INFORMATION PROCESSING STRATEGIES AND LEARNING STYLES AMONG DISTRACTABLE ELEMENTARY SCHOOL CHILDREN

By

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CHAPTER I

THE RESEARCH PROBLEM

Introduction

Despite efforts of educators to provide the individual student with a maximally beneficial learning experience, many children continue to have trouble succeeding in school. Recently, researchers concerned with this problem have directed investigations to the area of cognitive style (Das, Kirby, and Jarman, 1979; Kagan, 1966; Witkin et al. 1977a). Cognitive style refers to the "characteristic ways in which individuals conceptually organize the environment" (Goldstein and Blackman, 1978, p. 2). While traditional approaches to cognition deal with the content or product of thought, researchers of cognitive style emphasize the structure, or process, of thought (Goldstein and Blackman, 1978). It has been stated that since the construct of cognitive style emphasizes how individuals arrive at answers (the structure of thought), looking at learning problems in terms of cognitive style may hold promise for successful remediation (Covington, 1970).

Research has identified and investigated several types of cognitive style (Goldstein and Blackman, 1978; Kogan, 1976). Of particular relevance to the question of learning problems are the cognitive styles of simultaneous processing, sequential processing, field independence, field dependence, impulsivity, and reflectivity (Das, Kirby, and Jarman, 1979; Kagan, 1966; Witkin et al., 1977b).

Statement of the Problem

Often, children who have learning problems in school meet with frustration because teachers, parents, and various school personnel do not know how to help them. While these children obviously have difficulties with their school work, they do not have measureable intellectual deficits. These children are often thought of as behavior problems in the classroom, as they may have short attention spans and display behaviors that are disrupting to the classroom.

Researchers of cognitive style propose that the lack of success in helping these children with their problems in school may be related to the approach that educators take to solving the problems. They note that educators try to help children by dealing with the product of the student's work instead of with the process that the student went through to arrive at that product (Covington, 1970). Therefore, they propose that investigation of the ways a student arrives at an answer (i.e., investigation of his cognitive style), may give educators a clue as to how to deal with the student's problem (Das, Kirby, and Jarman, 1979; Goldstein and Blackman, 1978; Witkin et al., 1977b).

Also, the behavior characteristic of distractability is identified as a predominant symptom in children with learning problems (Hebben et al., 1981; Tarver and Hallahan, 1974; Vrana and Pihl, 1980). Therefore, the purpose of this research is to investigate the relationships among the cognitive styles of simultaneous processing, sequential processing, field independence, field dependence, impulsivity, and reflectivity in distractable children.

Definition of Terms

Cognitive Style is a construct that describes the self-consistent modes of functioning used by individuals in perceptual and intellectual activities. The cognitive styles investigated in this paper are simultaneous and successive processing, field independence-field dependence, and impulsivity-reflectivity.

Distractable is a term used to describe children who have trouble attending to tasks, and who seem to have little self-control over their disruptive behaviors in the classroom. In the present study, distractability is implied by high scores on the Behavior Rating Scale for children.

Field Dependence is a construct used to describe perception contingent upon the prevailing visual field. Difficulty disembedding the figures on the Children's Embedded Figures Test (CEFT), is considered indicative of field dependence in the present study.

Field Independence is a construct used to describe perception that is not contingent upon the surrounding visual field. Successful disembedding of figures on the CEFT is considered indicative of field independence.

Impulsivity is the tendency to react quickly and incorrectly to problems with a high response uncertainty where several possible solutions are available. In the present study, the combination of a high error rate and low average latency on the Matching Familiar Figures (MFF), test is considered indicative of impulsivity.

Perception is the capacity for comprehension and the gaining of meaning through interpretation of sensations.

Reflectivity is the tendency to respond slowly and accurately to problems with high response uncertainty, where several possible solutions are available. In the present study, a combination of a low error rate and a high average, latency on the MFF test is considered indicative of reflectivity.

Simultaneous Processing refers to a cognitive process whereby separate elements are synthesized into groups, information is synthesized globally. In the present study, high scores on Raven's Coloured Progressive Matrices (CPM) will be indicative of effective use of simultaneous processing.

Successive (Sequential) Processing is a cognitive process whereby separate elements are synthesized in serial order. In the present study, high scores on the Visual Aural Digit Span Test (VADS), are indicative of effective use of successive processing.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Cognitive style, the hypothetical construct that describes characteristic ways an individual conceptually organizes his environment, has been a focus of recent educational research. Goldstein and Blackman (1978) describe cognitive style as a term used in reference to the characteristic ways individuals use to "conceptually organize" their environment. It has been theorized by authors of literature on cognitive style that difficulties in learning do not necessarily reflect limitations in intellectual capacity. Instead, it is proposed that the way a person learns may have a significant effect on performance on a particular task (Das, 1972; Das, Kirby, and Jarman, 1975; Witkin et al., 1977b). The particular cognitive styles dealt with in the present study are simultaneous and successive processing (Das, Kirby, and Jarman, 1979), field independence and field dependence (Witkin et al., 1977a), and impulsivity-reflectivity (Kagan, 1965).

It has been noted that children with learning problems are often distractable (Hebben et al., 1981; Tarver and Hallahan, 1974; Vrana and Pihl, 1980). Teachers and parents often describe children with learning problems as being easily distracted from their school work. Therefore, the present study will examine the cognitive styles of simultaneous and successive processing, field independence-field dependence, and impulsiv-

ity-reflectivity in children who are identified as distractable.

Simultaneous and Successive Processing

Das, Kirby, and Jarman (1979), propose that cognitive style can be discussed in terms of individual differences in preferred or habitual ways of processing information. Information processing strategies have been studied by several researchers (Das, Kirby, and Jarman, 1979; Loess, 1952; Luria, 1966, 1973). Luria proposed the existence of simultaneous and successive processes on the basis of his observation of behavioral changes in humans following brain lesions (Luria, 1966). Luria's model of the three blocks of the brain is of particular interest to the study of information processing (Das, Kirby, and Jarman, 1979). Luria's model proposes that different areas of the brain control different activities (Luria, 1966). Luria specifically identifies three distinct units of the brain. Unit 1 supplies energy for various conscious and unconscious mental activities, unit 2 obtains, processes, and stores information, and unit 3 is responsible for the planning and programming of behavior (Das, Kirby, and Jarman, 1979).

Luria's model sparked the development of other ideas relevant to information processing. In particular, Das, Kirby, and Jarman (1979), cite Luria's research as a basis for development of their own ideas on information processing.

Das, Kirby, and Jarman (1979), describe two modes of information processing, simultaneous and successive processing. These authors hold that the two modes of processing are distinct, identifiable, and measureable (Das, Kirby, and Jarman, 1975). Simultaneous processing is described as the synthesis of individual elements into groups, above all,

spatial groups (Das, and Malloy, 1975). Das and Malloy (1981), cite copying of geometric figures as an example of a task requiring simultaneous processing. The tests most commonly used to measure the use of simultaneous processing are the Raven's Coloured Progressive Matrices, Figure Copying, and Memory for Designs (Das, Kirby, and Jarman, 1979).

Das and Malloy (1975) state that successive processing involves the arrangement of stimuli in sequence. Das, Kirby, and Jarman (1979), point out that in successive processing, a system of cues activates the components, and the system is not totally surveyable at any one point in time (i.e., each part of the task must be dealt with separately, synthesis of separate elements into one group is not possible). Recall of a series of numbers is an example of a task involving successive processing. Successive processing is commonly measured with tests involving digit span, free recall, and visual short term memory (Das, Kirby, and Jarman, 1979).

Das, Kirby, and Jarman (1979), point out that both simultaneous and successive processing can be involved in all forms of responding, regardless of the presentation method of the information.

> The model assumes that two modes of processing information are available to the individual. The selection of either or both modes depends on two conditions: (1) the individual's habitual mode of processing information as determined by social-cultural and genetic factors, and (2) the demands of the task (p. 50).

It is suggested that while a simple relationship between simultaneous and successive processing and school achievement is not predictable from the simultaneous and successive processing model, some types of tasks may utilize one mode of processing over another mode (Das, Kirby, and Jarman, 1979). In particular, Das, Kirby, and Jarman (1979), suggest that areas of achievement involving interpretation of spatial

information, such as mathematics, should be more related to simultaneous processing, while those areas involving retention of unrelated information, such as spelling, would require successive processing. They hold that the most important feature of the two types of processes in terms of particular tasks is that complex subjects such as reading and comprehension, would require the use of both forms of processing (Das, Kirby, and Jarman, 1979). In a discussion of research comparing the processing strategies of high and low achieving students, Das explains that "it appears that the two groups process information differently; the success of the high achievement group suggests that they are able to employ their processes appropriately" (Das, Kirby, and Jarman, 1979; p. 9). It is important to note that in the described research, both simultaneous and successive factors were identifiable in both groups of achievers.

Research suggests that it is possible to teach children to process information appropriately. Das states that in two recent studies, a remediation program aimed at improving successive processing among low achieving children brought about notable improvements in decoding skills (Das and Malloy, 1981).

While there is no available research specifically investigating the relationships among simultaneous and successive processing and other cognitive styles, researchers of simultaneous and successive processing have implied that some relationships exist (Das, Kirby, and Jarman, 1979). In particular, impulsivity-reflectivity, and field dependence-field independence have been noted as having possible relationships with simultaneous and successive processing (Das, Kirby, and Jarman, 1979). These researchers suggest that the functions involved in tasks such as the Matching Familiar Figures Test (MFF), measuring reflectivity require

orderly step by step evaluation of alternatives, therefore reflectivity may be related to successive processing. In discussing constructs relevant to cognitive style, Das, Kirby, and Jarman (1979, p. 141), state that "it would seem likely that field independence is related to simultaneous processing, just as general visualization is."

Field Independence-Field Dependence

Field independence-field dependence is an approach to cognitive style that is based on the study of perception. Herman Witkin developed the construct of field independence-field dependence in conjunction with his studies involving "perception of the upright," determination of the upright position for objects tilted in space (Witkin, 1950). Witkin's early research utilized the Rod and Frame Test (RFT). The subject is seated in darkness and views a luminous rod suspended in a luminous frame. Both the rod and the frame can be tilted independently. The trial begins with both the rod and frame tilted. The subject's task is to tell the experimenter how to adjust the rod to a position that the subject believes is upright, or vertical (Goldstein and Blackman, 1978). Subjects who successfully guide the rod to a true upright position are described as field independent, while those subjects who direct the rod in relation to its position in the tilted frame are described as field dependent (Witkin et al., 1977).

Goldstein and Blackman (1978), note that as a result of extensive studies investigating field independence-field dependence, the construct was broadened to denote a "global articulated" dimension, a dimension on which individuals differ in their tendency to structure the visual field. Witkin holds that field independence-field dependence is rela-

tively stable and has relevance to many aspects of an individual's life (Witkin et al., 1977). Witkins' early research suggests a hierarchial relationship between field independence-field dependence, with field independence as the more desirable characteristic. Kogan (1976), notes that Witkin's more recent research suggests that field independence and field dependence are two ways of perceiving that are different from each other, but one is not necessarily better or worse than the other. Indeed, in a recent extensive review of field independence-field dependence (Witkin et al., 1966b), Witkin goes into great detail explaining the characteristics associated with field independence and field dependence, pointing out the assets and drawbacks of each of the two cognitive styles.

Witkin and his associates state that individuals who are field dependent tend to be strongly oriented toward their social environment, and therefore, display high levels of social skill and confidence, while field independent individuals tend to be more task oriented, and focused on the physical environment (Witkin et al., 1977b). It is also noteworthy that with further research on the construct, new, more convenient tests were developed to measure field independence-field dependence. The tests most commonly used in present day research are the Embedded Figures Test (EFT), and the Children's Embedded Figures Test (CEFT), developed in 1971 and 1963 respectively.

In a discussion of constructs related to field dependence-field independence, Goldstein and Blackman (1978, p. 196), state that research suggests that "children considered to be reflective on the basis of their MFF scores were more field independent, as measured by the CEFT than children considered to be impulsive." Also, as pointed out earlier

in this paper, authors of research on simultaneous and successive processing imply a relationship between their construct and field independence-field dependence (Das, Kirby, and Jarman, 1979).

Impulsivity-Reflectivity

Children with learning problems are often described as impulsive, that is teachers and parents of children with learning problems typically report that these children seem to react to situations without thinking. Jerome Kagan (1965), asserts that this is a cognitive style which effects performance on particular tasks. Kagan describes an individual as impulsive or reflective (Kagan, 1965). Typically, an impulsive individual is one who reacts to a stimulus quickly, making many errors, while a reflective individual reacts slowly, making fewer errors. It has been stated that whether an individual is impulsive or reflective may imply a great deal about other aspects of his performance.

> Reflection-impulsivity is related to certain clinical syndromes including hyperactivity, brain damage, epilepsy, and mental retardation. It also effects school performance, as shown by the greater impulsivity of children with reading difficulties, learning disabilities, and school failure (Messer, 1976, p. 1026).

Research studies have found that reflective children scan material in a more systematic fashion than impulsive children do (Messer, 1976). Also, reflective children tend to look at more parts, more often, for longer periods of time than do impulsive children (Cook, 1976).

While Kagan's early research was primarily concerned with the distinction between impulsivity and reflectivity, his later research acknowledges that many people are neither impulsive nor reflective. Kagan describes "fast accurates" as those individuals who react quickly and correctly, and "slow inaccurates" as those individuals who react

slowly and incorrectly (Messer, 1976). While these two styles have been acknowledged and described by Kagan, the main research focus continues to be on the impulsivity and reflectivity dimensions of the construct because of their immediate relevance to educational research (Messer, 1976). Also, Kagan (1965), notes that impulsivity-reflectivity seems to be stable among children, with a general trend that children become more reflective with age (i.e., a child who is more impulsive than peers at a particular age will likely still be more impulsive than peers at a later age).

While the Matching Familiar Figures Test (MFF), is the instrument most often used to measure impulsivity, it has been stated that performance on the MFF relates to performance on a variety of tasks:

> The degree to which the child pauses to evaluate the quality of his cognitive product acts on the entire spectrum of cognitive processes by influencing the quality of initial decoding, recall, and hypothesis generation. Some children accept and report the first hypothesis that is printed on the screen of awareness and act upon it with only the barest consideration for its appropriateness or validity. Others devote a long period of time to study and reflection and censor many hypotheses. This individual-difference dimension is apparent as early as two years of age (Kagan, 1971, p. 109).

Messer (1976) notes that research has investigated relationships between impulsivity-reflectivity and other cognitive styles. Massari (1975) found that children considered reflective on the basis of MFF scores were more field-independent (as measured by the CEFT), than were children who were impulsive. Also, it is important to note that there is evidence that impulsive behaviors can be remediated through use of strategies teaching improved scanning techniques with appropriate training materials while having the children verbalize the scanning techniques out loud (Messer, 1976; Meichenbaum and Goodman, 1971).

Distractability

Children with learning problems are often described as distractable. In fact, it is not unusual for distractability to be named as the cause of the problems that a particular child has in school. While much of the available research on distractability involves children identified as having a specific disability, authors imply that distractability is associated with many types of learning problems (Hebben et al., 1981; Tarver et al., 1974; Vrana and Pihl, 1980). Tarver and his associates (1974) conducted a review of several studies involving distractability, and found that children with learning disabilities were more distractable on selected tasks involving embedded figure contexts, and on tasks involving incidental learning than were average children. A study involving learning disabled and normal children ages eight to 10.6 (Vrana and Pihl, 1980), found that normal children selectively attended significantly better than learning disabled children on tasks where stimuli were close together. Hebben and his associates (1981, p. 287) conducted a study investigating attention deficits and information processing in "poor readers, good readers, and normal readers referred for school problems." The study concluded that attention deficits may account for the performance of poor readers on verbal tasks.

The research available on distractability would seem to indicate that children who have learning problems are more often distractable than children who do not have learning problems. Thus, it appears reasonable to investigate learning styles in distractable children specifically.

Summary

It has been suggested that cognitive styles are involved in performance of children on school tasks (Goldstein and Blackman, 1978). Authors of research on specific types of cognitive style hold that their constructs are relevant to achievement of children in school, and that different types of cognitive style may be related to each other (Das, Kirby, and Jarman, 1979; Goldstein and Blackman, 1978; Messer, 1976). It has also been stated that different types of cognitive styles can be remediated so that children have the techniques to use the cognitive style that is appropriate for a particular task (Das and Malloy, 1981; Messer, 1976). It is noted that there is insufficient research involving relationships between several cognitive styles, in particular, simultaneous and successive processing, field independence-field dependence, and impulsivity-reflectivity. Thus, it is suggested that the relationships between these cognitive styles be investigated (Das, Kirby, and Jarman, 1979; Goldstein and Blackman, 1978). Also, since research indicates a greater tendency for children with learning problems to be distractable, research specifically involving distractable children is warranted (Vrana and Pihl, 1980).

Hypotheses

Studies by authors of cognitive style (Das, Kirby, and Jarman, 1979; Goldstein and Blackman, 1978; Messer, 1976), pose the following research question: are there relationships among different cognitive styles? The present study will attempt to address this research question through investigation of the following hypotheses:

1. It is expected that there will be a relationship between simultaneous processing and impulsivity-reflectivity.

2. It is expected that there will be a relationship between simultaneous processing and field independence-field dependence.

3. A relationship between successive processing and impulsivity-reflectivity is expected.

4. A relationship between successive processing and field independence-field dependence is expected.

5. It is expected that there is a relationship between impulsivity-reflectivity and field independence-field dependence.

CHAPTER III

METHOD

Sample

Seventy-six first to sixth grade students at an elementary school in Muskogee, OK, participated in the study. The subjects were all those students at the school identified as "distractable" on the Behavior Rating Scale for Children. The sample included 15 first graders (4 females, 11 males), seven second graders (4 females, 3 males), 23 third graders (11 females, 12 males), 13 fourth graders (3 females, 10 males), 11 fifth graders (4 female, 7 males), and seven sixth graders (3 females, 4 males) males). There were 29 females and 47 males in the study. The participants in the study were from a predominantly middle-low socio-economic neighborhood.

Instruments

The Behavior Rating Scale for Children (also known as the Self-Control Rating Scale) is used in the present study as a measure of distractability in elementary school aged children. While this rating scale is typically used to measure self-control in children, it was used in the present study to infer distractability as distractability in the present study is operationally defined in terms of self-control behaviors. The scale consists of items describing classroom behavior of children. Each item is followed by several choices that describe the

frequency of a behavior. The student's teacher circles the choice that appropriately describes the frequency of each behavior as it occurs in the individual child in question. There are seven choices describing the frequency of each behavior ranging from always to never. P. C. Kendall and his associates developed the Behavior Rating Scale for Children, for use in educational behavioral research with children. Kendall and Wilcox (1979) report internal consistency coefficients of .98 and test re-test reliability of .84 for the Self-Control Rating Scale. Discriminant validity of the Behavior Rating Scale for children is suggested by virtue of its very low, non-significant correlations with IQ scores and mental age. Also, correlations with other tests associated with distractability found in a validation study of 110 average third to sixth graders are used to imply congruent validity (Kendall and Wilcox, 1979).

The Children's Embedded Figures Test (Karp and Konstadt, 1963) was used to measure Field independence-field dependence. The test is made up of two series of colored designs on cards. The subject is shown a figure (tent first series, house second series), and the task is to find the figure within a larger picture. There are 11 cards in the tent series, and 14 cards in the house series.

No time limit is set on the CEFT, and administration time is about 15-25 minutes for each child. The standardization sample for the CEFT included children aged fice to 12. Internal consistency data is reported for seven to 12 year olds as being between .83 and .90 (Buros, 1972). Also, validity studies conducted with nine to 12 year olds comparing the CEFT to the Embedded Figures Test yielded correlations of .70 to .86. It is suggested that the lower correlations may hve been the result of

the lowered reliability of the EFT for children below age 11 (Buros, 1972). In a review of the CEFT for Buros Mental Measurements Yearbook, Sheldon A. Weintaub suggests that while construct validity research is needed, the CEFT seems to be an adequate downward extension of the EFT (Buros, 1972).

The Matching Familiar Figures Test was used as a measure of impulsivity-reflectivity. The test, developed by Jerome Kagan et al. (1964), is a match to sample task involving the presentation of a picture of a familiar object such as a tree, with six similar objects, one of which is identical to the single object. The child's task is to pick the picture out of the six choices that exactly matches the single picture. The pages, covered in clear plastic, are held by a stand so that the top and bottom pages faced each other at a 120 degree angle. The child is instructed to find the picture on the bottom page that exactly matches the picture on the top page and to point to his choice. While there is no time limit, response times for each first response are recorded. Administration of the MFF requires approximately 10 minutes.

While there are no available noational norms for the MFF, reliability and validity have been reported by several researchers using the instrument in their studies. Test re-test and equivalent form reliability coefficients ranging from .62 to .98 have been reported for the MFF (Messer, 1974).

The Coloured Progressive Matrices test is used as a measure of simultaneous processing. The test consists of 36 pictures with a piece missing out of each picture. The subject's task is to look at each picture and pick the piece (out of a choice of six), that correctly completes the design. There is no time limit on the test, and adminis-

tration requires 10-15 minutes. The Coloured Progressive Matrices Test was developed by J. C. Raven as a measure of general intelligence, and is typically used as such. However, it has been used to indicate simultaneous processing in studies investigating types of processing (Das, Kirby, and Jarman, 1979).

Test re-test reliability is reported as .80 for children age seven and over, and as .65 for children under the age of seven (Raven, 1962). Comparisons with other measures of general intelligence yield validity coefficients ranging from .5 for children under seven years old, to .65 for children seven years old and older.

The Visual Aural Digit Span test is used in the present study as a measure of sequential processing. The VADS is a series of serial recall tasks. There are four sections involved in the test. The child listens to digits then repeats them, looks at digits then repeats them, listens to digits then writes them, and looks at digits then writes them. The digits in the two listening series are read by the tester at one second intervals, and for the two reading series, the digits are exposed for 10 seconds. The number of digits in each of the four tasks progresses from strings of two digits to strings of seven digits. The test is discontinued if the child fails both trials of any string of digits. Administration of the VADS requires approximately 15 minutes.

While the VADS test is primarily used to measure perceptual-motor integration, sequencing, and recall, it is used in the present study as a measure of successive processing. In a study investigating use of successing processing, Hobby (1981) suggests that the VADS test is appropriate as a measure of successive processing as sequencing abilities are primary to use of successive processing. Hobby (1981) also states

that equal matching of visual and aduitory muodalities on the VADS test makes this test optimal in evaluation of successive processing skills.

Reliability data for the VADS was gathered using 62 elementary school aged children with learning and behavior problems (Koppitz, 1977). Koppitz states test-retest reliability coefficients for the VADS as ranging from .72 to .92. Also, it is stated (Koppitz, 1977), that intercorrelations among the subtests of the VADS range from .29 to .92 among a norming sample of 810 kindergarten to sixth grade children. Correlations between WISC Digit Span Forward subtest and the VADS subtests produced coefficients ranging from .30 to .55.

Procedure

The Children's Behavior Rating Scale was filled out by the classroom teacher of each child in Sadler Elementary School. All of the children identified as distractable (cut-off criterion for identification is three or more ratings of six or seven on a seven point scale), were included in the sample. The Children's Embedded Figures Test, Coloured Progressive Matrices, Visual Aural Digit Span Test, and Matching Familiar Figures test were administered to each child individually. The order of the tests was rotated (EFT, MFF, CPM, VADS; MFF, CPM, VADS, EFT; CPM, VADS, EFT, MFF; VADS, EFT, MFF, CPM). Administration of the group of four tests requires approximately 45-60 minutes per child. Each test battery was hand scored by the tester, and the results were compiled and listed on data sheets. The data was entered into the terminal at the Oklahoma State University Computer Center and correlation coefficients for the relationships among variables were computed using the statistical Package for the Social Sciences (Nie et al., 1975).

Analysis of Data

In analysis of the data, successful test scores on use of the cognitive styles investigated in the study was inferred from scores on tests considered relevant to those cognitive styles. High scores on the CPM were considered reflective of successful use of simultaneous processing skills while low scores on the CPM were reflective of difficulties with simultaneous processing tasks. High scores on the VADS test were considered reflective of successful use of successive processing skills while low VADS test scores were considered reflective of problems with successive processing tasks.

Field independence-field dependence was measured with the CEFT. High scores on the CEFT were considered indicative of field independence. Low CEFT scores were considered indicative of field dependence.

Inpulsivity-reflectivity was measured with the MFF test. Combination of high latency and low error scores on the MFF test was considered indicative of a tendency toward reflectivity. A combination of low latency and high error scores was considered indicative of impulsivity. It is important to note that in the present study, subjects were not classified individually as impulsive or reflective rather, the tendency for scores in to occur a certain manner was examined.

Limitations of the Study

It is important to note factors that influence the generalizability of the study. The subjects in the study were all of those students in an elementary school population who were identified as distractable. Also, identification of students as distractable was made on the basis

of scores on one measure, the SCRS, thus limiting the scope of the study. Therefore, the findings of this study are generalizable to elementary school children who display distractability as indicated by behaviors displaying a lack of self-control.

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to examine relationships among the cognitive styles of simultaneous processing, successive processing, field independence-field dependence, and impulsivity-reflectivity in distractable elementary school children. In order to determine the existence of relationships among the variables in the study, Pearson r correlation coefficients were computed for the test score data.

Tests of the Hypotheses

The results of the computation of data presented in Tables I and II will be discussed in evaluation of the following five null hypotheses:

1. There is no significant relationship between simultaneous processing and impulsivity-reflectivity.

2. There is no significant relationship between simultaneous processing and field independence field dependence.

3. There is no significant relationship between successive processing and impulsivity-reflectivity.

4. There is no significant relationship between successive processing and field independence-field dependence.

5. There is no significant relationship between impulsivity-reflectivity and field independence-field dependence.

TABLE I

MEANS, STANDARD DEVIATIONS, AND RANGES FOR SCORES IN THE PRESENT STUDY

	X	S.D.	Range
Raven's	19.3	6.23	30.0
VADS Total	20.9	3.91	18.0
CEFT Total	17.2	4.01	19.0
Aulat MFF	11.4 (sec's)	5.13	31.7
Total Errors MFF	13.67	6.44	38.0

TABLE II

PEARSON r COEFFICIENTS FOR TEST SCORES IN PRESENT STUDY

	Raven's	VADS	CEFT	Avlat (MFF)	Total Errors
Raven's	---	----	----	----	-----
VADS	.46626**	----	----	----	-----
CEFT (Total)	.53232**	.53935**	----	----	-----
Avlat (MFF)	.19890*	.27604**	.08416	----	-----
Total Errors	-.50647**	-.36273**	-.47812**	-.141	-----

*P < .05.
**P < .01.

Null Hypothesis 1: There is no relationship between simultaneous processing (as reflected in CPM scores), and impulsivity-reflectivity (as reflected in MFF scores). The inverse correlation (-.50) between total errors on the MFF and scores on the CPM combined with a correlation between the average latency on the MFF and scores on the CPM suggests rejection of null hypothesis 1.

Null Hypothesis 2: There is no relationship between simultaneous processing and field independence-field dependence. Simultaneous processing (as measured by CPM scores), is correlated with field independence-field - dependence (measured by CEFT scores), in the present study (.53). Thus, it is possible to reject null hypothesis 2 in the present study.

Null Hypothesis 3: There is no relationship between successive processing (VADS scores) and impulsivity-reflectivity (MFF scores). There is a mild significant correlation between VADS scores and average latency on the MFF (.27), and a significant correlation between VADS scores and total errors on the MFF. In the present study, it is reasonable to reject null hypothesis 3.

Null Hypothesis 4: There is no relationship between successive processing and field-independence - field-dependence. There is a significant correlation (.53), between successive processing and field independence-field dependence in the present study. Field independence is found to be positively correlated with successive processing. This correlation suggests rejection of null hypothesis 4.

Null Hypothesis 5: There is no relationship between impulsivity-reflectivity and field independence-field - dependence. There is an inverse correlation of .-47 between total errors on the MFF and scores

on the CEFT, but there is no correlation between average latency on the MFF and scores on the CEFT. Thus, while field independence and total errors on the MFF seem to be inversely related, it is not reasonable to reject null hypothesis 5.

CHAPTER V

CONCLUSIONS

Statistical analysis of the variables in the present study suggests that there are relationships among the cognitive styles investigated in this paper.

In the present study, there is a significant relationship between simultaneous processing and field independence - field dependence, with a positive correlation between field independence and simultaneous processing. This finding agrees with Das, Kirby, and Jarman's (1979), hypothesis of a relationship between simultaneous processing and field independence.

Successive processing was found to be related to impulsivity-reflectivity. The findings of this study suggest a positive relationship between successive processing and reflectivity; a negative relationship between successive processing and impulsivity. This too, would seem to agree with Das, Kirby, and Jarman (1979), in that these authors predicted that since successive processing requires a step-by-step evaluation of stimuli, impulsivity and successive processing would be inversely related.

A positive relationship between successive processing and field independence was found, indicating an inverse relationship between successive processing and field dependence.

Simultaneous processing was found to be inversely related to total errors on the MFF test. While there was some relationship between

simultaneous processing and latency of response on the MFF test, the strength of the relationship is questionable. Thus, it may not be reasonable to imply a relationship between simultaneous processing and impulsivity-reflectivity on the basis of the data in the present study.

Similarly, field independence appears to be inversely related to the tendency to respond incorrectly. It is difficult to associate the complete construct of impulsivity-reflectivity with field independence, as average latency is not statistically correlated with field independence in this study. This finding is consistent with Messer's (1976), report that while moderate correlations were found between field independence and total errors on the MFF test, correlations involving average latency were not consistently significant. It is suggested by the author of the present study that field independence is not necessarily contingent upon the amount of time spent thinking about a task. It is possible that the ability to disembed an object from a visual field is effected by the way a person perceives, but not contingent upon evaluation of his response.

Some particular findings of this research could warrant further study. Evaluation of quality of response seemed to be related to successive processing (though mildly), but not to simultaneous processing or field independence.

The relationship between successive processing and impulsivity in the present study may hold implications for educational remediation with distractable elementary school children. The positive relationship between successive processing and length of response time may imply that performance on tasks requiring use of successive processing, such as narrative speech, and serial recall, can be influenced by the amount of

time spent in evaluating a possible solution to a question.

Authors of research on successive processing and impulsivity (Das and Malloy, 1981; Messer, 1976), suggest that these particular cognitive styles hold promise for successful remediation. Also, results of recent research (Hobby, 1981) suggest that use of strategies designed to improve successive processing skills results in significant improvement on school tasks requiring use of successive processing. Thus, it is the opinion of the author of this paper that treatment strategies designed to improve successive processing skills in terms of helping children learn to evaluate their responses could have a positive effect on performance on tasks requiring successive processing. Since many tasks involved in school achievement utilize successive processing, improvement of successive processing should facilitate achievement in school. There is also recent research (Kerasotes, 1980) to suggest that impulsivity can be reduced by use of cognitive-behavioral self-control training.

While the findings of the present research would seem to suggest that relationships between cognitive styles in distractable elementary school children exist, lack of a sufficient amount of studies exploring relationships among several cognitive styles would suggest the need for further research in this area. In particular, research results finding improvement on successive processing tasks (Hobby, 1981) by use of successive processing teaching strategies and reduction of impulsivity through cognitive-behavioral self-control training (Kerasotes, 1980) suggest that future research focusing on teaching strategies and cognitive-behavioral self-control may be warranted. It is the opinion of the present author that future research investigating successive processing

teaching strategies and reduction of impulsivity through cognitive behavioral self control may help educators learn how to better help students with learning problems succeed on performance of school tasks.

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