1990

The performance of language-impaired preschoolers on the K-ABC scales.

Jo-Ann Hilda. Birt
University of Windsor

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THE PERFORMANCE OF LANGUAGE-IMPAIRED PRESCHOOLERS ON THE K-ABC SCALES

by

Jo-Ann Hilda Birt

B.A. University of Prince Edward Island, 1988

A Thesis
Submitted to the Faculty of Graduate Studies
through the Department of Psychology
in Partial Fulfilment of the
Requirements for the Degree
of Master of Arts at the
University of Windsor

Windsor, Ontario, Canada

1990

ISBN 0-315-65159-8

ABSTRACT

The Performance of Language-Impaired Preschoolers on the K-ABC Scales

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Jo-Ann Hilda Birt

This study examined the effects of language impairment and age on the pattern of performance on the scales of the Kaufman Assessment Battery for Children (K-ABC). Four groups of preschool children were examined: 14 four-year-old children and 10 five-year-old children with a clinical diagnosis of expressive and receptive language impairments; 14 four-year-old children and 19 five-year-old children referred for reason other than language impairment.

Subjects were matched on age, sex, SES, and presence of behavior problems. The results provided some support for Telzrow's (1984) predicted pattern of performance. The language-impaired children did perform better on the Simultaneous Processing than the Sequential Processing Scale. However, the control group also exhibited this pattern of performance. The hypothesis that older language-impaired children would exhibit Telzrow's (1984) predicted pattern more clearly than the younger language-impaired children was not supported. Such findings may have been due to the small sample size and narrow age range employed. No clear distinction was revealed between the K-ABC Nonverbal

Scale and Kamphaus-Reynolds's Verbal Intelligence Composite for the subjects employed in the present study. Implications of the current results and suggestions for future research were also provided.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to Dr. Sylvia Voelker, my chairperson, for her encouragement and direction throughout this project. Her assurance that this time would come made the completion of this project possible. I would also like to express my appreciation to Dr. Neal Holland and Dr. Larry Morton, my committee members, for the time and energy they contributed to this project. Their insightful comments were of great benefit to this author.

Also, my gratitude is extended to Dr. Carmela Pakula for providing access to the information required for this study and the staff of Regional Children's Centre for being so helpful and tolerant of my intrusion into their schedules.

My sincere appreciation must be communicated to my friends who have withstood my expression of frustration and discouragement and rejoiced in my success. A special thanks to my family who have understood my many missed family events and all those "busy" evenings and weekends.

Finally, my sincere love and appreciation is extended to my best friend and husband, Gary McQuaid. He, most of all, has made this project possible with his many sacrifices and unending support. He has been the rock that I have leaned on throughout this entire endeavour.

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CHAPTER I

INTRODUCTION

Recent legislation (e.g., Ontario Education Act, 1980; U.S. PI. 94-142, 1986) mandating special education for preschool-age children has promoted early intervention programs for young children who are at-risk for later difficulties (Schakel, 1986). These intervention programs have proven to be effective in reducing the risk of subsequent grade retention (Simner, 1983), and in increasing home and later school adjustment (Huntley, Holt, Butterfill, & Latham, 1988; Lyon, Smith, & Klass, 1988). To benefit from these intervention programs, however, preschool children must first be accurately identified as requiring such services. As these intervention programs are often federally funded, identification of need often requires preschool children to be diagnosed as having some type of disability or impairment, such as a learning-disability, mental retardation, or a language impairment (American Speech and Hearing Association, 1989; Lidz, 1986; Lyon et al., 1988; Osgood, 1984; Reynolds & Clark, 1983). As a result of the specific requirements necessary for eligibility of these early intervention programs, assessment of preschool children has become more common for professional psychologists (Lyon et al., 1988).

A large percentage of preschool children who require assessment present with suspected speech and language impairments as the major concern (Field, 1987). Estimates of the prevalence of language impairments in preschool children range from .7% to 66% (Bax & Hart, 1976; Beitchman, Nair, Clegg, & Patel, 1986; Enderby & Phillipp, 1986; Love & Thompson, 1988; Randall, Reynell, & Curwen, 1974; Richman & Stevenson, 1977; Silva, 1980; Stevenson & Richman, 1976; Tuomi & Ivanoff, 1977). The disparity in these prevalence rates can be attributed, in part, to the fact that there is no consistent method of detection employed in diagnosing speech and/or language impairments (Beitchman, 1985a; Enderby & Phillipp, 1986; Kaufman & Kaufman, 1983b). As well, the range of these rates is broad indicating that researchers and diagnositicians are examining different aspects of language in their work. Yet, these reported rates are generally sufficiently high to suggest that language impairments in preschool children are not unusual.

This problem, the common occurrence of language impairments among preschool children, is further complicated by the fact that language impairments rarely occur in isolation. Preschool children with language impairments frequently have other primary or secondary difficulties associated with the language impairment. Some of these other developmental difficulties include: low IQ (Aram, Ekelman, & Nation, 1984; Silva, McGee, & Williams, 1983),

learning disabilities (Aram et al., 1984; Gibbs & Cooper, 1989; Rutter & Yule, 1976), motor problems (Bishop & Edmundson, 1987), or psychiatric problems including emotional and behavioral difficulties (Beitchman, 1985a, 1985b; Beitchman, Hood, Rochon, & Peterson, 1989; Beitchman, Nair, Clegg, Ferguson, & Patel, 1986; Beitchman & Peterson, 1986; Cantwell & Baker, 1977; Cantwell & Baker, 1987; Cantwell, Baker, & Mattison, 1979; Cohen, Davine, & Meloche-Kelly, 1989; Kotsopoulos & Boodoosingh, 1987; Love & Thompson, 1988; Rutter, 1976; Stevenson & Richman, 1978; Stevenson, Richman, & Graham, 1985).

Assessing preschool children can be challenging due to the characteristics associated with these young children's developmental status, such as short attention span, limited verbal expressive skills, and difficulty separating from significant others (Lidz, 1983). As is clear from the above discussion, the presenting problems of referred preschool children may further complicate individual assessment. The assessment procedures followed for these children often involve the administration of a standard intelligence test (American Speech and Hearing Association, 1989; Osgood, 1984). Some of the most commonly used intelligence tests for preschool children are the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967), the McCarthy Scales of Children's Abilities (MSCA; McCarthy, 1972), and the Stanford-Binet Intelligence Scale Fourth

Edition (SB:FE; Thorndike, Hagen, & Sattler, 1986) (Schakel, 1986; Zucker & Copeland, 1988). These traditional tests require extensive use of verbal skills on both the part of the examiner and the preschool child (Kamphaus & Reynolds, 1987; Telzrow, 1984; Valencia, 1984) and as a result may underestimate the intellectual ability of language-impaired preschool children and minority groups who do not employ English as their primary language (Kaufman & Kaufman, 1983b; Kennedy & Hiltonsmith, 1988).

In an attempt to provide a test that circumvents these concerns, Alan and Nadine Kaufman developed the Kaufman Assessment Battery for Children (K-ABC; 1983a, 1983b). This test minimizes language demands and thus provides an instrument that may facilitate the measurement of cognitive skills of language-impaired and minority group children.

There has been little research conducted examining the adequacy of the K-ABC in assessing the intellectual functioning of language-impaired preschool children. Ricciardi (1987) completed one such study examining the performance of language-impaired preschool children on the K-ABC. This novel study was entangled with several methodological limitations. The present research will again examine the performance on the K-ABC of a group of preschool children with a clinical diagnosis of language-impairment; however, it will attempt to improve on Ricciardi's (1987) methodology. As well, an alternate classification system of

the K-ABC subtests developed by Kamphaus and Reynolds (1987) will be evaluated for preschool children. In order to provide a rationale for this research, several areas of the literature will be reviewed, including development and properties of the K-ABC, the Kamphaus-Reynolds's (1987) classification system, research examining the use of the K-ABC with preschool children, and Ricciardi's (1987) study.

Development of the Kaufman Assessment Battery for Children

Underlying Goals and Theories

The K-ABC is an individually administered measure of intelligence and achievement appropriate for normal and exceptional children between the ages of 2.5 and 12.5 years. The K-ABC has a strong theoretical, as well as a practical background. In an attempt to combine the theoretical with the practical, the Kaufmans established six goals for the K-ABC:

1). to measure intelligence from a strong theoretical and research basis,

2). to separate acquired factual knowledge from the ability to solve unfamiliar problems,

3). to yield scores that translate to educational intervention,

4). to include novel tasks,

5). to be easy to administer and objective to score, and

6). to be sensitive to the diverse needs of preschool, minority group, and exceptional children (Kaufman & Kaufman, 1983b, p. 5).

The theoretical foundation of the K-ABC is based on two different types of theories:

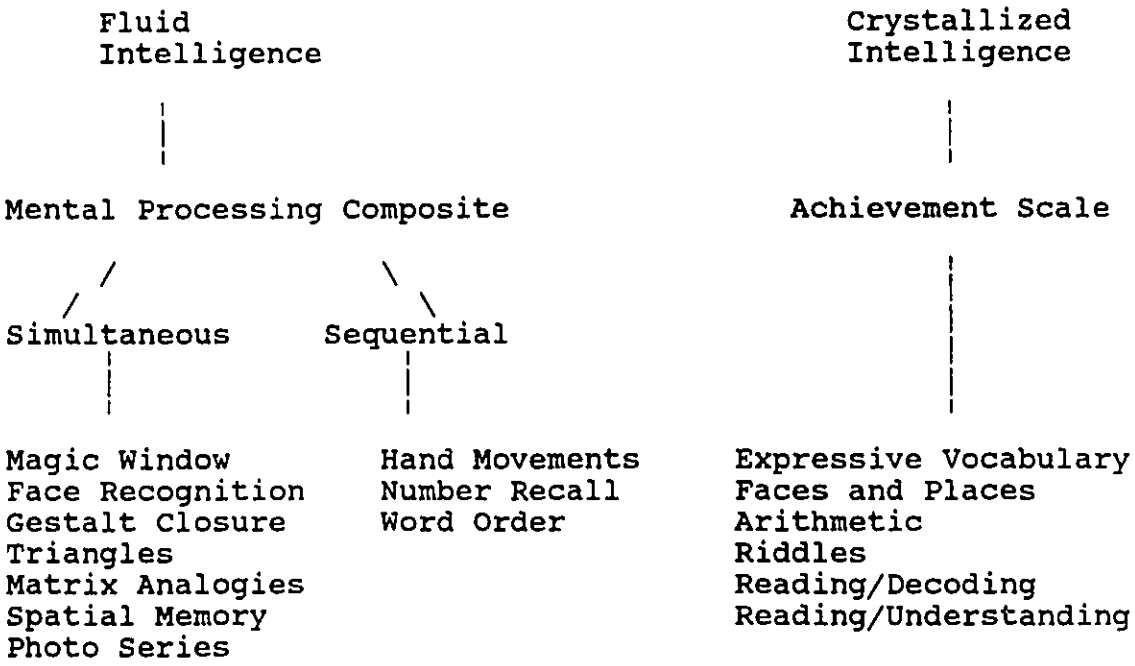
1). Theories of Information Processing: These theories are derived from various fields, such as clinical neuropsychology (Luria, 1966; Das, Kirby & Jarman, 1973, 1979), cerebral specialization (Sperry, 1968, 1982), and cognitive psychology (Neisser, 1967). Luria (1966) discussed three major functional divisions of the brain. The second division controls the coding of information and is believed to be located in the occipito-parietal and fronto-temporal areas. According to Luria information could be processed simultaneously or sequentially depending on the area stimulated and/or the nature of the required task. Luria (1966) stated that "... extirpation of the occipital and parietal cortex leads ... to a disturbance of differentiation of simultaneously (spatially) organized groups of stimuli, whereas as a lesion of the temporal cortex leads to a disturbance ... of their successive organization " (pp. 80-81). Sperry's (1968, 1982) research on cerebral specialization revealed that each hemisphere of the brain is specialized to perform certain kinds of functions and information processing. The left hemisphere functions in processing linguistic information and performing sequential processes which require a serial or temporal order for problem-solving. The right hemisphere is specialized for fulfilling nonverbal tasks and simultaneous information processing. This hemisphere is most adequate at problem solving which involves gestalt-like, frequently spatial, and integration of stimuli. Finally, from his research in cognitive psychology, Neisser (1967) proposed that there are different types of mental functioning which rely on underlying mental processes. He proposed these processes to be parallel processing which carries out many activities simultaneously, and serial processing which carries out only one activity at a time.

From these theories of information processing,

the Kaufmans have created the Simultaneous and Sequential Processing Scales as part of the K-ABC. These authors propose that even though each hemisphere is specialized, any task involves both simultaneous and sequential processing, but that one process is more dominant than the other (Kamphaus & Reynolds, 1984).

2). Cattell-Horn Theory of Intelligence: Cattell and Horn (Cattell, 1971; Horn, 1968; Horn & Cattell, 1966) have proposed that intelligence is composed of fluid abilities and crystallized abilities. Fluid abilities allow the individual to adapt to and respond in a flexible manner when presented with unfamiliar problems, and crystallized abilities are the abilities developed from prior experience, such as school (Kaufman & Kaufman, 1983b).

From this theory the Kaufmans created the Mental Processing Composite and the Achievement Scale of the K-ABC. The Mental Processing Composite includes both the Sequential and Simultaneous Processing Scales and is intended to measure fluid abilities. This composite involves novel tasks which attempt to describe the child's method of responding. The Mental Processing Composite serves to measure the child's present level of intellectual functioning. The Achievement Scale, on the other hand, was designed to measure crystallized abilities such as tasks that have been traditionally assessed by tests of verbal intelligence (e.g., vocabulary and language concepts), tests of school achievement (e.g., reading), or both (e.g., arithmetic and general information) (Kaufman & Kaufman, 1983b, p. 2). These tasks are typically of the type to which children have previously been exposed. Both the achievement and ability components of the K-ABC are vital for understanding the child's present level of functioning and for planning appropriate intervention. Figure 1 provides a description of the K-ABC according to its underlying theories.



Note. Figure information obtained from Kaufman & Kaufman, 1983b, pp. 2-5.

Figure 1. K-ABC Organization According to Underlying Theories.

Kaufman (1984) clearly states that it is not the intention of the K-ABC authors that the K-ABC should adhere to any one of these theories, but rather that it should be an integration of these theories.

Standardization

The development of the K-ABC spanned a period of five years (1978-1983). The development occurred in four stages: task and item development (1978-1979), national tryout (1980), national standardization (1981), and sociocultural norming (1982) (Kaufman & Kaufman, 1983b). The standardization sample of the K-ABC consists of over 2000 children which is representative of the children in the United States between the ages of 2.5 and 12.5 years (according to 1980 Census data). These children were chosen according to sex, race, socioeconomic status, educational placement, geographic region, and community size (Kaufman & Kaufman, 1983b). The rigorous and extensive processes of development and standardization of the K-ABC have resulted in an assessment battery consisting of 16 subtests (Mental Processing subtests: $\underline{M}$ = 10, $\underline{SD}$ = 3 and Achievement subtests: $\underline{M}$ = 100, $\underline{SD}$ = 15), and five global scales ($\underline{M}$ = 100, $\underline{SD}$ = 15).

Subtests and Scales

The K-ABC consists of 16 subtests (descriptions provided in Table 1) which are divided into five scales. The subtests administered for each scale at each age level are provided in Table 2. This Table provides information about the Simultaneous Processing Scale, the Sequential Processing Scale, the Achievement Scale, and the Nonverbal Scale; however it does not provide any information about the Mental Processing Composite. The Mental Processing Composite consists of a combination of the subtests administered for both the Simultaneous and Sequential Processing Scales at any age. Thus, by combining the subtests administered for these two scales, it can be determined which subtests comprise the Mental Processing Composite at each age level.

Each of these scales were developed for a specific purpose. The Sequential and Simultaneous Processing Scales were developed in an attempt to identify the manner in which children process information, rather than merely determining which questions were responded to correctly or incorrectly. As already mentioned, the Achievement Scale and the Mental Processing Composite serve to distinguish between ability and achievement. Finally, the Nonverbal Scale is used as a measure of ability for children who are hearing-impaired, language-impaired, or do not employ English as their primary

TABLE 1

Order of Administration and Description of the K-ABC Subtests

---

1). **MAGIC WINDOW**: Identifying a picture which the examiner exposes by slowly moving it behind a narrow window, making the picture only partially visible at any one time.

2). **FACE RECOGNITION**: Selecting from a group photograph the one or two faces that are exposed briefly on the preceding page.

3). **HAND MOVEMENTS**: Performing a series of hand movements in the same sequence as the examiner performs them.

4). **GESTALT CLOSURE**: Naming an object or scene pictured in a partially completed "inkblot" drawing.

5). **NUMBER RECALL**: Repeating a series of digits in the same sequence as the examiner says them.

6). **TRIANGLES**: Assembling several identical triangles into an abstract pattern to match a model.

7). **WORD ORDER**: Touching a series of silhouettes of common objects in the same sequence as the examiner says them.

8). **MATRIX ANALOGIES**: Selecting the meaningful picture or abstract design which best completes a visual analogy.

9). **SPATIAL MEMORY**: Recalling the placement of pictures on a page that is exposed briefly.

10). **PHOTO SERIES**: Placing photographs of an event in chronological order.

11). **EXPRESSIVE VOCABULARY**: Naming the object pictured in a photograph.

12). **FACES AND PLACES**: Naming the well-known person, fictional character, or place pictured in a photograph or drawing.

(table continues)

13). **ARITHMETIC**: Demonstrating knowledge of numbers and mathematical concepts, counting and computational skills, and other school-related arithmetic abilities.

14). **RIDDLES**: Inferring the name of a concrete or abstract concept when given a list of its characteristics.

15). **READING/DECODING**: Identifying letters and reading words.

16). **READING/UNDERSTANDING**: Demonstrating reading comprehension by following commands that are given in sentences.

Note. Table information obtained from Kaufman and Kaufman, 1983a, p.6 , 1983b, pp. 3, 5.

TABLE 2

Age-by-Scale Grouping of Subtests on the K-ABC

	AGE			
Scale	2.5	3	4	5
SEQUENTIAL				
Hand Movements	X	X	X	X
Number Recall	X	X	X	X
Word Order	-	-	X	X
SIMULTANEOUS				
Magic Window	X	X	X	-
Face Recognition	X	X	X	-
Gestalt Closure	X	X	X	X
Triangles	-	-	X	X
Matrix Analogies	-	-	-	X
Spatial Memory	-	-	-	X
Photo Series	-	-	-	-
ACHIEVEMENT				
Expessive Vocabulary	X	X	X	-
Faces & Places	X	X	X	X
Arithmetic	-	X	X	X
Riddles	-	X	X	X
Reading/Decoding	-	-	-	X
Reading/Understanding	-	-	-	-
NONVERBAL				
Face Recognition	-	-	X	-
Hand Movements	-	-	X	X
Triangles	-	-	X	X
Matrix Analogies	-	-	-	X
Spatial Memory	-	-	-	X
Photo Series	-	-	-	-

Note. - indicates subtests not administered at age level.

Note. Table information obtained from Kaufman & Kaufman, 1983b, pp. 4, 35.

language. This scale consists of subtests that can be administered in pantomime and thus can really be used for any child lacking in expressive and/or receptive verbal skills.

Even though Kaufman and Kaufman (1983b) have used these scales to describe the intellectual functioning of a wide variety of children, there has been an abundance of controversy regarding the basic theoretical underpinnings of the K-ABC. This controversy revolves around the K-ABC's ability/achievement and simultaneous/sequential dichotomies.

Although the Mental Processing Composite was established to measure fluid abilities and the Achievement Scale to measure crystallized abilities, Bracken (1985) proposes that none of the Sequential Processing subtests measure what Cattell (1971) labelled as being fluid intelligence. In fact, Bracken (1985) and Jensen (1984) suggest that the Sequential Processing Scale measures short term memory only. Kaufman and Kamphaus (1984) dispute this interpretation by proposing that the Sequential Processing Scale cannot be merely a measure of rote memory as the tasks that have secondary loadings on this scale are not measures of short term memory (e.g., Arithmetic, Vocabulary, and Riddles).

Bracken (1985) also suggests that only five of the seven subtests on the Simultaneous Processing Scale correspond to measures of fluid intelligence. As well,

Bracken (1985) has proposed that the K-ABC does not adequately measure crystallized abilities as the Riddles subtest on the Achievement Scale appears to be the only good measure of crystallized abilities as described by Cattell (1971). In contrast to these criticisms of the K-ABC Achievement Scale as a measure of crystallized abilities, McCallum, Karnes, and Edwards (1984) found, when examining the usefulness of the K-ABC for assessment of gifted children, that the K-ABC Achievement Scale "may be more strongly related to verbal and crystallized abilities than are other K-ABC scores" (p. 62).

Willson, Reynolds, Chatman, and Kaufman (1985) have also provided evidence which suggests that the ability (fluid intelligence)/achievement (crystallized intelligence) distinction of the K-ABC is less than adequate. These researchers have found that the Achievement Scale tasks involve simultaneous and sequential processing which are intended to measure ability, not achievement. However, Kaufman and Kaufman (1983b) explain this finding by suggesting that it is impossible to totally separate novel learning from prior experience. In fact the Kaufmans state that "achievement can legitimately be thought of as the ability to integrate the two types of mental processing and apply them to real-life situations" (Kaufman & Kaufman, 1983b, p. 33). It was never expected that there would be

factorial purity between processing and achievement (Kaufman, 1984).

Kaufman and Kamphaus (1984) have shown in factor analytic studies that a robust Achievement factor does not appear until eight years of age, and that prior to the age of four years of age, the two established factors can be labelled Sequential and Simultaneous/Achievement. This finding indicates that the ability/achievement distinction may not be appropriate for all age groups. The K-ABC authors acknowledge the discrepancy in the ability/ achievement dichotomy at various ages. Zucker and Copeland (1988) suggest that for preschool children, the Achievement Scale tasks may depend more on processing abilities than acquired knowledge as preschool children are limited in their acquired knowledge. Telzrow (1984) suggests that this ability/achievement discrepancy can be attributed to the different tasks employed at different ages which affects the factor structure of the K-ABC.

Keith and Novak (1987) in their study of school-aged children found that the Achievement Scale subtests formed a Verbal Reasoning factor and a Reading factor. These results were supported by the research conducted by Kaufman and McLean (1986). This research provides further evidence for the inadequacy of the ability/achievement dichotomy as it was found that the Achievement factor split into an Achievement factor and a Reading factor. Kaufman and

Kaufman (1983b) agree that alternate interpretations of the factors may be useful and state that the ability/ achievement distinction was based on a decision of practicality to aid in nondiscriminatory assessment of handicapped and minority children.

There has also been research investigating the simultaneous/sequential dichotomy of the K-ABC. Sternberg (1984) proposed that the K-ABC did not really provide for the measurement of cognitive styles, as the K-ABC did not provide for observing the child to see how the task was approached before determining if it was simultaneous or sequential in nature. Rather, the K-ABC authors arranged the tasks according to the style that they believed the task involved. Kaufman (1984) discounts this statement by saying:

> It is not the task of the K-ABC or the WISC-R or Stanford-Binet to evaluate children's motivation or qualitative aspects of their performance; these are tasks of the trained clinician who carefully observes, records, and interprets children's behaviors and strategies... (p. 422).

As well, Kaufman and Kaufman (1983b) have acknowledged the fact that any task can be solved by simultaneous or sequential processing; however, these researchers qualify this statement by proposing that in each task there will be a dominant processing style. Yet, Lyon and Smith (1987) have shown that children have processing preferences in the

way that tasks are approached. In the Lyon and Smith (1987) study, 30% of the at-risk preschool children had a preferred processing style (17% simultaneous and 13% sequential). This finding suggests that some children will approach tasks in a consistent manner regardless of the cognitive style that is expected for the task. Kamphaus and Reynolds (1987) suggest that children who solve tasks in a manner that is inconsistent with the dominant processing style will encounter difficulties that may reveal academic and behavioral problems.

The Kaufmans' distribution of tasks into Simultaneous Processing and Sequential Processing Scales may not accurately represent the processes that the children will actually employ during the assessment. Sternberg (1984) has concluded that the K-ABC does not measure the cognitive styles of individuals but instead relates processing styles to tasks. Kaufman and Kaufman would disagree with this statement, especially on the grounds that the simultaneous/sequential dichotomy was thoroughly researched and apparent during the construction phase of the K-ABC.

A second problem with the simultaneous/sequential dichotomy is that the assigned tasks sometimes fail to load (correlate most highly) with their designated factor (Goldstein, Smith, & Waldrep, 1986). A prime example of this problem occurs with the Hand Movements subtest. This subtest is labelled as a sequential processing task and is

given to the entire age range of the K-ABC. However, with increasing age of the child this task is found to correlate more highly with the Simultaneous Processing Scale. In fact, for children aged 10 years and older, this subtest is a Simultaneous Processing task, but is still included as part of the Sequential Processing Scale (Das, 1984; Kaufman & Kamphaus, 1984). Kaufman and Kamphaus (1984) justify the retention of Hand Movements on the Sequential Processing Scale at these older ages by proposing that this subtest is the first, second, or third best measure of sequential processing for nine of the eleven age groups and only the fifth best measure of simultaneous processing. However, these researchers fail to take into account that there are only three Sequential Processing subtests while there are seven Simultaneous Processing subtests.

A fact that critics of the K-ABC simultaneous/ sequential dichotomy fail to recognize is that Face Recognition, a Simultaneous Processing task, is not administered past four years of age, as above this age it begins to load on the Sequential Processing Scale (Kaufman & Kaufman, 1984). This latter finding does not discount the former, it merely proposes that there are many factors to be considered in determining the adequacy of the simultaneous/ sequential dichotomy.

These controversies concerning the theoretical underpinnings of the K-ABC have stimulated an inquiry into the value of the K-ABC. In support of the K-ABC, Kaufman (1984) has stated that the K-ABC is not intended to adhere to any one theory but rather to a combination of theories. As well, the fact that there are few intellectual measures appropriate for language-impaired and minority children also lends support to the K-ABC.

Reliability

The mean subtest coefficients for the Mental Processing Scale range from .71 to .89. At the school age level, coefficients varied from .71 to .85 and for preschool children the mean values ranged from .72 to .89. The Achievement Scale subtests provided higher mean split-half coefficients ranging from .77 to .87 for preschool children and from .84 to .92 for school aged children. The mean split-half reliability coefficient for the original global scales for preschool children in the standardization sample ranged from .86 (Simultaneous Processing Scale) to .93 (Achievement Scale), and for school-aged children it ranged from .89 (Sequential Processing Scale) to .97 (Achievement Scale). These results indicate that the subtests and global scales have good internal consistency with the subtests

being less consistent than the global scales and the Achievement Scale being the most consistent of all.

The test-retest reliability of the K-ABC was established by administering the test twice to 246 children spanning the entire age range but divided into three specific age groups. The test-retest interval was 2 to 4 weeks (M = 18 days). The stability of the subtests is adequate, except for Hand Movements and Face Recognition (range .59 to .98), with the stability of the Achievement subtests being excellent for all ages (range of .72 to .98). The global scales' test-retest reliability coefficients ranged from .77 to .97. (Kaufman & Kaufman 1983b). It is important to note that these coefficients could have been inflated due to practice effects resulting from the short test-retest interval.

The mean standard error of measurement (SEM) for the Mental Processing subtests ranged from 1.0 to 1.6 points (SD = 3) for preschool children and 1.1 to 1.6 for school-aged children. The Achievement subtests have comparable SEMs with the range for preschool children being 5.4 to 7.2 points and 4.0 to 5.6 (SD = 15) points for school-aged children. The mean SEMs for preschool children on the global scales range from 3.9 (Achievement Scale) to 5.7 (Simultaneous Processing Scale) and from 2.7 (Achievement Scale) to 5.0 (Sequential Processing Scale) for school-aged children. These values indicate that the potential for

error is less in the global scales than in the subtests and that more confidence can be placed in the scores of older children than in scores of preschool children.

The K-ABC Interpretive Manual (Kaufman & Kaufman, 1983b) does lack information on the test-retest reliability over relatively long periods of time (Mehrens, 1984) which is imperative in order to determine the quality of its test-retest reliability. However, Valencia's (1985) study of 42 Mexican-American children's repeat performance on the K-ABC, over a period of four to six months, revealed global scale stability coefficients ranging from .76 to .90 and subtest coefficients ranging from .26 to .89. Also, Lyon and Smith (1987) have found that over a nine month period the stability coefficients for a sample of "at risk" preschool children ranged from .78 to .88 for the global scales and .65 to .79 for the subtests. These reliabilities are similar to those reported in the K-ABC manual, suggesting that the K-ABC is indeed a reliable assessment tool.

Validity

The K-ABC Interpretive Manual (Kaufman & Kaufman, 1983b) was published with an unprecedented amount of information on the validity of the test. The 43 validity studies reported in the Interpretive Manual provide evidence

for the construct validity, concurrent validity, and predictive validity of the K-ABC. There has been evidence presented for and against the construct validity of the K-ABC. The fact that the test scores increase with increasing age (developmental changes), and that the Mental Processing and Achievement subtests correlate adequately with their respective scales (Kaufman & Kaufman, 1983b) provide support for the construct validity of the K-ABC.

Factor analysis is another method of determining the construct validity of a test, as the subtests measuring a common construct should load highly on the same factor. For example, if the K-ABC is to have construct validity, all the subtests of the Simultaneous Processing Scale should load maximally on one factor and minimally on the other factors. As the K-ABC measures two types of mental processing and achievement, three factors should be apparent. This has been shown to be the case when factor analytic studies of the K-ABC's standardization sample were performed (Kamphaus & Kaufman, 1986; Kaufman & Kamphaus, 1984; Kaufman & Kaufman, 1983b; Moon, Ishikuma, & Kaufman, 1987; Willson et al., 1985).

Studies on children outside of the standardization sample were performed in order to determine the generalizability of the factors. Goldstein, Smith, and Waldrep (1986) did not find a clearly established simultaneous, sequential, or achievement factor from their

three, four, or five factor solutions of the K-ABC for 40 non-referred three-year-olds. Also, Keith (1986) found that when all the K-ABC subtests were included in factor analysis, the three factor solution was not as "clean" as would be expected. Keith and his associates (Keith, 1985, 1986; Keith & Dunbar, 1984) have interpreted the factors arising from the factor analyses of the K-ABC as nonverbal reasoning, verbal memory, and verbal reasoning, respectively. Thus, although similar factors emerged, Keith and his associates believed that the simultaneous/ sequential/achievement distinction did not accurately describe the factors and, as a result, renamed the factors. Kaufman and Kaufman (1983b) suggest that such alternate interpretations may be useful.

Another method for examining the construct validity of a test is to examine its correlations with other established tests. It is believed that the new test should correlate only moderately with established tests because if the new test is too highly correlated it would overlap with the established test and have nothing new to offer. The K-ABC has shcwn to correlate moderately with traditional intelligence tests such as the WISC-R , WPPSI, and the Stanford-Binet (Kaufman & Kaufman, 1983b; Klanderman, et al., 1985; Krohn, et al., 1988; Lyon & Smith, 1986; Naglieri & Haddad, 1984). Correlations between the K-ABC and these tests range from .35 to .87. The Achievement Scale of the

K-ABC correlates higher with the traditional measures (range from .35 to .87, M = .69), as would be expected if they were measuring achievement, than does the Mental Processing Composite (range from .35 to .85, M = .64), which is believed to measure ability rather than achievement (Kaufman & Kaufman, 1983b; Kamphaus & Reynolds, 1987; Klanderman et al., 1985; Krohn et al., 1988; Naglieri, 1985a, 1985b; Naglieri & Haddad, 1984; Obrzut et al., 1987).

The concurrent validity of the K-ABC Achievement Scale and various achievement tests have produced correlations ranging from .45 to .89 (M = .68) (Kaufman & Kaufman, 1983b; McLoughlin & Ellison, 1984; Naglieri & Haddad, 1984). These findings indicate that the K-ABC Achievement Scale is an adequate estimate of school achievement. Comparing the K-ABC and tests of general cognitive ability such as the MSCA and the Woodcock-Johnson Psycho-Educational Battery (WJPB; Woodcock, 1977) produces correlations between these tests and the Mental Processing Composite ranging from .37 to .68 (M = .52) and .25 to .79 (M = .59) for the Achievement Scale. These findings indicate that either the Achievement Scale measures general cognitive abilities better than does the Mental Processing Composite or that the tests of general cognitive abilities are more achievement oriented than the K-ABC.

The K-ABC has been compared to various achievement tests to determine how well the K-ABC would be able to predict later school achievement. The interval between administration of the tests was between six to twelve months. The results of studies investigating the predictive validity of the K-ABC suggest that the Achievement Scale of the K-ABC would be a better predictor of later school achievement than the Mental Processing Composite, as the average correlation between the achievement tests and the K-ABC Achievement Scale was .77 and for the Mental Processing Composite was .52.

Even though there is not unanimous support for the validity of the K-ABC, it is generally supported. In fact, Kamphaus and Reynolds (1987) judge the K-ABC technical development to be superior to that of all other popular tests of intelligence.

Kamphaus and Reynolds's K-ABC Categorization

Although the K-ABC has received some support for its ability/achievement dichotomy, Kamphaus and Reynolds (1987) have interpreted the K-ABC from a verbal/performance perspective. Kamphaus and Reynolds (1987) have combined the K-ABC subtests into different scales in an attempt to more

accurately describe the intelligence of children. Their alternative categorization of subtests is presented in Table 3.

Initially, studies were performed examining the joint factor analysis of the Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechsler,1974) and the K-ABC (Kaufman & McLean, 1986; Kaufman & McLean, 1987; Keith, Hood, Eberhart, & Pottebaum, 1985; Naglieri, & Jensen, 1987). In Kaufman and McLean's (1987) study employing normal children, the findings provided evidence for a joint three factor solution in comparison of these two tests. Each of the factors corresponded to an established factor from each test. For example, Factor I consisted of the K-ABC Achievement Scale and the WISC-R Verbal Comprehension factor, Factor II represented the K-ABC Simultaneous Scale and the WISC-R Performance Scale, and the K-ABC Sequential Scale and the WISC-R Freedom from Distractibility factor constituted the third factor established in this study. Naglieri and Jensen (1987), cited in Kamphaus and Reynolds (1987), found almost identical results in their joint factor analysis of these two tests; however, these researchers interpreted the factors as representing Verbal Ability, Spatial Ability, and Memory Span, respectively. Kamphaus and Reynolds (1987) suggest that different interpretations of the K-ABC can aid in the understanding of specific children's performance in populations being studied.

TABLE 3

Kamphaus & Reynolds's (1987) Categorization of K-ABC Subtests

	AGE			
Scale	2.5	3	4	5
VERBAL INTELLI-GENCE COMPOSITE				
EXPRESSIVE VOCABULARY	-	-	X	-
FACES & PLACES	-	-	X	X
ARITHMETIC	-	-	X	X
RIDDLES	-	-	X	X
READING COMPOSITE				
READING/DECODING	-	-	-	-
READING/UNDERSTANDING	-	-	-	-
GLOBAL INTELL-GENCE COMPOSITE				
HAND MOVEMENTS	X	X	X	X
NUMBER RECALL	X	X	X	X
MAGIC WINDOW	X	X	X	-
WORD ORDER	-	-	X	X
FACE RECOGNITION	X	X	X	-
GESTALT CLOSURE	X	X	X	X
TRIANGLES	-	-	X	X
MATRIX ANALOGIES	-	-	-	X
SPATIAL MEMORY	-	-	-	X
EXPRESSIVE VOCABULARY	X	X	X	-
FACES & PLACES	X	X	X	X
ARITHMETIC	-	X	X	X
RIDDLES	-	X	X	X

Note. - indicates subtests not administered at age level.

Note. Table information obtained from Kamphaus & Reynolds, 1987, p. 78.

In another, study cited in Kaufman and McLean (1986), Keith et al. (1985) found that four factors emerged, instead of three, when examining the joint factor analysis of the K-ABC and the WISC-R for learning disabled children. These factors were very similar to those reported by Kaufman and McLean (1987) except that Factor I from the latter study broke down to include an Achievement/Verbal Comprehension factor and a factor consisting of the two K-ABC reading subtests. Kaufman and McLean (1986) found similar results in a similar learning disabled sample. Kamphaus and Reynolds (1987) have supported the use of this four factor solution, especially when interpreting the performance of learning disabled and minority children.

From these studies, Kamphaus and Reynolds (1987) have developed three additional scales to aid in the interpretation of K-ABC results. The Verbal Intelligence Scale consists of all the K-ABC Achievement subtests except the two reading subtests. The rationale constituting the establishment of this scale is that the two reading subtests are school oriented and do not provide a true measure of verbal intelligence. Also, as it is believed that for preschool children the Achievement Scale measures general intelligence rather than achievement (Kamphaus and Reynolds, 1987), and as preschool children are not administered the reading subtests, it makes sense that these subtests would be separated. Kamphaus and Reynolds (1987) labelled the two

reading subtests the Reading Composite, which is to be calculated for children between the ages of 7 and 12.5 years. The final scale developed by Kamphaus and Reynolds (1987) is the Global Intelligence Composite which consists of the subtests included in the Mental Processing Composite and the Verbal Intelligence Scale (all the K-ABC subtests except the two reading subtests). Kamphaus & Reynolds (1987) suggest that the Global Intelligence Composite provides a measure which is much more g saturated than the Mental Processing Composite. This interpretation of the K-ABC provided by Kamphaus and Reynolds (1987) may prove useful in understanding the performance of special populations on the K-ABC.

Assets and Limitations

Research on the K-ABC has revealed several limitations of this test which include: its unfulfilled promise of new improvements to the intellectual assessment of children (Goetz & Hall, 1984; Kamphaus & Reynolds, 1987); inconclusive evidence for the simultaneous/sequential and the ability/achievement dichotomies (Sternberg, 1984); its limited floor and ceiling (Allard & Pfohl, 1988; Bloom Allard, Zelko, Brill, & Pfohl, 1988; Bracken, 1985; Kamphaus & Reynolds, 1987); and its inaccurate white/nonwhite

differences (Bracken, 1985; Jensen, 1984; Krohn et al., 1988). As well, the K-ABC has been criticized on the basis that its exclusion of language measures may lead to failure to identify children with impaired language skills (Allard & Pfohl, 1988; Kamphaus & Reynolds, 1987). The skills measured by the Sequential Processing Scale are limited because the K-ABC requires only minimal language which is a sequential processing task (Bracken, 1985; McCallum et al., 1984).

Despite its limitations, the K-ABC has several advantages over the more traditional intelligence tests. First, the K-ABC is far more closely tied to its theoretical basis than are other intelligence tests, and it is the first major battery to be based upon a theory that attempts to specify styles of information processing (Das, 1984; Sternberg, 1984). Also, its standardization procedures were excellent, partially due to the fact that minority groups and exceptional children were included (Kamphaus & Reynolds, 1987), and it is more accurate than most of the traditional intelligence tests in describing a child's functioning in relation to cohorts' performance as it is based on recent (1980) census data (Kamphaus & Reynolds, 1987). The conorming of the K-ABC scales and the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984) allows these scales to produce comparable information on the

ability, achievement, and adaptive behavior of children (Kamphaus & Reynolds, 1987; Telzrow, 1984).

The K-ABC has an incomparable amount of reliability and validity data, allowing for the strict analysis of its psychometric properties (Anastasi, 1984; Bracken, 1987; Kamphaus & Reynolds, 1987). It also provides a variety of novel tasks, as well as teaching items to ensure that the child understands the nature of the tasks (Kamphaus & Reynolds, 1987; Sternberg, 1984). In addition, the K-ABC Nonverbal Scale makes the K-ABC ideal for estimating the cognitive skills of hearing-impaired, language-impaired, and minority children between the ages of 4 and 12 years (Kamphaus & Reynolds, 1987; Kaufman & McLean, 1987; Krohn et al., 1988; McCallum et al., 1984; Valencia, 1984). The K-ABC is good, if not better than other intelligence tests, at predicting school achievement (Kamphaus & Reynolds, 1987), which has been an important function of intelligence tests. Also, the K-ABC is easy to administer (Telzrow, 1984); and it is enjoyable for children as it includes test materials that are interesting to them (Das, 1984; Telzrow, 1984) and many of its tasks can be presented in a gamelike manner.

Finally, the K-ABC has potential value for assessing special populations in order to determine their intellectual ability in a manner that is relatively unbiased by language skills. Obtaining such information can have a tremendous effect on the type and amount of remediation that the child

will receive. For example, a language-impaired child who is assessed by a more traditional language-based intelligence test may be identified as mentally retarded, but if assessed by the K-ABC, the child may be acknowledged as possessing adequate intellectual abilities. These two assessments would result in different academic placement/remediation plans for the child. It is especially important to gain accurate and unbiased information about preschool children as it has been shown that the implementation of early intervention programs can reduce difficulties experienced later in life (Simner, 1983; Huntley et al., 1988; Lyon et al., 1988).

The K-ABC and Preschool Children

Even with the determination of remediation as one of its aims and the importance of preschool assessment already stated, there is a paucity of empirical research describing the K-ABC's use with special populations of preschool children. Most of the research performed on the K-ABC has studied its reliability, validity, and/or factor structure. For example, of the 43 validity studies described in the K-ABC Interpretive Manual (Kaufman & Kaufman, 1983b) only seven involved preschool children, and only one of these

seven involved exceptional ("at-risk") preschool children (Lyon et al., 1988).

Although some research has been completed describing the actual pattern of performance of different groups of school-aged children on the K-ABC (Barry, Klanderman, & Stipe, 1983; Bolen, Childers, Durham, & Benton, 1983; Mealor, Livesay, & Finn, 1983 all cited in Telzrow, 1984; Naglieri, 1985a, 1985b; Naglieri & Haddad, 1984; Obrzut et al., 1987; Obrzut & Obrzut, 1983 cited in Telzrow, 1984; Valencia, 1985), such research with preschool children is rare. There has been some research conducted involving the K-ABC and different groups of preschool children, such as minority children (Krohn et al., 1988; Valencia, 1984; Whitworth & Chrisman, 1987), at-risk children (Allard & Pfohl, 1988; Lyon & Smith, 1986; Lyon et al., 1988; Zucker & Copeland, 1988), handicapped children (Lyon, Smith, & Klass, 1986 cited in Allard & Pfohl, 1988), learning disabled children (Lyon & Smith, 1987), and language-impaired children (Kennedy & Hiltonsmith, 1988; Ricciardi, 1987). These studies have indicated that the K-ABC is a valid measure of intellectual functioning for these exceptional groups, possibly more so than traditional measures (Ricciardi, 1987; Whitworth & Chrisman, 1987; Valencia, 1984; Zucker & Copeland, 1988). As well, this research has indicated that exceptional groups perform more poorly on the

K-ABC than do nonexceptional groups (Lyon et al., 1986; Lyon et al., 1988; Ricciardi, 1987; Zucker & Copeland, 1988).

However, most of this research was performed in an attempt to verify the validity of the K-ABC rather than to describe the pattern of performance on the K-ABC obtained by these different groups of preschool children. For example, Kennedy and Hiltonsmith (1988) studied 30 preschool children with an expressive language impairment in order to examine the concurrent validity of the K-ABC in relation to two nonverbal measures of cognitive skills: the Pictorial Test of Intelligence (PTI; French, 1964) and the Hiskey-Nebraska Test of Learning Aptitude (HNTLA; Hiskey, 1966). These researchers concluded that these three tests were measuring, to some degree, the same construct.

Kamphaus and Reynolds (1987), Kaufman and Kaufman (1983b), and Telzrow (1984) have proposed that some exceptional groups of preschool children will show different patterns of performance on the K-ABC. Telzrow (1984) suggested that mentally retarded preschool children will perform poorly on all scales of the K-ABC, and that language-learning-disabled preschool children will score highest on the Nonverbal Scale, and higher on the Simultaneous Processing Scale than on the Sequential Processing or Achievement Scales. Mentally retarded preschool children would be expected to perform poorly on all scales of the K-ABC because of general developmental

deficits. Language-learning-disabled preschool children would be expected to show the specified pattern of performance because their nonverbal abilities exceed their verbal abilities, which are required for some of the simultaneous and sequential tasks, as well as achievement tasks. Telzrow (1984) proposed that the examination of K-ABC profiles of exceptional children may prevent mis-diagnosis of mental retardation.

In an attempt to test Telzrow's (1984) prediction regarding the performance of language-learning-disabled preschool children, Ricciardi (1987) studied four groups of preschool children: language-impaired children, children with behavior problems, children with both language impairment and behavior problems, and "normal" control children. Ricciardi (1987) failed to find support for Telzrow's (1984) prediction. He did not find a distinctive pattern of performance for the language-impaired group. In fact, the pattern of performance that had been predicted for the language-impaired children was obtained by the group with behavior problems.

Ricciardi (1987) proposed that the reason the language-impaired children and the children with behavior problems obtained their respective performance on the K-ABC could have been due to: 1). the language-impaired children being unable to utilize the sequential and simultaneous processing strategies properly, being delayed in the emergence of these

processes, or being developmentally delayed in general, and/or 2). the performance of the group with behavior problems being affected by distractibility and attentional difficulties. Another explanation Ricciardi (1987) suggested was that the language-impaired children were heterogeneous with regard to type of language impairment and that this heterogeneity caused the failure to obtain a specific pattern of performance for this group.

Ricciardi's (1987) language-impaired samples included children who were experiencing expressive difficulties or both receptiv ..d expressive difficulties. Examining the performance of a more homogeneous group of language impaired children may produce results similar to those suggested by Telzrow (1984).

Another criticism of Ricciardi's (1987) study is that it included children ranging in age from three-years, four-months to six-years, one-month. Utilization of such a broad range of preschool children when employing the K-ABC is a questionable procedure because children at different age levels receive different K-ABC subtests. The comparison of children receiving different subtests may have confounded the results obtained from his study. In fact, tests like the K-ABC which employ a multi-ability approach to assessment have been criticized for not providing a comparable profile of subtests for children at different age levels (Vernon, 1987).

In addition to not considering various age groupings for his subjects, Ricciardi (1987) did not eliminate the diagnosis of general developmental delay (mental retardation) from those preschool children with language impairments and/or behavioral problems. As described by Telzrow (1984), mentally retarded children would be expected to perform differently on the K-ABC than would children found to be language-impaired. The lack of distinction between these two groups in Ricciardi's (1987) study may have affected the results. The results of the McCarthy Scales administered in counterbalanced order to a subset of the subjects argues against this possibility; however, it can not be ruled out.

Rationale for the Present Study

To briefly reiterate, several points have become apparent thus far. The literature has shown that early intervention programs can prevent later difficulties for preschool children. Also, it has been shown that it is common for preschool children to have language impairments and that the K-ABC can potentially provide an unbiased method of assessing language-impaired preschool children for early intervention programs. Yet, little research has examined the performance of preschool children on the K-ABC.

Telzrow (1984) has proposed distinct patterns of performance for several groups of preschool children. Ricciardi (1987) empirically tested Telzrow's (1984) prediction for the performance of language-impaired preschool children. Ricciardi's (1987) results did not support Telzrow's (1984) prediction. However, Ricciardi's (1987) study had several methodological flaws. The present study will, like Ricciardi's (1987) study, examine the performance of language-impaired preschool children on the K-ABC; however, it will attempt to improve on the procedures employed by Ricciardi (1987).

The present study will again attempt to validate Telzrow's (1984) hypothesis that language impaired-preschool children will show a specific pattern of performance on the K-ABC. This study will examine a homogeneous group of clinically language-impaired preschool children to determine if this group is characterized by the pattern of performance on the K-ABC suggested by Telzrow (1984). However, as language impairments are rarely found in isolation, the experimental group will include not only clinically diagnosed language-impaired preschool children but also preschool children who have behavior problems in addition to a language impairment. A clinical control group of preschool children will be used in an attempt to isolate the effects of language impairment on K-ABC performance. The present study will examine the Kamphaus and Reynolds (1987)

interpretation of the K-ABC, in order to determine the relationship of the performance of clinically diagnosed language-impaired preschool children on the Nonverbal Scale in comparison to their performance on the Verbal Intelligence Composite.

As well, this study will examine different age groups of clinically diagnosed language-impaired and control preschool children in an attempt to detect whether or not the simultaneous and sequential processes are delayed in language impaired preschool children, as suggested by Ricciardi (1987). Children aged four and five years will be employed in the present research. The rationale for utilizing these age groups is that the K-ABC Achievement factor does not become apparent until four years of age (Kaufman & Kamphaus, 1984). Prior to this age no clear distinction between factors which represent the Mental Processing Composite and the Achievement Scale is apparent (Zucker & Copeland, 1988). As well, the four- and five-year-old distinction will be employed because the subtests loading on each factor of the K-ABC varies significantly at these two ages, indicating that these two groups will be administered different subtests from the K-ABC.

Also, this study will include a measure of adaptive behavior in order to ensure that the performance of the clinically language impaired group is not the result of a general developmental delay (mental retardation).

According to criticisms and procedures described above, three hypotheses will be investigated in this study.

Hypothesis I

The pattern of performance on the K-ABC predicted by Telzrow (1984) may become apparent if a more homogeneous group of language-impaired preschool children is examined. Specifically, it is expected that the clinically diagnosed language-impaired children will exhibit their best performance on the Nonverbal Scale and will perform better on the Simultaneous Processing Scale than on the Sequential Processing Scale or the Achievement Scale. In fact, older clinically diagnosed language-impaired preschool children will more clearly exhibit the pattern of performance on the K-ABC predicted by Telzrow (1984). This proposal eminates from previous research indicating that the sequential processes of preschool children develop prior to the simultaneous processes (Das, 1984; Das et al., 1979; Ricciardi, 1987). Thus, delays or deficits in sequential processing, in relation to simultaneous processing, will be more evident in older language-impaired preschool children than in younger language-impaired preschool children.

Hypothesis II

The clinically language impaired preschool children in this study will perform more poorly on the Mental Processing Composite than will the control groups. This assumption arises from the research of Lyon and Smith (1987), Lyon et al. (1988), and Zucker and Copeland (1988) who found that "at risk" preschool children performed more poorly than "normal" children on the Mental Processing Composite. Due to the fact that language impaired children are considered to be "at risk", similar results would be expected if such children were studied. As well, Ricciardi (1987) found that the language impaired preschool children in his study performed more poorly on the MPC than did the children in the comparison group.

Hypothesis III

The clinically diagnosed language-impaired preschool children will perform better on the Nonverbal Scale than on the Verbal Intelligence Composite of the K-ABC. This prediction is based on the fact that language-impaired preschool children experience more deficits in verbal than nonverbal skills (Huntley et al., 1988; Nelson, Kamhi, & Apel, 1987; Nippold, Erskine, & Freed, 1988; Valencia,1984.

CHAPTER II

METHOD

Subjects

The subjects for this archival study were selected from the clinical chart data of 168 consecutive admissions to the child outpatient program of Windsor Western Hospital's Regional Children's Centre (RCC) in Windsor between July, 1984 and April, 1989. These subjects were part of an outpatient service and treatment program provided by RCC for families of the Windsor and Essex County region. All of the children available for this study were assessed by a clinical psychologist employed at RCC. Each assessment was completed individually and involved a variety of assessment techniques.

Due to the retrospective design of this study, subject selection and exclusion criteria were limited to data consistently available across charts. Subjects classified as language-impaired (LI) met the following criteria: 1). a clinical diagnosis of both expressive and receptive language impairment as determined by a qualified speech pathologist, 2). English as the primary language, and 3). no evidence of mental retardation. The clinical diagnosis established by the speech pathologist was based on experienced clinical

judgment and scores obtained from various speech and language tests. Most of the language-impaired children received one of the three following speech and language tests: Test for Auditory Comprehension of Language - Revised (TACL-R; Carrow-Woolfolk, 1985), Expressive One-Word Picture Vocabulary Test (EOWPVT; Gardner, 1979), and the Sequenced Inventory for Communication Development - Revised (SICD-R; Hedrick, Prather, & Tobin, 1984). Reliability and validity data for these tests are provided in Appendix A. The selection criteria were utilized in order to ensure the homogeneity of the language-impaired group. Employing these criteria, a total of 24 subjects were selected to participate in the language-impaired group.

The clinical control subjects (CON) were selected using the following criteria: 1) no suggestion of any language impairment as determined by either a clinical psychologist or speech pathologist, 2). referral to RCC for some difficulty other than speech and language problems, 3). English as the primary language, and 4). no evidence of mental retardation. A total of 33 subjects, from the original 168, were included in the this control group.

Two subdomains (Personal and Play and Leisure) of the Vineland Adaptive Behavior Scales-Survey Edition were selected as the most viable measures available for exclusion of mentally retarded subjects. These two subdomains were

selected because they contain items through which children may demonstrate adaptive skills with minimal demands for language, such as caring for toileting needs without assistance and engaging in make believe activities. Thus, language-impaired children would not perform in a deficient manner on these scales because of their language impairments. Mentally retarded children, however, were likely to perform poorly on these subdomains as they lacked the abilities to perform these adaptive skills. The criteria employed for eliminating subjects were a performance on both subdomains in the Low range indicating that subjects were functioning at the second percentile on these scales. The application of these two subdomains in the selection of subjects resulted in the exclusion of 11 children: six from the language-impaired group and five from the control group.

The groups were matched as closely as possible on age, sex, SES, and presence of behavior problems. The LI and CON groups were each subdivided into two groups based on age: younger LI and CON groups (48 to 59 months of age) and older LI and CON groups (60 to 71 months of age). There were 14 subjects in each of the younger LI (11 males and 3 females) and CON (9 males and 5 females) groups, 10 subjects (6 males and 4 female) in the older LI group, and 19 subjects (12 males and 7 females) in the older CON group.

Information concerning parental occupation was used to determine the socio-economic status of the children in each group. The criteria employed were those established by Hollingshead (1957). These criteria are presented in Table 4. Also, the occurrence of behavior problems (externalizers versus internalizers) was determined for each group. This was done by employing information provided by a measure of personality functioning, the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), or a clinical diagnosis of externalizing (e.g., conduct disorder, hyperactivity, aggression, attention problems) and/or internalizing (e.g., anxiety, social withdrawal, shyness, depression) behavior problems. The criterion for being labelled as exhibiting behavior problems on the CBCL was having a T-score of at least 71 on the respective scale. Table 5 provides a distribution of scores for each group on these matched variables.

Procedures

After Drs. Voelker and Pakula obtained approval for the study from Windsor Western Hospital Research Committee, the author reviewed clinical charts and coded the following: information regarding sex and age of the subjects, the

TABLE 4

Criteria for Determining SES as Proposed by Hollingshead (1957)

CATEGORY	OCCUPATION
1	Executives, large proprietors, major professionals.
2	Managers, medium proprietors, lesser professionals.
3	Administrative personnel, small independent proprietors, minor professionals.
4	Clerical, sales, technicians, owners of little businesses.
5	Skilled manual employees.
6	Machine operators, semi-skilled employees.
7	Unskilled employees.

Note. Table information obtained from Mazer, 1976, p. 243.

TABLE 5

Distribution of Scores of Matched Variables for Each Group

		YLI	OLI	YCON	OCON
AGE (mos.) M		52.79 (3.41)*	65.10 (3.75)	54.21 (3.57)	65.16 (3.31)
SEX	M	11	6	9	12
	F	3	4	5	7
SES	FOC M	2.55 (1.07)	2.00 (0.50)	2.33 (1.18)	2.29 (1.21)
	MOC M	1.58 (0.87)	2.40 (1.80)	2.14 (1.31)	2.13 (1.38)
BEH PROB	INT	0	2	1	1
	EXT	3	1	10	7
	BOTH	1	2	2	4
	NEITHER	10	5	1	7

Note. YLI = Younger Language-impaired Group
OLI = Older Language-impaired Group
YCON = Younger Control Group
OCON = Older Control Group

Note. BEH PROB refers to Behavior Problems.
INT refers to Internalizing Behavior Problem.
EXT refers to Externalizing Behavior Problem.
BOTH refers to both Internalizing and Externalizing Behavior Problems.
NEITHER refers to neither Internalizing or Externalizing Behavior Problems.

Note. * values in parentheses indicate standard deviations.

reason for referral of the subjects to RCC, information regarding pregnancy and birth history, subjects' developmental milestones, medical history of the subjects, age at onset and the duration of the presenting problems of the subjects, number of siblings and birth order of the subjects, marital status of the subjects' parents, parental education and occupation, outside assistance provided to the subjects and their families, first and other languages spoken in the home, measures of intellectual and personality functioning of the subjects, measures of adaptive behavior of the subjects, information regarding the speech and language functioning of the subjects, clinical impressions and diagnosis of the subjects, and treatment history and recommendations for the subjects.

For standardized tests with available norms, reported raw scores were converted to standard scores. The K-ABC protocols for subjects meeting the criteria described in the previous section were selected for data analysis.

Design and Data Analyses

A 2 (Group) X 2 (Age) Univariate Analysis of Variance (ANOVA) was computed in order to determine if the four groups in the present study differed significantly in terms

of age. A Chi-Square was utilized to investigate the possibility that the sex of the subjects had a differential effect on the results of the study. The ability of the present research to match groups in terms of SES was investigated by employing a 2 (Group) X 2 (Age) Multivariate Analysis of Variance (MANOVA). This analysis provided information to determine if the groups differed significantly in the occupation of their fathers and mothers (SES) as these factors may have had an effect on the results. As well, a frequency count and Chi-square were computed to determine the number of children expressing behavior problems in each of the four groups and to determine if these numbers had a differential effect on the results.

The main concern of this study was to determine if the homogeneous group of clinically diagnosed language-impaired preschool children performed distinctively differently on the K-ABC than did the control subjects. Specifically, this research attempted to determine if the LI group exhibited Telzrow's predicted pattern of performance and if the age of the LI children had an effect on the pattern of performance that emerged. For this reason, a 2 (Group) X 2 (Age) X 3 (Scale) repeated measures univariate analysis of variance (ANOVA) repeating on the Scale variable was employed to investigate the effects of group and age in relation to the Sequential Processing, Simultaneous

Processing, and Achievement Scales of the K-ABC. The results of this analysis dictated the necessity for examining within group effects.

A 2 (Group) X 2 (Age) analysis of variance (ANOVA) was computed in order to determine if the language-impaired and control groups of different ages could be discriminated by their overall ability (K-ABC MPC Scale). A 2 (Group) X 2 (Age) X 2 (Scale) ANOVA with Scale as the repeated measure allowed for the detection of differences between the Verbal Intelligence Composite score and the Nonverbal Scale score for each of the four groups.

CHAPTER III

RESULTS

Matched Variables

The 2 (Group) X 2 (Age) ANOVA computed to reveal any significant differences in the mean ages of each group indicated that the four groups did differ significantly in their age ($F(3,53) = 3.11$, $p < 0.05$). Scheffe tests revealed that the differences occurred between the younger and older subjects in each group. The younger LI group did not differ significantly, in terms of age, from the younger CON group ($F(1,26) = 1.34$, $p > 0.05$). As well, the older LI group did not differ significantly from the older CON group on this variable ($F(1,27) = 0.03$, $p > 0.05$). There were no apparent significant differences between the groups in the number of males and females studied in each group (df = 1, $X^2 = 2.20$, $p > 0.05$). The examination of the effects of SES on the K-ABC performance of the four groups was completed by performing a 2 (Group) X 2 (Age) MANOVA with the fathers' occupation and the mothers' occupation as the dependent variables (see Appendix B for raw data). This investigation revealed that there were no significant main effects for GROUP ($F(3,39) = 0.03$, $p > 0.05$), AGE ($F(3,39) = 0.52$, $p > 0.05$), or the GROUP X AGE Interaction ($F(3,39) = 0.59$, $p >$

0.05) for these dependent variables. Thus, SES did not significantly effect the performance on the K-ABC of the four groups.

The frequency count of the number of children in each group with internalizing, externalizing, both internalizing and externalizing behavior problems, or neither internalizing or externalizing behavior problems (raw data provided in Appendix C) indicated that the CON groups had a greater number of children expressing behavior problems than did the LI groups (see Table 5). Chi-Squares utilized to test the significance of these differences revealed that there was not a significant difference in the number of children expressing internalizing ($df = 1$, $\underline{X}^2 = 0.17$, $\underline{p} > 0.05$), externalizing ($df = 1$, $\underline{X}^2 = 1.79$, $\underline{p} > 0.05$), or both internalizing and externalizing behavior problems ($df = 1$, $\underline{X}^2 = 3.43$, $\underline{p} > 0.05$) in the four groups of subjects. The analyses comparing subject groups on matched demographic variables indicated satisfactory comparability of subject groups in age, gender, socioeconomic status, and presenting problems.

Predicted Pattern of Performance

The major concern of the present study was to determine if Telzrow's predicted pattern for language-impaired

preschool children would emerge when a homogeneous group of clinically language-impaired preschool children was examined. Specifically, it was predicted that the LI groups would exhibit their best performance on the K-ABC Nonverbal Scale and would perform better on the Simultaneous Processing Scale than on the Sequential Processing and Achievement Scales. As well, it was suggested that the children in the older LI group would be more likely to exhibit this pattern of performance than would the children in the younger LI group. Appendix D provides the raw data utilized in this analysis.

The 2 (Group) X 2 (Age) X 3 (Scale) repeated measures ANOVA with Scale as the repeated measure employed to examine the pattern of performance on these scales revealed a main effect for GROUP ($F(1,48) = 50.60$, $p < 0.001$) and SCALE ($F(2,96) = 13.59$, $p < 0.001$) not for AGE ($F(1,48) = 0.58$, $p > 0.05$) or the Interactions (Group X Age $F(1,48) = 0.28$, $p > 0.05$, Group X Scale $F(2,96) = .24$, $p > 0.05$, Age X Scale $F(2,96) = .24$, $p > 0.05$, Age X Group X Scale $F(2,96) = .37$, $p > 0.05$). As indicated by Tukey's Studentized Range Test, the CON groups obtained significantly higher scores than did the LI groups on all the Global Scales of the K-ABC, as well as the Kamphaus-Reynolds's Verbal Intelligence Composite.

Telzrow's (1984) predicted pattern of performance for language-impaired preschool children was not evident in this group of clinically diagnosed language impaired preschool

children (see Figure 2). Table 6 provides the means and standard deviations for the K-ABC scales. Although Telzrow (1984) predicted that language-impaired children would exhibit their best performance on the Nonverbal Scale of the K-ABC, neither of the LI groups had their best performance on this scale. All groups in the present study had their best performance on the Simultaneous Processing Scale followed by the Nonverbal Scale in all groups, except the younger CON group. As Telzrow (1984) had predicted, the language-impaired groups did perform better on the Simultaneous Processing Scale than on the Sequential Processing Scale of the K-ABC, however, both the LI and CON groups performed significantly better on the Simultaneous Processing Scale than on the Sequential Processing ($F(1,21) = 12.73$, $p < 0.01$; $F(1,29) = 6.05$, $p < 0.05$, respectively) and Achievement Scales ($F(1,21) = 19.88$, $p < 0.01$; $F(1,29) = 8.27$, $p < 0.01$, respectively). As the AGE factor in the 2 X 2 X 3 ANOVA did not prove to be significant, an examination of the hypothesis that Telzrow's (1984) predicted pattern of performance on the K-ABC would be more evident in the older LI group was not warranted.

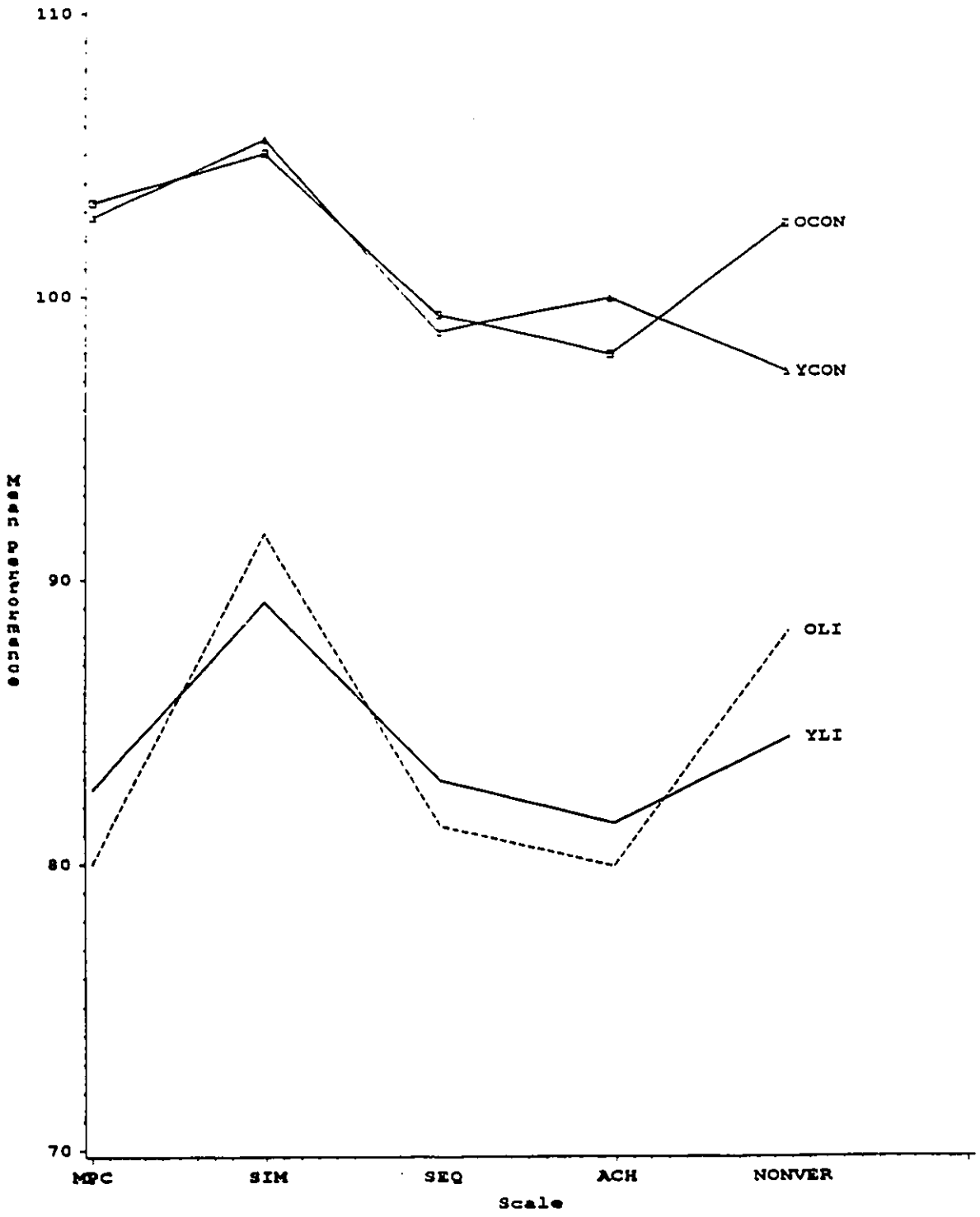


Figure 2. Mean Performance on K-ABC Global Scales by Group

TABLE 6

Means and Standard Deviations for the K-ABC Scales by Group

	GROUPS			
	YLI (N=14)	OLI (N=10)	YCON (N=14)	OCON (N=19)
SCALE	M	M	M	M
Simultaneous	89.2 (13.2)*	91.6 (12.4)	105.5 (13.7)	105.0 (14.9)
Sequential	82.9 (11.3)	81.3 (10.2)	98.7 (10.4)	99.3 (13.4)
Achievement	81.4 (8.5)	79.9 (11.7)	99.9 (9.3)	97.9 (10.3)
Nonverbal	84.4 (9.9)	88.1 (14.5)	97.2 (9.4)	102.4 (14.9)
Mental Processing Composite	82.6 (12.4)	80.0 (12.3)	102.8 (12.4)	103.3 (13.4)
Verbal Intelligence Composite	81.0 (10.2)	87.7 (14.9)	99.3 (8.9)	95.0 (11.7)

Note. YLI = Younger Language-impaired Group
OLI = Older Language-impaired Group
YCON = Younger Control Group
OCON = Older Control Group

Note. * values in parentheses are standard deviations.

Performance on the Mental Processing Composite by the Groups

The prediction that the clinically diagnosed language-impaired preschool children would perform more poorly than the control children on the Mental Processing Composite of the K-ABC was supported in this study. A 2 (Group) X 2 (Age) ANOVA with scores on the Mental Processing Composite serving as the dependent variable was performed as a means of examining this hypothesis. The results of this analysis revealed that there was a significant main effect for GROUP but not for AGE or the GROUP X AGE interaction (see Table 7). A Tukey's Studentized Range Test indicated that the mean score for the CON groups on the Mental Processing Composite (103.06) was significantly greater than the mean score obtained by the LI groups (81.54).

Performance of the LI Groups on the K-ABC Nonverbal Scale and the Kamphaus-Reynolds's Verbal Intelligence Composite

A 2 (Group) X 2 (Age) X 2 (Scale) ANOVA with scores on the K-ABC Nonverbal Scale and the Kamphaus-Reynolds's Verbal Intelligence Composite as the repeated variable was employed in an attempt to determine if the clinically diagnosed language-impaired preschool children would perform better on

TABLE 7

Summary of ANOVA -- Main Effects for AGE, GROUP, and the Interaction on the Mental Processing Composite

Source	df	SS	MS	F	
AGE	1	15.87	15.87	0.10	
GROUP	1	6376.16	6376.16	40.30	*
AGE X GROUP	1	32.95	32.95	0.21	
ERROR	53	8385.26	158.213		

Note. * $p < 0.0001$

the K-ABC Nonverbal Scale than on the Kamphaus-Reynolds's Verbal Intelligence Composite, as had been predicted. In this analysis, there was a main effect for GROUP but not AGE, SCALE or the Interactions (see Table 8). Results from Tukey's Studentized Range Tests revealed that the CON groups (KNV $\underline{M}$ = 100.97, KRV $\underline{M}$ = 96.88) performed significantly better on the Nonverbal Scale and the Verbal Intelligence Composite than did the LI groups (KNV $\underline{M}$ = 87.12, KRV $\underline{M}$ = 84.06). As the AGE and SCALE factors in this analysis did not prove to be significant the examination of individual groups on the two scales was not warranted.

TABLE 8

Summary of ANOVA -- Main Effects for GROUP, AGE, SCALE, and the Interactions for Two K-ABC Scales

Source	df	SS	MS	F
GROUP	1	3604.03	3604.03	19.24 *
AGE	1	144.71	144.71	0.77
SCALE	1	199.45	199.45	1.68
GROUP X AGE	1	41.92	41.92	0.22
GROUP X SCALE	1	3.00	3.00	0.03
AGE X SCALE	1	56.92	56.92	0.48
GROUP X AGE X SCALE	1	321.95	321.95	2.72
ERROR	45	7825.39	173.90	

Note. * $p < 0.001$

CHAPTER IV

DISCUSSION

The present study investigated the effects of language impairment and age on the performance of preschool children on the K-ABC scales. In this investigation, children clinically diagnosed as impaired in both expressive and receptive language were compared to children diagnosed as exhibiting difficulties other than expressive and receptive language impairments. These children were divided into two groups, younger and older, so that the effects of age could be examined. The performance of these children on the five K-ABC Global Scales and the Kamphaus-Reynolds's Verbal Intelligence Composite was examined in an attempt to determine if Telzrow's (1984) predicted pattern of performance emerged and to examine how the children with language impairments performed in relation to the children without expressive and receptive language impairments. The following discussion will provide some understanding of the significance of the above analyses. As well, suggestions will be made for future research with the K-ABC.

Telzrow's (1984) prediction was partially supported in the present research in that the language-impaired children did perform significantly better on the Simultaneous Processing Scale than the Sequential Processing and

Achievement Scales. This finding is consistent with the research conducted by Fourqurean (1987) who found that a group of Latino learning-disabled school-aged children performed significantly better on the Simultaneous Processing Scale than the Sequential Processing Scale. However, all the groups in the present study showed this pattern of performance on the K-ABC.

In contrast, the results from Ricciardi's (1987) study did not provide any support for the above results. The inconsistency in results may be attributable to the fact that the present study employed a more homogeneous group of language-impaired children or the fact that the present study employed relatively small age ranges; whereas, Ricciardi employed a very broad age range of subjects. At the preschool level, the number and types of tasks administered from the K-ABC changes and increases with age. Tasks utilized at younger ages are not appropriate for older children. Thus, the subjects in Ricciardi's study did not receive a common battery of tests on which comparisons were possible.

The pattern of performance obtained by the language-impaired groups in the present study is similar to that predicted by Telzrow (1984). Thus, it is possible that the pattern of performance on the K-ABC obtained by these subjects can be attributed to their language impairments. However, an alternative hypothesis does exist. Ricciardi

(1987) suggested that the reason his group of children exhibiting behavior problems had a similar performance as the one found for the language-impaired subjects in the present study was because children with behavior problems are often characterized by distractibility and difficulty attending. According to Ricciardi, these problems result in poor performance on the WISC-R Freedom from Distractibility factor which measures similar abilities as the K-ABC Sequential Processing factor. Thus, the poor performance on the Sequential Processing Scale of the K-ABC, in relation to the Simultaneous Processing Scale, was attributed to distractibility and difficulty attending.

In the present study, 38% of the language-impaired and 67% of the control subjects presented with behavior problems. In each group (language-impaired and control), 75% of the children performed better on the Simultaneous Processing Scale than on the Sequential Processing Scale. Thus it is possible, that the pattern of performance obtained by the language-impaired subjects and the control groups was affected by the presence of behavior problems. The performance of the language-impaired groups can probably be attributed to a combination of the above factors and their language impairments.

All of the children in the present study were expressing some developmental delay that required referral to a children's mental health clinic. These delays may have

affected the ability of the children in the present study to concentrate and focus attention. All the subtests of the K-ABC require concentration and attention for successful performance, which may provide an explanation why "normal" children perform better on the K-ABC than do exceptional children (Lyon & Smith, 1987; Lyon et al., 1988; Zucker & Copeland, 1988). The Sequential Processing Scale, more than the other K-ABC scales, appears to require short term recall and imitation (Bracken, 1985; Jensen, 1984; Sternberg, 1984, Willson et al., 1985). Children with difficulties concentrating and attending will perform poorly on tasks requiring these abilities. This proposal provides some explanation why both the language-impaired and control groups performed significantly better on the Simultaneous Processing Scale than the Sequential Processing Scale of the K-ABC. Naglieri and Jensen's (1987) interpretation of the Sequential Processing Scale as a measure of memory span may have been more appropriate for the present study than the traditional interpretation. Perhaps, Telzrow's (1984) predicted pattern of performance for language-impaired children would be more applicable to a group of children who have difficulties focusing attention and concentrating, as did all the children in the present study.

This study did not provide support for the hypothesis that Telzrow's (1984) predicted pattern of performance on the K-ABC would be more apparent in the older language-

impaired group than in the younger language-impaired group. This lack of significant results does not provide conclusive evidence that this hypothesis is unfounded. The analysis employed to examine this hypothesis would have benefited from a larger number of subjects as small sample sizes may have suppressed significant findings. As well, the age groups in the present study differed in age by only one year. The emergent pattern may not have been distinguishable with such a narrow age range. Thus, research involving a larger sample and a broader age range may provide different results.

As hypothesized the clinically diagnosed language-impaired preschool children performed more poorly on the Mental Processing Composite of the K-ABC than did the control children. This finding is consistent with previous research completed by Lyon and Smith (1987), Lyon et al., (1988), and Zucker and Copeland (1988) who found that exceptional children perform more poorly on the K-ABC than do nonexceptional children. More specifically, Ricciardi (1987) found that non-language-impaired preschool children performed better on the K-ABC Mental Processing Scale than did language-impaired preschool children, which the present study has reaffirmed.

Although the K-ABC was designed to minimize the demand of language skills, the Mental Processing Composite contains some subtests which require expressive and/or receptive

language skills. The selection criteria for the inclusion in the language-impaired groups required a diagnosis of both expressive and receptive language impairment which suggests that subjects in the language-impaired groups would perform poorly on the subtests requiring such abilities. However, the inclusion criteria for the control groups required that the children not exhibit expressive or receptive language impairments which would allow such subjects a chance for better performance on the subtests requiring language skills. It is not surprising then that the control groups performed significantly better than the language-impaired groups on the Mental Processing Composite.

Like the Mental Processing Composite, the control groups performed significantly better on the Nonverbal Scale of the K-ABC and the Kamphaus-Reynolds's Verbal Intelligence Composite than did the clinically diagnosed language-impaired groups. It is evident that the language-impaired groups, who lack expressive and receptive verbal skills, will perform more poorly than the control groups, who have at least adequate verbal skills, on a scale that measures verbal abilities.

It is not clear why the control groups performed significantly better on the Nonverbal Scale than did the language-impaired groups. Perhaps, this finding can be attributable to the fact that although the aim of the Nonverbal Scale is to minimize language demands placed on

the examinee by being administered in pantomime, it need not be. Thus, if in the present study the Nonverbal Scale was not administered in pantomime, the language-impaired subjects would have been at a disadvantage. Without the implementation of this scale in pantomime, examinees would be required to exhibit, at least receptivre language skills. The subjects in the present study were expressing both expressive and receptive language impairments. As a result, the manner of administration of the Nonverbal Scale in the present study may have affected the performance on the K-ABC of the language-impaired subjects. As this was an archival study, investigation into the manner of administration of this subtest was impractical, if not impossible.

More importantly though, it should be noted that only one of the 24 language-impaired subjects obtained a Nonverbal Scale standard score that was in the mentally retarded range. A more traditional intellectual measure with extensive language demands may have resulted in more of the language-impaired subjects performing in the mentally retarded range. For example, Ricciardi's (1987) study revealed that for the 11 language-impaired subjects who were administered both the K-ABC and the MSCA, only two subjects obtained a K-ABC Nonverbal Scale standard score below 70; whereas, seven subjects obtained a MSCA General Cognitive Index standard score that was below 70.

The present study predicted that the language-impaired groups would perform better on the K-ABC Nonverbal Scale than on the Kamphaus-Reynolds's Verbal Intelligence Composite as it is believed that their nonverbal skills are better developed than their verbal skills (Huntley et al., 1988; Nelson et al., 1987; Nippold et al., 1988; Valencia, 1984). However, for both the language-impaired and control groups, there was not a significant difference between the mean scores on the K-ABC Nonverbal Scale and the Kamphaus-Reynolds Verbal Intelligence Composite, even though average scores on the K-ABC Nonverbal Scale were greater for both the language-impaired and control groups.

At preschool age, the Verbal Intelligence Composite contains subtests from the original K-ABC Achievement Scale. As has been previously stated, at the preschool level scores on the Achievement Scale are related to general intelligence. Thus, perhaps for the subjects in the present study, the Verbal Intelligence Composite represented a measure of general intelligence rather than verbal ability. As a measure of general intelligence, it would not be expected that the language-impaired groups would perform more poorly on the Verbal Intelligence Composite than the Nonverbal Scale.

Methodological Limitations

The present study attempted to determine the effects of language impairment and age on the performance on the original K-ABC scales and the Kamphaus-Reynolds's Verbal Intelligence Composite for preschool children. The language impairment variable was examined by employing children with expressive and receptive language impairments and control children without such a diagnosis. The language-impaired children were diagnosed by a qualified speech pathologist who employed clinical judgment and assessment results in order to obtain a diagnosis. Although the diagnoses involved careful and professional consideration, they were somewhat subjective as they were based on the opinions of one individual.

As well, by utilizing a group of children diagnosed as exhibiting both expressive and receptive language impairments, the present study was limited in its ability to generalize its results to children with differing severity and other types of language impairments. The generalizability of the present results was also limited because the children diagnosed as language-impaired were presently receiving or had previously received treatment for their impairment. Children who have received treatment for their impairment may perform differently than children who have not received such treatment (Durrant, 1988).

Another limitation of the present study was its ability to eliminate children with general developmental delay from the groups. Ricciardi (1987) suggested that the VABS or a neuropsychological battery be used to distinguish children with general developmental delay from those expressing language impairments. The present study employed two subdomains of the VABS in an attempt to establish this distinction. It is possible that this limited measure was insensitive to this distinction. For example, Hope (1991) found that the subjects in her study presenting as borderline mentally retarded exhibited their best VABS performance on the Socialization and Daily Living Skills domains, the domains from which the two subdomains employed in the present study were selected. In the present research, it was the expectation that mentally retarded children would perform poorly on these subdomains due to their limited adaptive skills and as a result be excluded form the study. A neuropsychological battery would have provided more information so that a more accurate distinction could have been established.

This study would have benefited from the use of a second intellectual measure. The employment of two "intelligence" measures would have allowed for comparisons of the pattern of performance of the subjects on the two instruments. Such an addition to the present research would

have allowed for discussion of the K-ABC's success/failure to more accurately assess exceptional children.

Finally, the control children employed in the present research consisted of a heterogeneous group of referred preschool children not exhibiting expressive and receptive language impairments. The heterogeneity of this group of children suggests that the present findings may not be generalizable to a more homogeneous group. As well, this study would have benefited from the inclusion of a sample of "normal" control children to which both the language-impaired and clinical control subjects could have been compared.

Implications and Future Research

The present study provides evidence for the utility of the K-ABC for assessing language-impaired preschool children. As indicated in the Introduction of this paper, the K-ABC has been shown to be effective in assessing "normal" and exceptional preschool children. Not only can the K-ABC serve to provide more accurate information concerning the abilities of exceptional children, but also it can serve as an aid in diagnosis. Although Bracken (1985), McCallum et al. (1985), and Naglieri (1985a, 1985b)

have suggested that the K-ABC's limited language demands may hinder the identification of exceptional children, the present research, along with Telzrow (1984), has suggested that exceptional children have a specific pattern of performance on the K-ABC. Future research should examine this pattern of performance in an attempt to determine if it is more apparent in some exceptional groups of children (e.g., language-impaired children) than in others. As well, it should be determined at what age this pattern emerges and its consistency throughout the K-ABC age range. By conducting such experiments, the effectiveness of the K-ABC for exceptional children will become more apparent.

The present research did not find support for the hypothesis that the older language-impaired group would exhibit Telzrow's (1984) predicted pattern of performance more clearly than the younger language-impaired group. As previous research (Fourquerean, 1987; Ricciardi, 1987) has indicated that older children are more likely than younger children to exhibit Telzrow's (1984) pattern, future research should employ larger samples and broader age ranges in order to study this hypothesis.

The utility of the K-ABC Nonverbal Scale for language-impaired and minority children is apparent from its minimization of language demands. Yet, it would be beneficial to further investigate the factors that affect the pattern of performance on this scale in relation to

other K-ABC scales for such children. Such research may provide support for the above proposal why the language-impaired subjects in the present study did not exhibit relatively stronger performance on this scale.

The Kamphaus-Reynolds's Verbal Intelligence Composite, as a measure of general intelligence, did not differ significantly from the Nonverbal Scale for any of the groups. Preschool aged children, in general, have limited language abilities and as a result the age of the subjects in the present research may have created a situation where it was difficult to distinguish general intelligence from verbal intelligence. Further investigations employing the Verbal Intelligence Composite and the other Kamphaus-Reynolds's scales with older subjects are required for the validation of this recategorization.

Finally, as there has been dispute concerning the composition and the abilities assessed by the Simultaneous Processing and Sequential Processing Scales of the K-ABC, future research should examine the nature of and the abilities utilized by these scales. For example, Sternberg (1984) criticized the K-ABC because tasks were assigned to scales a priori. He suggested that tasks could be performed utilizing either of the mental processes and should only be assigned to a scale once the particular strategy employed had been determined. In support of Sternberg (1984), Goldstein et. al (1986) have found that the subtests

proposed to compose each scale sometimes fail to load on the designated factor. As well, previous discussion has suggested that further examination of the abilities actually assessed by the scales is necessary.

APPENDIX A

Speech and Language Tests Administered most to Language-Impaired Children

Reliability and Validity of the TACL-R

The Test for Auditory Comprehension of Language - Revised (TACL-R) was developed by Carrow-Woolfolk in 1985. It has been shown to have adequate reliability and validity. Test-retest and split-half reliability coefficients are in the .90 range, with the coefficients being .95 and .96 respectively. The test manual provides evidence of the TACL-R's content and construct validity. The author indicated that the TACL-R has been found to assess appropriate language skills and that there is a developmental progression in raw scores obtained on this test. As well, its construct validity is also supported by the fact that it can discriminate among various types of language-impaired children. In determining the criterion-related validity of the TACL-R, the author correlated tha TACL-R with the Test for Auditory Comprehension of Language (TACL; Carrow, 1973), the Sequenced Inventory for Communication Development (SICD; Hedrick, Prather, and Tobin, 1975), and the Peabody Picture Vocabulary Test (PPVT; Dunn, 1965). The correlation coefficients between the TACL-R and these other measures of language abilities were .86, .73 and .68 respectively. These results indicate that the the TACL-R has moderate to high criterion-related validity.

Note: All information obtained from test manual.

Reliability and Validity of the EOWPVT

The Expressive One-Word Picture Vocabulary Test (EOWPVT) was developed by Gardner in 1979. The test manual provides information on the split-half reliability of this test which is reported to be .92. The criterion-related validity as measured by comparing the EOWPVT to the PPVT and the Columbia Mental Maturity Scale (CMMS; Burgemeister, 1972). The validity coefficients with the PPVT and EOWPVT ranged from .67 to .78 with a median value of .70. For the CMMS the correlations had a median of .39 with a range of .29 to .59. Correlation between the EOWPVT and the WPPSI Verbal Scale was repored to be .81. These values indicate that the EOWPVT is an adequate measure of language abilities.

Note: All information obtained from test manual.

Reliability and Validity of the SICD-R

In 1984, Hedrick, Prather, and Tobin published the revised version of the Sequenced Inventory for Communication Development (SICD-R). Its reliability coefficents are reported to be in the .90s. The manual reports the inter-examiner and test-retest reliability (one week interval between testings) of the SICD-R to range from .88 to 1.00 with averages being .96 and .93 respectively. The fact that the items for the SICD-R were obtained from many well established language measures is provided as support for the content validity of the SICD-R. Correlations between the scales of the SICD-R and the PPVT were provided by the authors as support for the criterion-related validity of the test. The correlation coefficients between the PPVT and the Receptive Communication scale and the Expressive Communication scale of the SICD-R were .80 and .75 respectively. These findings indicate that the criterion related validity of the SICD-R is more than adequate.

Note: All information was obtained from test manual.

APPENDIX B

Raw Data for SES of the Subjects According to the Occupations of Their Parents

TABLE B-1

SES of the Language-Impaired Groups

Younger LI Group

No.	FOC	MOC
1.	--	1
2.	2	1
3.	2	--
4.	1	1
5.	2	2
6.	--	--
7.	2	4
8.	3	1
9.	3	2
10.	5	1
11.	2	1
12.	2	2
13.	4	1
14.	--	2

Older LI Group

No.	FOC	MOC
15.	2	6
16.	2	1
17.	1	2
18.	2	2
19.	3	1
20.	--	1
21.	2	1
22.	2	1
23.	--	4
24.	2	5

Note. FOC represents father's occupation.
MOC represents mother's occupation.

Note. -- indicates information not provided.

TABLE B-2

SES of the Control Groups

Younger CON Group

No.	FOC	MOC
25.	1	1
26.	2	1
27.	4	4
28.	--	1
29.	2	4
30.	4	1
31.	2	1
32.	--	2
33.	3	3
34.	1	2
35.	4	4
36.	3	4
37.	1	1
38.	1	1

Older CON Group

No.	FOC	MOC
39.	2	4
40.	2	1
41.	2	1
42.	--	2
43.	6	1
44.	2	2
45.	2	1
46.	2	1
47.	1	4
48.	--	4
49.	--	--
50.	2	2
51.	2	2
52.	--	--
53.	--	1
54.	2	--
55.	4	1
56.	2	4
57	1	4

Note. -- indicates information not provided.

APPENDIX C

Raw CBCL Scores and Clinical Diagnosis for the Control Groups

TABLE C-1

CBCL Scores and Clinical Diagnosis for the LI Groups

Younger LI Group

No.	CBCL INT.	CBCL EXT.	DIAGNOSIS
1.	--	--	cond.,attention *
2.	--	--	poor parenting
3.	63	46	poor parenting
4.	71	72	--
5.	--	--	--
6.	67	68	--
7.	69	67	cond., cog. skills
8.	58	73	--
9.	57	63	--
10.	52	52	--
11.	53	41	--
12.	--	--	poor parenting
13	61	60	brain damage
14.	61	56	poor parenting

Older LI Group

No.	CBCL INT.	CBCL EXT.	DIAGNOSIS
15.	64	58	brain damage
16.	73	62	hyper.
17.	75	60	brain damage
18.	67	67	brain damage
19.	63	55	poor parenting
20.	69	60	hyper.
21.	75	70	cond.
22.	59	57	--
23.	72	55	--
24.	67	57	--

Note. -- indicates scale not administered or no diagnosis provided.

Note. cond. = conduct disorder.

Note. * all subjects also received a diagnosis of expressive and receptive language impairments.

TABLE C-2

CBCL Scores and Clinical Diagnosis for the CON Groups

Younger CON Group

No.	CBCL INT.	CBCL EXT.	DIAGNOSIS
25.	--	--	hyper.
26.	--	--	hyper.,cond.
27.	--	--	brain damage
28.	62	72	L.D.,hyper,cond.
29.	69	--	cond.
30.	59	72	hyper.,cond.
31.	59	72	hyper.,cond.
32.	81	85	L.D.,hyper.,cond.
33.	46	47	cond.
34.	60	57	cond.
35.	64	60	anxious
36.	--	--	hyper.,cond.
37.	71	78	anxious
38.	--	--	hyper.

Older CON Group

No.	CBCL INT.	CBCL EXT.	DIAGNOSIS
39.	76	83	cond.
40.	80	84	cond.,anxious
41.	61	45	cond.,brain damage
42.	67	67	poor parenting
43.	53	47	anxious
44.	--	--	hyper.,cond.
45.	--	--	hyper.
46.	70	82	cond.
47.	59	65	L.D.
48.	66	67	cond.,social skills
49.	73	78	hyper.
50.	--	--	cond.
51.	--	--	poor parenting
52.	71	73	poor parenting
53.	45	52	poor parenting
54.	61	68	poor parenting
55.	--	--	hyper.
56.	51	51	cognitive skills
57.	51	50	poor parenting

Note. -- indicates scale not administered.
Note. hyper. = hyperactivity
cond. = conduct disorder
L.D. = learning disability

APPENDIX D

Raw Data for Subjects' Performance on the K-ABC

TABLE D-1

Performance of the Language-Impaired Groups on the K-ABC

Younger LI Group (N = 14)

No.	SIM	SEQ	ACH	MPC	NV	KRV
1.	72	78	70	72	--	--
2.	77	66	--	69	84	--
3.	88	93	82	89	82	80
4.	89	91	80	89	82	78
5.	88	72	77	78	80	--
6.	84	78	78	79	--	76
7.	93	89	76	90	100	73
8.	83	74	73	76	86	70
9.	118	89	101	105	102	101
10.	94	80	93	86	78	93
11.	96	89	--	92	100	96
12.	93	80	74	85	88	71
13.	72	78	78	72	68	75
14.	74	83	80	75	78	78

Older LI Group (N = 10)

No.	SIM	SEQ	ACH	MPC	NV	KRV
15.	81	71	73	75	69	100
16.	71	69	66	66	71	65
17.	68	69	54	65	--	58
18.	75	60	70	66	--	71
19.	100	87	85	93	98	90
20.	77	69	78	70	--	79
21.	93	83	100	87	89	101
22.	101	83	84	92	85	82
23.	94	81	73	87	94	102
24.	101	95	78	99	111	74

Note. -- indicates data not available.

Note. SIM represents Simultaneous Porcessing Scale
SEQ represents Sequential Processing Scale
ACH represents Achievement Scale
MPC represents Mental Processing Composite
NV represents Nonverbal Scale
KRV represents Verbal Intelligece Composite

TABLE D-2

Performance of the Control Groups on the K-ABC

Younger CON Group (N = 14)

No.	SIM	SEQ	ACH	MPC	NV	KRV
25.	94	104	105	99	100	105
26.	71	87	88	75	74	88
27.	101	106	110	104	106	108
28.	112	110	97	113	95	97
29.	108	91	103	100	95	103
30.	108	110	100	110	102	100
31.	98	89	88	93	104	87
32.	112	78	91	95	102	91
33.	108	98	100	104	97	101
34.	103	98	92	100	85	92
35.	129	112	109	125	93	108
36.	110	102	113	107	104	111
37.	127	110	115	123	113	113
38.	96	87	87	91	91	86

Older CON Group (N = 19)

No.	SIM	SEQ	ACH	MPC	NV	KRV
39.	116	93	92	106	108	97
40.	112	106	105	110	98	106
41.	88	87	92	86	87	91
42.	118	110	111	116	121	110
43.	116	117	122	119	119	121
44.	100	80	88	89	89	91
45.	96	98	92	96	87	90
46.	88	104	85	94	91	86
47.	112	89	112	101	110	102
48.	139	108	--	129	138	68
49.	100	98	83	99	103	88
50.	129	102	101	119	125	100
51.	106	85		96	93	78
52.	118	102	98	112	103	99
53.	96	126	104	110	100	102
54.	84	89	98	91	94	98
55.	121	112	93	120	121	96
56.	86	76	90	79	83	87
57.	103	78		90	96	--

Note. -- indicates data not available.

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VITA AUCTORIS

Jo-Ann Hilda Birt was born on June 23, 1966 in Charlottetown, P.E.I.. She attended elementary and secondary school in Morell, P.E.I. and received her high school diploma in June, 1984. She received her Bachelor of Arts degree, major in psychology, from the University of Prince Edward Island in May, 1988. Jo-Ann is enroled as a Doctoral candidate in Clinical-Child psychology at the University of Windsor and is currently completing the requirements for a Master of Arts degree in Clinical-Child psychology.