The Relationships Between Reading Performance And Three Measures of Distractibility Using Young Children

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CHAPTER I

INTRODUCTION

Presentation of the Problem

Identification and isolation of contributing factors in reading disability are of a wide and varied nature. However, there can be little doubt that early identification of children with special needs will provide these children with a sounder, more sophisticated educational program.

One factor which is a significant handicap to children learning to read is distractibility. Remaining free from distraction requires the ability to attend selectively to only the relevant cues in the immediate environment. If a child is unable to ignore irrelevant noises, sights, smells, and other conflicting input and attend to specific input, the instructional lesson for that child is destined to fail.

Children in kindergartens and first grades are today being asked to do an extraordinary amount of complex tasks. It is very probable that school systems unintentionally allow some children to become inattentive and confused during the school day simply by the schools' organizational patterns.

It is known that children with attentional disorders do exist. Whether these disorders are innate or are learned in our school systems cannot at this time be determined. We can, however, attempt to identify

children who cannot function in the present systems. The early identification of these children is the major focus of this study.

Remaining free from distraction in today's school systems involves the ability to use selective attention. A physiological definition of attention (not selective attention) is one that includes changes in the body of the organism. Changes such as dilation of the blood vessels in the head, the disappearance of the alpha waves in the brain, the dilation of the pupils of the eye and a temporary arrest of the breathing mechanisms are recorded when an organism is attending to a stimulus in the environment (Travers, 1972). Pelham and Ross (1977, p. 2) define selective attention as "that type of attention which involves the organism's focusing on relevant information and excluding or filtering out irrelevant information." Selective attention differs from attention in that it implies the organism's purposeful focusing on relevant cues of interest in the environment. This ability to focus selectively on the environment allows organisms to make order and sense from all the various stimuli entering their senses. The term selective attention further defines the construct of attention by attaching a connotation of purposeful attending to the attending process.

Norman's (1968) model of selective attention illustrates the process by which information is sensed, prioritized, selected, and attended. Norman illustrates that all input information has access to storage, but only the pertinent information is allowed to selectively filter to the point where attention is given to this relevant input. If subjects are unable to distinguish between inputs of high versus low pertinence, then attention is likely to be given to irrelevant stimuli.

Utilizing the concepts in Norman's model, distractible children are unable to give priority to relevant stimuli with reference to how the stimuli relate to the thoughts or tasks at hand. Without prioritizing the sensory input, attention is selectively given to stimuli and/or cues in the environment which are irrelevant to the situation. Then, the child can be said to be distractible or selectively inattentive.

Ross (1976) offers this example of selective attention interacting with a classroom task:

> Take a child who is supposed to learn to say the sound 'bee' to the visual presentation of the letter 'b' written on a chalkboard. Among the stimuli being received by this child at that moment is not solely the shape of the letter but also the teacher's pointing finger, the teacher's voice modeling the sound, extraneous noises in the room, other things written on the board, the color of the board, the color and size of the letter, a pinching shoe, a growling stomach, the pressures of the seat and so forth. From among all those, the child must select the shape of the letter and the teacher's voice in order to learn the appropriate response. This remarkable feat requires selective attention (p. 41).

Ross further states that selective attention is a necessary requirement but not a guarantee that learning will take place. Other variables such as aptitude and memory must also be considered as important variables in the scheme of learning. While these variables as well as methodology, pace of instruction, and teacher sophistication are all aspects of the teaching/learning process which should be monitored by the schools, assessing a child's ability or inability to selectively attend to the learning situation should also be of utmost concern to educators involved in teaching children to read.

Presently, assessment of a child's attentional abilities are not assessed until after the child encounters difficulty with learning to read. And, even then, there is no systematic, universally accepted way

of making an objective, formal judgment about a child's ability to function in today's schools.

However, tasks such as the three subtests on the Wechsler Intelligence Scale for Children-Revised (WISC-R), Arithmetic, Coding, and Digit Span, have been identified through factor analysis as being indicators of a factor coined by Cohen (1959) and Kaufman (1975) as Freedom from Distractibility. This factor indicates the degree to which a child is able to focus on relevant cues and filter out the irrelevant cues of the testing situation.

The McCarthy Scales of Children's Abilities (MSCA) have been similarly analyzed to reveal factors which according to Kaufman (1979a) might be interpreted as distractibility factors. Other interpretations for low scores on these selected subtests include test anxiety, sequencing, or memory abilities. Therefore, when making a diagnosis of a child's attentional deficits, care must be exercised to ensure that all possible alternative diagnoses are considered.

A third assessment device developed in 1969 by Conners consists of a 39 item rating scale employing items describing various behaviors of children. A professional well acquainted with the child completes the scale by assigning a value of either 0, 1, 2, or 3 to each item according to the degree of relationship to the child's behavior. Conner's Teacher Rating Scale (CTRS) is a frequently used instrument in drug studies measuring hyperactivity. However, the scale has been subjected to factor analysis yielding an inattentive/daydreaming factor which is of interest in this study (Conner, 1969; Kupietz et al., 1972; Werry et al., 1975).

These three measures allow children's attentional abilities to be

assessed. The relationships between these measures are of primary concern to this study. A second focus of this study involves the relationship of reading achievement to the concept of distractibility. The Gates-MacGinite Reading Test Level A Form 1, 1965 (Gates) has been chosen as a measure of reading achievement. The Gates has been used in numerous studies designed to predict first grade achievement (Holmes, 1974), to compare and validate other standardized tests (Jackson, 1975; Norfleet, 1973), and to measure gain in reading comprehension (Pelham and Ross, 1977; Smith, 1979). Therefore, the Gates was selected as a valid test for measuring reading achievement.

Purpose of the Study

The purpose of this study is to compare the relationships between measures of performance on a reading task and three measures of distractibility in order to gain a better understanding of the role played by distractibility in the process of learning to read.

Statement of the Problem

Identification of children who are distractible (or who cannot selectively attend to relevant cues in their environment) has been possible as early as 1959 when Cohen factor analyzed the Wechsler Intelligence Scale for Children (WISC) and revealed a group of subtests which could diagnosis this difficulty. With the revision of the WISC in 1974 came the need for a factor analysis of the new WISC-R. In 1975, Kaufman analyzed the WISC-R to reveal a factor (Factor C) similar to Cohen's distractibility factor.

Although identification of distractible children is possible with

the WISC-R, it is not possible to use this test as an early identification tool since it is designed for children who are at least six-and-a-half years of age. The Wechsler scale which is appropriate for use with children under six is the Wechsler Preschool and Primary Intelligence Scale (WPPSI). However, when factor analyzed, the WPPSI does not reveal a similar distractibility factor (Hollenbeck and Kaufman, 1973). Fortunately, there does exist a relatively new instrument which shows great promise for providing educators with a method of assessing young children's attentional abilities. The McCarthy Scales of Children's Abilities (MSCA) (McCarthy, 1972) is an instrument which was designed with early detection of children's learning problems in mind. Kaufman, who has done extensive research with factor analytic studies, has analyzed the MSCA and has found factors which could prove useful in identifying distractibility problems at an early age. Kaufman (1975) suggests further research be done by stating:

> . . . the McCarthy's norms extend upward only to 8½ years, so correlational studies with the WISC-R and Stanford-Binet at this age will be important for purposes of understanding the continuity of measurement. (Continuity from one instrument to the other is extremely important when evaluating longitudinal data for groups of specific cases). Nevertheless, most of the correlation studies should be conducted with children in the 3-6 year range, the ages for which the McCarthy seems best suited (p. 289).

The present study was designed to study the relationships between the McCarthy Scales of Children's Abilities, the Wechsler Intelligence Scale for Children-Revised, the Conner's Teacher Rating Scale, and reading achievement as measured by the Gates-MacGinite Reading Test. The Conner's scale was used to "give credence to the fact that children who perform poorly on . . . various measures of so-called distractibility are indeed, observed to be distractible" (Kaufman, 1980, p. 1). Reading

achievement was included as a variable because of the important influence distractibility has on the process of learning to read (Smith, 1979).

This study sought responses to the following questions:

1. To what extent do the McCarthy, Wechsler, and Conner's scales identify the same children as being free from distraction?

2. To what extent does the McCarthy scale identify over a period of a year the same children as being free from distraction?

3. To what extent is reading achievement related to being free from distraction?

With these questions in mind the following hypotheses are stated:

Hypotheses

Hypothesis I. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on selected subtests of the MSCA (spring, 1980) when controlling for IQ.

Hypothesis II. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on selected subtests of the MSCA (spring, 1981) when controlling for IQ.

Hypothesis III. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on selected subtests of the WISC-R (spring, 1981) when controlling for IQ.

Hypothesis IV. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of

silent reading comprehension and the CTRS (spring, 1981) when controlling for IQ.

Hypothesis V. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA (spring, 1981) and the MSCA (spring, 1981) when controlling for IQ.

Hypothesis VI. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA (spring, 1980) and the WISC-R (spring, 1981) when controlling for IQ.

Hypothesis VII. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA (spring, 1980) and the CTRS (spring, 1981) when controlling for IQ.

Hypothesis VIII. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA (spring, 1981) and the CTRS (spring, 1981) when controlling for IQ.

Hypothesis IX. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA (spring, 1981) and the CTRS (spring, 1981) when controlling for IQ.

Hypothesis X. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the WISC-R (spring, 1981) and the CTRS (spring, 1981) when controlling for IQ.

CHAPTER II

SELECTED REVIEW OF RELATED LITERATURE

Introduction

Typically, young children are enthusiastic learners ready for all types of experiences. The eagerness with which these new experiences are sought is a never-ending marvel for those who are fortunate enough to work with young learners. This eagerness, interest, and curiosity is evident in virtually all young children. However, zeal for learning can be quickly eliminated by teaching methods and practices that do not adequately consider each child's optimum learning environment.

Freedom from distractibility is an importnat part of a child's optimum learning environment. Smith (1979) recommends adjustments in children's instructional programs if they exhibit attentional deficiencies. Reducing the time spent in instructional activities, developing relaxation techniques, evaluating the results of teaching, and adjusting the teacher expectations are the possible steps to be taken for children who are not free from distraction.

Smith further suggests that distractible children will outgrow their problems by fourth grade and certainly by sixth. However, the yearly accumulative effects of struggling with distractibility can leave children academically disadvantaged and reading disabled unless interventive measures are taken.

Smith's (1979) important findings will be included in part three of

this chapter. Part three will present various analyses of the WISC-R. Parts four and five will present similar analyses of the MSCA and the CTRS. The next portion of this chapter, part two, will develop a theory of distractibility using models of information-processing by Craik and Lockhart, by Gagne', and by others.

Theoretical Framework for the Role of Distractibility

Craik and Lockhart (1972) have developed a theory of information processing and memory storage which can be analyzed to demonstrate the role of distractibility in a learning situation. They state it is now widely accepted that memory can be classified into three levels of storage: sensory; short-term memory; and long-term memory.

As Norman (1968) stated in his model of selective attention, Craik and Lockhart (1972) state that stimuli can enter into the sensory stores regardless of whether or not the subject is paying attention to the stimuli. Transference of the stimuli to short-term storage depends upon whether or not the subject selects that stimulus or cue as one to which to attend. If selection does not occur in an estimated one-quarter to two seconds, the cue will not have the option of entering the short-term memory store and will be lost. Additionally, if processing of the information does not occur in an estimated maximum of 30 seconds, the information will not enter long-term storage and will be permanently lost. These time frames allow distinctions to be made between distractibility and short attention span. A distractible child is one who has difficulty in the two second time frame while a child with a short attention span has difficulty processing cues in the maximum 30 second time

frame. Thus, according to Kaluger and Kolson (1978, p. 97) "distractibility . . . will result in a short attention span, but not all children with short attention spans are necessarily distractible."

Just as distractibility and short attention span are separate behaviors, hyperactivity is also a separate behavior although the literature does not always report them as being distinct behaviors. Hyperactivity, distractibility and short attention span are all different and varied behaviors which can be measured separately and independently of each other. Not all children exhibit all three behaviors. A child can be overly active but not distractible or distractible and not overly active. The single behavior, distractibility, is the behavior of interest in this study.

Recently, the medical profession has recommended to the American Psychiatry Association that the term attention deficit disorder replace the term minimal brain dysfunction (Lerner, 1981). Their criteria for diagnosing a child as inattentive requires at least three of the following to exist: (1) often fails to finish things started, (2) often doesn't seem to listen, (3) easily distracted, (4) has difficulty concentrating on schoolwork or other tasks requiring sustained attention, (5) has difficulty sticking to a play activity. These statements are similar to those listed on the Conner's Teacher Rating Scale (Appendix) indicating a certain degree of continuity between different professional areas.

Gagne's theory of information processing can also be used to provide a framework for the discussion of distractibility. His model is perhaps the most thoughtful concept yet postulated for the explanation of how learning occurs.

Gagne's (1977) model, as Norman's and Craik and Lockhart's do, begins with the environment offering stimuli to the learner. The environment in a learning to read situation would involve either presentation of a word or a letter. Receptors is the term used by Gagne' by describe the medium through which information has access to the learner. These receptors register information in a few hundredths of a second. The next processes for the information involve selective attention and the sensory register. The learner selects the relevant bits of incoming information in one-quarter to two seconds. The information (such as the word or letter sound being presented) proceeds to short-term memory or as Gagne' explains, the working memory. During this phase of learning, the learner has 30 seconds to either encode the information into long-term memory or lose it. Encoding of information is not merely the collection of information but rather the organization, referencing, and cross-referencing of it. This encoding of information provides the learner with information which will remain with the learner indefinitely.

After information is either automatically generated in long-term memory or worked out in short-term memory, the learner automatically selects a way in which to respond either vocally or motorically. Gagne' (1977) offers the term response generator for this stage. The final stage of learning is termed effectors. This stage allows the learner to perform, thereby gaining internal and external environmental feedback about performance. Thus, the circular pattern of learning is complete.

In addition to the components already stated, Gagne' believes the whole system is controlled by two other components: executive control and expectancies. The executive control would include what is commonly called cognitive strategies (both innate and learned). Expectancies

would include what is commonly called the affective domain.

Although information transfer from the sensory registers to short-term memory is the only part of Gagne's model which has been interpreted as directly involving distractibility, the entire model has been presented because it can be used to delineate between hyperactivity, distractibility, and short-attention span. Hyperactive children would have difficulty processing information from the receptors to the sensory register. Distractible children would have difficulty processing infomation from the sensory register stage to the short-term memory stage, while children with short attention spans would have difficulty processing the information from short-term to long term memory.

After considering Gagne's model of information processing, a follow-up discussion using Bloom's (1970) theory of mastery learning is necessary. Borrowed from one of Bloom's examples is the following illustration. If students are normally distributed with respect to their levels of distractibility, and all the students are provided with the same amount, quality, and availability of instruction, the end result will be a normal distribution on a measure of reading achievement. Thus. the correlation between distractibility and reading achievement will be moderate to high. Conversely, if the students are again normally distribute with respect to their levels of distractibility and are provided with instruction suited to their needs, the majority of students will achieve mastery. Thus, the relationship between distractibility and reading achievement would approach zero.

Bloom (1979) presents five variables as strategies for mastery learning. Each variable has a direct and significant effect on the distractible learner. The five variables are: aptitude of learner,

quality of instruction, ability to understand instruction, perserverance, and time allowed for learning. Bloom (1970) offers definitions for each of these five variables:

> 1. aptitude is the amount of time required by the learner to attain mastery of a learning task. (Implicit in this formulation is the assumption that, given enough time, all students can conceivably attain mastery of a learning task).
> 2. quality of instruction is the degree to which the presentation, explanation, and ordering of the elements of the task to be learned approach the optimum for a given learner.
> 3. the ability to understand instruction may be defined as the ability of the learner to understand the nature of the task to be learned and the procedures to be followed in the learning of the task.
> 4. perserverance is defined as the time the learner is willing to spend in learning.
> 5. time allowed for learning implies the student be allowed enough time for the learning to take place (pp. 21-29).

In some instances in order to utilize Bloom's concepts, it would be necessary to reduce the teacher-pupil ratio to one-on-one while in other situations the ratio could be larger. In any event, distractible children being taught under such philosophies as Bloom's conception of mastery learning would have an opportunity to receive an education equal to that of their less distractible peers.

In addition to inadequate mastery learning environments, distractible children sometimes encounter pedagogical difficulties in learning to read. Abrams (1981) states that the problem most children have in school is not due to their inabilities, their problems are due to teachers who lack fundamental teaching skills. Cohen (1971) agrees with this assertion stating that the major cause of reading failure is dyspedagogia, a termed coined to indicate a lack of good teaching. Bateman (1974) goes further by stating that the term learning disabilities should not be used to apply to children with learning problems. Instead, a more appropriate term might be teaching disabilities. The possibility must

exist that not only are some children distractible and hard to teach but also that some children become distractible because of poor teaching.

A final concept related to the role of distractibility and reading achievement is offered by Pelham and Ross (1977). They relate distractibility to reading achievement using an assessment device called central-incidental learning. Others who have used this central-incidental learning task include: Hale and Piper (1973); and Tarver and Hallahan (1974).

Pelham and Ross (1977) utilized the Gates-MacGinite Reading Tests, 1965 to determine the reading ability of their 74 male subjects in grades one, three, and five, in a large suburban elementary school. Using the central-incidental paradigm to study selective attention in their subjects, Pelham and Ross (1977, p. 3) concluded that "children with reading problems exhibit concurrent difficulties in selective attention." They stated that the development of selective attention is delayed from two to four years in poor readers. It is easy to speculate that if selective attention is developed more slowly in some than in others, these children are at a distinct disadvantage in trying to attend selectively to reading instruction that is gauged to the level of the average child.

Initially, this study was to include a task of central-incidental learning. However, after correspondence with Pelham (1980) and Ross (1980), it was decided that fundamental aspects of the task were still in the developmental stages and that the task would not be used (Pelham, 1979). It is mentioned now only because of the important conclusions reached by them concerning the delay in selective attentional abilities of some learners. A main supposition of this study is that freedom from

distractibility is a developmental phenomenon developing more slowly in some than in others. And if theories of learning such as those by Craik and Lockhart, Gagne', Bloom, and Ross are not applied to distractible learners, disability and failure in the learning-to-read process is significantly predictable.

Attempts have been made in this part of the chapter to build a theoretical framework for accepting the concept of distractibility and importance of it in the learning process, specifically the learning to read process. The next three parts of this chapter will offer analyses of the three instruments used to assess distractibility.

Selected Analyses of the WISC-R

Smith (1979) presented an historical overview of factor analyses fo the WISC done in the last 21 years. He analyzed 24 pieces of factor analytic research involving the WISC and disabled readers. He found overwhelming evidence that disabled readers could be identified by their low scores on the WISC's distractibility factor (Factor C or FD). Smith (1979, p. 29) summarizes his review by noting that "it is apparent from the review of the literature that low scores on the WISC subtests, Arithmetic, Coding, and Digit Span appear to characterize groups of disabled readers." However, Smith's main contribution to the study of reading disability and Factor C stems from his own study wherein he was able to accurately predict disabled and able readers at the second grade level using Factor C of the WISC-R. Further, he found that at fourth and sixth grade, this predictive ability declined leading him to conclude that distractibility is a developmental ability.

Smith's (1979) population consisted of 466 elementary school pupils

from four schools in three counties in north-central Oklahoma. From this group, 60 pupils at each of three grade levels were randomly selected. This total sample of 180 consisted of 30 able and 30 disabled readers at each of the second, fourth, and sixth grade levels. Smith used the Gates-MacGinite Reading Tests, 1965 and the Bond and Tinker expectancy formula to classify his subjects as either able or disabled. Smith found that he could accurately classify seventy-five percent of his second grade subjects as either able or disabled on the basis of their Factor C scores. Smith (1979, p. 71) concludes his research by stating that "although one may outgrow distractibility, the reading problem is not likely to disappear unless early adjustments are made for this . . . factor."

Reschly and Reschly (1979) offered these additional comments about the history of the WISC-R's Factor C:

> Varied interpretations of the FD scores have appeared in the literature, and, in comparison to the other factor scores, relatively little research has been published. Despite confusion about terminology and relatively sparse research, FD is commonly interpreted as a measure of attention (Kaufman, 1975; Bush and Waugh, 1976). The research on FD does confirm that underachieving students in comparison to other groups obtain lower FD scores (p. 356).

Reschly and Reschly (1979) reported on a 1974 comprehensive study funded by the Arizona State Department of Education. Part of that study involved reading and math achievement, race, teacher ratings, and all three WISC-R factors, Verbal Comprehension (VC), Perceptual Organization (PO), and Freedom from Distractibility (FD). VC subtests include Vocabulary, Information, Similarities, and Comprehension. PO subtests include Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Mazes. FD subtests include Arithmetic, Digit Span, and Coding. Their subjects included 787 first, third, fifth, seventh, and

ninth grade children including 212 Anglos, 189 Blacks, 184 Chicanos, and 202 Native American Papagos.

A Teacher Rating Scale (TRS) was used in their study which coincided with Kaufman's (1979c, p. 11) admonition to not "foolishly attribute low scores on the third-factor subtests to distractibility or anxiety for a child who is observed to be attentive, absorbed by the tasks, and calm." Their TRS consisted of 88 items which contained two areas of interest to the Reschly's: academic and attention. The academic items included 10 items such as "assignments are incomplete and poorly written," and "is one or more years behind the class academically." The attention items included six items such as "attention span is short," and "is easily distracted." Each item was rated on a five point scale from a low of not noticeable to a high of noticeable to a very large degree. This scale and its rating procedure is very similar to the one developed by Conners in 1969.

Reschly and Reschly (1979) report significant correlations at the .01 level for all their intercorrelations when comparing the three WISC-R factors to reading achievement, math achievement, TRS-academics and TRS-attention. The Metropolitan Achievement Test was used to assess reading and math achievement. Their correlations with the WISC-R FD factor were reported as: reading achievement (.58), math achievement (.60), TRS-academic (.40), and TRS-attention (.30). They further analyzed the data by partialling out the VC and PO factors and correlating FD with TRS-attention. This resulted in a total r of .18 ($p < .01$). Therefore, they cautiously viewed the efficacy of classifying children as

distractible based on either FD or TRS-attention. However, if they had computed partial correlations for FD and TRS-attention when controlling for VC and PO for each grade, as Smith did (1979), they may have noted startlingly different results. It is probable that the r values for first graders would have been much larger than for older groups. This age-appropriate analysis would support Smith's finding that distractibility is developmental and directly related to reading disability.

The next portion of Chapter II presents selected analyses of the MSCA. Interest in the MSCA as an early measure of attentional deficits stems from the fact that the WISC-R cannot be used to assess distractibility in pre-first graders and the WPPSI does not reveal a similar factor (Hollenbeck and Kaufman, 1973).

Selected Analyses of the MSCA

The MSCA provide an assessment of general intellectual levels of children through the use of 18 subtests grouped to form six scales. Unlike the WISC-R which was designed to assess Verbal and Performance abilities, the MSCA assess Verbal, Perceptual-Performance, Quantitative, General Cognitive, Memory, and Motor skills. The General Cognitive Index (GCI) is comprised of scores obtained from the first three scales. The Memory and Motor scales assess separate, specific abilites. The GCI is somewhat comparable to the WISC-R IQ having a mean of 100 and a standard deviation of 15. However, McCarthy avoided the term IQ because of its tendency to be abused and because of its negative meaning to some professionals. Kaufman and Kaufman (1974) found significant differences in GCI and IQ for a goup of children classified as learning disabled. This group of learning disabled children received scores one standard

deviation below the scores of their matched control group.

The most extensive analyses of the total MSCA have been done by Kaufman. He and others have investigated the MSCA for black-white differences (Kaufman and Kaufman, 1973; Kaufman and Dicuio, 1975); age differences (Kaufman and Hollenbeck, 1973; Kaufman, 1975b); and sex differences (Kaufman and Kaufman, 1973).

Although differences in scores were found between blacks and whites at some age levels, minor, non-significant differences were found between males and females. Conclusions were therefore reached which indicated these differences should not be of paramount concern to this study. However, differences in the factor analysis of the MSCA by age, indicate some very important differences which affect the design of this study. Kaufman (1975) identified five factors at ages 5-5½ while identifying six factors at the 6½-7½-8½ age group. The factor at each of those two age groups which most closely resembles the WISC-R's Factor C is termed Memory. However, it should be remembered that different researchers analyzing the same research can select different factor names for exactly the same data. Additionally, it should be remembered that Cohen originally stated that Factor C was a memory factor. However, he later refuted that statement. Therefore, the MSCA's memory factor was chosen for use in this study not because of its name but rather for the abilities the factor represents.

At ages 5-5½, the three subtests on the MSCA which loaded on the Memory factor with a value of at least .25 were Pictorial Memory (.42), Tapping Sequence (.25), and Imitative Action (.26). At the 6½-7½-8½ age group, the three subtests which loaded on the Memory factor with a value of at least .25 were Number Questions (.32), Verbal Memory I (.31),

and Numerical Memory I (.50).

Despite Kaufman's analysis which identified a memory factor for both age groups listed above, more recent analyses have not identified such a factor (Keith and Bolen, 1980; Weibe and Watkins, 1980). A possible accounting for those differences includes the fact that Kaufman used the standardization sample while the other researchers used children having academic problems and from lower middle-class families respectively. These more recent researchers also used higher loading criteria than did Kaufman.

Perhaps the only two studies yet published which compare the MSCA and the WISC-R are now summarized. Both studies use subjects classified as learning disabled.

Goh and Youngquist (1979) tested 40 children from Wisconsin who had been diagnosed as learning disabled. The mean age for the group was 7.2 years. Each child was administered a battery of tests including the MSCA and the WISC-R. They found the GCI to be eight to eleven points below the WISC-R IQ but not a full 15.4 points (or 1 SD) as Kaufman and Kaufman reported (1974). They concluded by questioning whether the GCI can be used as a measure of intelligence for special education placement. Their sample size definitely affects their study's ability to be generalized to other groups, but their study poses interesting questions for future research.

Taylor and Iminez (1980) have published the second research relating the MSCA and the WISC-R. Their subjects were 60 second-grade students living near Boston. Thirty of their subjects were classified as learning disabled (LD) based on the federal guidelines while 30 were non-LD students randomly chosen after being matched for chronological

age, grade, and sex. The MSCA and WISC-R were identified as predictor variable while the Wide Range Achievement Test was the criterion variable. Their results indicate that for the LD students, group placement is best predicted by the WISC-R Comprehension subtest accounting for 18 percent of the variation in achievement. The final regression equation for the LD group included the WISC-R Comprehension, Arithmetic, and Object Assembly and the MSCA Quantitative and Memory Indices accounting for 44 per cent of the total variation in achievement. Further research similar to this could be done using not just the WISC-R subtests as predictor variables but rather the three WISC-R factors as well as the various MSCA factors.

Selected Analyses of the CTRS

Conner's Teacher Rating Scale (CTRS) has been adopted for use by the National Institute of Mental Health. The scale is a 39 item questionnaire (Appendix) which has been factor analyzed to reveal several factors dealing with children's behavior. Professionals well-acquainted with the child are asked to rate each of the items on a 0-3 scale (some researchers use a 1-4 scale which can be converted to a 0-3 scale by subtracting 1.0 from the mean score). A high score indicates that a child is not free from distraction while a low score indicates the child is relatively free from distraction. The items consist of such items as "hums and makes odd noises,""fidgets in seat," and "tattles."

Conners (1969) identified five factors in his analysis of the CTRS. They are: conduct disorder, daydreaming-inattentive behavior, anxious-fearful behavior, hyperactivity, and a health-social factor. The factor

of interest in this study is the daydreaming/inattentive factor.

Subjects used in this analysis were 82 boys and 21 girls who were referred to a clinic for behavior disorders, hyperactivity or "poor attention span associated with learning disabilities" (Conners, 1969, p. 885). The mean age for thegroup was 9.8 years with a SD of 1.8. No subject had an IQ below 80 and all were judged to be intellectually, emotionally, and socially stable.

Subsequent to Conner's initial research, other studies have revealed similar results. Trites et al. (1979) summarized the means and standard deviations of Conner's inattentive passive factor from four different studies. His modified reportings (means based on 0-3 scoring) are reported in Table I. Means from Canada and the Midwest are of almost the same magnitude while the mean scores from New Zealand and New York closely match.

TABLE I

MEANS AND STANDARD DEVIATIONS OF CONNER'S INATTENTIVE-PASSIVE FACTOR FROM FOUR INDEPENDENT STUDIES

	New Zealand[1]	Midwestern United States[2]	New York[3]	Canada[4]
Ss	normal	normal	normal	normal
$\bar{X}$	.83	.51	.82	.52
SD	.60	.57	.75	.62
N	418	291	92	14,083

The first study done in New Zealand was researched by Sprague, Cohen and Werry in 1974. Study number two was completed by the same group in the Midwestern United States (Werry, Sprague, and Cohen, 1975). The third study took place in New York (Kupietz, Bralen, and Winsberg, 1972) while the final study took place in Canada (Trites, 1979).

The difficulty in interpretation of these studies lies in the fact that although different populations can now be compared, arbritrary cut-off scores cannot be used. Some clinicians have suggested using a cut-off score of 2 SD above the mean to indicate a disorder in any particular dimension. This means for a child to be labeled inattentive, the mean factor score would have to be 2.03 in New Zealand, 1.65 in the Midwest, 2.32 in New York, and 1.76 in Canada. The interpretation and establishment of regional norms is at this point open for further research. Regional norms rather than national norms can be more appropriately used in describing acceptable behavior.

Goyette, Conners, and Ulrich (1978) have analyzed a revised teacher rating scale as well as a parent rating scale by Conners and have published findings consistent with the original Conner's scale. Because this revision of items was so slight as to make little statistical difference, and because the CTRS is not the type of assessment device which can be purchased from a test publisher, 1969 items and factor analysis were used in this study. However, the 28-item revision by Goyette et al. (1978) needs further examination in a study such as this.

One final piece of information about the CTRS involves post-hoc analysis by Trites (1979). He requested teachers of 14,083 Canadian school aged 3 to 12 year olds to estimate their children's learning capacities as either below, average, or above average. He then

compared the three levels of capacity against the Conner's scores. For children scoring 1.5 or more on the inattentive factor, he found 40.7 per cent of the children to be classified as below average whereas only four percent of the above average children were rated inattentive. As far as actual rates of achievement, 39 per cent of the children with below average achievement were rated by their teachers as inattentive while only 1.7 per cent of the above average group were rated as inattentive. These varied percentages can be interpreted to validate the importance of the relationship between inattentiveness and academic achievement.

The Conner's scale has only a ten-year history. However, that history has been impressive and well-researched. The CTRS has a strong future in the identification of behavior disorders. And although it has been most widely used in studies dealing with hyperactivity and pharmocology, its role in assessing children's attentional abilities is promising.

Summary

Analyses of the three measures of distractibility selected for use in this study have been presented. The three have withstood the scrutinies of time and are widely accepted in the professional community. Their relationship to each other and to reading achievement has been this study's area of interest. Reading achievement has been presented and is viewed as a skill which is acquired as any school-related skill is acquired. The ability to read is dependent upon presentation, attention, storage, retrieval, and feedback of and about the task (Gagne', 1977) as well as the opportunity and time to acquire the skill (Bloom, 1970).

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

The need for the study of distractibility and its relationship to learning to read has been presented in the preceding chapters. This chapter will include the research methodology utilized including a description of the subjects, testing procedures, test instruments, and statistical analysis. First an explanation is made of the relationship between this study and an earlier one by Morton (1980).

Morton's (1980) dissertation employed selected subtests of the McCarthy Scales of Children's Abilities (MSCA). When the MSCA was factor analyzed by Kaufman (1975b), different subtests loaded at different age levels. For the 5-5½ year olds the subtests used to determine levels of distractibility were Imitative Action, Tapping Sequence, and Pictorial Memory. At the 6½-7½-8½ year level. the subtests used to determine levels of distractibility were Number Questions, Verbal Memory I, and Numerical Memory I. At Kaufman's suggestion, Morton included Number Questions with the other three subtests employed in the study with five year olds. Morton's subtests, given in 1980, and those at the 6½-7½-8½ year level given in 1981 were of interest in this study. Additionally, subjects used in 1980 by Morton and not lost to natural attrition were used in this 1981 study.

Subjects

Subjects chosen for this study were selected first graders in two elementary schools in two north-central and western Oklahoma cities. In all, 65 subjects comprised the sample for this study including approximately four per cent Black children with the remaining ninety-six per cent Caucasian.

Subjects were chosen on the basis of:

1. Participation in a study by Morton (1980). Morton's subjects were selected on the basis of: (A) attending kindergarten for the first time and at least five years of age; (B) Evaluated as a non-reader at the time of testing; (C) Scoring at least 85 on the Slosson Intelligence Test for Children and Adults (Slosson); (D) Evaluated as being free from observable visual, speech and/or hearing disabilities; (E) Maintaining regular attendance during days of assessment; (F) Parental permission given to participate in study.
2. Parental permission to participate in 1981 study.
3. Attendance during the days of administration of the tests.

A description of the sample in 1980 appears in Table II. A description of the sample not lost to normal attrition and used in 1981 appears in Table III.

Testing Procedures

The Slosson was administered in April of 1980 to determine eligibility for participation in the studies. Also, at that time, the following subtests of the MSCA were individually administered by three trained examiners: (1) Imitative Action; (2) Tapping Sequence; (3) Pictorial

Memory; and (4) Number Questions. The following subtests of the Wechsler Intelligence Scale for Children-Revised (WISC-R) were individually administered during April of 1981: (1) Arithmetic; (2) Coding; (3) Digit Span. The following subtests of the MSCA were also administered at that time: (4) Number Questions; (5) Verbal Memory I; (6) Numerical Memory I.

TABLE II

DESCRIPTION OF THE SAMPLE IN 1980

Subjects	Female	Male	Age Range	Median Age	IQ Range	Mean IQ
N=120	N=64	N=56	5.3 - 6.5	5.8	85-147	112

TABLE III

DESCRIPTION OF THE SAMPLE IN 1981

Subjects	Female	Male	Age Range	Median Age	IQ Range	Mean IQ
N= 65	N=38	N=27	6.4 - 7.7	6.9	85-146	113

After all subtests were administered to the subjects, the Gates-MacGinite Reading Test Level A, Form 1 was administered to each of the two groups of first graders. The group reading test was administered in a regular classroom. Careful monitoring of each child was done in order to assure an optimum and true picture of each child's silent reading ability. In all administration of tests, strict adherence to standard directions was maintained with all tests being given in a place relatively free from interference. At the end of April, 1981, the CTRS was completed for each child by the child's teacher.

Test Instruments

Slosson Intelligence Test for Children and Adults (Slosson)

This test is individually administered primarily for the purposes of screening. The items for this test are similar in nature to the Stanford-Binet. A reliability coefficient of .97 was obtained on 139 individuals from ages 4 to 50 years using a test-retest interval within a period of two months. Concurrent validity of the Slosson is indicated by the high correlations with the Stanford-Binet. Coefficients ranging from .90 to .98 are reported in the manual. The population used in obtaining comparative results came from urban and rural populations in New York state. American Indian, Black, and White subjects were included representing a cross-section of socioeconomic levels.

McCarthy Scales of Children's Abilities (MSCA)

The MSCA is an individually administered test of mental ability designed to assess children ages 2½ to 8½. Its 18 subtests are grouped

to form six scales: Verbal, Perceptual-Performance, Quantitative, General Cognitive, Memory and Motor. The first three subtests form the General Cognitive scale. The General Cognitive Index (GCI) has a mean of 100 and a standard deviation of 15 likening it to an intelligence quotient on other tests of mental ability. Norms are provided for each of the six scales but not the 18 individual subtests.

The 1032 subject sample was stratified according to age, sex, color, geographic region, and father's occupation using the estimate available at the time from the U.S. Bureau of the Census. Split-half correlations corrected by the Spearman-Brown formula for the six scales range from .60 to .96 with a mean r of .84. Coefficients correlating the MSCA and the Stanford-Binet resulted in a value of .81. Correlation of the MSCA and the WPPSI resulted in values of .62 to .71. Predictive validity with the MSCA and the Metropolitan Achievement Tests, 1970 for a group of 35 girst graders resulted in a value of .49 (McCarthy, 1972, p. 42).

Following is a description of the MSCA subtests used in this study:

1. Imitative Action requires the child to repeat a series of four simple motions illustrated one at a time by the examiner.

2. Tapping Sequence requires the child to play from memory a sequence of simple tones tapped on a toy xylophone.

3. Pictorial Memory requires the child to name as many objects as possible from a card of six objects displayed for 10 seconds.

4. Number Questions requires the child to compute simple arithmetical problems involving counting, addition, subtraction, multiplication, and division without the use of pencil or paper.

5. Verbal Memory requires the child to repeat series of words and

sentences spoken by the examiner at the rate of one per second.

6. Numerical Memory I requires the child to repeat series of numbers spoken by the examiner at the rate of one per second.

Imitative Action, Tapping Sequence, Pictorial Memory, and Number Questions comprise the MSCA-80. Number Questions, Verbal Memory I, and Numerical Memory I comprise the MSCA-81 variable.

Wechsler Intelligence Scale for Children Revised (WISC-R)

The WISC-R is an extensively used instrument to assess mental ability in children ages 6 to 17. The standardization sample composed of 2200 children was stratified on the basis of age, sex, race, (white - non-white), geographic region, occupation of head of household, and urban-rural residence. The WISC-R provides three scores (Verbal, Performance, and Full Scale IQs). Subtest, split-half reliability coefficients corrected by the Spearman-Brown formula, range from .57 to .90 with a mean r of .78. Corresponding values for the three scales range from .89 to .96 with a mean r of .93 (Wechsler, 1974). Correlations with the full scale IQs of the WISC-R and WPPSI resulted in a correlation coefficient of .82. Correlating the full scale IQs of the WISC-R and the WAIS resulted in a value of .95. Coefficients of correlation computed for the WISC-R full scale IQ and the mean Stanford-Binet resulted in a coefficient of .73.

Following are the WISC-R subtests used in this study:

1. Arithmetic requires the child to compute simple arithmetical problems involving counting, addition, subtraction, multiplication, and division without the use of pencil or paper.

2. Digit Span requires the child to repeat series of numbers both forward and backward.

3. Coding requires the child to draw geometric shapes underneath other shapes following a code at the top of the activity.

Conner's Teacher Rating Scale, 1969 (CTRS)

The CTRS used in this study is the 1969 version consisting of 39 items (Appendix) which are used by a professional well-acquainted with the child. The examiner is asked to, "rate the child's behavior according to how each of the following problems apply during the past month" (Conners, 1981, personal communication). These items include behaviors such as "disturbs other children", "sulky", "shy", and "inattentive." Conners (1969) published test-retest correlation coefficients ranging from .72 to .91 indicating stability of measurement over a one-month period of time.

Gates-MacGinite Reading Test, 1965
Level A, Form 1 (Gates)

The Gates is a reading achievement test widely used in public schools. It is a group test measuring two aspects of silent reading ability: vocabulary and comprehension. The comprehension portion of the test was selected for use in this study. The comprehension portion consists of 34 passages of increasing length and difficulty. The reader is asked to mark a picture that best illustrates the meaning of the passage or that answers the question based on the passage.

The test was standardized on a nationwide sample of approximately 40,000 students in 38 communities. The communities were selected on

the basis of geographic location, size, and socioeconomic level to assure a representative sample. Reliability was established by using both alternate form reliability and split-half correlations. Coefficients for the Primary A-1 Comprehension Test are reported as .83 for the alternate forms and .94 for the split-half computation (Gates and MacGinite, 1965).

Concurrent validity with the Gray Oral Reading Paragraphs (Gray) has been established by Jackson (1975) who found that seventy-seven percent of the second-grade sample who could not successfully complete the first Gray paragraph also scored below average on the Gates. Of those scoring above average on the Gates, fifty seven percent scored at the fifth grade level on the Gray passages.

Holmes (1974) reported an r of .77 between a combination of the Comprehensive Tests of Basic Skills (CTBS) and the Metropolitan Readiness Tests and the Gates, Level A. Eight subtests fo the CTBS were reported to correlate with the Gates, Level A at a value of .82.

Statistical Analysis

The statistical analyses used in this study were conducted at the Oklahoma State University Computer Center utilizing an IBM computer-370/168 with OS/US2 MUS. The Statistical Package for the Social Sciences (SPSS) (Null et al., 1975) was used for the computations of the Pearson product-moment correlation coefficient and the partial correlation coefficients. The Pearson r was appropriate to use since all data were of a score nature. A partial correlation program was used to control for suspected influences of intelligence and of distractibility during administration of the intelligence test. Without using

a partial analysis and controlling for confounding variables, a false degree of relationship could have been computed for each correlation.

CHAPTER IV

STATISTICAL ANALYSES

Introduction

This study investigated the relationship between various measures of distractibility and reading achievement. Distractibility has been measured by the Wechsler Intelligence for Children-Revised (WISC-R), the McCarthy Scales of Children's Abilities (MSCA), and the Conner's Teacher Rating Scale (CTRS). Reading achievement was assessed using the Gates-MacGinite Reading Test, 1965 Level A, Form 1.

To control for the effects of intelligence in determining the relationships between distractibility and reading achievement, a residual IQ score was computed for each subject and was used in the partial correlation analysis. These individual residual IQ scores were computed by correlating scores on the Slosson and WISC-R since the WISC-R was felt to be the best documented and most widely accepted measure of distractibility. This correlation allowed a predicted IQ to be made based on the relationship between the Slosson and the WISC-R scores. The difference between the original Slosson IQ and the predicted Slosson IQ resulted in a residual IQ score. The residual IQ score was created for each subject and was based on the formula for obtaining residuals: $Y-Y'=d$. In effect, an IQ score with all effects of distractibility removed was created for each child. Residual IQ scores were then used in a partial

correlation program which had the effect of controlling for an intelligence score completely free from the influence of distractibility. The new residual IQ was termed IQ_{res} while the original Slosson score was termed $Slosson_o$. A schematic representation of the transformation from $Slosson_o$ to IQ_{res} is shown in Table IV.

TABLE IV

SCHEMATIC REPRESENTATION OF THE TRANSFORMATION FROM $SLOSSON_O$ TO $SLOSSON_P$ TO IQ_{RES}

$Slosson_o$, WISC-R = r
r = predictive Slosson ($Slosson_p$)
$Slosson_o - Slosson_p$ = residual IQ (IQ_{res})
$\therefore$, IQ_{res} = IQ independent of distractibility

Additionally, partial correlation coefficients were computed for MSCA-80 (Number Questions, Imitative Action, Tapping Sequence, and Pictorial Memory) and for MSCA-81 (Number Questions, Verbal Memory I, and Numerical Memory I) controlling for IQ_{res}. A partial correlation was computed for each hypothesis in order to control for the effects of intelligence on the relationship between measures of distractibility and reading achievement. The IQ which was held constant in each analysis did not represent just an estimate of the subjects' intellectual

capabilities but rather the subjects distractible-free intellectual capabilities. In effect, the use of a partial correlation procedure treated all subjects as if they possessed the same score or ability. SPSS formulas used to compute the Pearson product-moment correlation coefficients and the partial correlation coefficients are listed respectively:

$$r = \frac{\sum_{i=1}^{N}(X_i - \bar{X})(Y_i - \bar{Y})}{\left\{\left[\sum_{i=1}^{N}(X_i - \bar{X})^2\right]\left[\sum_{i=1}^{N}(Y_i - \bar{Y})^2\right]\right\}^{1/2}} \qquad r_{ij.k} = \frac{r_{ij} - (r_{ik})(r_{jk})}{\sqrt{1 - r_{ik}^2}\ \sqrt{1 - r_{jk}^2}}$$

Tests of the Hypotheses

The first four hypotheses state there are no significant relationships between reading ability and any of the four variables measuring distractibility. All relationships between variables were tested by partialling out a derived distractibility-free intelligence score. This distractibility-free intelligence score is represented by the symbol IQ_{res} and is explained and outlined in Table IV and its preceding paragraph. Hypothesis I and II cannot be rejected at the .05 level of confidence while III and IV can be rejected at that level.

Hypothesis I. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on selected subtests of the MSCA-80 when controlling for IQ_{res}.

Table V indicates a value of .12 for the correlation between the Gates and the MSCA-80 resulting in a probability value of .173.

Therefore, Hypothesis I cannot be rejected at the .05 level.

Hypothesis II. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehnesion and on selected subtests of the MSCA-81 when controlling for IQ_{res}.

Table IV indicates a value of .20 for the correlation between the Gates and the MSCA-81 resulting in a probability value of .056. Therefore, Hypothesis cannot be rejected at the .05 level.

Hypothesis III. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on selected measures of the WISC-R when controlling for IQ_{res}.

Table V indicates a value of .49 for the correlation between the Gates and the WISC-R resulting in a probability value of .0001. Therefore, Hypothesis III can be rejected at the .05 level indicating that a significant relationship does exist between reading ability and distractibility as measured by these instruments. Additionally, 24 percent of the variation in reading achievement can be accounted for by the variation in scores on the WISC-R.

Hypothesis IV. There is no significant relationship between reading performance and distractibility as indicated by scores on a test of silent reading comprehension and on the CTRS when controlling for IQ_{res}.

Table V indicates a value of -.42 for the correlation between the Gates and the CTRS resulting in a probability value of .0001 indicating that a significant, negative correlation between reading ability and distractibility does exist as measured by these instruments.

Additionally, 18 percent of the variation in reading achievement can be accounted for by the variation in scores on the CTRS.

TABLE V

CORRELATIONS BETWEEN THE GATES AND THE FOUR VARIABLES OF DISTRACTIBILITY WHEN CONTROLLING FOR IQ_{RES}

Gates	r	r^2	df	p
MSCA-80	.12	.01	62	.173
MSCA-81	.20	.04	62	.056
WISC-R	.49	.24	62	.0001*
CTRS	-.42	.18	62	.0001*

* ($p < .05$, $\therefore$ reject Hypotheses III and IV)

The next six hypotheses state there are no significant relationships between any of the distractibility variables. Hypotheses V and IX cannot be rejected while Hypotheses VI, VII, VIII, and X can be rejected at the .05 level of confidence.

Hypothesis V. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA-80 and the MSCA-81 when controlling for IQ_{res}.

Table VI indicates a value of .19 for the correlation between the

MSCA-80 and the MSCA-81 resulting in a probability value of .071. Therefore, Hypothesis V cannot be rejected at the .05 level.

Hypothesis VI. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA-80 and the WISC-R when controlling for IQ_{res}.

Table VI indicates a value of .35 for the correlation between the MSCA-80 and the WISC-R resulting in a probability value of .002. Therefore, Hypothesis VI can be rejected at the .05 level indicating that a significant relationship does exist between the two instruments used for measuring distractibility. Additionally, 12 percent of the variation in the MSCA-80 can be accounted for by the variation in the WISC-R.

Hypothesis VII. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA-81 and the CTRS when controlling for IQ_{res}.

Table VI indicates a value of -.25 for the correlation between the MSCA-80 and the CTRS resulting in a probability value of .025. Therefore, Hypothesis VII can be rejected at the .05 level indicating that a significant relationship does exist between the two instruments used for measuring distractibility. Additionally, six percent of the variation in the MSCA-80 can be accounted for by variation in the CTRS.

Hypothesis VIII. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests of the MSCA-81 and the WISC-R when controlling for IQ_{res}.

Table VII indicates a value of .47 for the correlation between the MSCA-81 and the WISC-R resulting in a probability value of .0001. Therefore, Hypothesis VIII can be rejected at th .05 level indicating that a significant relationship does exist between the two instruments

used for measuring distractibility. Additionally, 22 percent of the variation in the MSCA-81 can be accounted for by the variation in the scores on the WISC-R.

TABLE VI

CORRELATIONS BETWEEN THE MSCA-80 AND ALL OTHER DISTRACTIBILITY VARIABLES WHEN CONTROLLING FOR IQ_{RES}

MSCA-80	r	r^2	df	p
MSCA-81	.19	.04	62	.071
WISC-R	.35	.12	62	.002*
CTRS	-.25	.06	62	.025*

* ($p < .05$, $\therefore$ reject Hypotheses VI and VII)

Hypothesis IX. There is no significant relationship between two measures of distractibility as indicated scores on selected subtests of the MSCA-81 and the CTRS when controlling for IQ_{res}.

Table VII indicates a value of -.16 for the correlation between the MSCA-81 and the CTRS resulting in a probability value of .108. Therefore, Hypothesis IX cannot be rejected at the .05 level.

Hypothesis X. There is no significant relationship between two measures of distractibility as indicated by scores on selected subtests

of the WISC-R and the CTRS when controlling for IQ_{res}.

Table VIII indicates a value of -.46 for the correlation between the WISC-R and the CTRS resulting in a probability value of .0001. Therefore, Hypothesis X can be rejected at the .05 level indicating that a significant relationship does exist between the two instruments used for measuring distractibility. Additionally, 21 percent of the variation in scores on the WISC-R can be accounted for by variation in the CTRS scores.

TABLE VII

CORRELATIONS BETWEEN THE MSCA-81 AND ALL REMAINING DISTRACTIBILITY VARIABLES WHEN CONTROLLING FOR IQ_{RES}

MSCA-81	r	r^2	df	p
WISC-R	.47	.22	62	.0001*
CTRS	-.16	.03	62	.108

*($p < .05$, $\therefore$ reject Hypothesis VIII

Summary

Six hypotheses have been rejected at the .05 level of confidence. Significant relationships exist between reading performance as measured

by the Gates and distractibility as measured by selected WISC-R subtests and the CTRS. The MSCA-80 significantly correlates with the WISC-R and the CTRS. Finally, the MSCA-81 significantly correlates with the WISC-R while the WISC-R significantly correlates with the CTRS. Further analyses of the implications of these significant relationships will be made in Chapter V.

TABLE VIII

CORRELATION BETWEEN THE WUSC-R AND THE CTRS WHEN CONTROLLING FOR IQ_{RES}

WISC-R	r	r^2	df	p
CTRS	-.46	.21	62	.0001*

* ($p < .05$, $\therefore$ reject Hypothesis X)

CHAPTER V

DISCUSSION AND IMPLICATIONS

Introduction

This research studied the relationships between reading achievement and three measures of distractibility. The Gates-MacGinite Reading Test, 1965 Level A Form 1 and selected subtests of the Wechsler Intelligence Scale for Children-Revised (WSIC-R) and McCarthy Scales of Children's Abilities (MSCA), and the Conner's Teacher Rating Scale (CTRS) were utilized. Efforts were made to identify a suitable instrument with which to assess young children who exhibit attentional deficits and reading difficulties. This chapter has two remaining parts. Part two will present the findings discussed in Chapter IV as well as answer questions posed in Chapter II. Part three will present implications of this study for further research and for educational practice.

General Summary and Discussion

Kaufman's freedom from distractibility (FD) factor on the WISC-R still appears to be the most consistent and accurate method of identifying young children with attentional difficulties. In all analyses using the WISC-R subtests as a variable, significant correlation coefficients were computed.

A particularly important relationship to be considered involves

the WISC-R subtests and the CTRS (Table VIII). A significant (α =.05) correlation of -.46 was computed for these two variables indicating that a moderate inverse relationship exists between the two assessment devices. Children who are observed to be distractible by their teachers score relatively high on the CTRS. A child who is not observed to be distractible would score close to zero on that CTRS factor. A child who scores low on the WISC-R subtests could be identified as distractible while a child scoring high on these subtests would not. Therefore, distractible children identified with the CTRS and receiving a high score would have to receive a low score on the WISC-R to create this inverse significant value of -.46.

Therefore, the CTRS' inattentive/daydreaming factor would appear to possess concurrent validity with the WISC-R's FD factor. The CTRS also correlated significantly with the MSCA-80 (-.24) in the same way it had correlated with the WISC-R. However, the small magnitude of the correlation and the small variance accounted for by the MSCA-80 reduces the importance of the MSCA-80 as a valid predictor for children with attentional deficits. And, the nonsignificant correlation of -.15 for the CTRS and the MSCA-81 sheds further doubt on the utility of using these selected McCarthy subtests for assessing attentional deficits.

The strongest variables for assessing distractibility appear to be the WISC-R subtests and the CTRS. Additionally, the WISC-R subtests and the CTRS were the only variables which correlated significantly with reading achievement (.49 and -.42, respectively) (Table V). These correlates support the findings of Smith (1979) who found that the FD factor on the WISC-R could accurately identify able and disabled readers at the second grade level. Because of the disappearance of this factor

at higher grades in Smith's (1979) study, the assumption was made that modification in a young distractible child's instructional program could allow the child to avoid difficulty in learning to read.

In the initial planning stages of this research, the MSCA-80 and MSCA-81 subtests were viewed as a promising method of identifying distractible children too young for the WISC-R. Both the MSCA-80 and the MSCA-81 correlated significantly with the WISC-R (.34 and .47, respectively) (Table VI and VII, respectively). And, oddly enough a very low correlation of .19 was obtained when computing the relationship of the MSCA-80 and MSCA-81 (Table VI). However, neither McCarthy grouping correlated significantly with either the CTRS or the Gates. (One exception to that statement is a significant correlation between the MSCA-80 and the CTRS. However, because of the small magnitude of the correlation (-.24), its relative importance to the study of distractibility is questionable).

Therefore, at this time a conclusion will be made that the selected subtests of the MSCA used in this study and in Morton's study do not play a major role in identifying distractible children or those with potential reading difficulties. It is suspected that other subtests or combination of subtests may have been more appropriately used. However, the CTRS and WISC-R do appear to play a major role in identifying distractible children and those with potential reading difficulties.

The most valuable conclusion reached from this study includes the concepts of preventive and/or interventive measures for certain children. For some children who are observed and/or formally assessed as being distractible, a diagnostic-prescriptive plan should be established. This preventive plan should give attention to the quality and quantity

of instructional time including such variables as those presented by Bloom (1970) and outlined in Chapter II.

A discussion of three questions from Chapter II follows:

1. To what extent do the McCarthy, Wechsler, and Conner's scales identify the same children as being free from distraction? The WISC-R and CTRS appear to be valid and consistent measures of a distractibility factor while the MSCA selected subtests do not.

2. To what extent does the McCarthy scale identify over a period of a year the same children as being free from distraction? This study did not support the MSCA selected subtests as remaining stable over time with respect to distractibility assessment.

3. To what extent is reading achievement related to being free from distraction? Reading achievement is significantly related to being free from distraction as measured by the Gates and selected subtests from the WISC-R and the CTRS.

Recommendations

If distractibility in young children accounts for nearly 25 percent (Table V) of the variation in their reading achievement, attention must be given to coping with this relationship in the classrooms. It is recognized that correlates do not indicate causation. In the case of distractibility causing reading disability, an experimental research design is the next step in the scientific process of determining causation. An experimental study could be designed as follows. Pre-readers could be identified as either distractible or non-distractible using the CTRS. Group teaching versus individual teaching would be the independent variable employed with four groups (group teaching-distractibles,

individual-distractibles, group teaching-nondistractibles, individual teaching-nondistractibles). Taken into consideration and controlled for would also be methodology, teacher ability, time frame, and materials. At the end of a year of this controlled teaching-learning situation, an analysis of variance would probably reveal that distractible learners who had received modified instruction would be significantly advanced over their distractible peers who had received traditional instruction. Both non-distractible groups would probably differ significantly from the distractible group who had received no modified instruction but these non-distractible groups would probably compare equally to the distractibles who had received modified instruction. Although this type of research would allow educators to draw more definitive conclusions concerning distractibility and reading achievement, experimental research is very difficult to achieve in today's schools systems.

Recommendations for further research include replication of this study using all subtests of the MSCA and the WISC-R and using the most recent revision of the CTRS (Lerner, 1981b). The research cited in Chapter II by Goh and Youngquist and by Taylor and Iminez would be valuable resources and beginning points upon which to build a design.

Using all subtests of the MSCA rather than just one or even two groups of subtests is recommended since the MSCA have not received the same amount of factor analytic research as has the WISC-R. Using all subtests of the MSCA would allow the researcher more opportunity to study its factor structure.

By using all subtests of the WISC-R, the researcher would have the opportunity to further study its factor structure as well as to study

intra-individual differences in scores. Further, more efficient use of multiple regression techniques could be employed, thereby making a more accurate prediction equation possible for use in preventive/ interventive programs.

Recommendations for educational practice involve giving attention to sound theories of learning acquisition and children's attentional abilities. Providing modifications in the instructional programs of certain children through adjustments in their daily schedules would be an appropriate action in attempts to diagnostically prevent reading difficulties.

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APPENDIX

Conner's Teacher Rating Scale 1969

1. Sits fiddling with small objects
2. Hums and makes other odd noises
3. Falls apart under stress of examination
4.* Coordination poor
5. Restless or overactive
6. Excitable
7.* Inattentive
8.* Difficulty in concentrating
9. Oversensitive
10. Overly serious or sad
11.* Daydreams
12. Sullen or sulky
13. Selfish
14. Disturbs other children
15. Quarrelsome
16. "Tattles"
17. Acts "smart"
18. Destructive
19. Steals
20. Lies
21. Temper outbursts
22. Isolates himself from other children
23. Appears to be unaccepted by group
24.* Appears to be easily led
25. No sense of fair play
26.* Appears to lack leadership
27. Does not get along with opposite sex
28. Does not get along with same sex
29. Teases other children or interferes with their activities
30. Submissive
31. Defiant
32. Impudent
33. Shy
34. Fearful
35. Excessive demands for teacher's attention
36. Stubborn
37. Overly anxious to please
38. Uncooperative
39. Attendance problem

* loadings of at least .43 on Factor II-inattentive/daydreaming

VITA[2]

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