
Ties	4	5	9

size of the present sample, 13 males and 21 females, no attempt was
made to compute intercorrelation coefficients between these SCST
response patterns and the other 12 variables in the present study.

The frequency of response patterns for those male and female
subjects who have mastered each of the five WTRSD-B-C tests are summa-
rized in Table 13. The first column indicates the total number of male
or female subjects in the study and their response patterns. In each of
the rest of the columns, are the number of subjects having mastered
(correctly answered 80% of the questions) each of the WTRSD-B-C tests.
The DPW-CI-DG-RC response style was the most efficient for males while
the CI-DG-RC-DPW appeared to be the most effective for females in terms
of the WTRSD-B-C measures. This disposition toward an analytic style in
males and the inferential style in females may be tied to developmental
age variables.

The frequency of response patterns by level of intelligence
(WISC-FS) for males and females are summarized in Table 14. The DPW-
CI-DG-RC response style was common for male and female subjects across
all intelligence levels, while CI-DG-DPW-RC appears to be more related
to intelligence as are those response patterns beginning with either a
DG or a RC percentage.

The distribution of response patterns in terms of the WISC-AI
(Analytic Index) is summarized in Table 15. Here certain response pat-
terns tend to differentiate between inter- and intra-sex patterns. For
example, the CI-RC-DPW-DG female pattern, as in other tables, appears
to be associated with poorer general performance, WTRSD-B-C, WISC-FS,
impulsivity and field dependence.

TABLE   13.

FREQUENCY DISTRIBUTIONS FOR SCST RESPONSE
PATTERNS AND WTRSD-B-C MASTERS*

	WTRSD											
	Total N		PT		BA		O		CE		D	
	M	F	M	F	M	F	M	F	M	F	M	F
DPW-DG-CI-RC		2		1		1				1		1
DPW-RC-DG-CI		1		1						1		1
DPW-CI-DG-RC	4	9	4	7	3	3	3	2	3	5	2	6
DPW-CI-RC-DG	5		5		2		2		2		1	
DG-DPW-CI-RC		1		1		1				1		1
DG-CI-DPW-RC	1	2	1	2	1	1			1	1	1	1
DG-CI-RC-DPW	1		1		1				1		1	
RC-CI-DPW-DG	1	2	1	2	1	2		1		2		1
RC-CI-DG-DPW		1		1		1				1		
CI-DPW-DG-RC	1	1	1	1		1	1	1	1	1	1	1
CI-DG-DPW-RC	1	3	1	3		2		2		2	1	2
CI-DG-RC-DPW	2		1								1	
CI-RC-DPW-DG		3		2		1		1		1		1
CI-RC-DG-DPW	1	1		1								
Total	17	26	15	22	8	13	6	7	8	16	8	15
N	13	21	12	18	7	10	5	7	7	14	6	14
Ties	4	5	3	4	1	3	1	0	1	2	2	1

*Mastery level for each test is set at 80%.

TABLE 14.

FREQUENCY DISTRIBUTION FOR SCST
RESPONSE PATTERNS AND WISC-FS RANGES*

| | WISC-FS | | | | | |
| | 89-107 | | 109-116 | | 117-142 | |
	Male	Female	Male	Female	Male	Female
DPW-DG-CI-RC		1		1		
DPW-RC-DG-CI				1		
DPW-CI-DG-RC	2	4		4	2	1
DPW-CI-RC-DG	2		1		2	
DG-DPW-CI-RC				1		
DG-CI-DPW-RC				1	1	1
DG-CI-RC-DPW					1	
RC-CI-DPW-DG			1	1		1
RC-CI-DG-DPW						1
CI-DPW-DG-RC			1			1
CI-DG-DPW-RC			1			3
CI-DG-RC-DPW	1		1			
CI-RC-DPW-DG		2		1		
CI-RC-DG-DPW	1	1				
Total	6	8	5	10	6	8
N	4	7	4	8	5	6
Ties	2	1	1	2	1	2

* WISC-FS Scores for N=34 divided by thirds.

TABLE 15.

FREQUENCY DISTRIBUTION OF SCST RESPONSE
PATTERNS AND WISC-AI

	Male $\bar{X}$-37.8		Female $\bar{X}$-36.0		Total $\bar{X}$-36.7	
	Above $\bar{X}$	Below $\bar{X}$	Above $\bar{X}$	Below $\bar{X}$	Above $\bar{X}$	Below $\bar{X}$
DPW-DG-CI-RC				2		2
DPW-RC-DG-CI				1		1
DPW-CI-DG-RC	2	1	3	6	5	7
DPW-CI-RC-DG	3	2			3	2
DG-DPW-CI-RC				1		1
DG-CI-DPW-RC	1		1	1	2	1
DG-CI-RC-DPW	1				1	
RC-CI-DPW-DG	1		1		2	1
RC-CI-DG-DPW			1	1	1	
CI-DPW-DG-RC		1	1		1	1
CI-DG-DPW-RC	1		2	1	3	1
CI-DG-RC-DPW	1	1			1	1
CI-RC-DPW-DC				3		3
CI-RC-DG-DPW		1		1	1	1
Total	10	6	9	17	20	22
N	6	6	8	13	17	17
Ties	4	0	1	4	3	5

Although specific intercorrelation coefficients cannot be uti-
lized in comparing the present analysis of SCST data to others used in
the literature, certain trends do seem apparent. Generally, descrip-
tive responses (DP and DG) appear to be more efficiently utilized by
males then females, which has also been found by Lee, Kagan and Rabson
(1963). Results of the present study are not consistent with those of
Coop and Brown (1970) who found that there was no significant difference
between analytic (high DPW subjects) and non-analytic (high CI subjects)
in terms of total intelligence. Some support can also be inferred for
Serafica and Sigel (1970) who felt that boys who could read used their
analytic ability to selectively attend to specific features to help with
the forming of concepts while non-readers stopped at analysis. The DPW-
CI-RC-DG response pattern in Table 13 supports this inference. Support
is also found in the present study for Annesley (1971) who found, with
fifth grade boys, that DPW responses occurred more often with better
readers.

4. <u>To what degree is verbal intelligence (WISC-V) associated
with performance of the aided reading comprehension skills
cited previously in 1) through 5)?</u>

The intercorrelations between the WISC-V (verbal intelligence
score) and the five aided reading comprehension measures from the WTRSD-
B-C are summarized in Table 16. Eight of the 15 possible intercorrela-
tion coefficients were significant. The correlation coefficients for
the WISC-V and the WTRSD-BA (determining sequence) were consistently
significant: males (p $<$ .023), females (p $<$ .062) and total (p $<$ .006).
The paragraph topic (WTRSD-PT) was significantly correlated with the
WISC-V (p $<$ .044) for females and the total sample (p $<$ .020). Signifi-

cant intercorrelation coefficients of (p<.001 and p<.019) were found

for males and the total sample between the WISC-V and WTRSD-CE (using

logical reasoning in synthesizing information). Also a significant

(p<.057) relationship was found for males between the WISC-V and the

WTRSD-D (finding details). No significant intercorrelation coefficients

were found for WISC-V and the WTRSD-O (predicting outcomes). These

results suggest the skills measured by the WISC-V are significantly re-

lated to several skills measured by the WTRSD-B-C, such as determining

sequence as measured by the WTRSD-BA. An examination of the relation-

ships between the four WISC measures (WISC-V, WISC-P, WISC-FS and WISC-

AI) and the WTRSD-B-C is included in the discussion of Question 7.

TABLE 16.

INTERCORRELATION SUMMARY OF
WISC-V AND WTRSD-B-C

	WTRSD-B-C				
	PT	BA	O	CE	D
Male	.382	.617(.023)	.176	.787(.001)	.538(.057)
Female	.442(.044)	.413(.062)	.235	.255	.216
Total	.394(.020)	.463(.006)	.113	.399(.019)	.236

Level of significance, two-tailed, for p<.10 is listed in
parentheses following each coefficient.

5. <u>To what degree is non-verbal intelligence (WISC-P) asso-
   ciated with performance of the aided reading comprehen-
   sion skills cited previously in 1) through 5)?</u>

TABLE 17.

INTERCORRELATION SUMMARY OF
WISC-P AND WTRSD-B-C

	WTRSD-B-C				
	PT	BA	O	CE	D
Male	.431	.583(.034)	.497(.084)	.410	.618(.023)
Female	.564(.007)	.572(.006)	.579(.006)	.311	.526(.013)
Total	.513(.002)	.567(.001)	.526(.002)	.350(.042)	.558(.001)

Level of significance, two-tailed, for $p < .10$ is listed in
parentheses following each coefficient.

The intercorrelation coefficients between the WISC-P (perfor-
mance on non-verbal intelligence) and the five aided reading comprehen-
sion measures from the WTRSD-B-C are summarized in Table 17. As with the
WISC-V, a significant relationship was found with the WTRSD-BA (deter-
mining sequence) and the WISC-P for males ($p < .034$), females ($p < .006$)
and total sample ($p < .001$). The WISC-P also showed a significant re-
lationship to the WTRSD-O (predicting outcomes) for males ($p < .084$),
females ($p < .006$) and total sample ($p < .002$) as well as to the WTRSD-
D (finding details), males ($p < .023$), females ($p < .013$) and total
sample ($p < .001$). For females, a significant intercorrelation coeffi-
cient ($p < .007$) was found between the WTRSD-P (finding a paragraph

topic) and the WISC-P. An examination of the relationships between

the four WISC measures (WISC-V, WISC-P, WISC-FS and WISC-AI) and the

WTRSD-B-C is included in the discussion of Question 7.

6. To what degree is non-verbal and verbal intelligence (WISC-FS) associated with performance of the aided reading comprehension skills cited previously in 1) through 5)?

TABLE 18.

INTERCORRELATION SUMMARY OF
WISC-FS AND WTRSD-B-C

	WTRSD-B-C				
	PT	BA	O	CE	D
Male	.450	.642(.016)	.375	.632(.019)	.623(.021)
Female	.552(.009)	.543(.010)	.440(.045)	.325	.404(.069)
Total	.500(.003)	.574(.001)	.343(.046)	.428(.011)	.434(.010)

Level of significance, two-tailed, for $p < .10$ is listed in parentheses following each coefficient.

The intercorrelation coefficients between the WISC-FS (full

scale intelligence) and the five aided reading comprehension measures

from the WTRSD-B-C are summarized in Table 18. Twelve of the 15

possible relationships were significant. All three of the coefficients

involving the WTRSD-BA (determining sequence) were significant: males

($p < .016$), females ($p < .010$) and total sample ($p < .001$). The WISC-FS

also showed a significant relationship to the WTRSD-D (finding details),

males ($p < .021$), females ($p < .069$) and total sample ($p < .001$).

Significant relationships between the WISC-FS and the WTRSD-PT (finding

paragraph topics) included females (p < .009) and total sample (p <

.003), the WTRSD-O (predicting outcomes) included females (p < .045)

and total sample (p < .046) and the WTRSD-CE (using logical reasoning

in synthesizing information) included males (p < .019) and total sample

(p < .011). An examination of the relationships between the four WISC

measures (WISC-V, WISC-P, WISC-FS and WISC-AI) and the WTRSD-B-C is in-

cluded in the discussion of Question 7.

> 7. <u>To what degree is the Analytic Index (WISC-P subtests:
> Block Design, Object Assembly and Picture Completion)
> associated with performance of the aided reading compre-
> hension skills cited previously 1) through 5)?</u>

TABLE 19.

INTERCORRELATION SUMMARY OF
WISC-AI AND WTRSD-B-C

	WTRSD-B-C				
	PT	BA	O	CE	D
Male	.512(.073)	.681(.009)	.452	.457	.542(.054)
Female	.433(.049)	.515(.016)	.394(.077)	.320	.567(.007)
Total	.458(.006)	.590(.000)	.367(.032)	.370(.030)	.513(.002)

Level of significance, two-tailed, for p < .10 is listed in
parentheses following each coefficient.

The intercorrelations between the WISC-AI and the five mea-
sures included in the WTRSD-B-C are summarized in Table 19. Of im-
portance here is the significant relationship (p $<$.073) for males be-
tween the WISC-AI and the WTRSD-PT (finding paragraph topics). None
of the other WISC measures were related to this WTRSD subtest for males,
while all other WISC measures were significantly related to WTRSD-PT
for females including WISC-AI (p $<$.049). Significant coefficients ex-
isted between the WISC-AI and the WTRSD-BA for males (p $<$.009), females
(p $<$.016) and total sample (p $<$.000), the WTRSD-D for males (p $<$.054),
females (p $<$.007) and total sample (p $<$.002), the WTRSD-C for females
(p $<$.077) and total sample (p $<$.032), the WTRSD-CE for the total sam-
ple (p $<$.030).

In summary, 44 of 60 correlation coefficients cited for the interre-
lationships between the four WISC measures and the five aided reading
comprehension measures in the WTRSD-B-C with males, females and total
sample were significant. All four WISC measures were significantly re-
lated to the WTRSD-D for males, females and total sample. All four WISC
measures were significantly related to the WTRSD-PT for females and total
sample but not for males, except in the case of WISC-AI. No significant
relationships were found between the WISC-V and the WTRSD-O; however, they
were found with the other three WISC measures for females and total sam-
ple. All four WISC measures correlated significantly for WTRSD-D for
males and also for females and total sample with the exception of the
WISC-V. All four of the WISC measures were significantly related to the
WTRSD-CE for total sample only while the WISC-V and WISC-FS were signi-
ficantly related to this skill with males. In general, those comprehen-

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sion skills implicated in reading by the WTRSD-B-C, which are related
in significant ways to the skills subsumed under intelligence as measured
by the WISC, include:

    1. Determining sequence or selecting from a story which
        of several events came just before or just after
        another event.

    2. Identifying a topic or main idea from a story. (Pri-
        marily for females).

    3. Selective attention to details and the use of memory
        in recalling those details.

    4. Using logical reasoning in predicting story outcomes.
        (Primarily for females).

    5. Using logical reasoning in synthesizing information in
        determining cause and effect. (Primarily for boys).

8. To what degree is style of categorization (SCST-DPW, SCST-
    DG, SCST-RC, SCST-AI) associated with field dependence-
    independence (CEFT)?

TABLE 20.

INTERCORRELATION   SUMMARY OF
SCST AND CEFT

	Male	Female	Total
SCST DPW%	-.091	.285	.110
SCST-DG%	.036	-.087	-.051
SCST-RC%	.198	-.487(.024)	-.089
SCST-CI%	-.467	-.015	-.186

Level of significance, two-tailed, for $p < .10$ is listed in
parentheses following each coefficient.

The intercorrelations between the SCST and the CEFT are summarized in Table 20. Only one significant negative correlation coefficient (p $<$ .024) was found and that was for the SCST-RC percentage of females. The more field independent the female subject, the fewer her number of relational-contextual responses.

Table 21 is presented to show the frequency patterns for the CEFT as well as the MFFT, which is examined in Question 9. Using the CEFT, subjects were classified as being either field independent (FI), those above the median number of correct response, or field dependent (FD). Seven of the 10 female subjects utilized response patterns beginning with a DPW percentage which indicates a more analytical approach. This is consistent with the Witkin concept of field independence in which a subject pays attention to details in a way that allows him to disembed a simpler figure from a more complex one.

9. To what degree is style of categorization (SCST-DPW, SCST-DG, SCST-RC, SCST-AI) associated with reflection-impulsivity (MFFT-E, MFFT-RT)?

The frequency distribution of SCST response patterns as they relate to male and females subjects classified as being reflective or impulsive with the MFFT are summarized in Table 21. Both reflective and impulsive male subjects utilized essentially the same range of response patterns while female subjects reflected a wider variety of response patterns.

The intercorrelations between the SCST and the MFFT are summarized in Table 22. In terms of the correlation coefficients between the MFFT-RT (mean response time), and the SCST category percentages, two were significant for male subjects: DPW, -.639 (p $<$ .017) and RC, (p $<$ .025);

TABLE 21.

FREQUENCY DISTRIBUTIONS FOR SCST RESPONSE PATTERNS WITH
REFLECTIVE-IMPULSIVE AND FIELD DEPENDENT-INDEPENDENT SUBJECTS

| | MFFT | | | | CEFT | | | |
| | IMPULSIVE | | REFLECTIVE | | FD | | FI | |
	Male	Female	Male	Female	Male	Female	Male	Female
DPW-DG-CI-RC				1				
DPW-RC-DG-CI								
DPW-CI-DG-RC	2	3	1	2	2	4		5
DPW-CI-RC-DG	1		2		2		3	
DG-DPW-CI-RC		1				1		
DG-CI-DPW-RC		1				2	1	
DG-CI-RC-DPW							1	
RC-CI-DPW-DG		2	1			2	1	
RC-CI-DG-DPW		1				1		
CI-DPW-DG-RC			1		1			1
CI-DG-DPW-RC		1	1	1		2	1	1
CI-DG-RC-DPW	1		1		1			
CI-RC-DPW-DG		2		1		2		
CI-RC-DG-DPW	1	1			1	1		
Total	5	12	7	5	7	15	8	10
N	4	8	6	5	6	10	6	10
Ties	1	4	1	0	1	5	2	0

TABLE 22.

INTERCORRELATION SUMMARY OF
SCST AND MFFT

	SCST			
	DPW	DG	RC	CI
MFFT-RT				
Male	-.639(.017)	.219	.611(.025)	.387
Female	.226	-.213	-.068	-.089
Total	-.204	-.070	.358(.037)	.123
MFFT-E				
Male	.307	.107	-.370	-.125
Female	-.383(.087)	.135	.381(.089)	.124
Total	-.022	.103	-.078	.011

Level of significance, two-tailed, for $p < .10$ is listed in
parentheses following each coefficient.

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and one for the total sample: RC, (p <.037). Two significant cor-

relations coefficients between the MFFT-E (errors) and the SCST were

found for females: DPW, -.383 (p<.087) and RC, (p<.089).

From these results it appears that impulsive subjects tend to

pick similar details in many picture sets of the SCST and repeat many of

them thus elevating their percentage of DPW responses. Those males who

tend to be more reflective take more time and do not point out the first

detail they see. They then may see and report more relationships, thus

increasing their percentage of SCST-RC responses.

10. To what degree is reflection-impulsivity (MFFT-E, MFFT-
    RT) associated with field dependence-independence?

TABLE 23.

INTERCORRELATION SUMMARY OF
MFFT AND CEFT

	Male	Female	Total
MFFT-RT	.196	.350	.281
MFFT-E	-.613(.024)	-.664(.001)	-.626(.000)

Level of significance, two-tailed, for p<.10 is listed in
parentheses following each coefficient.

The intercorrelation between the MFFT-RT and MFFT-E and the CEFT

is summarized in Table 23. The strength of the interrelationship be-

tween the MFFT-E and CEFT is apparent throughout this study. These

highly significant negative correlation coefficients include: males,

(p <.024); females (p<.001) and total sample (p<.000). These two

variables were both significantly correlated for females and total sample for the WTRSD-D (reading for details).

TABLE 24.

INTERRELATIONSHIP OF SCORES
ON MFFT AND CEFT

| | | MFFT | | | |
		Slow Inaccurate	Fast Accurate	Impulsive	Reflective
	FD-Male	1		4	1
	FD-Female	1		8	
CEFT					
	FI-Male	1	1		4
	FI-Female		2		4

The distribution of subjects who are classified as being either field dependent or independent on the CEFT and who are classified into one of four categories utilizing the mean response times and errors on the MFFT are summarized in Table 24. Impulsive subjects refers to those subjects who were above the error median and below the response time median while reflective subjects refers to those subjects above the response time median and below the error median. The slow-inaccurate classification refers to those subjects who were above the median on both errors and response times. The fast-accurate classification refers to those subjects who were below the median on both errors and response

time. The significant relationship between field dependence-independ-
ence and reflectivity-impulsivity is apparent.

In order to explore further this relationship between the MFFT
and CEFT scores, the significant intercorrelation coefficients between
the CEFT, MFFT-E, WISC-AI are summarized in Table 25. The strength of
the WISC-AI correlation coefficient with the CEFT and MFFT-E is also re-
flected in the WISC-FS and WISC-P from which the WISC-AI is derived. It
appears that either a single factor may be operating in all three vari-
ables or that they combine for a synergistic effect. For example, sub-
jects who are field independent tend to perceive a field in a very ana-
lytic way, paying attention to details. The reflective subject tends to
wait before making a quick decision in response uncertainty situation.
Perhaps, the longer a subject waits the more he sees, and the more he
sees, the longer he waits.

TABLE 25.

INTERCORRELATIONAL LEVELS OF
SIGNIFICANCE* SUMMARY FOR
CEFT, MFFT-E, WISC-FS, WISC-P AND WISC-AI

	1	2	3	4
1. CEFT				
Male	—			
Female	—			
Total	—			
2. MFFT-E				
Male	.024	—		
Female	.001	—		
Total	.000	—		
3. WISC-FS				
Male	.061	.173	—	
Female	.533	.914	—	
Total	.082	.294	—	
4. WISC-P				
Male	.053	.217	.000	—
Female	.153	.168	.000	—
Total	.016	.052	.000	—
5. WISC-AT				
Male	.007	.078	.000	.000
Female	.028	.066	.000	.000
Total	.001	.009	.000	.000

* Two tailed.

Chapter 4

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary and Conclusions

The purpose of this study was to examine the interrelationships

between five measures of aided reading comprehension, intelligence and

three measures of cognitive style variables in first grade children.

The Wisconsin Tests of Reading Skill Development, Level B - Comprehension

(WTRSD-B-C) yielded the five aided reading comprehension measures

which were studied:

1. Identifying a paragraph topic (main idea)-WTRSD-PT.

2. Determining sequence on recalling events that happened

    just before or just after another event in a short paragraph

    WTRSD-BA.

3. Using logical reasoning in predicting outcomes-WTRSD-O.

4. Using logical reasoning in synthesizing information (cause

    and effect)-WTRSD-CE.

5. Reading for details, or selectively attending to and recalling

    details in a short paragraph-WTRSD-D.

The three measures of cognitive style variables utilized in the

study are listed below.

1. Field Dependence-Independence, sometimes referred to as a

    global-analytic style, was measured with the Children's

    Embedded Figures Test (CEFT).

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2. Style of Categorization, sometimes referred to as conceptual
    style, was measured with the Sigel Cognitive Style Test (SCST).

3. Reflection-Impulsivity, sometimes referred to as conceptual
    tempo, was measured with the Matching Familiar Figures Test
    (MFFT).

The Weschsler Intelligence Scale for Children (WISC) served as
the measure of intelligence. Four scores were utilized: Full Scale,
Verbal, Performance and the Analytic Index (WISC-P subtests: Block
Design, Picture Completion and Object Assembly).

Thirty-four first grade subjects (13 males, 21 females) were
individually administered the MFFT, CEFT and SCST with the order
of tests used being randomly rotated. Each subject was then individually
given the WISC. The WTRSD-B-C was given in two sittings to all sample
subjects in each of two schools. Sixteen variables were obtained
from scores on the above measures. Ten questions were examined
through the use of intercorrelational and partial correlational
techniques.

General results of the study are summarized as follows:

1. Significant relationships ($p < .01$) were found between
    the children's Embedded Figures Test and the Wisconsin
    Tests for Reading Skill Development--Details, with
    intelligence controlled, for females and the total sample.
    Field independent females, then, appear to be better
    able to selectively attend to and recall details from
    a short paragraph than field dependent females. This
    relationship did not exist for males when intelligence
    was controlled.

2. Significant relationships (p < .01) were found between
   the Matching Familiar Figures Test error score and the
   Wisconsin Tests for Reading Skill Development--Details,
   with intelligence controlled, for females and the total
   sample. Reflective females, then,appear to be better
   able to selectively attend to and recall details from
   a short paragraph than impulsive females. This relation-
   ship did not exist for males when intelligence was controlled.

3. Significant relationships (p < .10) were found between the
   Sigel Cognitive Style Test percentage of Descriptive
   Part-whole responses and the Wisconsin Tests for Reading
   Skill Development--Paragraph Topics test for females. Because
   of the problems concerning interpretation of the Sigel
   Cognitive Style Test results discussed previously in Chapter
   3, no generalization regarding this relationship can be
   made.

4. The four Weschsler Intelligence Scale for Children scores
   (Full Scale, Performance Verbal and Analytic Index) were
   significantly related with 44 of the 60 coefficients
   cited for the interrelationships with the five aided
   reading comprehension measures from the Wisconsin Tests
   for Reading Skill Development, Level B-Comprehension
   (Paragraph Topic, Before or After, Outcomes, Cause-Effect
   and Detail). Some WISC measures correlated significantly
   for males and or for females only. The Before or After

test (determing sequence) was significantly related to
all four WISC measures with males, females and total
sample. This similarities between specific skills
subsumed under the constructs of cognitive style and
intelligence as they relate to the aided reading com-
prehension skills are suggested by the results of the
present study.

5. A significant relationship (p<.024) existed between the
Children's Embedded Figures Test and the Sigel Cognitive
Styles Test percentage of Relational-Contextual responses
for females. As discussed in Chapter 3, a problem
with the interpretation of this relationship makes
generalization impossible.

6. Significant relationships existed between the Matching
Familiar Figures response times and the Sigel Cognitive
Styles Test percentage of Descriptive Part-Whole responses
(p<.017) for males and the Relational-Contextual responses
for males (p<.075) and the total sample (p<.037).
As mentioned previously, problems of interpretation of
the SCST percentages make generalizations about these
relationships difficult.

7. Significant relationships existed between the Matching
Familiar Figures Test error score and the Sigel Cognitive
Styles Test percentage of Descriptive Part-Whole responses
(p<.087) for females and the percentage of Relational-Con-
textual responses (p<.089) for females. As mentioned

previously, problems of interpretation of the SCST

percentages make generalizations about these relation-

ships.

8. Significant relationships existed between the Children's

Embedded Figures Test and the Matching Familiar Figures

Test error score for males (p < .024), females (p < .001)

and total sample (p < .000). These results suggest that

the more reflective a subject, the more likely he would

be field independent.

From the results, it appears that cognitive style variables,

particularly field dependence-independence and reflectivity-impulsivity,

are significantly related to two skills involved in aided reading

comprehension as measured by the WTRSD-B-C. The first skill involves

the selective attention paid to specific details in a short

paragraph and their short term recall. The second skill involves

the ability to find the main idea or paragraph topic.

The reflective subject, who studies his opti ns for a long

period of time before making a decision, is more likely to be

field independent and focus on details in a paragraph. These

two cognitive style variables are significantly related and appear

to be associated with a common factor which also includes the skills

measured by the Analytic Index from the WISC.

Implications

Data derived from the present study are interpreted as support

for emphasizing the potentially important roles which cognitive

styles may play in the understanding of processes involved in aided

reading comprehension and in the teaching of reading comprehension

skills. Cognitive style tests may well be essential tools for

examining the interaction between cognitive and affective dimensions

of the reading process. Understanding individual difference variables,

such as motivation, selective attention to details, the ability to

refrain from rapid impulsive guessing when the correct response is

uncertain and the manner in which one analyzes details when develop-

ing concepts is essential to the understanding of reading behavior

and to the development of reading process models.

While the skills and processes measured by intelligence tests

require certain cognitive competencies, cognitive styles play a

separate role in aided reading comprehension tasks as measured

by the WTRSD-B-C. For example, with intelligence controlled,

there appears to be a factor including both the CEFT and the MFFT-E

variables which correlates significantly with the aided reading

comprehension skill of recalling specific details from a short

paragraph. If a teacher could measure this factor in a student,

he might be able to alter his teaching style to efficiently utilize

the cognitive learning style of the student having trouble with that

skill. Instructional materials could be written in a manner geared

to meet the needs of students with different degrees of cognitive

style variability. The usefullness of the CEFT and the MFFT in

evaluating cognitive style variables with various aided reading

comprehension tasks was supported by results from the present study. Instructors of diagnostic reading classes should emphasize the potential usefulness of various cognitive style tests which have been shown to be both reliable and valid.

Further research in this field should be directed at the following:

1. Re-examination of the relationships between cognitive styles, intelligence and reading comprehension measures with progressively older male and female subjects. Are the relationships established in the present study similar to those found when the stimulus material used by the subject is not read to him while he reads it silently to himself?

2. Examination and development of reliable and valid interpretation procedures for responses to the Sigel Cognitive Styles Test. The response patterns explored by the author should be examined with a much larger sample than that employed in the present study. Response patterns may well be significantly correlated with other cognitive style measures like the CEFT and MFFT.

3. Examination, with regard to cognitive style variables, of several of the current conceptual models or theories used to explain the cognitive and affective processes involved in reading comprehension (Goodman, 1968; Ruddell

and Bacon, 1972; Geyer, 1972; and Venezky and Calfee,
1970). Testable hypotheses which would examine the
various roles which cognitive styles may play should
be developed and tested. For example, Ruddell and Bacon
(1972) suggest the importance of affective mobilizers and
cognitive strategies in the understanding of the reading
process. How are styles of categorizations of reflection-
impulsivity implicated in development of these affective
mobilizers and cognitive strategies?

APPENDIX A

Directions and Example of the
Children's Embedded Figures Test (CEFT)
(Witkin, Oltman, Raskin and Karp 1971, pp. 22--23)

APPENDIX A

Directions and Example of the

Children's Embedded Figures Test (CEFT)

Witkin, Oltman, Raskin and Karp (1971, pp. 22-23

Each plate was enclosed in plastic to protect against cues from dirt and other marks.

Training Procedure

1. Training on the discrimination figues (D1-D4): E shows the child the first simple cut-out form (TENT) and says: "This looks something like a TENT, doesn't it? This black line at the bottom shows where our TENT rests on the ground. See if you can find another TENT that looks exactly like ours on this page." E then shows the first discrimination card, D1, and says, "Go ahead and point to the one like ours." The cut-out is then placed over the subject's choice and they are compared. Whether or not the choice is correct, it is often helpful to examine each of the incorrect alternatives on the card and explain to the child why they are incorrect. For example, E might say: "You see, this is not like our TENT because it is too small," or "This one is not like our TENT because it is upside-down", etc. The concepts of correct shape, size and orientation on the page should be stressed.

The child is then shown the second discrimination card, D2, and so on, until he gets two items right in succession. If the child fails to reach this standard on the first trial, the series may be repeated two additional times. If the child cannot achieve two successive correct discriminations on the third repetition, testing should be discontinued.

2. Demonstrating the embedding process for children aged 6 and under (E1 and E2): Following the TENT discrimination procedure, the process of embedding a TENT figure is illustrated, using cards E1 and 2. The child holds the cut-out simple form and E says: "Find the TENT here," pointing in turn to each of the three complex figures on cards P1 and 2. E should show him where it is. E should also point out that the TENT in the complex figures is the same as the form in the child's hand, even though, for example, a line may cross it or the top part may be a different color from the bottom.

3. Practice on the embedding figures (P1 and P2): P1 is presended and E says: "A TENT like ours is hidden somewhere in this

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picture. <u>The idea of our game is to find the hidden TENT. Show me where the TENT is.</u>"

The child is permitted to retain the simple cut-out form for comparison with P1. If he indicates a correct choice, he is told: "<u>Now you may outline the place where you saw our TENT. That's fine; now let's see how our TENT will fit.</u>"

The child is then asked to verify his choice, with the Examiner's help, if necessary, by placing the cut-out over the area where he outlined to show that they match. If the child does not indicate the correct choice, E shows him where it is and asks the child to outline the area.

E then presents P2, after taking the cut-out form from the child. E should point out that although, up to now, the embedded figure has appeared as an unbroken unit, it might also be made up of several shapes and/or colors. To encourage the child to view the picture as a whole, E says: "<u>What does this picture look like to you?</u>" (If necessary, E can suggest an appropriate name.) The child is then told: "<u>Now find our TENT and outline it just the way you did before.</u>" The response is again verified with the cut-out form. E can correct or help when necessary. If the child cannot find the TENT, E shows him where it is, outlining the sides of the TENT and explaining that it is the same TENT even though it has two different colors and a line inside it. E then says: "<u>Now you show me with your stamp where the TENT is.</u>"

Testing

For children below the age of 8 years, testing begins with item T1. Older children begin with T6 and are automatically credited with having passed T1 through T5. However, if the subject fails three or more of TENT items T7-T11, he loses this automatic credit and is given T1 through T5.

Testing is stopped upon completion of the TENT series if the subject fails all items T7-11. If at least one of these five items is passed, testing continues with the HOUSE series.

Before presenting the items in the HOUSE series (H1-14), E presents Discrimination Series D5-8, following the directions given for D1-4. E then gives card P3 as the single practice item for the HOUSE series and after that proceeds to H1, continuing until there have been five consecutive failures.

In presenting the first three test items in each series, E follows the procedure given for P2, saying: "<u>What does this look like to you?</u>" and after the child has named the figure in any appropriate way, E says, "<u>Now find our TENT (or HOUSE) and outline it just the way you did before.</u>" E should make sure the cut-out TENT or HOUSE forms are not visible to the child. The Examiner may assist or correct a child who does not arrive at the solution, although these are scored as failures.

After the first three items in each series, the child is not shown the cut-out unless he specifically asks to see it, unless he fails three consecutive items, or as already described, when it is shown to

enable him to verify his choice. The child is informed whether he has succeeded or failed on any item only under the conditions specified earlier.

Scoring

Responses are scored 1 or 0. A score of 1 is given only when the first choice is correct and verified, as previously described in the "Training" section. If an incorrect choice is spontaneously corrected before the child sees the cut-out model, full credit is given. Correct choices made after the model is seen are scored as failures. The total score equals the number of items passed, 25 being the maximum score.

Example
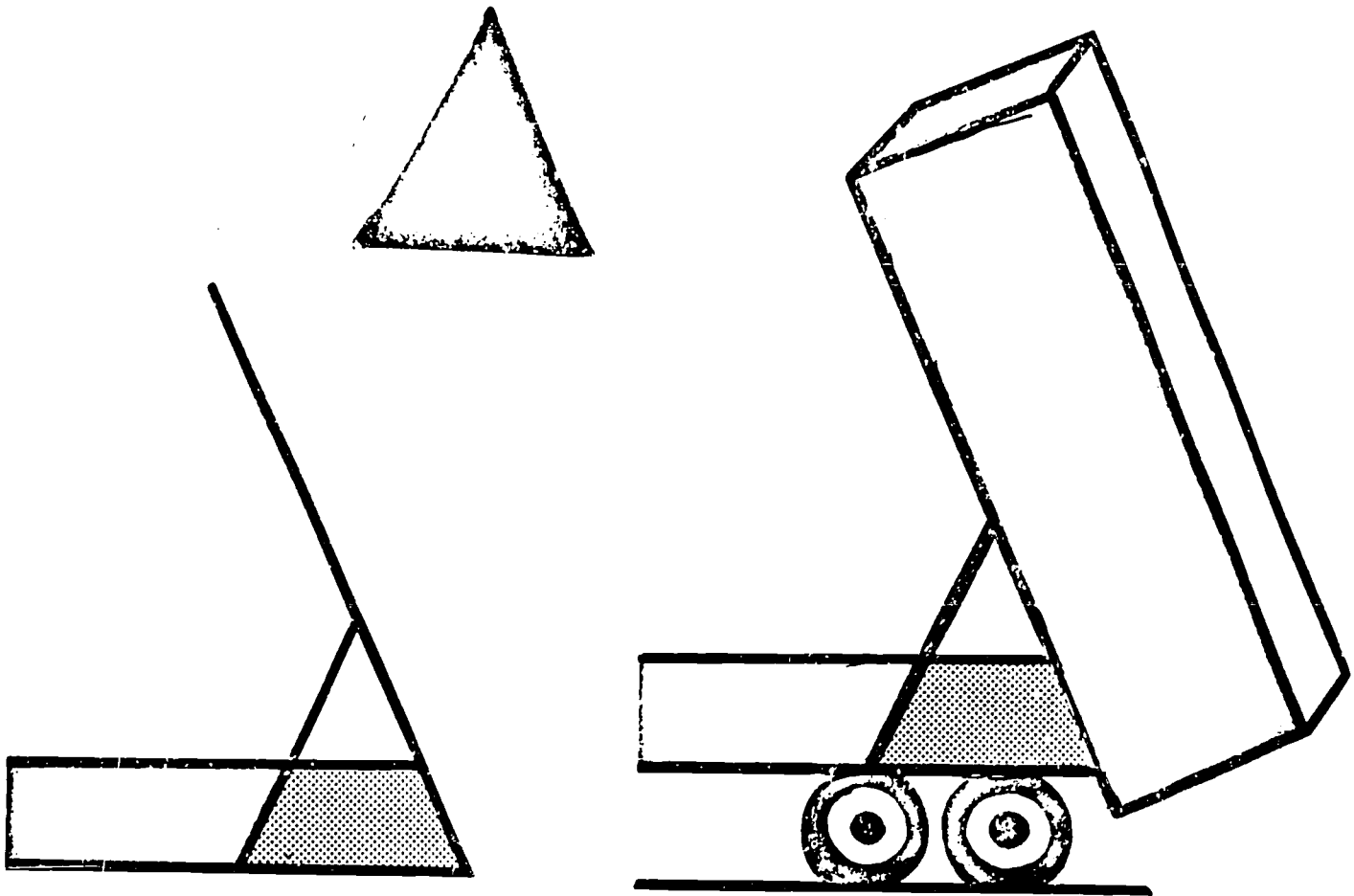
APPENDIX B

Directions and Example of the Adapted Form
Sigel Cognitive Styles Tests (SCST)
(Sigel 1967)

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APPENDIX B

Directions and Example of the Adapted Form

Sigel Cognitive Styles Tests (SCST) - Sigel (1967)

Timing: Cards 2-3 -- 90 seconds
          Cards 4-35 -- 75 seconds

Present Card I in either the Form M (boys) or Form F (girls)
to the Subject and say:

> "Here is a set of cards on which are pictures
> of many familiar things. On card number 1 you can see
> three pictures: the tomato has an A under it; the
> pear has a B underneath; and the apple has a C beneath
> it. What I want you to do is pick out any two of
> the three pictures which go together, belong together
> or are related in any way. When you select two of them,
> tell me and I'll write them down. Then I want you to
> tell me why you picked those two." Pause for reasons,
> then point out other possible pairings giving some
> example reasons.
>   "When I turn over each of these cards I want you
> to tell me as many pairs as you can which go together,
> belong together or are related in any way and give me
> a reason for each choice. I will tell you when to
> stop." Allow 75 or 90 seconds depending on card numbers.

> "There are no right or wrong answers. I am in-
> terested in the different ways children see things.
> You may see many things or only a few. If you wish
> to change your reason simple tell me. If you can't
> think of any more pairs before I say 'stop', just
> tell me." Do not prompt.

Proceed through the appropriate form using the following format:

Card No.	Pair	Responses	Categories
Example 1	A,C	Both are round.	
	A,C	Both are red.	
	B,C	Can eat them.	
	B,C	Got stem-like things.	
	A,B	Both grow in a garden.	
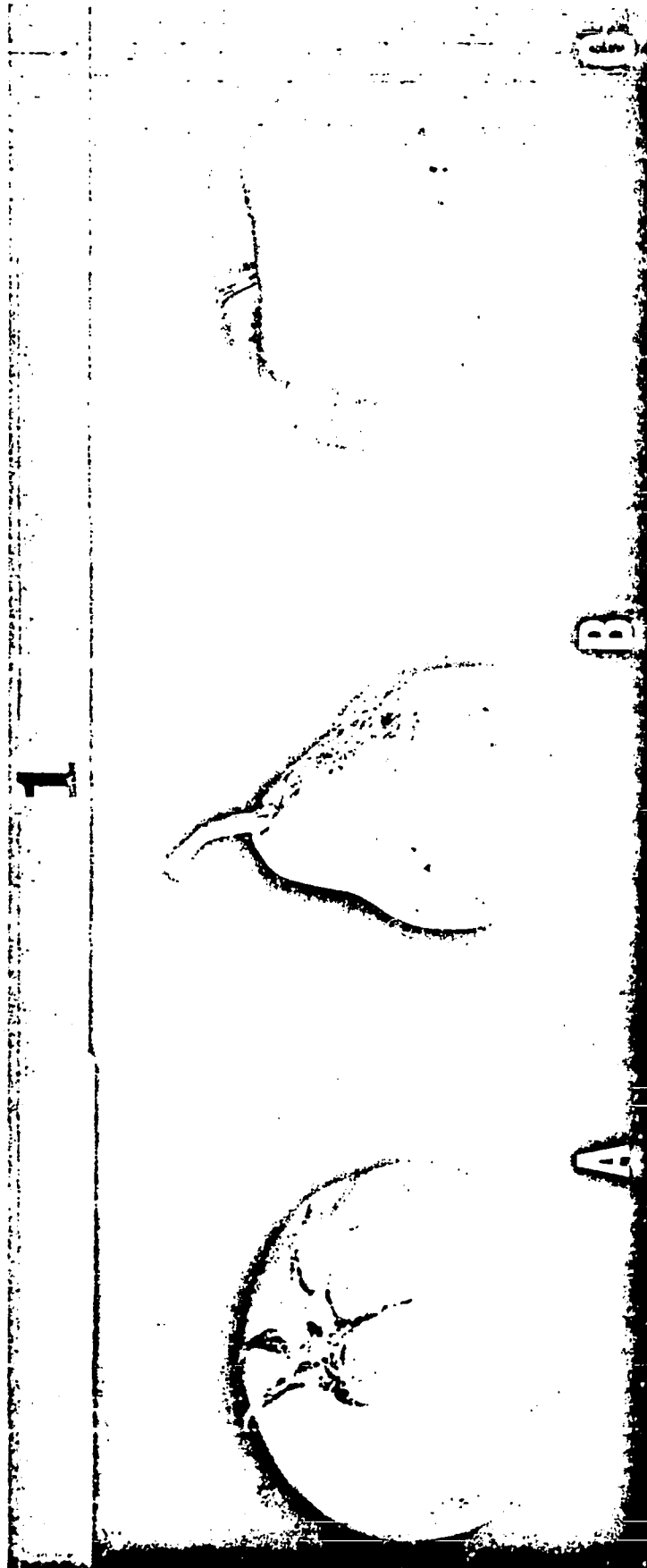
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Example

APPENDIX C

Directions and Example of the Matching
Familiar Figures Test (MFFT)
(Kagan 1965a)

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APPENDIX C

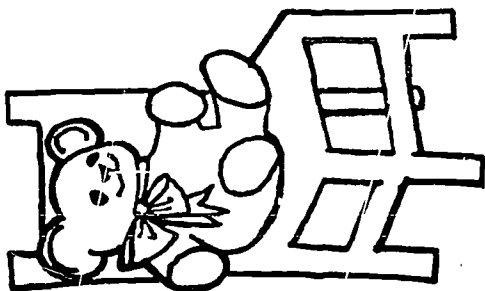Directions and Example of the Matching
Familiar Figures Test (MFFT) - Kagan (1965a)

"I am going to show you a picture of something you know and them
some pictures that look like it. You will have to point to the picture
on the 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 the 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.

Example
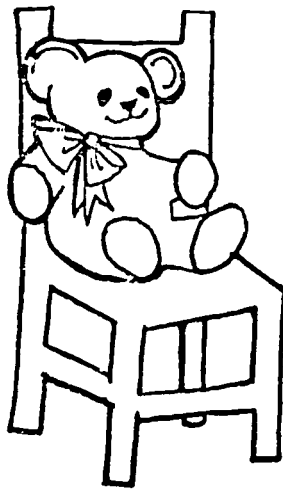
Example
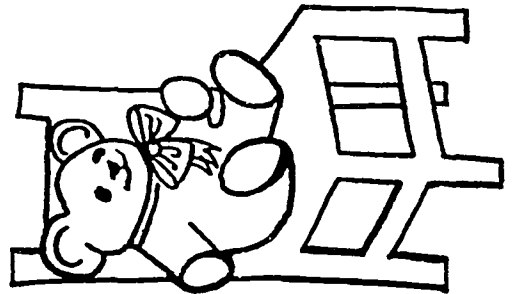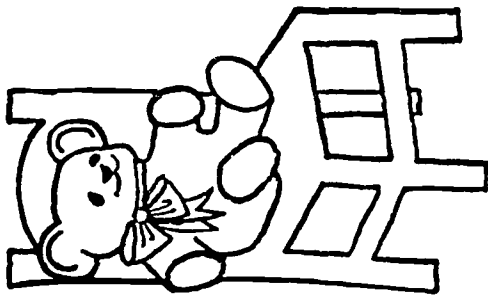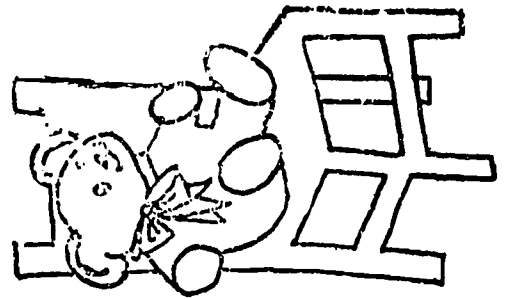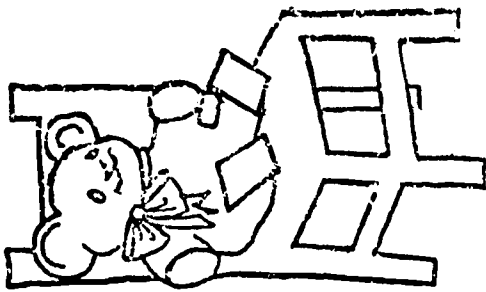
APPENDIX D

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B---Comprehension, TEST 1: Paragraph Topics
(Otto 1973, pp. 7-8)

APPENDIX D

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B—Comprehension, TEST 1: Paragraph Topics
(Otto 1973, pp. 7-8)

Each student in the group is given a copy of the test booklet with his
or her name on it. A chalkboard demonstration is given to show them
how to fill in the answers with their pencils.

General Instructions

> These tests are about what you learn and remember from
> stories and sentences. It's important for you to do
> your best. After you take the tests we'll find out
> what things you already do well. We'll also find out
> what you need to know more about so we can spend more
> time helping you to learn those skills.

Test 1 Instructions-Paragraph Topics, Form I

> In this test you'll decide what stories are about.
> Look at the example box on this page (point). In the
> box is a story. Read the story silently as I read it
> out loud. Then I'll ask a question about the story.
> Listen carefully. Ready?

>> He picked up one dish at a time. He
>> put it in the soapy water. Then he
>> washed it with a cloth and cleaned it
>> in clear water. He set the clean dishes
>> down to dry.

> What was the whole story about? "A, cloth. B, drying.
> C, soapy water. D, washing dishes. (Wait for a response.)
> Good. The whole story was about washing dishes. Mark
> your answer by filling in the circle beside washing dishes,
> answer choice D in the example box. (Check to see that
> all children answered correctly.)

> You will do the rest of the stories just like you did
> the example story. I will read each story and the
> answer choices to you but from now on I cannot help you
> choose the answer. You will fill in the circle next
> to the answer that tells what the whole story is about.
> When you're not sure which answer is correct, mark the
> answer you think is right. Remember that you are not to
> talk during the test. Do not say any of your answers
> out loud. Ready?

> (Read each story and the answer choices only once. Wait until
> all children have completed an item before proceeding to the
> next item.)

Test 1 Instructions-Paragraph Topics, Form I (cont'd.)

<u>Example</u>

He picked up one dish at
a time. He put it in the
soapy water. Then he
washed it with a cloth and
cleaned it in clear water.
He set the clean dishes
down to dry.

(A) cloth
(B) drying
(C) soapy water
(D) washing dishes

APPENDIX E

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 2: Before or After
(Otto 1973, pp. 12-13)

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 2: Before or After
(Otto 1973, pp. 12-13)

Each student in the group is given a copy of the test booklet with
his or her name on it. Procedure for penciling in answer is reviewed.

Test 2 Instructions--Before or After

> This test is about when things happen in stories.
> Look at the row of pictures beside the X. (Point.)
> I am going to tell you a short story. I'll ask you
> to mark the picture that shows what happened <u>before</u>
> one part of the story. (Pause.) Listen carefully and
> I will read the story to you.
>
> > Ken's dad was painting the fence. He was
> > almost out of paint and sent Ken to get some
> > more. On the way back, Ken tripped and
> > spilled the can of paint. Suzy came along
> > on her roller skates and helped Ken clean up
> > the mess. When they got home, Ken's father
> > had finished the fence. He was already
> > cleaning his brush.
>
> Which picture in the row shows what happened <u>just before</u>
> Suzy came by on roller skates? (Wait for a response.)
> Good. The picture of the boy with the spilled paint.
> Ken spilled the paint just before Suzy came along on her
> skates. Mark your answer by filling in the circle under
> the picture of the boy with the spilled paint. (Check
> to see that all children answered correctly.)
>
> The rest of the test is like the example we just did,
> but from now on I cannot help you. For each row look
> at the pictures while I read a story. Then I'll ask you
> what happened <u>before</u> one part of the story. For each
> row you will fill in the circle under just <u>one</u> picture.
> When you're not sure which picture is correct, mark the
> picture you <u>think</u> is right. Remember that you must
> listen very carefully. Keep your answer to yourself.
> Don't work ahead, and don't say anything out loud. Ready?

(Read each story and question once. Wait until all children
have completed an item before proceeding to the next item.)

Test 2 Instructions--Before or After (cont'd.)

Example

X   (A)   (B)   (C)
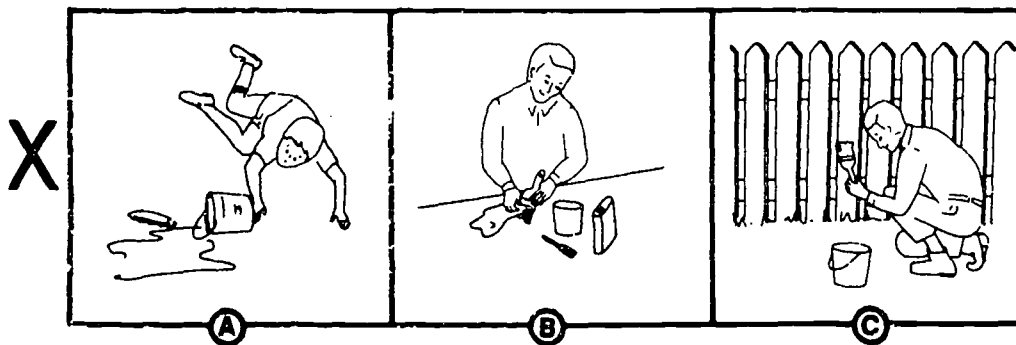
APPENDIX F

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 3: Outcomes
(Otto 1973, p. 16)

Directions and Example of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 3:   Outcomes
(Otto 1973, p. 16)

Each student in the group is given a copy of the test booklet
with his or her name on it. Procedure for penciling in answer is
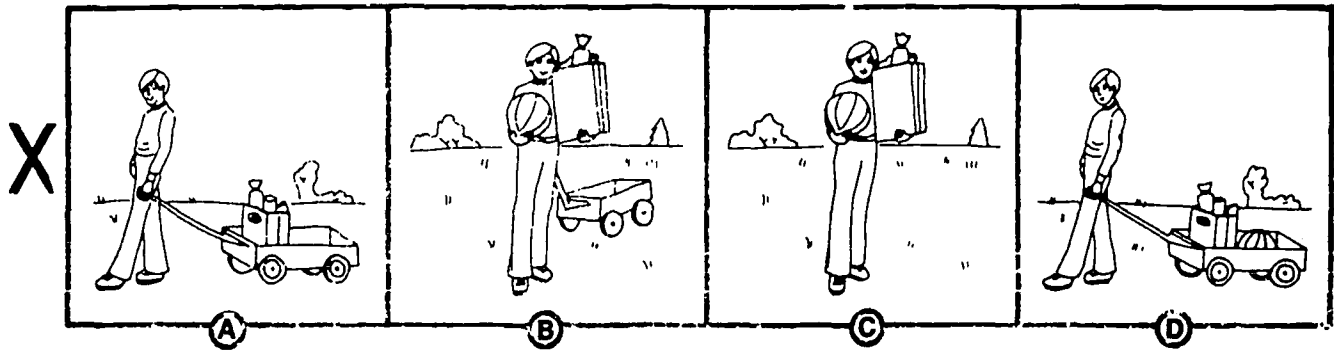reviewed.

Test 3 Instructions--Outcomes

This test is about what might happen right after a
sentence I will say to you. Look at the row of pic-
tures beside the X on this page. (Point.) I am going
to say a sentence to you. Decide which picture in the
row shows what might happen right after the sentence.
Listen carefully. John picked up the ball, put it in
his wagon, and pulled the wagon to the grocery store.
Which picture shows what might happen right after the
sentence. Listen carefully. John picked up the ball,
put it in his wagon, and pulled the wagon to the
grocery store. (Wait for a response.) Good. The last
picture does. It shows John pulling his wagon with the
ball and a bag of groceries in it. Mark your answer by
filling in the circle under this picture. (Check to
see that all children answered correctly.)

The rest of the test is like the example we just did,
but from now on I cannot help you. For each row I'll
read a sentence to you. You will decide which picture
shows what might happen right after the sentence I say.
For each row you will fill in the circle under just one
picture. When you*re not sure which picture is correct,
mark the picture you think is right. Remember that you
must listen very carefully. Keep your answer to your-
self. Don't work ahead, and don't say anything out
loud. Ready?

(Read the directions for each item only once. Wait until all
children have completed an item before proceeding to the next
item.)

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Example

X

APPENDIX G

Directions and Examples of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 4: Cause-Effect
(Otto 1973, p. 19)

Directions and Examples of the

Wisconsin Tests for Reading Skill Development,

Level B-Comprehension, TEST 4: Cause-Effect

(Otto 1973, p. 19)

Each student in the group is given a copy of the test booklet with his or her name on it. Procedure for penciling in answer is reviewed.

Test 4 Instructions-Cause-Effect, Form I.

This test is about deciding whether one thing will make another thing happen. Look at the examples on this page. Read the two sentences for Example X silently as I read them aloud. "A, The cat cut a foot." (Pause.) "B, She had a bad limp." Would sentence A, "The cat cut a foot," have caused sentence B, "She had a bad limp"? (Wait for a response.) Good. Yes, sentence A could have caused sentence B. A cut foot might cause an animal to limp. Mark your answer to example X by filling in the circle under Yes beside these two sentences. (Check to see that all children answered correctly.)

Now read the two sentences for example Y. "A, Suzy's pen was red." (Pause.) "B, She lost it." Would sentence A cause sentence B? (Wait for a response.) That's right. It would not. The color of a pen would not cause someone to lose it. Mark your answer to example Y by filling in the circle under No beside these two sentences. (Check to see that all children answered correctly.)

The rest of the test is just like the examples. I'll read the sentences to you, but from now on I cannot help you answer the question. You'll decide whether the thing in sentence A would make the thing in sentence B. happen. Then fill in the circle under Yes or No. When you're not sure which answer is correct, mark the answer you think is right. Remember that you must listen very carefully. Keep your answer to yourself. Don't work ahead, and don't say anything out loud. Ready?

(Read each pair of sentences and the question only once. Wait until all children have completed an item before proceeding to the next item.)

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Test 4 Instructions-Cause-Effect, Form I (cont'd.)

Examples

		Would A cause B?	
		Yes	No
X	A. The cat cut a foot.	Yes	No
	B. She had a bad limp.	◯	◯
Y	A. Suzy's pen was red.	Yes	No
	B. She lost it.	◯	◯

APPENDIX H

Directions and Examples of the
Wisconsin Tests for Reading Skill Development,
Level B--Comprehension, TEST 5: Detail
(Otto 1973, p. 24)

APPENDIX H

Directions and Examples of the

Wisconsin Tests for Reading Skill Development,

Level B-Comprehension, TEST 5: Detail

(Otto 1973, p. 24)

Each student in the group is given a copy of the test booklet with his or her name on it. Procedure for penciling in answer is reviewed.

Test 5 Instructions-Detail, Form I

This test is about what happens in stories. Look at the
example box on this page. (Point.) In the box is a story.
Read the story silently as I read it aloud.

It was a busy day for Susan and her father.
In the morning they flew in a small airplane.
In the afternoon Susan went swimming. In the
evening Father went sailing with some friends.

Now I am going to ask you a question about the story. Look
at question X. "Who flew in the airplane? A, Susan only.
B, Father only. C, Susan and Father. D, friends." Look in
the story and find who flew in the airplane. (Wait for a
response.) Good. The story says both Susan and Father flew
in the airplane. Mark your answer to question X in the ex-
ample box by filling in the circle next to the words Susan
and Father, answer choice C. (Check to see that all children
answered correctly.)

Now look at question Y. "When did Susan go swimming? A, in
the afternoon. B, in the evening. C, when Father went sail-
ing. D, when Father went flying." Look in the story and find
when Susan went swimming. (Wait for a response.) Good. The
story says Susan went swimming in the afternoon. In the ex-
ample box fill in the circle next to the words in the after-
noon, answer choice A. (Check to see that all children
answered correctly.)

You will do the test questions just like you did the example
questions. I will read the stories and the questions to
you but from now on I cannot help you find the answers. You
will fill in the circle next to your answer choice. Remember

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Test 5 Instructions-Detail, Form I (cont'd.)

> to look in the stories and find the word or words that
> will answer the questions. When you are not sure which
> answer is correct, mark the answer you <u>think</u> is right.
> Remember that you are not to talk during the test. Do
> not say any of your answers out loud. Ready?

> (Read stories, questions, and answer choices only once. Wait
> until all children have completed an item before proceeding to
> the next item.)

Examples

It was a busy day for Susan and her father. In the morning they flew
in a small airplane. In the afternoon Susan went swimming. In the eve-
ning Father went sailing with some friends.

> X   Who flew in the airplane?
> Ⓐ Susan only
> Ⓑ Father only
> Ⓒ Susan and father
> Ⓓ friends

> Y   When did Susan go swimming?
> Ⓐ in the afternoon
> Ⓑ in the evening
> Ⓒ when Father went sailing
> Ⓓ when Father went flying

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