1998

Concurrent Validity of Mental Ability Screening Tools : A Comparison of Normal Students' Performance on the Kaufman Brief Intelligence Test and the Shipley Institute of Living Scale-Revised

D. Melanie Peters
Portland State University

THESIS APPROVAL

The abstract and thesis of D. Melanie Peters for the Master of Science in Speech Communication: Speech and Hearing Sciences were presented May 6, 1998, and accepted by the thesis committee and the department.

COMMITTEE APPROVALS: [redacted]

Lisa Letcher-Glembo, Chair

[redacted]

Mary Gordon-Brannan

[redacted]

Mary K. Kinnick
Representative of the Office of Graduate Studies

DEPARTMENT APPROVAL: [redacted]

Peter C. Ehrenhaus, Acting Chair
Department of Speech Communication

ABSTRACT

An abstract of the thesis of D. Melanie Peters for the Master of Science in Speech Communication: Speech and Hearing Sciences presented May 6, 1998.

Title: Concurrent Validity of Mental Ability Screening Tools: A Comparison of Normal Students' Performance on the Kaufman Brief Intelligence Test and the Shipley Institute of Living Scale-Revised.

This study compared the Kaufman Brief Intelligence Test (K-BIT), a verbal and nonverbal mental ability screening tool, to the Shipley Institute Living Scale (SILS), a nonverbal screening tool of mental ability, as part of a larger, ongoing study which is examining the effects of orofacial clefts on early career maturity. In terms of general intellectual ability, the K-BIT and the SILS provide descriptive categories, percentile ranks, raw scores, standard error of measurement, standard scores, standardization and norms, subtest scores, and total scores. The K-BIT provides normative curve equivalents and stanines, which the SILS does not. The SILS provides abstract and conceptual quotients, WAIS and WAIS-R full-scale IQ estimates, and *t*-scores which the K-BIT does not.

Forty subject permission forms were distributed at two private schools, two public schools, and two youth groups. Seventeen adolescents (aged 14 to 17) agreed to participate in the study. Subjects completed two measures of mental ability. In addition, all subjects completed a biographical questionnaire.

The research question asked was "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?" Descriptive statistics were utilized to respond to the research question.

A comparison was completed to determine if the two tests yielded similar percentile ranks and descriptive categories when administered to the same individual. Comparison of subjects' vocabulary, abstract/matrices, and composite/total percentile ranks and corresponding descriptive categories on the two measures determined that: (a) scores on the vocabulary subtest were more likely to be similar when descriptive categories were used rather than percentile ranks, (b) percentile ranks and descriptive categories across the two tests' abstract/matrices subtests were mixed and inconclusive, and (c) scores on the two tests' composite/total scores were more likely to be similar when descriptive categories were used rather than percentile ranks.

CONCURRENT VALIDITY OF MENTAL ABILITY SCREENING TOOLS: A COMPARISON OF NORMAL STUDENTS' PERFORMANCE ON THE KAUFMAN BRIEF INTELLIGENCE TEST AND THE SHIPLEY INSTITUTE OF LIVING SCALE-REVISED

by

D. MELANIE PETERS

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE
in
SPEECH COMMUNICATION:
SPEECH AND HEARING SCIENCES

Portland State University
1998

DEDICATION

This thesis is dedicated to my family.

ACKNOWLEDGMENTS

I have many people to thank for their guidance, instruction, inspiration, patience, and time, all of which were crucial to the completion of this paper. I would like to use this opportunity to thank them publicly:

Dr. Lisa Letcher-Glembo of the Speech and Hearing Sciences Program, my advisor. Her willingness to share insights and time has enabled me to achieve a goal that did not always seem possible.

Joan McMahon retired professor of the Department of Speech and Hearing Sciences. I would not be writing this today, if it was not for her belief in my potential as a Speech-Language Pathologist.

My family for their support and encouragement.

My daughter Samantha, for her understanding.

My son Jeremy, for reminding me when it was time to play.

My husband Patrick, who learned to sleep with the lights on, endured less than perfection in our lives, and most importantly, enabled me to follow my dreams.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

Introduction

Intelligence measurement tools are used by professionals to measure mental ability. Multi-subtest, comprehensive batteries of an individual's mental ability, administered by properly trained professionals with considerable psychometric and clinical experience, are essential for making diagnostic or placement decisions, evaluating personality, and inferring neuropsychological assets and deficits.

Brief intelligence tests, commonly known as screening tests are designed for circumstances when an estimate or brief measure of intelligence is adequate. Examples of such instances are (a) screening to identify high-risk children; (b) rechecking periodically the intellectual status of a child who was previously administered a thorough clinical psychological battery; (c) yielding to time constraints; (d) measuring the intelligence of various groups for research; and (e) deciding whether a complete evaluation is warranted. The use of screening tools saves time for the psychologist by reducing the time spent administering tests.

Different types of formal tests are available to measure general intellectual status. The most widely accepted and used series of tests include the Wechsler Adult

Intelligence Scale-Revised (WAIS-R; Wechsler, 1981), the Wechsler Intelligence Scale for Children-III (WISC-III; Wechsler, 1991), and the Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R; Wechsler, 1989) (Naugle, Chelune, & Tucker, 1993; Parker, 1993; Prewett, 1995). Administration of formal intelligence tests, such as the Wechsler intelligence series, typically take a minimum of 75 minutes to complete and are administered by professionals in psychology who have considerable psychometric and clinical experience. In fact, purchase and use of these tests is often restricted by the publisher to individuals with specific education, training, and experience in intelligence assessment. While such restrictions help to maintain the American Psychological Association's (1985) Standards for Education and Psychological Testing, it may be, at times, appropriate and necessary for professionals outside of the field of psychology to obtain an estimate of an individual's intellectual status.

Letcher-Glembo, a speech-language pathologist, has an ongoing study focusing on the effects of factors, such as mental ability, on the career development of adolescents with and without orofacial clefts. As a part of her 1989 study, she utilized the SILS as the tool to measure mental ability of subjects, cleft and noncleft, between the ages of 14 and 17 years of age (Letcher-Glembo, 1989). She has subsequently sought to expand the scope of her project in terms of subject recruitment and has pursued external support through a National Institute of Health grant. An anonymous grant reviewer stated, in his or her critique of Letcher-

Glembo's submission, that a mental ability screening tool that measured both verbal and nonverbal aspects of an individual's development would be a preferable measure over the SILS which solely measures nonverbal skills. The potential necessity of changing measurement tools when data had already been collected led to the question of how similarly or differently a mixed modality mental ability screening tool would measure individuals from a nonverbal mental ability screening tool.

A brief measure of intelligence is often sufficient in estimating the mental ability of subjects. Unfortunately, the availability and knowledge of such intelligence screening tools by communicative disorder specialists tends to be limited. There are also few intelligence screening tools that are reliable, valid, well normed, and can be administered in a short administration time. Inspection of past research and test critiques (Harnish, Beatty, Nixon, & Parsons, 1994; John & Rattan, 1992; Naugle et al., 1993; Prewett, 1995) suggest however, that two intelligence screening tools have been found to be particularly useful: the Kaufman Brief Intelligence Test (K-BIT) and the Shipley Institute of Living Scale (SILS). The concurrent validity of these measures, however, has not yet been established.

Traditionally, measures of nonlinguistic cognition have been measured by a speech-language pathologist via informal measures of play assessment when formal cognitive testing results are unavailable (Paul, 1995). There are circumstances, however, when researchers in speech-language pathology require a more standardized measure of intelligence than informal screening provides. These instances commonly occur in research settings and public schools where hypothesis testing, assessment, and intervention take place daily.

Specifically, speech-language pathologists can utilize intelligence screening tools to make inferences regarding (a) an individuals nonverbal mental age as a reference point for language functioning; (b) the intellectual abilities of various groups for research purposes, (c) determination as to whether a referral to an appropriate professional for formal intelligence testing is warranted (Paul, 1995), (d) the mental status of a previously identified special education student, (e) a students' eligibility for special education, and (f) requalification of a special education student for services.

The benefits of screening tools are that intelligence estimates can be gathered in a short amount of time, without requiring a full battery of psychological tests. Practically speaking, mental ability screening tools enable clinicians working in schools to identify students who may require comprehensive intelligence testing and obtain estimates of students' mental ability with a minimal time commitment. Because screening tools can be administered in a short period of time, school clinicians can limit the amount of time spent in assessment by the speech-language pathologist and regular class instruction lost by the student during test administration.

The drawbacks of utilizing screening tools are many, however, if they are utilized by paraprofessionals without adequate psychometric experience or are used for purposes other than which the screening tool was designed. As with any testing tool, clinicians should be aware of the possibility of false negatives or positives. A false negative or positives can result in a student with actual deficits going unidentified by the clinician, or mistakenly result in a student experiencing decreased regular education classroom instruction due to being falsely identified as a student in need of complete battery of academic, psychological and language test.

Statement of Purpose

Speech-language pathologists in general, have limited testing choices when seeking mental ability information. As mentioned earlier, administration of comprehensive mental ability testing tools requires a graduate degree in psychology. Related professionals and paraprofessionals however, may administer screening tools. This ability to administer and utilize mental ability screening tools for clinical and research purposes, allows speech-language pathologists to combine standardized and criterion-referenced mental ability data in making assessment and treatment decisions.

There is no known research comparing the K-BIT to the SILS as a research tool for screening mental ability. Both tests are designed for researchers and clinicians to gather data about mental ability; however, the design and the administration of the tests vary greatly. In this study, the K-BIT and the SILS were administered to adolescent subjects to determine if the two tests yield similar results.

This concurrent validity study was developed to compare the SILS to other mental ability screening tools, as part of a larger ongoing study, which is examining the effects of orofacial clefts on early career maturity. The decision to utilize adolescents for this study was made in order to gain additional data that could also be utilized by researchers in the above mentioned study. The outcome of this research will contribute to the field of speech-language pathology by providing researchers and clinicians with a comparison of two mental ability screening tools.

The following specific research question was developed "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?"

Based upon available literature and assumptions regarding the design of screening tools, the following study hypotheses were stated:

1. A subject's percentile rank and descriptive category on the K-BIT vocabulary subtest and the SILS vocabulary subtest will be similar for adolescents in regular education.

2. A subject's percentile rank and descriptive category on the K-BIT matrices subtest and the SILS abstract subtest will be similar for adolescents in regular education.

3. A subject's percentile rank and descriptive category on the K-BIT composite and the SILS total will be similar for adolescents in regular education.

Definition of Terms

The following operational terms are defined for the purpose of this study:

Abstract Quotient (AQ): a derived score based on a regression equation that predicts abstraction scores for an individual, based upon the individual's vocabulary score, age, and education level. It is calculated by subtracting a subject's predicted abstraction score from the subject's obtained abstraction score and converting this difference to a standard score with a mean of 100 and a standard deviation of 15 (Zachary, 1986).

chronological age: a person's age stated in hours, days, weeks, months, or years and months since birth (Coleman, 1993).

Conceptual Quotient (CQ): a derived score that was designed as an objective measure of intellectual impairment. It is a ratio of mental ages derived from the vocabulary and abstraction scores (Zachary, 1986). It is utilized by the SILS.

comprehensive intelligence testing: a standardized testing tool that measures an individual's intelligence in multiple areas such as, but not limited to, verbal comprehension, memory, spatial visualization, and perceptual speed.

descriptive category: a verbal description used to describe norm based scores to nonprofessionals.

group intelligence testing: an intelligence testing tool that enables testing to be completed by more that one individual at a given time.

individual intelligence test: a testing tool that is designed to be administered to individual subjects, one at a time.

intelligence: general mental ability, especially the ability to make flexible use of memory, reasoning judgment, and information in learning and dealing with new situations and problems (Goldenson, 1984); the ability to understand and apply knowledge. For example, intelligence is measured using a standardized intelligence test, and the results are expressed numerically (Coleman, 1993).

Kaufman Brief Intelligence Test (K-BIT): a test that has been identified as a useful screening measure of mental ability. The test consists of two subtests: verbal (vocabulary) and nonverbal (matrices). It has been shown to be brief and easy to administer (Miller, 1995; Parker, 1993; Young, 1995).

mental abilities: ability as measured by test of an individual in areas of spatial visualization, perceptual speed, number facility, verbal comprehension, word fluency, memory, and inductive reasoning (Goldenson, 1984).

mental ability screening: a testing tool that is used to screen or estimate an individual's intelligence. It may be written for group administration and is commonly used in research, personnel selection, or vocational guidance.

mental age: a numerical scale unit, derived by dividing an individual's results on a standardized measure of cognitive ability by the average score for other persons of the same age (Goldenson, 1984). It is based on assessment of the person's skills and comparison of those skills to the age at which they are considered typical, and is used as an index of developmental level in referring to the age at which a person is functioning (demonstrating specific abilities). Also known as developmental age or functional age (Coleman, 1993).

mental age equivalent: a score derived by regressing a test score on chronological age (Zachary, 1986).

normative curve equivalent: a standardized score with a range from <1 to >99.

percentile rank: represents a value on a scale of 100 that indicates the percent of the distribution that is equal to or below the value. It indicates the percentage of individuals that the examinee outperformed in his/her age group (Kaufman & Kaufman, 1990).

raw score: the number of items scored correct on a particular subtest or test. Raw scores on subtests cannot be interpreted directly (Kaufman & Kaufman, 1990).

Shipley Institute of Living Scale (SILS): a test that has been identified as a useful screening measure of estimating mental ability (Shipley, 1940, as cited in Zachary, 1986). The nonverbal test consists of two subtests: a vocabulary test and an abstract thinking test. It has been shown to be a quick, accurate estimate of intellectual ability.

significant difference: a measurement used to determine if standard score differences may correspond to, for example, a difference between an individual's verbal and nonverbal intelligence (Kaufman & Kaufman, 1990).

standard error of measurement: forms a band of error around the examinees true score. It is used to communicate the fluctuations that are known to characterize test scores (Kaufman & Kaufman, 1990).

standard score: the distance from the mean of the examinee's performance, taking into consideration the standard deviation of the distribution of raw scores. They have a constant meaning when based on distributions that are normal or approximately normal (Kaufman & Kaufman, 1990).

standardization and norms: derived from a set of studies carried out to determine how the test works in a known population in order to use it as a basis for comparison (Paul, 1995).

stanine: normalized standard scores with a mean of 5 and a standard deviation of 2 (Paul, 1995).

subtest score: a raw score earned on a subtest.

t-score: a standard score with a mean of 50 and a standard deviation of 10.

total score: the combination of subtest scores.

WAIS full scale IQ estimation: a derived SILS score designed to estimate WAIS full scale IQ. It is an estimate derived from the Shipley total raw score and is interpreted as a general measure of verbal intelligence (Zachary, 1986).

WAIS-R full scale IQ estimation: a derived SILS score designed to estimate WAIS-R full scale IQ. It is an estimate derived from the Shipley total raw score and is interpreted as a general measure of verbal intelligence (Zachary, 1986).

CHAPTER II

REVIEW OF THE LITERATURE

This study investigated if the general intellectual ability measured by the SILS is similar to the general ability measured by the K-BIT. This research was conducted by administering the SILS and the K-BIT to 17 normal adolescents ranging in age from 14 to 17 years. This study was intended to assist researchers and clinicians by providing new information regarding the existence of concurrent validity between the SILS and the K-BIT.

To undertake a study of this nature, it was helpful to have an overall understanding of the impact of intelligence on speech and language development as well as to appreciate the manner in which speech-language pathologists typically address this issue in their clinical interactions. An overview of formal intelligence tests and screening tools to assess mental ability is provided. Particular emphasis is given to discussion of the K-BIT and SILS including their design and applicability of use with adolescent populations.

Role of Intelligence Testing in Speech-Language Pathology

Scope of Speech-Language Pathology Practice

The scope of practice in speech-language pathology requires "screening, identifying, assessing and interpreting, diagnosing, and rehabilitating cognitive/communication disorders" (ASHA Scope of Practice Guidelines for Speech-Language Pathologists as cited in Shames, Wiig, & Secord, 1994, p. A-2). This guideline requires speech-language pathologists to have an understanding of the relationship between cognition and communication, and recommends that communicative disorder specialists need to be aware of assessment and treatment tools to address cognition and communication appropriately.

Reasons Speech-Language Pathologists Measure Intellectual Function

In 1988, Wochnik discussed the advantages and disadvantages of verbal and nonverbal intelligence testing in children with speech disorders. The author concluded that verbal intelligence testing is indicated even in cases where communication is difficult, because a verbal intelligence profile provides important information on general mental retardation and on specific deficiencies in speech related mental development. In a more recent study by Schonweiler (1994), intelligence testing was found to be a necessary component in the research of speech development in children.

While speech-language pathologists are often well versed in how to assess communicative function, they tend to be less knowledgeable about the assessment of intellectual and cognitive function (Brookshire, 1992). In fact, the administration of mental ability tests by speech-language pathologists is uncommon due to the requirement that test administrators have a Master's level degree in psychology. For this reason, speech-language pathologists most commonly defer to psychologists for intelligence testing. There are however situations when comprehensive intelligence testing is not warranted.

Risks and Benefits of Mental Ability Screening Tools

An speech-language pathologist may administer a mental ability tool to an individual or groups of individuals as a means of: (a) estimating an individual's nonverbal mental age as a reference point for language functioning, (b) estimating the intellectual abilities of various groups for research purposes, (c) determining if a referral to an appropriate professional for formal intelligence testing is warranted (Paul, 1995), (d) estimating the mental status of a previously identified special education student, (e) assessing a students eligibility for special education, and (f) reestablishing the eligibility a student for special education services. When these times arise, speech-language pathologists can administer mental ability screening tools, to gain insightful estimates into an individual's mental abilities.

The potential benefits derived from the use of mental ability screening tools must be weighed against the possible risks involved in their use. Mental ability screening tools are designed to obtain intelligence estimates in a short amount of time by professionals with adequate psychometric experience. Most screening tools such as the K-BIT and SILS are standardized, thereby giving professionals additional normative information. From the standpoint of a classroom teacher and speech-language pathologist, screening tools allow a student to be assessed with minimal time spent away from the classroom. Students and parents may appreciate that screening allows data to be gathered in a much shorter time, possibly increasing the student's motivation to perform well.

The risks of utilizing screening tools are substantial if they are utilized as a replacement for comprehensive intelligence testing in the presence of educational, emotional, or neuropsychological problems, or for purposes other than which the screening tool was designed and intended. From the standpoint of a classroom teacher and speech-language pathologist, screening tools may not give adequate data, thereby requiring a student to also complete a complete battery of psychological tests, which would lead to increased loss of regular classroom time. Students may become frustrated by having to complete a mental ability screen and complete battery of psychological test, if their score on the screening tool indicates that a complete battery is warranted. Parents may feel that a screening tool does not provide the types of information required for evaluation purposes.

Terminology Speech-Language Pathologists Should Know

As a discipline, the following basic framework should be understood. *Intelligence* refers to general mental ability. *Mental ability* is the measurable performance on an intelligence test or screening tool of spatial visualization, perceptual speed, number facility, verbal comprehension, word fluency, memory, and inductive reasoning (Goldenson, 1984). The terms intelligence and mental ability can be used interchangeably. Tests have been designed to look at verbal and nonverbal intelligence. Individuals with language difficulties such as aphasia as well as motor speech disorders such as apraxia have been found to demonstrate depressed scores on verbal intelligence tests (Brookshire, 1992; Marquardt & Sussman, 1991).

A subset of mental ability or intelligence is *cognition*. Cognition includes the following components of intelligence: attention, memory, orientation, reasoning, judgment, and flexibility of thought. *Mental age* is a numerical scale unit, derived by dividing an individual's results on a standardized measure of cognitive ability by the average score for persons of the same age (Goldenson, 1984). It is for this reason, that speech-language pathologists often calculate *chronological age* which is a person's age stated in hours, days, weeks, months, or years since birth (Coleman, 1993). Comparison of a person's chronological age, current skills, and age at which those skills are typically observed in others allows calculation of a *developmental level* or *functional age* (Coleman, 1993). For example, at the chronological age of 36 months, a child may demonstrate the receptive language skills of a 30-month-old and thus be said to be functioning at a developmental level of a 30-month-old child.

For clinical purposes, of all the terms listed thus far, mental age appears to provide the best guideline available to determine the goals of intervention using a developmental perspective (Paul, 1995). Mental age rather than chronological age as a reference point to decide whether a child has a language disorder was adopted by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association) in 1994. This view is shared by Kamphaus and Reynolds (1987), who stated, "any evaluation of a child that ignores intellectual and academic development is going to be inadequate for developing a comprehensive understanding of children and their reciprocal interactions with the environment" (p. 9).

Intelligence Testing Overview

Intelligence tests, hereafter interchangeably referred to as *mental ability tests*, can provide information to speech-language pathologists that is vital in research, assessment, and referral to appropriate professionals. A wide array of mental ability testing tools are available. Determining which mental ability tool to use is not an easy choice. Not all tests can be ethically administered by speech-language pathologists. In order to better understand which tools are appropriate for use by speech-language pathologists, categorization of mental ability assessment tools were reviewed in terms of (a) individual and group tests, (b) nonverbal versus mixed modality tests, (c) age group for which they are normed, and (d) comprehensive and screening mental ability tools.

Individual and Group Mental Ability Tests

Individual tests generally provide a more valid, detailed picture of intelligence than group tests (Seligman, 1980), but are far more time consuming to administer and score, and require considerable experience and training to administer. Individual tests of mental ability were developed prior to group tests and continue to be the more widely used. Tests that fall within this category include the WISC-III (Wechsler, 1991), the WPPSI-R (Wechsler, 1989), and the WAIS-R (Wechsler, 1981). There are also mental ability tests such as the SILS that can be administered to more than one subject at a time. These types of tests are timed tests, designed to allow administrators the flexibility to test large groups of subjects.

Modalities Tested by Mental Ability Tests

Mental ability tests can be categorized by the modality that they test: nonverbal or mixed (verbal and nonverbal). Examples of mental ability tests that utilize nonverbal responses include the Naglieri Nonverbal Ability Test-Multilevel Form (N NAT-Multilevel Form; Naglieri, 1996), the Matrix Analogies Test-Short Form (MAT-SF; Naglieri, 1985), the Revised Beta Examination-II (Kellogg & Morton, 1978), and the SILS. These tests allow subjects to respond without using their voice. Sample types of items from these tests include: (a) mazes that require the individual to mark the shortest distance through a maze without crossing any lines, (b) codes that the individual completes by matching figures with their corresponding numbers, (c) picture completion by filling in the parts of the pictures that have been omitted, (d) clerical checking by reviewing the marking pairs that are not alike, and (e) picture absurdities in which individuals identify drawings that are wrong or foolish. Verbal mental ability tests add the verbal modality. Examples of tests that include verbal mental ability testing are the WISC-III, the WPPSI, the WAIS-R, the Differential Ability Scale (Elliot, 1990), and the K-BIT.

These tests require subjects to respond with their voice for portions of the test. In the case of the K-BIT, sample items include: (a) expressive vocabulary that requires the subject to say the name of a pictured object, (b) definitions that allow either a verbal or written response, and (c) matrices which the subject may respond to by either pointing to the picture or by saying the correct answer. These tests may be difficult or impossible to administer to a subject who is nonverbal, has limited verbal abilities, or for whom English is a second language.

Age Norms for Mental Ability Tests

Mental ability tests can be categorized by the population for which they are designed, namely children, adolescents, or adults. Tests vary greatly in terms of the age ranges for which they are normed. For example, the WISC-III is appropriate for ages 6 through 16.11 years of age; the WAIS-R is appropriate for ages 16 through

74 years of age; the K-BIT is appropriate for ages 4 through 90 years of age. According to the test manual, the SILS is appropriate for adolescents and adults aged 14 years and older. Norms, however, are only provided in its manual for respondents who are 16 through 64 years of age (Zachary, 1986).

Comprehensive and Screening Tools for Mental Ability Testing

Mental ability tests can be categorized by their construction as either a comprehensive measure of mental ability or as a screening tool of mental ability. Researchers have long since agreed that the Wechsler intelligence series are the most widely accepted tests used to measure intelligence comprehensively. The WISC-III, WPPSI-R, and WAIS-R are often the standard by which all other tests are compared (Bartz, 1968; Carvajal et al., 1993; Dennis, 1973; Frisch & Jessop, 1989; Paulson, & Lin, 1970; Phelps, Bell, & Scott, 1988; Prewett & Matavich, 1994; Rothlisberg, 1987; Wechsler, 1991).

Test usefulness notwithstanding, the length of time required to complete administration of comprehensive tests such as the WAIS-R preclude their use in some instances (Naugle et al., 1993). In the case of the Wechsler series, the core subtests require approximately 50 to 70 minutes, with each supplemental subtest adding an additional 10 to 15 minutes to the administration time. Consequently, a number of shorter, more easily administered measures such as the MAT-SF, Henmon-Nelson Tests of Mental Ability (Lamke, Nelson, & French, 1973), SILS, Wonderlic Personnel Test (Wonderlic & Associates, 1983), and the K-BIT have been devised as alternatives to be used in such instances (Naugle et al., 1993).

Short forms such as the MAT and various Wechsler series short forms are commonly composed of select subtests from the more comprehensive test batteries. These types of short form tests are similar to screening tools like the K-BIT and the SILS in that both were developed for professionals in circumstances when administration of comprehensive intelligence batteries was not feasible due to testing time limitations. The one feature that separates tests like the K-BIT and SILS from the majority of other short form tests is that these later measures were created specifically to screen mental ability. The majority of short form tests were created by extracting selected subtests from comprehensive mental ability tests.

Mental Ability Screening Tools

Mental ability screening tools are designed for circumstances when comprehensive intelligence batteries are inadequate due to limitations such as: financial cost, time constraints, availability, or professional qualifications. These screening tools enable related professionals such as speech-language pathologists the opportunity to screen an individual's mental ability, thereby enabling them to make educated comparisons and referrals when necessary. Four screening tools commonly discussed in research literature include: SILS (Zachary, 1986), MAT-SF (Naglieri, 1985), K-BIT (Kaufman & Kaufman, 1990), and WISC-III Short Form (Kaufman et al., 1996).

The Shipley Institute of Living Scale (SILS)

The SILS can be administered in either a group or individual setting. It appears to be useful in a variety of settings where a quick, accurate estimate of intellectual functioning is important (Retzlaff, Slicner, & Gibertini, 1986). The SILS consists of two subtests: a vocabulary subtest and an abstract reasoning subtest. The vocabulary subtest is comprised of 40 multiple-choice items that the examinee answers by circling the best synonym from four choices provided. For example, a word is presented in capital letters, along with four other words in lower case. The subject is required to circle the one lowercase word which means the same thing, or most nearly the same thing as the word in capital letters (e.g., LARGE = red, big, silent, wet). The abstract reasoning test is comprised of 20 items that assess abstract thinking through a pattern analysis format. For example, an item from this subtest may request that the subject complete a presented pattern by writing a response in a provided blank space (e.g., 1 2 3 4 5 ___).

The SILS produces vocabulary, abstraction, and total raw scores by summing the number of correct responses for each scale, then adding in a correction factor for any omitted items (for the vocabulary scale) or multiplying by 2 (for the abstraction scale). Raw scores are converted into *t*-scores, percentile ranks, and mental ages. Tables are provided to calculate a Conceptual Quotient (CQ), Abstract Quotient

(AQ), and an estimated IQ score. The examiner can use the standard error of measurement (*SEM*) to establish confidence intervals to assess the likelihood that an individual's true score falls within a given interval of scores. Additional levels of interpretation can also include the CQ or the AQ. The CQ is a ratio of mental ages derived from the vocabulary and abstraction scores, and is designed as an objective measure of intellectual impairment. The AQ is based on a regression equation that predicts abstraction scores for a given individual from the individual's vocabulary score, age, and educational level.

Typical applications of the SILS include its use as an intellectual screening tool in research, personnel selection, and vocational guidance (Zachary, 1986), while others have reported the SILS as being an effective tool in the prediction of WAIS-R IQ estimates (Watson et al., 1992).

Past reviewers have found that the SILS is quick and uncomplicated to administer, has a high correlation with the WAIS and the WAIS-R, and yields a reasonably accurate estimate of verbal intelligence (Kirk & Gurmal, 1992). It continues to be one of the most commonly employed short Wechsler surrogates, used by about 25% of clinical and counseling psychologists (Piotrowski & Keller, 1989; Piotrowski & Lubin, 1990, as cited in Watson et al., 1992) to estimate the general level of intellectual functioning of subjects tested in research studies (Harnish et al., 1994). Not everyone agrees, however. Recently, an NIH grant reviewer had this to say in regard to selection of the SILS as a proposed mental ability screening tool in a study of cleft and noncleft adolescents:

> The mental ability instrument, the Shipley was revised approximately 10 years ago, data remain limited in terms of gender and age-referenced norms. The test was originally designed to screen mentally deteriorated psychiatric patients from other patient groups. It is not generally considered a useful instrument for assessing intellectual ability but rather is a screen for deteriorated intellectual ability. Given that complete Wechsler batteries were rejected because of time constraints, a more accurate measure would be a short version of the WISC-III for individuals between the ages of 14 and 17 years, and a short version of the WAIS-R (or soon to be released WAIS III). The norms for these tests are more recent and/or based on larger samples than the Shipley's and better stratified across age and gender. Short versions of these tests can be based on three, four, or five subtests. Even these shortened versions are a more accurate estimate of mental ability than the Shipley since they address both verbal and nonverbal functioning and the Shipley addresses only verbal functioning in terms of vocabulary and verbal abstraction. Since IQ is an important factor in predicting career maturity (and may be a factor differentiating cleft from noncleft groups), it is important to have as accurate an estimate as possible (unidentified NIH Grant Reviewer, personal communication, December 4, 1996).

These concerns voiced by the NIH reviewer, served as the catalyst for this comparison study.

The Matrix Analogies Test-Short Form (MAT-SF)

The MAT (Naglieri, 1985) is a measure of nonverbal reasoning. It measures a person's ability to reason by analogy from pictorial, or nonverbal forms. The test includes four kinds of items: (a) pattern completion, (b) reasoning by analogy, (c) serial reasoning, and (d) spatial visualization. Two forms of the MAT are available. The expanded form, MAT-EF (64 items), is administered only to individuals. The short form, MAT-SF (34 items), is a screening instrument designed for group administration. It is designed for persons ranging in age from 5 to 17.11 years of age. It is a paper-pencil test consisting of abstract designs with missing elements and matrices containing progressive elements that predict the next element in progression. The test yields raw scores, percentile ranks, stanines by half-year age intervals, descriptive classifications associated with the stanines, and age equivalents from 5 to 17.11.

The MAT can be used in various ways. The MAT-SF requires only that standardized directions be given orally and the test booklets collected and scored. The test can be given by a number of educational and clinical personnel, including teachers familiar with group ability tests. Because of the nonverbal nature of the MAT-SF, it is useful for testing persons with communication disorders, limited language development, or non-English language backgrounds (Robinson, 1987). In addition, both versions of the MAT could be useful in research settings as relatively quick measures of ability (Robinson, 1987). The group administration of the MAT-SF makes it particularly appealing for data collection.

Past reviewers have described the MAT-SF as a promising measure of nonverbal ability that is easy and efficient to administer and score (Robinson, 1987). Researchers utilizing the MAT-SF have also determined that the concurrent validity of the MAT-SF has been supported by its significant correlations with other measures of intelligence (Prewett & Farney, 1994, as cited in Prewett, 1995). A more recent study by Prewett (1995) involved a comparison of the MAT-SF and K-BIT with the WISC-III. That study found that the MAT and K-BIT performed equally well as screening instruments with the WISC-III as the criterion measure of intelligence. The two screening tests correlated highly and similarly with the WISC-III full scale IQ, which is consistent with what has been reported by other researchers (Prewett & Farhney, 1994; Prewett & McCaffery, 1993; Kaufman & Kaufman, 1990; Naglieri, 1985; Prewett, 1992a, 1992b).

The Kaufman Brief Intelligence Test (K-BIT)

The K-BIT differs from most of the earlier screening tools in that it includes measures of both verbal and nonverbal cognitive functions in addition to providing a composite IQ. The K-BIT consist of two subtests, a verbal (vocabulary) and a non-verbal (matrices). The verbal subtest is made up of Part A and Part B sections.

Part A is comprised of 45 expressive vocabulary items administered to all ages and requiring the respondent to provide a verbal label for a variety of objects. For example, the subject is shown a picture of a bed and is asked by the examiner "What is this?"

Part B is made up of 37 definition items and is administered to individuals 8 years and older. For example, the subject is shown a visual clue (a dark color) which is read by the examiner. The subject is then asked to complete the following clue by providing the missing letters (e.g., br_w_). The matrices subtest consists of 48 increasingly difficult multiple-choice visual analogy items requiring the individual to select a meaningful or abstract response to complete a partial pattern shown. For example, the subject is shown a drawing of a dog along with a row of potential response pictures. The examiner then asks the subject to find the response that best corresponds with the stimulus picture (e.g., dog: bone).

Raw scores are obtained for each subtest and converted into standard scores, composite standard scores (K-BIT IQ composite), percentiles, descriptive performance categories, and standard score differences by age. The K-BIT is administered individually and was designed primarily for nonpsychological evaluation (Parker, 1993).

The K-BIT produces vocabulary and matrices raw scores by subtracting the number of errors from the ceiling item for each scale. The raw scores for each scale are then converted to standard scores, which are derived scores that have uniform meaning from subtest to subtest. The sum of the standard scores earned on vocabulary and matrices provides the K-BIT IQ composite score. The standard scores for the three summary scales can also be converted into percentile rank equivalents, which give the percentage of individuals in the normative population who would have scores below the midpoint for a particular score. The examiner can use the *SEM* to establish confidence intervals to assess the likelihood that an individual's true score actually falls within a given interval of scores. Additional levels of interpretation include a category system that presents verbal descriptions for commonly used standard score ranges, and the ability to determine significant differences between the vocabulary standard score and the matrices standard score.

Typical applications of the K-BIT include its use as an intellectual screening tool in research, personnel selection, estimating the intelligence of large numbers of subjects, and vocational guidance (Kaufman & Kaufman, 1990). Others have found the K-BIT to be a valid screening measure of intellectual function that yields IQ estimates that are generally similar to those of the WAIS-R (Naugle et al., 1993).

Researchers suggest that the K-BIT is brief and easy to administer (Miller, 1995; Parker, 1993; Young, 1995), has scores that are on a common metric with other intelligence scales and achievement tests, and yields adequate concurrent validity with other measures of intelligence (Burton, Nagle, & Schuster, 1995). Because the K-BIT was developed in 1990, the test does not share the long history accorded to the SILS. Researchers who have utilized the K-BIT have found it to be useful as a screening test when the WISC-III was the criterion measure (Prewett, 1995), and "holding some promise as a measure of intelligence when time constraints, patient stamina or physical handicap, or cost efficiency preclude administration of the longer WAIS-R" (Naugle et al., 1993, p. 186). Most notable is the call by researchers for additional research data with the K-BIT (Prewett, 1995; Burton et al., 1995).

The Wechsler Intelligence Scale for Children-III (WISC-III)

Researchers began to develop abbreviated versions of Wechsler's scales nearly from its time of initial publication more that a half a century ago (McNemar, 1950, as cited in Kaufman et al., 1996). In the past, researchers have stressed that when selecting short forms, it is essential to give much weight to clinical factors thereby ensuring that the specific abilities measured by each chosen subtest are not redundant and that the brief battery as a whole reflects an appealing clinical unit (Kaufman, 1972, 1976; Telegen & Briggs, 1967; as cited in Kaufman et al., 1996). Kaufman et al. (1996) compared three WISC-III short forms. Short form #1 was developed primarily on psychometric grounds. Short form #2 was designed to be practical (short administration time). Short form #3 was designed as a compromise between practical and psychometric/clinical. After studying the three forms, Kaufman and colleagues (1996) preferred the short form #3 because they believed that the practical form (#2) was insufficiently valid and that the psychometric form (#1) took too long to give and to score. They preferred the "compromise" short form #3, composed of Similarities (S), Arithmetic (A), Picture Completion (PC), and Block Design (BD). The chosen tetrad shares two subtests with each of the other selected short forms and provides measurement of three of the four WISC-III factors.

The administration of the WISC-III Short Form (SF) takes approximately 25 minutes (Connery, Katz, Kaufman, & Kaufman, 1996; Kaufman et al., 1996).

Because this form was not administered as a clinical unit to any children or adolescents by Kaufman et al. (1996), psychometric data are based on complete administrations of the WISC-III to the standardized sample. A more recent study by Connery et al. (1996) supported that the administration time of the WISC-III SF is approximately 25 minutes. It is intended for use with subjects ranging in age from 6 to 16 years of age. Equations for converting a person's sum of scaled scores on the four subtests to estimated Full Scale IQ (FSIQ) were provided by the Kaufman et al. (1996) study. To use the equations, the subjects' scaled scores are combined on the four pertinent subtests. The sum is then entered into the equation. For example, a child's scaled scores on S, V, PC, and BD total 43. That figure would be entered into the equation as: Estimated FSIQ = 1.7(43) + 32 = 73.1 + 32 = 105.1 = 105.

Kaufman et al., in their 1996 study, provided a table listing equations for converting sums of scaled scores on the S-A-PC-BD tetrad. The researchers in the Kaufman et al. (1996) study acknowledge the suggestion made by Thompson in 1987 that called for caution when utilizing short forms because of their limited validation and use in studies.

Comparison of Mental Ability Tools

A number of tools have been developed for use in mental ability screening. The MAT-SF, while previously proven to have value as a mental ability screening tool, requires a master's level degree in psychology or education, or the equivalent in a related field with relevant training or assessment. It has also been updated recently and superseded by the Naglieri Nonverbal Ability Test-Multilevel Form (N NAT-Multilevel Form; Naglieri, 1996). The WISC-III SF, also proven to be a valuable tool, is an expensive test, costing $695.00, and requires a doctorate level degree in psychology or education, or the equivalent in a related field with relevant training in assessment.

The K-BIT and the SILS appear to be viable options for use as mental ability screening tools by speech-language pathologists for the following reasons: (a) the K-Bit tests both verbal and nonverbal abilities of the subject; (b) it is relatively inexpensive; and (c) it can be administered by educational, psychological, vocational, and medical personnel. The SILS advantages include its short administration time, level of qualification required to administer the test, and ease in test administration.

A comparison of the testing information provided by the K-BIT and the SILS indicate a wide range of information is available. While it is apparent that the two mental ability screening tools present test result data in different ways, there are similarities across both tests. Both tests provide descriptive categories, percentile ranks, raw scores, *SEM*, standard scores, standardization and norms, subtest scores, and total scores. The K-BIT provides normative curve equivalents and stanines, which the SILS does not. The SILS provides AQs and CQs, WAIS and WAIS-R full scale IQ estimates, and *t*-scores, which the K-BIT does not. Table 1 summarizes the information provided from the K-BIT and the SILS.

Table 1

Types of Testing Information Derived from the K-BIT and SILS Testing Tools

Type of Information	K-BIT	SILS
Abstract quotient	No	Yes
Conceptual quotient	No	Yes
Descriptive categories	Yes	Yes
Estimate of WAIS full scale IQ	No	Yes
Estimate of WAIS-R full scale IQ	No	Yes
Mental age equivalents	No	Yes
Normative curve equivalents	Yes	No
Percentile ranks	Yes	Yes
Raw scores	Yes	Yes
Significant differences	Yes	No
Standard error of measurement	Yes	Yes
Standard scores	Yes	Yes
Standardization and norms	Yes	Yes
Stanines	Yes	No
Subtest scores	Yes	Yes
Total scores	Yes	Yes
t-scores	No	Yes

Summary

In general, the use and administration of intelligence screening tests by speech-language pathologists has been limited. This may be due, in part, to the extensive training and expertise required administering and interpreting these tests. This problem may be further compounded by limited exposure to such tools during their graduate education experience. There are clearly studies that discuss the usefulness of intelligence testing in research involving speech sciences.

Intelligence screening tools are most often compared with intelligence test batteries and other ability screening tools when determining whether a screening tool has good predictive abilities (Burton et al., 1995; Canivez, 1995; Prewett, 1992b, 1995).

To date, however, the concurrent validity of the SILS and the K-BIT has not been compared. Knowledge of the correlational relationship between the intelligence screening tools would provide insight into the amount of overlap that exists between the constructs measured by the tests. The information derived from this comparison would assist practitioners in making informed choices about selection of intelligence screening tools when needed for use in clinical and research settings.

CHAPTER III

METHODS

This study was designed to compare normal students' performance on two mental ability screening tools, the K-BIT and the SILS, in order to determine if there is concurrent validity between the two tests.

This research study sought to address the following question "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?"

Subjects

Subject Recruitment

Subjects were recruited from two private schools, two public schools, and two youth groups. Agencies servicing adolescents were contacted and, upon approval, the researcher made group presentations to adolescent-aged groups. Packets containing (a) a subject recruitment letter (Appendix A) approved by Portland State University's Human Subjects Research Review Committee, (b) an attached response form (Appendix B) that potential subjects sent back to state willingness or decline to participate in the study, (c) a consent form (Appendix C), and (d) a stamped envelope addressed to PSU's Speech and Hearing Clinic. The recruitment packets were distributed from December 1, 1997, to February 4, 1998, to students meeting the age and gender criteria established for this study. Subject recruitment was ongoing for 3 months following the initial presentation. Subjects were not paid for their participation in this study.

Subject Criteria

The following criteria were used in selection of all subjects who participated in the study:

1. Subjects were within the age range of 14 to 17 years, as this age grouping provided a cross section sampling of adolescent aged individuals.

2. Subjects were enrolled in regular education classes and were not receiving any special services. Information about these criteria was obtained from the subjects.

3. Subjects and parents provided written approval from parent or guardian to participate in the study.

Proposed Subject Pool

The proposed subject group was 24 normal adolescents. Specifically, the target subject group was to consist of 12 males and 12 females, 3 subjects each for the age intervals of 14, 15, 16, and 17 years of age.

Response Rate

Between December 1, 1997, and February 4, 1998, 40 recruitment packets were distributed to adolescents within the age range of 14 to 17 years. Distribution occurred at pre-scheduled, administration-approved presentations completed by the principal investigator at two public schools, two private schools, and two community youth group gatherings. The names of the adolescents attending the presentations were not given to the principal investigator. Subjects responded by mailing back the preliminary response form contained within the recruitment packet stating their willingness to participate in the study. Of the 40 recruitment packets distributed, 24 responses were received. Of the 24 responses received, 9 males and 8 females agreed to participate in the study. The remaining 7 reply forms received were from adolescents who declined to participate in the study (3 male, 3 female, and 1 gender unspecified). Follow-up attempts were not possible due to the nature of the recruitment presentations made by the principal investigator.

Final Subject Sample

Table 2 summarizes the proposed distribution of subjects for the comparison study of normal adolescents. Table 3 summarizes the actual final distribution of subjects according to age and gender. Using the criteria and recruitment procedures discussed, 17 subjects participated in this study.

Table 2

Adolescents: Proposed Distribution of Subjects in Each Age and Gender Group (N = 24)

	Age				
	14	15	16	17	Subtotals
Male	3	3	3	3	12
Female	3	3	3	3	12

Table 3

Adolescents: Actual Distribution of Subjects in Each Age and Gender Group (N = 17)

	Age				
	14	15	16	17	Subtotals
Male	3	3	0	3	9
Female	1	3	2	2	8

Measures and Procedures

Subject recruitment took place in private schools, public schools, and youth organizations by way of group presentations. No further follow-up procedures beyond the initial recruitment attempt were utilized. All subjects who agreed to participate in the study completed the K-BIT and the SILS. A biographical questionnaire was also given in order to ensure subject criteria guidelines were met.

No monetary awards were provided to participants. The emphasis of the current study is on the comparison of performance on the two mental ability screening tests.

Biographical Questionnaire and Occupational Status Scores

A biographical questionnaire constructed by Letcher-Glembo (1989) was utilized to determine subject eligibility based upon criteria guidelines. The questionnaire also elicited information about educational, occupational, and socioeconomic status aspirations. While each subject completed the questionnaire, not all data were used for the purposes of the current study.

The Kaufman Brief Intelligence Scale

All subjects completed the K-BIT, an intelligence screening tool developed by Kaufman and Kaufman (1990) to screen mental ability. The K-BIT is composed of two subtests that measure verbal and non-verbal abilities. Data on its test-retest reliability, standard error of measure, validity, and internal consistency were cited by Parker (1993) and indicate that it is a valid and reliable measurement instrument. A sample test question is provided in Table 4.

Table 4

Sample K-BIT Question

For this test, we will use clues to find a word. Look at this one.
Part of a train
That's one clue about the word you're looking for. Here is another clue. The word has 7 letters and has a C, O, O, S in the places shown. What word is it?
C __ __ o o s __
Answer: Caboose

Shipley Institute of Living Scale-Revised

In order to measure mental ability, all subjects completed the SILS, a screening tool developed by Shipley in 1953, and revised by Zachery in 1985. The SILS consists of two subtests that utilize multiple-choice items and an open-ended series. Data on its test-retest reliability, standard error of measure, validity, and internal consistency were cited by Letcher-Glembo (1989), and indicate that it is a valid and reliable measurement instrument. A sample test question is provided in Table 5.

Table 5

Sample SILS Question

Circle the one word that means the same thing, or most nearly the same thing, as the first word.				
LARGE	red	big	silent	wet

Procedures and Order of Presentation

The following procedures were utilized for this study:

1. Group presentations were made by the principal investigator to recruit subjects.

2. Preliminary written willingness to participate in the study was obtained from subjects and also from the subjects' guardian(s) via mailed responses.

3. The subjects who agreed to participate were contacted by telephone by the principal investigator. It was arranged for subjects to meet with the examiner at their homes or an agreed upon location at an appointed date and time.

4. Signed written consent forms were completed prior to testing by the subjects.

Subjects were seen for a single data gathering session that took approximately 1 hour to complete. Administration of the SILS and the K-BIT was completed in alternating order for the subjects to counterbalance the possible effects of learning performance. The biographical questionnaire was always administered at the end of the session. After data collection was completed for all subjects, test responses were hand-scored.

Ten of the participating subjects were below 16 years of age. It was decided to use the 16-year-old norm table for the ten 14 to 15-year-old subjects who participated. This decision was based upon information obtained from other cognitive tests (e.g., WISC-III) which indicates a relatively small growth in cognitive abilities from ages 14 to 15 years (Connery et al., 1996).

Scoring Reliability

Scoring reliability was addressed by having the principal investigator score all tests. A random sample of 20% of the subjects were then rescored by an independent doctorate-level scorer in order to ensure scoring accuracy.

Data Analysis

Use of Data to Respond to the Study's Research Question

The research question asked, "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?" This question was answered by comparing (a) each subject's percentile rank and descriptive category on the K-BIT vocabulary subtest to the same subject's percentile rank and descriptive category on the SILS vocabulary subtest, (b) each subject's percentile rank and descriptive category on the K-BIT matrices to the same subject's percentile rank and descriptive category on the SILS abstract, and (c) each subject's percentile rank and descriptive category for the K-BIT IQ composite to the same subject's percentile rank and descriptive category on the SILS total composite.

Data Scoring

To utilize data collected, tests were scored according to respective test protocols. A raw score for each subject was obtained. SILS and K-BIT raw scores scales were converted into standard scores and *t*-scores for analysis and comparison. This was necessary because standard scores and *t*-scores have a constant meaning when based on distribution that are normal or approximately normal. Confidence intervals of 90% were established for the resulting scores.

Standard scores and *t*-scores were converted into percentile ranks and descriptive categories. Descriptive categories utilized by the K-BIT and the SILS with corresponding percentile rank ranges are listed in Tables 6 and 7, respectively.

Table 6

Descriptive Categories Utilized by the K-BIT and Corresponding Percentile Ranks

Descriptive Category	Percentile Rank Range
Upper Extreme	98 - >99.9
Well Above Average	91 - 97
Above Average	75 - 90
Average	25 - 73
Below Average	09 - 23
Well Below Average	02 - 08
Lower Extreme	<.01 - 02

Table 7

Descriptive Categories Utilized by the SILS and Corresponding Percentile Ranks

Descriptive Category	Percentile Rank Range
Very Superior	>71
Superior	66 - 70
Above Average	61 - 65
High Average	56 - 60
Average	46 - 55
Low Average	41 - 45
Below Average	36 - 40
Much Below Average	31 - 35
Very Much Below Average	<30

For purposes of comparison, this investigator made the following category comparisons in order to deal with the unequal number of descriptive categories used by the K-BIT and the SILS. Table 8 presents the specifics of how the principal investigator elected to group the unequal number of descriptive categories of the K-BIT and the SILS. It was decided that: the K-BIT's upper extreme is equivalent to the SILS's very superior; the K-BIT's well above average is equivalent to the SILS's superior; the K-BIT's above average is equivalent to the SILS's above average and high average; the K-BIT's average is equivalent to the SILS's average; the K-BIT's below average is equivalent to the SILS's low average and below average; the K-

BIT's well below average is equivalent to the SILS's much below average; and the K-BIT's lower extreme is equivalent to the SILS's very much below average.

Table 8

K-BIT and SILS Descriptive Categories Comparison

K-BIT		SILS	
Descriptive Category	Percentile Rank Range	Descriptive Category	Percentile Rank Range
Upper Extreme	98 - >99.9	Very Superior	>71
Well Above Average	91 - 97	Superior	66 - 70
Above Average	75 - 90	Above Average, High Average	61 - 65, 56 - 60
Average	25 - 73	Average	46 - 55
Below Average	9 - 23	Low Average, Below Average	41 - 45, 36 - 40
Well Below Average	2 - 8	Much Below Average	31 - 35
Lower Extreme	<0.1 - 02	Very Much Below Average	<30

Descriptive Analysis

The tests were scored following completion of all subject data collection. The data were analyzed by the principal researcher and presented using descriptive and quantitative techniques. Certain statistical analyses such as complete intercorrelation matrix and statistical comparisons of all score differences could not be completed because of small sample size and the inflated error rate that would result. Sample size allowed: (a) determination of response rate; (b) calculation of individual subject's percentile ranks on K-BIT and SILS for vocabulary, matrices/abstract, and composite/total; (c) determination of descriptive category that corresponded with received percentile ranks and *t*-scores; (d) calculation of ± score differences in percentile ranks for each individual subject for vocabulary, matrices/abstract, and composite/total; and (e) calculation of ± score percentile rank point differences when comparing individual subject's K-BIT results to SILS percentile rank; (f) comparison of K-BIT descriptive categories and percentile rank ranges to the SILS descriptive categories and percentile rank ranges; and (g) analysis of 14 and 15-year-old subjects' percentile ranks on the K-BIT and SILS to determine the effects of norms on scores.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The purpose of this study was to compare normal adolescent performance on two screening tools of mental ability: the K-BIT, a combined verbal/nonverbal tool, and the SILS, a nonverbal tool. Seventeen adolescents ranging in age from 14 to 17 years were administered the above-mentioned mental ability screening tools. Tests were scored and data analysis was completed to respond to the research question: Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?

Study Limitations

There were a number of limitations inherent in this comparison study. First, 40 subject packets were distributed. Only 24 subjects responded. The response rate for this study was 60%, with 7 subject positions unfilled due to a combination of lack of response and subjects who declined to participate. Second, the proposed subject distribution was 50% male and 50% females, whereas the actual final subject distribution was 60% males and 40% females (9 males and 8 females). In light of these limitations, the study results are presented.

Comparison of Individual Subject's Test Scores

The research question asked, "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?" SILS and K-BIT raw scores were converted into standard scores and *t*-scores. Standard scores and t-scores were then converted into percentile ranks and descriptive categories. The resulting percentile ranks and descriptive categories were used to answer the research question. The individual subjects' subtest performance on the K-BIT and the SILS in terms of their percentile rank and descriptive category performance on each of the following are included in Appendix D: vocabulary subtest, matrices/ abstract subtest and the composite/total score. Furthermore, Appendix D presents for each subject, the calculation of ± percentile rank point differences when comparing percentile rankings of each individual subject on K-BIT and SILS subtests and overall composite score. An overview of the subjects' performance in terms of percentile rankings on the K-BIT and SILS vocabulary subtest, matrices/abstract, and total/composite score are presented in Table 9.

Vocabulary percentile ranks and descriptive categories. Both tests have vocabulary subtests. The subjects' percentile ranks on the K-BIT ranged from 47 to 91. The subjects' percentile ranks on the SILS ranged from <1 to 88. Comparison of each of the subject's vocabulary percentile ranks revealed point differences as small as 3 to as large as 58 percentiles. It is notable that 6 of the 17 subjects' vocabulary K-BIT and SILS percentile ranks were within 5 points of each other.

Twelve subjects earned a higher percentile rank on the K-BIT vocabulary subtest when compared to the SILS vocabulary subtest.

Table 9

Range of Subject Performance on the K-BIT and SILS in Terms of Percentile Rankings

Subtest Name	K-BIT Percentile Rank Range	SILS Percentile Rank Range
Vocabulary	47-91	<1 - 88
Matrices/Abstract	7 - 97	70 - 95
Total/Composite	32 - 95	54 - 94

Table 10 summarizes the study's findings in terms of the distribution of subjects' performance according to corresponding descriptive category scores. The breakdown of subjects' vocabulary K-BIT scores resulted in the following distribution of K-BIT's descriptive categories: 6 subjects scored *average*, 9 subjects scored in the *above average* category, and 2 subjects scored *well above average*. In comparison, one the SILS descriptive categories distribution was as follows: 4 subjects scored *low average/below average*, 5 subjects scored *average*, and 8 subjects scored *above average/high average*. A direct comparison of each individual's descriptive category vocabulary scores on the two tests scores revealed 8 equivalent matches. Seven of the 17 subjects matched by one category ± higher or lower (e.g., K-BIT *average* to SILS *low average*).

Table 10

Distribution of Subjects Performance According to Corresponding Descriptive Category Scores (DCS) on the K-BIT and SILS Measures of Mental Ability

Subtest	K-BIT Descriptive Category	SILS Descriptive Category	Subjects Whose K-BIT Percentile Fell in this Range (*n*)	Subjects Whose SILS Percentile Fell in this Range (*n*)	Direct Matches Across SILS and K-BIT DCS for Individual Subjects (*n*)
Vocabulary	Upper Extreme	Very Superior	0	0	0
	Well Above Average	Superior	2	0	0
	Above Average	Above Average, High Average	9	8	5
	Average	Average	6	5	3
	Below Average	Low Average, Below Average	0	4	0
	Well Below Average	Much Below Average	0	0	0
	Lower Extreme	Very Much Below Average	0	0	0
Matrices/ Abstract	Upper Extreme	Very Superior	0	0	0
	Well Above Average	Superior	4	1	0
	Above Average	Above Average, High Average	5	15	4
	Average	Average	7	1	0
	Below Average	Low Average, Below Average	0	0	0
	Well Below Average	Much Below Average	1	0	0
	Lower Extreme	Very Much Below Average	0	0	0
Total/ Composite	Upper Extreme	Very Superior	0	0	0
	Well Above Average	Superior	2	0	0
	Above Average	Above Average, High Average	9	13	7
	Average	Average	6	4	2
	Below Average	Low Average, Below Average	0	0	0
	Well Below Average	Much Below Average	0	0	0
	Lower Extreme	Very Much Below Average	0	0	0

Matrices/abstract percentile ranks and descriptive categories. The subjects' percentile ranks on the K-BIT ranged from 7 to 97. The subjects' percentile ranks on the SILS ranged from 70 to 95. Comparison of each of the matrices/abstract percentile ranks revealed individual point differences as small as 1 to as large as 69 percentiles. Six of the 17 subjects' vocabulary K-BIT and SILS percentile rank were within 5 points of each other. Five subjects earned a higher percentile rank on the K-BIT matrices as compared to their percentile rank on the SILS abstract.

The K-BIT's descriptive categories for subjects' matrice subtest scores resulted in the following placements: 1 subject scored *well below average*, 7 subjects scored *average*, 5 subjects scored *above average*, and 4 subjects scored *well above average*. In comparison, application of the SILS descriptive categories to subjects' abstract scores resulted in the following placements: 1 subject scored *average*, 4 subjects scored *high average*, and 11 subjects scored *above average*, and 1 subject scored *superior*. A direct comparison of each individual's descriptive category matrices and abstract scores revealed 4 equivalent matches. Ten of the 17 subjects matched by one category ± higher or lower (e.g., K-BIT *average* to SILS *low average*).

Composite/total percentile ranks and descriptive categories. The subjects' percentile ranks on the K-BIT ranged from 32 to 95. The subjects' percentile ranks on the SILS ranged from 54 to 94. Comparison of each of the subject's composite/total percentile ranks revealed point differences as small as 1 to as large as 34. Four of the 17 subjects' total/composite K-BIT and SILS percentile ranks were within 5 points of each other. Eight subjects earned a higher percentile rank on the K-BIT composite subtest as compared to their SILS total percentile rank.

The K-BIT's descriptive categories for subjects' composite scores resulted in the following placements: 6 subjects scored *average*, 9 subjects scored *above average*, and 2 subjects scored *well above average*. In comparison, application of the SILS descriptive categories to subjects' total scores resulted in the following placements: 4 subjects scored *average*, 5 subjects scored *high average*, and 8 subjects scored *above average*. A direct comparison of each individual's descriptive category composite and total scores revealed 9 equivalent matches. Eight of the 17 subjects matched by one category ± higher or lower (e.g., K-BIT *average* to SILS *low average*).

Summary of subjects' percentile rank differences on the K-BIT compared to the SILS. Percentile rank comparisons were made of the 17 subjects' K-BIT vocabulary subtest scores to the SILS's vocabulary subtest scores. Percentile rank comparisons were made of the 17 subjects' K-BIT matrice subtest scores to the SILS's abstract subtest scores. These comparisons revealed mixed results, ranging from as small as a 1 point difference to as large as a 61-point difference. Comparison of the K-BIT composite scores to the SILS total scores also revealed mixed results, ranging from 1 to 28 points.

Additional analyses: Effects of norming on scores. Norms were not provided for 14 and 15-year-old subjects for SILS test results in the SILS test manual. As previously reported, normative data for 16-year-olds were used for the 14 and 15-year-old subjects in this study, thus their percentile rankings and descriptive categories were obtained from data normed for 16-year-olds. It was questioned whether or not this led to the mixed findings of this study. It was decided to look at the data of the 14 and 15-year-old subjects more closely.

A comparison of the ten 14 and 15-year-old subjects whose percentile ranks were normed against 16-year-old norms revealed mixed results. Seven of the 10 subjects demonstrated lower vocabulary percentile ranks on the SILS than on the K-BIT. Three of the 10 subjects demonstrated lower abstract percentile ranks on the SILS than on the K-BIT matrices. Five of the 10 demonstrated lower total percentile ranks on the SILS than on the K-BIT composite subtest. Results suggest use of the SILS 16-year-old norms for the 14 and 15-year-old subjects on the SILS was not the sole nor predominant cause of the mixed results found in differences on performance on the K-BIT and the SILS.

Discussion

The purpose of this study was to compare students' performance on the K-BIT to that on the SILS. This study was undertaken in order to determine if administration of the tests result in similar or differing test scores. This comparison study was undertaken because there was a need to determine if the SILS scores individuals similar to other mental ability screening tools. The information derived from this study would enable speech-language pathology researchers, such as Letcher-Glembo, to make a more informed decision regarding the continued use of the SILS as a mental ability tool in future research. This study was completed because there has not been a concurrent validity comparison made between the SILS and the more recently introduced K-BIT.

The research question asked, "Do the two tests yield similar percentile ranks and descriptive categories when administered to the same individual?" A comparison of all of the subjects' percentile ranks determined that, in this study, administration of the K-BIT and the SILS never resulted in the same percentile rank for any given individual. Scoring differences were noted for all subjects. That is, no subject received the same percentile ranking when administered the SILS vocabulary subtest and the K-BIT vocabulary subtest. Similarly, no subject received the same percentile ranking when administered the abstraction subtest of the SILS and the matrices subtest of the K-BIT. Furthermore, no subject's percentile ranking matched on the SILS and K-BIT total and composite scores respectively. These findings would suggest that either the tests address different features of the mental ability area than their subtest titles suggest or targets the proposed area of mental ability at a different difficulty level. Percentile ranks for individual subjects across the two mental ability screening tools were within 5 points on the vocabulary subtest 35% of the time. Similar results were found on the abstract/matrices subtest 35% of the time, but were found across the total/composite scores of the two tools only 24% of the time.

In addition to percentile ranks, the K-BIT and the SILS also provide descriptive categories to help interpret individual performance. These categories are intended to reflect in words the approximate distance from the group mean of each range of score, thereby giving a verbal translation of the normal curve (Kaufman & Kaufman, 1990). Of particular interest to the principal researcher were the notable differences in the spread of percentile ranks that the test manuals propose for the corresponding descriptive categories. The descriptive categories and corresponding percentile rank ranges do not appear to be comparable. An example of these differences is evident in a comparison of the percentile rank range for the two tests. The K-BIT's highest descriptive category, *upper extreme*, is 98 to >99.9, a total range of 2.0 percentile ranks. The percentile rank range for the SILS's highest descriptive category, *very superior*, is >71, a total range of 29 percentile ranks. The reverse appears to be true at each tests descriptive category midpoint. The percentile rank range for the K-BIT's midpoint descriptive category, *average*, is 25 to 73, a total range of 48 percentile ranks. The percentile rank range for the SILS's midpoint descriptive category, *average*, is 46 to 55, a total range of 9 percentile ranks. The authors of each test seem to have utilized differing rational in their decisions and design of descriptive categories and corresponding percentile rank ranges. The K-BIT's design utilizes smaller percentile rank ranges on the upper and lower categories, with percentile rank ranges gradually increasing up until the midpoint descriptive category. The SILS, on the other hand, appears to place it's largest percentile rank ranges on the outer most categories, with smaller percentile rank ranges surrounding a larger midpoint descriptive category range. It is not known what direct impact these findings may have had on this study, but it is assumed that it may have adversely effected descriptive category comparisons.

If one studies the performance of the 17 subjects on the two subtests and one total/composite measure, 51 potential comparisons could be made when comparing test performance on one measure to test performance on the other. A comparison of the descriptive categories of all subjects found 22 instances out of the possible 51 where the K-BIT and the SILS described the subjects the same. Of the 17 subjects, only 1 subject, a 17-year-old male, was found to have similar descriptive category scores on both subtests and the composite/total score. Fourteen subjects were found to have similar descriptive category scores across one of the measures' subtests or across the two measures' composite/total score. A review of these 14 subjects' ages revealed that 3 of the subjects were 14 years old, 4 of the subjects were 15 years old, 2 were 16 years old, and 5 were 17 years old. This indicates that similarities between the K-BIT and the SILS descriptive categories are across the board and are not limited to certain age groups within this study. For this study, descriptive categories for the entire subject pool ranged from *average* to *well above average* for the K-BIT, and *low average* to *superior* for the SILS. This would suggest that the study recruited individuals with a wide range of mental abilities.

The SILS is not normed for individuals under 16 years of age. It was decided to apply the norms for 16-year-olds to the scores of the ten 14 and 15-year-old subjects. It was assumed that there would be a larger difference in the subjects' scores due to the fact that the norms for 16-year-olds were used with the 14 and 15-year-old subjects. There were, however, mixed results. Of the ten 14 and 15-year-old subjects, 70% scored lower on the SILS vocabulary subtest versus the K-BIT vocabulary, 30% scored lower on the SILS abstract subtest versus the K-BIT matrices, and 50% scored lower on the SILS total percentile rank versus the K-BIT composite percentile rank. This finding, while important, should be weighed against the fact that the small sample size of this study will inevitably produce an inflated error rate.

Additional Insights

Beyond the original research question, a retrospective analysis was performed by the principal investigator to determine which test provided the most useful information. The tests were rated for two types of environmental setting: schools and research. Multiple factors and considerations were considered, and six areas of comparison were selected: age range of the test, age range of the normative data, assessment areas, test administration, test qualifications, and length of test administration.

1. The K-BIT can be given to younger children than the SILS. This would make the K-BIT a more useful testing choice for schools because one test could be purchased and given to the full range of school-age children. These same reasons would make the K-BIT a good choice for research settings.

2. The K-BIT provides normative data from 4 to 90 years of age. The SILS provides normative data from 16 to 64 years of age. The K-BIT would be a better choice for a school setting because standardized, normative data are a critical part of the information necessary for assessment and eligibility determination in the schools. Consideration of the diversity of subjects assessed in research settings would similarly make the K-BIT a preferred choice.

3. The K-BIT assesses both verbal and nonverbal ability. The SILS assesses nonverbal only. Concerns about unduly rewarding or penalizing an individual when assessing only verbal or nonverbal ability, makes the K-BIT a better choice for both school and research settings.

4. The K-BIT can only be administered individually. The SILS can be administered either individually or in a group setting. Use of the SILS may be indicated in research and school settings that require simultaneous administration

(group testing) of a mental ability tool to multiple individuals at any given single test administration time.

5. The K-BIT and the SILS can be administered by properly trained paraprofessionals. This makes both tests an acceptable choice for school and research settings.

6. The average administration time for the K-BIT ranges from 15 to 30 minutes. The administration of the timed SILS is 20 minutes. This makes both tests an acceptable choice for school and research settings.

Using these six criteria, it appears that within a school environment the K-BIT may be a better mental ability screening tool choice. This is based upon the K-BIT's wider age range of administration and norms, the fact that it assesses verbal and nonverbal modalities, and can be administered by paraprofessionals in 30 minutes or less.

Using these same six criteria, it appears that within a research environment, the SILS and K-BIT may both be a good mental ability screening tool choice. This takes into account that the K-BIT has a wider age range of test administration and norms, it assesses verbal and nonverbal modalities, and can be administered by paraprofessionals in 30 minutes or less. The potential drawbacks of using the K-BIT for research assessments are that it must be administered individually. The SILS, on the other hand, rates high for its ability to be administered by paraprofessional to individual or groups in 20 minutes. Potential drawbacks to the use of the SILS in research assessments are that it has a more limited age administration and norms range and it only measures mental ability through one modality. Given these perceived strengths and weaknesses, the decision as to which mental ability screening tool to use for research assessment should be made by the individual researcher based upon the subjects' age and perceived research data needs.

Beyond the original research question, the researcher wondered which test the subjects preferred. This question was raised due to the fact that both tests purport to measure mental ability, but approach the measurement in different ways. The SILS is a self-administered paper and pencil test that is administered in 20 minutes, whereas the K-BIT is administered individually, requiring verbal and nonverbal responses. The average administration time for the K-BIT varies from 15 to 20 minutes for 4 to 7-year-olds and up to 20 to 30 minutes for subjects from 8 to 90 years of age. The estimated administration time for this study's subjects was 20 to 25 minutes. The actual administration time for this study ranged from 24 to 30 minutes.

Upon completion of both tests, the researcher polled subjects as to whether they liked one test better than the other. Sixteen of the 17 subjects stated that they preferred the SILS to the K-BIT. Comments included: (a) "I could return to questions if necessary, on the SILS"; (b) "I didn't feel pressured to know the answer, because part of the SILS was multiple-choice"; (c) "I didn't have to feel bad about not knowing an answer on the SILS, but on the K-BIT you knew immediately if my answer was wrong."

CHAPTER V

SUMMARY AND IMPLICATIONS

Summary

The purpose of this thesis was to compare the performance of normal adolescents on the K-BIT to that of the SILS to address the main objective: determination of how individuals are ranked in terms of percentile rank and descriptive categories on the two measures' comparable subtests and total scores. Subjects were recruited through public schools, private schools, and youth agencies. Participation response rate was 60%. Seventeen subjects were administered two screening tools of mental ability and a biographical questionnaire.

Findings

Three hypotheses were formed to address the study objectives. The first hypothesis states that a subject's percentile rank and the descriptive category on the K-BIT vocabulary subtest and on the SILS verbal subtest will be similar for adolescents in regular education. The results of this study indicated that the percentile rank and descriptive category is not always similar. Differences were discovered in the subjects' percentile ranks on the two vocabulary tests ranging from 3 to 58 percentiles. Only 6 of the 17 subjects' vocabulary percentile ranks were within 5 points or less of each other. Differences in subjects' descriptive category scores on the two vocabulary tests were also noted, although 8 of the subjects' descriptive categories matched across the two tests. The results indicate that a subject's performance on the K-BIT vocabulary subtest performance is more likely to appear similar to his/her performance on the SILS vocabulary subtest if descriptive categories are used as the measure of comparison, rather than percentile rankings.

The second hypothesis states that a subject's percentile rank and descriptive category on the K-BIT matrices subtest and on the SILS abstract subtest will be similar for adolescents in regular education. The results of this study indicated that the percentile rank and descriptive category is not always similar. Differences were discovered in the subjects' performance scores on the abstract/matrices subtests ranging from 1 to 69 percentiles. Only 4 of the 17 subjects' abstract/matrices percentile ranks were within 5 points or less of each other. Differences in subjects' descriptive category scores on the two vocabulary tests were also noted. Only 4 of the subjects' descriptive categories matched when administered the two subtests of the K-BIT and SILS that purport to test the same construct.

The third hypothesis states that a subject's percentile rank and descriptive category on the K-BIT composite and on the SILS total will be similar for adolescents in regular education. The results of this study indicated that the percentile rank and descriptive category is not always similar. Differences were discovered in the subjects' performance on the composite/total scores when comparing across the two tests, ranging from 1 to 34 percentiles. Four of the 17 subjects' vocabulary percentile ranks were within 5 points of each other. Differences in subjects' descriptive category scores on the two vocabulary tests were also noted. Only 9 of the subjects' descriptive categories for composite/total performance matched exactly across administration of the K-BIT and the SILS.

Implications

Clinical Implications

In 1994 study, Schonweiler found intelligence testing to be a necessary component in the research of speech development in children. Speech-language pathologists, however, cannot ethically administer most intelligence tests. A possible answer to this need is the use of mental ability screening tools, which provide an overview of general mental functioning rather than pinpointing specific aspects of intelligence. There are many types of situations where mental ability screening tools could be used by speech-language pathologists. For example, school-based speech-language pathologists could use mental ability screening tools as a component of the eligibility assessment, 3-year reevaluation, and decision-making process.

The results from this study present evidence for a need by clinicians and researchers to review proposed screening tools when deciding upon a mental ability screening tool. The type of information needed by the test administrator and the testing population should also be considered. Although both the K-BIT and the SILS share similar scoring categories, they also offer scores specific to each test. The assumption that all screening tools provide similar scores should be questioned based upon this study's research results.

Another factor to considering when choosing a screening tool is the amount of time required to complete testing. Choosing a test based solely on the length of administration may adversely effect test results as well as impact a subjects motivation to perform. The SILS is administered in two 10-minute timed subtests. Only the definitions subtest is timed with the K-BIT. Examinees are allowed a maximum of 30 seconds to respond to each item. That means that the maximum time spent on the definitions subtest alone should be 18 minutes and 30 seconds. Estimated administration time for the complete K-BIT screening test is listed in the test manual by age range. The clinical implications of the current study suggest that while length of administration time is an important consideration, time should not be the sole factor on which a mental ability screening tool is selected.

Finally, the clinical implications of this study point out the need to examine closely actual normative data available for any test to be given prior to test administration. For example, a review of the SILS test manual revealed the following warnings:

> Although Shipley (1940) originally developed the scale to include younger children (down to age 8), use of this scale for children below age 14 is not recommended due to lack of age-appropriate norms. In particular, use of the Shipley in individual evaluations or to influence decisions about school placement in this younger age group should be avoided since the results could be misleading.
>
> Because the scale is self-administered, it is not recommended for individuals who are either unable or unwilling to cooperate. It is also not appropriate for use with individuals who have suspected mental retardation or have suffered profound cognitive deterioration due to neurological or severe psychological disturbances. Rather the Shipley is intended as a screening device for the broad band of near-average intelligence and for individuals who have suffered only mild-to moderate cognitive impairments. Because of the self-administered nature of the scale, its content, and the way it was standardized, its application should be restricted to individuals of at least below-average intelligence who are without specific language handicaps. (Zachary, 1986, p. 2)

It is now realized that these warnings alone seem to make the SILS an unlikely choice for clinicians working in school environments and many researchers working with mixed populations.

Future Research Implications

Studies of this nature often generate additional questions to be explored. These questions are usually compounded when the results are mixed, as was the case in this study. The results and impressions of this study suggest a need for an expansion of this study comparing normal subjects on the K-BIT and the SILS to that of a comprehensive IQ test, such as the WISC-III. This type of comparison would answer the question of which screening tool correlates better with commonly used tests such as the WISC-III. Along these same lines, it would be fascinating to complete a study of a short version of the WISC-III, short version of the WAIS-R, along with the K-BIT and SILS. As previously proposed by the NIH reviewer, the short versions of the WISC-III and the WAIS-R could be based on three, four, or five subtests. Since these shortened versions of the tests could include verbal and nonverbal functioning, it would allow for an excellent comparison to see which tools(s) provide the best estimate of mental ability. As proposed by Kaufman et al. (1996), the WISC-III SF could consist of the similarities, arithmetic, picture completing, and block design subtests.

It is important for speech-language pathologists to have as accurate an estimate as possible in light of the judgments that are made based on the relationship between mental ability and linguistic ability. Such a comparison would assist in better mental ability tool selection beyond what the current study could provide.

Another area of interest would be to duplicate this study with a larger sample size that was appropriately normed by both screening tools, rather then having to make accommodations for younger subjects. Namely, no subjects younger than 16 years of age would be included. The larger study could examine score comparisons to determine whether differences exist between performance on the K-BIT and SILS utilizing more formal statistical analysis techniques.

Additional studies should document the use of mental ability screening tools in communication disorder research. It is hoped that the results of this study may also stimulate further research into comparison between testing tools utilized by speech-language pathologists for purposes of assessment and research and how mental ability test score performance correlates with level of linguistic function.

REFERENCES

American Psychological Association. (1985). *Standards for educational and psychological testing* (rev. ed.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.) Washington, DC: Author.

Bartz, W. R. (1968). Relationship between WAIS, Beta, and Shipley-Hartford scores. *Psychological Reports, 22*, 676.

Brookshire, R. H., (1992). *An introduction to neurogenic communication disorders*. St. Louis, MO: Mosby Yearbook.

Burton, B. D., Naugle, R. I., & Schuster, J. M. (1995). A structural equation analysis of the Kaufman Brief Intelligence Test and the Wechsler Adult Intelligence Scale-Revised. *Psychological Assessment, 7*, 538-540.

Canivez, G. L. (1995). Validity of the Kaufman Brief Intelligence Test: Comparisons with the Wechsler Intelligence Scale for Children - third edition. *Assessment, 2*, 101-111.

Carvajal, H., Hayes, J., Lackey, K., Rathke, M., Wiebe, D., & Weaver, K. (1993). Correlations between scores on the Wechsler Intelligence Scale for Children-III and the General Purpose Abbreviated Battery of the Stanford Binet IV. *Psychological Reports, 72*, 1167-1170.

Coleman, J. (1993). *The early intervention dictionary: A multidisciplinary guide to terminology*. Bethesda, MA: Woodbine House.

Connery, S., Katz, D., Kaufman, A., & Kaufman, N. (1996). Correlations between two short cognitive tests and a WISC-III Short Form using a sample of adolescent inpatients. *Psychological Reports, 78*, 1373-1378.

Dennis, D. M. (1973). Predicting full scale WAIS IQs with the Shipley-Hartford. *Journal of Clinical Psychology, 29*, 3666-368.

Elliot, C. (1990). *Differential ability scales*. San Antonio, TX: Psychological Corporation.

Frisch, M., & Jessop, N. (1989). Improving WAIS-R estimates with the Shipley-Hartford and Wonderlic Personnel Tests: Need to control for reading ability. *Psychological Reports, 65*, 923-928.

Goldenson, R. (Ed.). 1984). *Longman dictionary of psychology and psychiatry*. New York: Longman Inc.

Harnish, M., Beatty, W., Nixon, S., & Parsons, O. (1994). Performance by normal subjects on the Shipley Institute of Living Scale. *Journal of Clinical Psychology, 50*, 881-883.

John, K., & Rattan, G. (1992). Shipley Institute of Living Scale-Revised. In D. J. Keyser & R. C. Sweetland (Eds.), *Test critiques* (Vol. IX, pp. 491-495). Austin, TX: Pro-Ed.

Kamphaus, R., & Reynolds, C. (1987). *Clinical and research applications of the K-ABC*. Circle Pines, MN : American Guidance Services.

Kaufman, A. S. (1972). A four-test short form of the Wechsler Preschool and Primary Scale of Intelligence. *Journal of Consulting and Clinical Psychology, 39*, 361-396.

Kaufman, A. S. (1976). A four-test short form of the WISC-R. *Contemporary Educational Psychology, 1*, 180-196.

Kaufman, A. S., & Kaufman, N. L. (1990). *Kaufman Brief Intelligence Test: Manual*. Circle Pines, MN: American Guidance Services.

Kaufman, A., Kaufman, N., Balgopol, R., & McLean, L. (1996). Comparison of three WISC-III short forms: Weighing psychometric, clinical, and practical factors. *Journal of Clinical Child Psychology, 25*, 95-105.

Kellogg, C., & Morton, N. (1978). *Revised Beta Examination-II*. San Antonio, TX: Psychological Corporation.

Kirk, R., & Gurmal, R. (1992). Review of Shipley Institute of Living Scale-Revised. In D. Keyser & R. Sweetland (Eds.). *Test critiques* (Vol. IX, pp 491-495). Austin, TX: Pro-Ed.

Lamke, T., Nelson, M., & French, J., (1973). *Henmon-Nelson tests of mental ability*. Chicago: Riverside.

Letcher-Glembo, L. (1989). *The career maturity of adolescents with clefts*. Unpublished doctoral dissertation, University of Minnesota.

Marquardt, T., & Sussman, H. (1991). Developmental apraxia of speech: Theory and practice. In D. Vogel & M. Carnito (Eds.), *Treating disordered speech motor control: For clinicians*. Austin, TX: Pro-Ed.

Miller, D. (1995). Review of the Kaufman Brief Intelligence Test. In J. Conoley & J. Impara (Eds.), *The twelfth mental measurements yearbook* (pp. 533-534). Lincoln, NE: The Buros Institute of Mental Measurements.

Naglieri, J. A. (1985). *Matrix analogies test-short form*. San Antonio, TX: Psychological Corporation.

Naglieri, J. A. (1996). *Naglieri nonverbal ability test-multilevel form*. San Antonio, TX: Psychological Corporation.

Naugle, R., Chelune, G., & Tucker, G. (1993) Validity of the Kaufman Intelligence Test. *Psychological Assessment, 5*, 182-186.

Parker, L. D. (1993). The Kaufman Brief Intelligence Test: An introduction and review. *Measurement and Evaluation in Counseling and Development, 26*, 152-156.

Paul, R. (1995). *Language disorders from infancy through adolescence; Assessment and intervention*. St. Louis, MO: Mosby.

Paulson, M. J., & Lin T. (1970). Predicting WAIS IQ from Shipley Hartford Scores. *Journal of Clinical Psychology, 26*, 453-461.

Phelps, L., Bell, M., & Scott, M. (1988). Correlations between the Stanford-Binet: Fourth Edition and the WISC-R with a learning disabled population. *Psychology in the Schools, 25*, 380-382.

Prewett, P. (1992a). The relationship between the Kaufman Brief Intelligence Test (K-BIT) and the WISC-R with incarcerated juvenile delinquents. *Educational and Psychological Measurement, 52*, 977-982.

Prewett, P. (1992b). The relationship between the Kaufman Brief Intelligence Test (I-BIT) and the WISC-R with referred students. *Psychology in the Schools, 29*, 25-27.

Prewett, P. (1995). A comparison of two screening tests (the Matrix Analogies Test-Short Form and the Kaufman Brief Intelligence Test) with the WISC-III. *Psychological Assessment, 7*, 69-72.

Prewett, P., & Farheny, M. (1994). The concurrent validity of the Matrix Analogies Test - Short Form with the Stanford-Binet: Fourth Edition and KTEA-BF (Academic Achievement). *Psychology in the Schools, 31*, 20-25.

Prewett, P., & Matavich, M. (1994). A comparison of referred students' performance on the WISC-III and the Stanford-Binet Intelligence Scale: Fourth Edition. *Journal of Psychoeducational Assessment, 12*, 42-28.

Prewett, P., & McCaffery, L. (1993). A comparison of the K-BIT with the Stanford-Binet, a two subtest short-form, and the K-TEA brief form. *Psychology in the Schools, 30*, 299-304.

Retzlaff, P., Slicner, N., & Gibertini, M. (1986). Predicting WAIS-R scores from the Shipley Institute of Living Scale in a homogenous sample. *Journal of Clinical Psychology, 42*, 357-359.

Robinson, A. (1987). Matrix analogies test. In D. J. Keyser & R. C. Sweetland (Eds.), *Test critiques* (Vol. VI, pp. 336-340). Austin, TX: Pro-Ed.

Rothlisberg, B. A. (1987). Comparing the Stanford-Binet, fourth edition to the WISC-R: A concurrent validity study. *Journal of School Psychology, 25*, 193-196.

Schonweiler, R. (1994). Synopsis results on 1,300 children with delayed speech development from an etiopathogenetic, audiologic, and phenomenologic viewpoint. *Folia-Phoniatrica et Logopaedica, 46*, 18-26.

Seligman, L. (1980). *Assessment in developmental career counseling*. Cranston, RI: Carroll Press.

Shames, G., Wiig, E., & Secord, W. (1994). Scope of practice, speech-language pathology and audiology. In *Human communication disorders: An Introduction* (Appendix A). New York: Merrill Press.

Shipley, W. C. (1940). A self-administering scale for measuring intellectual impairment and deterioration. *Journal of Psychology, 9*, 371-377.

Thompson, A. A. (1987). Methodological issues in the clinical evaluation of two and four subtest forms of the WAIS-R. *Journal of Clinical Psychology, 43*, 142-143.

Watson, C., Plemel, D., Schaefer, A., Raden, M., Alfano, A., Anderson, P., Thomas, D., & Anderson, D. (1992). The comparative concurrent validities of the Shipley Institutes of Living Scale and the Henmon-Nelson Tests of Mental Ability. *Journal of Clinical Psychology, 48*, 233-239.

Wechsler, D. (1981). *Wechsler Adult Intelligence Scale-Revised.* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1989). *Wechsler Preschool and Primary Scale of Intelligence-Revised.* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1991). *Wechsler Intelligence Scale for Children-third edition.* San Antonio, TX: Psychological Corporation.

Wochnik, M. (1988). Verbal or nonverbal intelligence tests in speech-handicapped children. *Folia-Phoniatrica, 40*, 111-116.

Wonderlic, E., & Associates (1983). *Wonderlic personnel test.* Northfield, IL: Author.

Young, J. (1995). Review of the Kaufman Brief Intelligence Test. In J. Conoley & J. Impara (Eds.), *The twelfth mental measurements yearbook* (pp 534-536). Lincoln, NE: The Buros Institute of Mental Measurements.

Zachary, R. A. (1986). *Shipley Institute of Living Scale: Revised Manual.* Los Angeles: Western Psychological Services.

APPENDIX A

SUBJECT RECRUITMENT LETTER

Dear Adolescent and Family:

We are engaged in a study of the way teenagers, 14-17 years, decide on their future careers. We are particularly interested in finding out if persons with minor handicaps go about the task in different ways than persons with no handicaps. In order to complete this project, we need to collect information from adolescents who are not handicapped.

We invite you to participate in this project. We need you and one of your parents to sign the attached form below and return it to us. If you are interested in helping us out, we will call and make arrangements to see you at your convenience. We need about one hour of your time. During that time, you will fill out a questionnaire and take two tests. The questionnaire and tests will be used to determine how you are pursuing your career goals as well as your general intellectual skills.

Any information we obtain from you will be kept strictly confidential and disclosed only with your permission. You will not be identified in any written report or publication that results from this study. If you or your parents would like more information about this study, please contact Dr. Letcher-Glembo at (503) 725-8378.

If you decide not to participate, or decide to participate and then decide to drop out, it will have no effect on any future relations you may have with Portland State University. We hope you decide to take part in this study. However, if you decide not to participate, we will respect that decision. Please return the attached form to let us know.

Sincerely,

Lisa Letcher-Glembo, Ph.D.
Assistant Professor
Speech and Hearing Sciences
Portland State University

D. Melanie Peters, B.S.
Speech-Language Pathology Graduate Student
Speech and Hearing Sciences
Portland State University

If you have any concerns or questions about this study, please contact the Chair of Human Subjects Research Review Committee, Research and Sponsored Projects, 105 Neuberger Hall, Portland State University, Portland, OR 97207. Telephone number: (503) 725-3417

Please keep a copy of this document for your records.

APPENDIX B

PRELIMINARY RESPONSE FORM

Preliminary Response Form

Name:	
Address:	
City/State:	Zip:
Telephone:	Birthdate:
Parent(s) name(s):	
Parent(s) work phone number:	
Best days/times to be reached:	

☐Yes, I wish to participate in this study.

☐No, I do not wish to participate in this study.

Signature of Adolescent Consenting to Participate

Signature of Parent/Guardian

APPENDIX C

SUBJECT CONSENT FORM

Informed Consent For Subjects

I,___________________________________, agree to take part in this research project on adolescents.

I understand the study involves participating in multiple testing tasks and a biographical questionnaire.

I understand that, because of this study, I may experience an inconvenience of time commitment. Participation in this study will require a "one time only" time commitment of approximately 1 hour.

I will not be paid for my participation.

I may not receive any direct benefit from taking part in this study, but the study may help to increase knowledge that may help others in the future.

Lisa Letcher-Glembo, principal researcher, has offered to answer any questions I have about the study and what I am expected to do.

She has promised that all information I give will be kept confidential to the extent permitted by law, and that the names of all people in the study will remain anonymous.

I understand that I do not have to take part in this study and that refusal or agreement to participate will not affect my course grade or my relationship with Portland State University.

I have read and understand the above information and agree to take part in this study.

_______________________________ _______________________________

Signature Date

If you have concerns or questions about this study, please contact the Chair of the Human Subjects Research Review Committee, Research and Sponsored Projects, 105 Neuberger Hall, Portland State University, Portland, OR 97207, Telephone (503) 725-3417.

APPENDIX D

COMPARISON OF INDIVIDUAL SUBJECT PERFORMANCE

ON THE K-BIT AND THE SILS

Comparison of Individual Subject Performance on the K-BIT and the SILS

(DC = Descriptive Category)

Subject 14-1 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	77	Above Average	24	Low Average	+53
Matrices/Abstract	86	Above Average	90	Above Average	-04
Composite/Total	84	Above Average	73	High Average	+11

Subject 14-2 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	58	Average	<1	Low Average	+58
Matrices/Abstract	42	Average	90	Above Average	-42
Composite/Total	50	Average	76	High Average	+26

Subject 14-3 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	70	Average	76	High Average	-06
Matrices/Abstract	96	Well Above Average	82	Above Average	+14
Composite/Total	90	Above Average	82	High Average	+08

Subject 14-4 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	75	Above Average	42	Average	+33
Matrices/Abstract	7	Below Average	76	High Average	-69
Composite/Total	32	Average	66	Average	+34

Subject 15-1 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	75	Above Average	31	Low Average	+44
Matrices/Abstract	75	Above Average	82	High Average	-08
Composite/Total	77	Above Average	66	Average	+11

Subject 15-2 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	82	Above Average	88	Above Average	-06
Matrices/Abstract	97	Well Above Average	93	Above Average	+04
Composite/Total	95	Well Above Average	79	High Average	+16

Subject 15-3 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	47	Average	42	Average	+05
Matrices/Abstract	70	Average	82	High Average	-12
Composite/Total	61	Average	70	Average	-09

Subject 15-4 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	50	Average	31	Low Average	+19
Matrices/Abstract	90	Above Average	70	Average	+20
Composite/Total	75	Above Average	54	Average	+21

Subject 15-5 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	82	Above Average	86	Above Average	-04
Matrices/Abstract	45	Average	86	Above Average	+41
Composite/Total	66	Average	88	Above Average	+22

Subject 15-6 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	88	Above Average	76	High Average	+12
Matrices/Abstract	32	Average	90	Above Average	-58
Composite/Total	66	Average	94	Above Average	-28

Subject 16-1 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	63	Average	66	Average	-03
Matrices/Abstract	66	Average	95	Superior	-29
Composite/Total	66	Average	90	Above Average	-24

Subject 16-2 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	77	Above Average	88	Above Average	-11
Matrices/Abstract	70	Average	90	Above Average	-20
Composite/Total	75	Above Average	92	Above Average	-07

Subject 17-1 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	88	Above Average	82	High Average	+06
Matrices/Abstract	79	Above Average	93	Above Average	-14
Composite/Total	87	Above Average	92	Above Average	-05

Subject 17-2 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	91	Well Above Average	88	Above Average	+03
Matrices/Abstract	91	Well Above Average	90	Above Average	+01
Composite/Total	93	Well Above Average	92	Above Average	+01

Subject 17-3 Male					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	70	Average	66	Average	+04
Matrices/Abstract	91	Well Above Average	86	Above Average	+05
Composite/Total	86	Above Average	82	High Average	+04

Subject 17-4 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	79	Above Average	66	Average	+13
Matrices/Abstract	68	Average	95	Superior	-27
Composite/Total	75	Above Average	90	Above Average	-15

Subject 17-5 Female					
	K-BIT		SILS		K-BIT %
Subtest	%	DC	%	DC	Difference (±)
Vocabulary	91	Well Above Average	88	Above Average	+03
Matrices/Abstract	75	Above Average	86	Above Average	-09
Composite/Total	87	Above Average	88	Above Average	-01