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The purpose of this study was to investigate the relationships among the scores of the Shipley Institute of Living Scale (SILS) and the Wechsler Adult Intelligence Scale-Revised (WAIS-R). Additional issues explored were the relationship between the SILS Vocabulary subscale and the WAIS-R Vocabulary subscale and if there were gender differences between scores on the SILS and WAIS-R. The sample consisted of 32 undergraduate college students (16 women and 16 men) ranging in age from 18 to 23.

There was a significant correlation between the SILS estimated WAIS-R Full Scale IQ scores and the obtained WAIS-R Full Scale IQ scores ($r = .39$, $p < .05$), critical value .3494. The correlations between the SILS estimated WAIS-R Full Scale IQ scores and the WAIS-R Verbal and Performance IQ scores ($r = .33$ and .30, $p < .05$) respectively, were not significant. SILS Vocabulary subtest scores had a $r = .65$ ($p < .05$) correlation to WAIS-R Vocabulary subtest scores. No significant differences between men and women group means were found on the SILS and WAIS-R scores. The relationships between the SILS scores and WAIS-R scores were inconclusive. They do suggest caution should be exercised when interpreting SILS scores with individuals in this age group.

Relationships Among the Scores of the Shipley Institute of Living Scale and the Wechsler Adult Intelligence Scale-Revised

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I would like to dedicate this work to my mother, Elma H. Kobler, and to the memory of my father, Dr. Carl D. Kobler, M.D. (1923 to 1993).

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TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

CHAPTER 1

INTRODUCTION

The development and use of psychometric instruments for assessing human behavior, intelligence and mental/emotional impairment have been major considerations for the field of psychology for over a century. Currently there are literally thousands of tests on the market to assess just about every aspect of the human condition. Combined with the fact the field of scientific psychology has become very diverse and specialized since its inception in the late 1800s, there are many screening instruments available to the professionals of today. Personality inventories, intelligence tests, and psychiatric status exams are some of the screening instruments employed by clinicians.

This study is concerned primarily with the area of clinical psychology and instruments designed to determine intellectual ability and psychiatric and/or neurological impairment. Although the clinical interview is still considered the most crucial part of an assessment, many assessments begin with a screening instrument of some sort. Screening instruments often provide the clinician with some details of the personality traits about one's prospective client and open up avenues of inquiry the clinician may wish to pursue during the clinical interview. The practitioner of today must be knowledgeable about the screening devices one chooses to apply. Inaccurate assessment can result in misdiagnosis and is potentially harmful to the client.

The types of instruments the clinician chooses as the initial screening tools often include a personality inventory and a brief intelligence test. The vast number of instruments to choose from is a double-edged sword. There is a smorgasbord of tests from

which to choose making the selection of the most effective instrument difficult. The clinician must ask if the instrument accurately measures what it is designed to measure and does so consistently under varying conditions; has the instrument withstood the test of time; has it held up under the scrutiny of researchers; how often has it been revised to meet the changing needs of a constantly changing society; how was the instrument developed and was it standardized on a representative population sample; and is the instrument sensitive to gender differences, socioeconomic differences, ethnic differences, age or developmental differences?

Two testing instruments that are in common use today and have withstood the test of time are the Shipley Institute of Living Scale (SILS), developed by W. C. Shipley in 1940 (Zachary, 1991) and the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). Although the SILS was developed in the 1930s and released in 1940, it remains intact as far as its original items are concerned (Deaton, 1992; Johnson, 1986; Kaufman, 1990; Zachary). This is not to say the SILS has not undergone revision. It was restandardized by Paulson and Lin in 1970 with a normative sample of 290 male and female psychiatric patients (Zachary). Based on their previous work with the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1981), Zachary, Crumpton, and Spiegel (1985) developed a continuous norming procedure for estimating WAIS-R Full Scale IQs (FSIQs) across various age groups, again using psychiatric patients as their normative sample. "In 1986 Zachary developed age adjusted norms for the Shipley and revised the SILS administration and interpretation manual." (Deaton; Johnson; Kaufman; Tamkin & Jackobson, 1987)

Several studies have been cited by Zachary (1991), the majority of which have restricted their sample groups to psychiatric patients only. The other studies cited used intact groups such as nursing students and psychiatric technicians. Zachary cited only four studies that addressed possible gender differences. Of the four studies, all were done with psychiatric patients or intact groups and showed conflicting results. All of the four studies used the Wechsler Adult Intelligence Scale (WAIS) and Shipley-Hartford Scale (SHS) as their testing instruments. The WAIS and SHS are the predecessors to the WAIS-R and SILS respectively. These studies are dated and suggest the need for more current gender difference studies using the most current versions of the Wechsler and Shipley testing instruments.

Although several criticisms have been directed at the SILS, the two criticisms this study was concerned with were the limited use of non-impaired (psychiatrically normal) homogeneous groups within specific age ranges and the lack of information with regard to gender differences. Retzlaff, Slicner, and Gibertini (1986) conducted a study of 18- to 24-year-old, men and women, military personnel who were considered non-impaired. With the results of their study, this indicated "Caution should be exercised when an individual's SILS score is used to estimate WAIS-R IQ if that person is in the age range 18 to 24, is psychiatrically normal, and/or has attained a SILS total score in the 53-67 range" (p. 359). Although their sample was comprised of 23 men and 18 women (mean age = 20.2 years), possible gender differences were not reported.

Pauker (1975) conducted a study on gender differences and predicting WAIS FSIQs from Shipley-Hartford scores. The Shipley-Hartford is the predecessor to the SILS. The

results indicated the estimated IQs were higher than WAIS obtained IQs of 63% of the female participants and 30% of the male participants. Concerns with this study were the ages of the participants ranged from 16 to 62 years; the sample was selected from hospital patients most of whom were psychiatrically impaired; and the study was dated and did not include either the SILS or WAIS-R.

The WAIS-R, on the other hand, is the standard by which all other adult intelligence tests are measured. The focus of this project was the study of the relationship of obtained SILS and WAIS-R scores. The study also included analysis of possible gender differences in obtained SILS and WAIS-R scores.

Results of this study were important to the academic areas of psychology and education in that they have provided additional information concerning the use of the SILS with non-impaired individuals and possibly indicated need for further research. It is important to the practitioners in both psychology and education in that the SILS is a commonly used instrument with both adults and adolescent school children, and it is important for these practitioners to use the best available screening devices in their assessments. If the SILS does not live up to what its advocates profess, then it should be used with caution, if at all, in the assessment of individuals.

Literature Review

After having worked with such individuals as Cattell, Spearman, and Pearson, David Wechsler joined Bellevue Psychiatric Hospital in New York City as chief psychologist in 1932. Prior to becoming the chief psychologist at Bellevue, Wechsler had begun working on a scale specifically designed for assessing the intellectual abilities of adults. The

original version (1939) of his intelligence scales, Wechsler-Bellevue I, was named after Bellevue Hospital (Edwards, 1974).

Previous experience with the administration of standardized intelligence, personality, and educational achievement tests helped prepare Wechsler for his work at Bellevue. Wechsler recognized the need for an intelligence scale for assessing adults from diverse backgrounds who had a variety of problems. At that time no such scale was available and children's scales, especially the Stanford-Binet, although acknowledged as inappropriate, continued to be used to assess adults (Edwards, 1974). Where other practitioners and educators saw intelligence tests as predictors of future achievement for children, Wechsler viewed them as useful clinical instruments for disturbed individuals (Kaufman, 1990).

Because Wechsler considered intelligence as multifaceted, his scales were comprised of subscales divided into two general areas, verbal and performance. By contrasting profiles on subtests and overall contrasts between verbal and performance scores, assessment of impairment became more specific with his multi-dimensional scales than with single score tests such as the Stanford-Binet. Due in part to the well established Stanford-Binet, Wechsler's original version caught on rather slowly. In 1946 Wechsler released the Wechsler-Bellevue II. Wechsler did not limit his work to adults, and in 1949 he released the Wechsler Intelligence Scale for Children (WISC) for testing 5-15 year olds. In 1955 Wechsler released the Wechsler Adult Intelligence Scale (WAIS).

> With the increasing stress on the psychoeducational assessment of learning disabilities in the 1960s and on neuropsychological evaluation in the 1970s, the

> Verbal-Performance discrepancies and subtest profiles yielded by Wechsler's scales were ready and waiting to overtake the one-score Binet (Kaufman, 1990, p. 8).

In 1967, he released the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) . A revised version of the WISC, the WISC-R, was published in 1974. The most recent revision of the WAIS was published in 1981. The WPPSI was revised in 1989, and the WISC underwent another revision and was released in 1991. Today the Wechsler Adult Intelligence Scale-Revised is the leading adult intelligence test on the market (Kaufman. Wechsler's contributions to the field of intelligence testing as a clinical tool are without parallel. About Wechsler, Edwards writes, "The names of contributors—Binet, Terman, Thorndike, Spearman, Thurstone—'hang together' in their diversity in a fashion unlike that of any other area. In our generation, their peer is found in David Wechsler" (1974, p. 3).

With the development of each new test came controversy over its perceived limitations. Again the questions as to sensitivity to gender, socioeconomic situation, culture, and ethnicity were asked. This emphasis on continually attempting to improve testing instruments resulted in frequent restandardizations and revisions with sample groups that better represented the general population. The desire by researchers to improve instruments has not diminished with time.

Defining Intelligence.

Undoubtedly one of the most difficult questions that arose with regard to intelligence testing remains, that is defining intelligence. In an address at the meeting of the American Psychological Association in 1975, David Wechsler described intelligence as:

> an aspect of behavior; it has to do primarily with the appropriateness, effectiveness, and worthwhileness of what human beings do or want to do. It is a many faceted entity, a complex of diverse and numerous components. It does not involve just one thing, and if treated as a capacity or as an ability, it must be perceived as an overall or global capacity (Wechsler, 1975, p. 135).

In the same address, Wechsler went on to say, "The assessment of intelligence inevitably is a value judgment" (Wechsler, 1975, p. 138). Wechsler (1939, 1958) defined intelligence as "the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment" (p. 3, p. 7).

In defense of intelligence tests, Wechsler stated:

> Intelligence is multifaceted as well as multi-determined. What it always calls for is not a particular ability but an overall competency or global capacity, which in one way or another enables a sentient individual to comprehend the world and to deal effectively with its challenges. Intelligence is a function of the personality as a whole and is responsive to other factors besides those included under the concept of cognitive abilities. Intelligence tests inevitably measure these factors as well (Wechsler, 1981, p. 8).

Since the WAIS-R is one of the instruments employed in this study, Wechsler's concepts of intelligence and intelligence tests will suffice as defining factors of intelligence. It stands to reason intellectual impairment would be the result of any psychiatric, medical, or neurological disorder that inhibits an individuals ability to comprehend the world and deal effectively with its challenges.

Although medical disorders are not commonly thought of as intellectually inhibiting, several, including diabetes mellitus, hormonal imbalance, hypoglycemia, and circulatory system disorders, to name just a few, can and often do, inhibit an individual's ability to think clearly. Medical disorders can cause psychiatric symptoms which mask the origin of the problem and leave clinical psychologists and other professionals with the false impression of a psychiatric disorder (Holmes, 1992).

Wechsler Adult Intelligence Scale-Revised.

As previously stated, the WAIS-R is the most widely used intelligence test on the market. Much of the content of the WAIS-R was derived from the WAIS. In order to promote ease of administration and scoring, reflect advances in data analysis, maintain higher interests of the test taker, and replace items that appeared dated, some items were dropped and new items added. The standardization procedures for the WAIS-R were changed to be more representative of the general population. Equal numbers of women and men between the ages of 16 and 74 were tested over a four-year period. Age ranges were divided into nine groups. A stratification plan that included the variables of age, gender, race, geographic region, occupation, education, and urban-rural residence was used. This stratification plan was devised using data from a 1970 United States Census as well as more recent census data as they became available (Wechsler, 1981).

Reliability and validity for the WAIS-R were discussed in detail by Wechsler in the WAIS-R manual. Concerning reliability, a split-half procedure was used, and the Spearman-Brown formula was applied to all of the 11 subtests except the Digit Span and Digit Symbol. Retest procedures were used on the latter two tests. Standard errors of

measurement and additional reliability information provided for the nine age groups. Reliability across all the age groups was high with an average coefficient of .97 for the Full Scale IQs. Overall reliability coefficients were consistently high. Validity for the WAIS-R was based primarily on validity studies of its predecessors, the WAIS and the Wechsler-Bellevue. Those studies included comparisons with other established IQ tests, empirical studies of groups of known intellectual levels, and factor analysis research (Wechsler, 1981; Kaufman, 1985; Spruill, 1984). Anastasi (1988) commented that the assumption that the WAIS-R can draw on previous research of the Wechsler adult scales with regard to validity was more likely to under-estimate its validity than over-estimate it.

Studies with a variety of groups such as the elderly and disabled adults support the contention that the WAIS-R is an extremely reliable instrument for research purposes (Kaufman, Kaufman-Packer, McClean, & Reynolds, 1991; Ryan, Georgemiller, Geiser, & Randal, 1985; Salvia, Gajar, Garjria, & Salvia, 1988). The reliability of the WAIS-R with regard to gender differences is also well established (Ensor & Phelps, 1989; Kaufman, 1990).

Shipley Institute of Living Scale.

Unlike the Wechsler series of adult scales, there is little known about the developmental and standardization groups for the SILS other than the age ranges. The developmental group was comprised of 462 high school freshmen, juniors, and seniors and college upperclassmen. The standardization group was comprised of 542 grammar school students, 257 high school students, and 217 college students. No demographic material as to age, gender, race, socioeconomic level, or number per age group was provided with the

original Shipley, then called the Shipley-Hartford Retreat Scale. The name was then changed to the Shipley-Hartford Scale and eventually to the Shipley Institute of Living Scale (Zachary, 1991).

The original Shipley Institute of Living Scale (SILS) was developed by Walter C. Shipley in the 1930s and released for publication in 1940. It was designed to be a quick screening device for detecting intellectual impairment and to provide an estimate of intellectual ability. Shipley's rationale behind its development was intellectual impairment does not affect all intellectual abilities equally. Based on research by himself and some of his peers, he concluded "while vocabulary was the best measure of premorbid intellectual functioning, abstract reasoning ability was the most accurate measure of postimpairment functioning" (Zachary, 1991, p. 43). Based on that rationale the SILS is divided into two sections, a Vocabulary test and an Abstract test. The Vocabulary section is comprised of 40 questions with a multiple choice format. The Abstract section is comprised of 20 questions with a completion format. One point is given for each correct vocabulary item and two points for each correct abstract item. The scores of each test are then added together to yield a Combined or Total score. With the original standardization group mental ages were computed for each participant using the Stanford-Binet for the adolescents and the Otis Self-Administered Test of Mental Abilities for the college age participants. Obtained Vocabulary, Abstract, and Total scores were then plotted against obtained mental age scores to determine mental age equivalents for obtained SILS scores.

Predicted Abstraction Ages were established by matching median Abstraction Ages accompanying each Vocabulary Age. A Conceptual Quotient (CQ), also referred to as the

impairment index or impairment quotient, was computed by dividing a person's mental age from his or her obtained Abstraction score by the mental age for predicted Abstraction score. This result was then multiplied by 100 to yield the CQ. The SILS manual indicates CQs of less than 100 imply impairment. Shipley's original normal or average functioning CQ cutoff score was actually 90, not 100 (Zachary).

Whatever revisions the SILS has undergone since its inception have been entirely in the methods in which obtained data are converted to yield WAIS or WAIS-R FSIQs and to improve methods for determining actual intellectual impairment. The test items remain in their original form.

Most of the studies employing the SILS have used psychiatric or intact groups such as psychiatric technicians and nurses as their sample groups. Although the SILS has withstood the test of time and continues to be a widely used clinical screening device and research instrument, the questions of reliability and validity of the test go unanswered.

In the Eleventh Mental Measurements Yearbook, Deaton (1992) wrote,

> The SILS manual is unusual in that it presents results of studies that do not support all recommended uses of the test. On the other hand, the presentations are weakened by a lack of direct evidence to support many assertions made. From a psychometric point of view, the SILS is woefully inadequate. Practitioners and clinicians will have to judge whether the use of the SILS will improve the diagnoses and services offered to clients (p. 824).

Johnson's critique of the SILS was not much more favorable than was Deaton's. He wrote, "Although correlations of the WAIS-R are about .7 to .8, estimates based on the

SILS should be used with caution. Under the best of circumstances, the 95% confidence intervals of the IQ estimates are 1.5 standard deviations of IQ" (Johnson, 1986, p. 439). That is just one of a long list of criticisms Johnson makes about the SILS.

Despite all the criticisms of the SILS, it remains a widely used testing instrument both for clinical assessment (Kaufman, 1990) and research (Zachary, 1991). Efforts to establish the accuracy of the SILS in estimating WAIS-R FSIQs continues with study after study, almost all using psychiatric patients in the studies. Dalton, Pederson and McEntyre (1987) reported,

> The current data show the usage of the SILS to obtain FSIQ estimates is not justified on the basis of shortened administration time. Several WAIS-R subtests or pairs of subtests yielded equal or more accurate estimates of FSIQ, yet require less administration time. However, a primary advantage of the SILS is the capacity for group administration. Within that context, the SILS provides an adequate estimate of FSIQ (p. 279).

Several studies support the contention (Dalton et al., 1987) that WAIS-R forms yield equally or more accurate WAIS-R estimates than does the SILS (Cyr & Atkinson, 1991; Silverstien, 1990; Ward, Selby, & Clark, 1987). Along with other cautions concerning the SILS, Morgan and Hatsukami (1986) warned against using the SILS with elderly populations and Frisch and Jessop (1989) indicated a need to control for reading ability when administering and interpreting the SILS.

John and Rattan (1992) indicated the SILS yields a reasonably accurate estimate of verbal intelligence but cautioned against generalizing results to various clinical groups due

to a lack of a representative sample in the standardization group. They did recommend the SILS as a useful screening device.

Results of a study by Fowles and Tunick (1986) indicated a .78 correlation for estimated FSIQs, which was in keeping with results by Zachary et al. (1985). A study by Heinemann, Harper, Friedman, and Whitney (1985) indicated the SILS overestimated FSIQs for lower average individuals (83% of group 1 and 55% of group 2) and underestimated for higher than average individuals (68% of group 1 and 80% of group 2). Weiss and Schell (1991) received impressive results with their study using the Zachary et al. procedure as described in the SILS manual. Their study yielded a correlation of .86 between estimated and obtained FSIQs.

The singularly most significant aspect of SILS was that each study used psychiatrically impaired participants in their project. Using impaired individuals as a normative sample group appears contradictory.

Purpose of this Study

In the clinical setting, initial testing is often done in groups, with limited time frames allowed for test administration and completion. With these parameters in mind, it becomes necessary to use short, quick screening devices that can be given in a group setting and are basically self-administered. The SILS is a brief, pencil and paper test designed to provide an estimate of intellectual ability and possible psychiatric or organic impairment. It is not designed to provide an accurate measure of global intelligence nor is it designed to provide specifics as to type of possible impairment. The purpose of this study was to investigate the accuracy of the SILS tables for estimating WAIS-R FSIQs for 18- to 24-year-old

undergraduate college students. The reason the WAIS-R was selected as a comparison test to the SILS is the WAIS-R is considered by many to be the standard by which other intelligence scales are measured for accuracy and to which the SILS converts total raw scores to an estimated WAIS-R FSIQs (Zachary, 1991; Kaufman,1990). This study compared the two tests by converting the total obtained raw scores from the SILS to estimated WAIS-R FSIQs and determining their relationship obtained WAIS-R Verbal, Performance, and Full Scale IQs from a sample of 18- to 24-year-old, undergraduate college students. In keeping with conversion procedures of both test administration manuals, initial conversions were in accordance with the age corrected tables as found in the test manuals. SILS estimated FSIQs and obtained Verbal IQs, Performance IQs, and FSIQs were then analyzed using the Pearson product-moment correlation technique. In addition, t tests were computed to compare estimated and obtained IQs, WAIS-R Vocabulary subtest scaled scores, and SILS vocabulary, abstract, and total raw scores by gender.

Significance of this Study

Although the SILS is one of the top eight quick screening devices in use today, it has been suggested there may be other devices that would be more accurate for assessment within the same time frame (Kaufman, 1990; Boone, 1991; Boone, 1992). As previously stated, the normative and study samples for the SILS have traditionally been made up of psychiatric patients of varying ages to the exclusion of non-impaired individuals within specific age groups. This lack of non-impaired sample groups has been the main criticism of the SILS. Again, very few studies have been done concerning gender differences on the

SILS. No known gender difference studies have been done with 18- to 24-year-old age groups (Zachary, 1991). Secondly, the accuracy of the SILS in estimating WAIS-R scores has been questioned by numerous researchers.

One of the purposes of research in general is to help correct or replace those instruments that have outlived their usefulness. The purpose of this study was to contribute to the solution of perceived problems with the SILS. By comparing the SILS to the well-established WAIS-R using an age specific, equally mixed (i.e., 50% men and 50% women) sample group, some questions about the SILS were answered. The need for information regarding non-impaired sample groups as well as gender difference information is without question important to the resolution of the shortcomings of the SILS.

This study investigated the relationships between estimated WAIS-R FSIQs from the SILS and obtained WAIS-R FSIQs, VIQs, and PIQs using the Pearson product-moment correlation. The study also investigated the relationship between the SILS and WAIS-R vocabulary subtests using the Pearson product-moment correlation. Gender differences were investigated for estimated WAIS-R FSIQS, SILS vocabulary and abstract raw scores, obtained WAIS-R FSIQs, VIQs, and PIQs. Participants were separated into two groups based on the gender of the participant. To determine possible gender differences in test score means t-tests were computed for the two groups.

The correlations among the scores from the two tests were expected to be below .50 with the exception being the correlation between the two vocabulary subtests which was expected to fall in the .70 to .90 range. Gender differences were not expected to be significant.

CHAPTER 2

METHOD

Participants

The participants for this study were 32, 18- to 24-year-old college students from a small, midwestern university. The participants ranged in age from 18 to 23 years with a mean age of 19.37, standard deviation 2.06. The sample was comprised of 16 men, mean age 20.26, standard deviation 2.68 and 16 women, mean age 19.09, standard deviation .82. All but one of the participants were Caucasian. The one exception was a woman whose father was Caucasian and mother was from India.

Prior to testing, each participant was required to read and sign an informed consent form that described the purpose of the study, procedures, individual rights to confidentiality, and right to withdraw from the study at any time without risk of reprimand or penalty of any kind (see Appendix A). The participants reported age, gender, and ethnicity on their individual test record forms. In order to insure confidentiality, each individual was assigned a two-digit code number to eliminate the use of names or any identifying information of a personal nature. Testing and data collection were initiated after approval for this study was received from the Review Board of Human Subjects in accordance with university policies.

Instruments

The Shipley Institute of Living Scale (SILS) is a self-administered, pencil and paper, screening device designed to yield an estimated Wechsler Adult Intelligence Scale-Revised Full Scale IQ (WAIS-R FSIQ) and to detect possible intellectual or mental impairment. It

is comprised of two subtests, Vocabulary and Abstract. An individual is given one point for each correct answer on the SILS Vocabulary subtest and two points for each correct answer on the Abstract subtest. The scores of the two subtests are added together to obtain a Combined or Total score. The Total score is then converted to an estimated WAIS-R FSIQ using either a formula or conversion table, both developed by Zachary (1991) and found in the SILS manual. Since Zachary's formula was used to develop the tables that yield the same estimated WAIS-R FSIQs as the formula, Zachary has recommended the use of the tables because they are less time consuming than calculating IQs with the formula.

The WAIS-R was the other instrument utilized in this study. It consists of 11 subtests, 6 verbal and 5 performance, designed to measure a variety of capabilities that can be evaluated based on obtained scores. The subtests measure several different areas of mental abilities yielding an overall or global intellectual functioning level.

Each subtest yields a raw score that is then converted to a scaled score. Scaled scores tables were developed from the norms of the normative samples. The subtest scales have a mean of 10 and standard deviation of 3. Three IQs are calculated from compiled subtest scaled scores, FSIQ, VIQ, and PIQ. The verbal, performance, and full scale IQs have means of 100 and standard deviations of 15.

The WAIS-R is individually administered and generally takes 60 to 90 minutes to complete. The reliability of the WAIS-R has been established using a split-half procedure on some of the subtests and a test-retest procedure on the remaining subtests. A split-half procedure

> produces a correlation coefficient between scores on two halves of a test, which is then corrected by the Spearman-Brown formula to obtain a reliability for the full length test. The split-half procedure is not appropriate for highly speeded tests such as the Digit Symbol or tests where the two halves may be considered separate tests such as the Digit Span. (Wechsler, 1981, p 29)

A test-retest procedure involves administering a test to a sample group, then re-administering the same test to the same sample group with a time lapse between test administrations. In the case of the WAIS-R Digit Symbol and Digit Span subtest the time frame between the first test administration and the retest administration was two to seven weeks. Reliability coefficients for the FSIQ ranged from .96 to .98. VIQ reliability coefficients ranged from .95 to .97 and PIQ reliability coefficients ranged from .88 to .94. Subtest coefficients ranged from .52 to . 96 (Wechsler, 1981). The vocabulary subtest had a .96 correlation to FSIQ and is considered the most reliable single indicator of overall intelligence of all the subtests. It was anticipated the SILS Vocabulary subtest scores would correlate significantly with the WAIS-R Vocabulary subtest scores.

Although the WAIS-R has been criticized for its dependence on research of its predecessor for validity data, both Anastasi (1988) and Kaufman (1990) support Wechsler's assumption that the WAIS-R is a valid measure of global intelligence. As previously stated, the reliability and validity of the WAIS-R supported its suitability as a research instrument for this study.

Sampling Procedure

Procedures for selecting the participants for this project began by posting a sign-up sheet on the bulletin board near the psychology and special education division office. Accompanying the sign-up sheet was a request for 18- to 24-year-old volunteers to participate in this study. Anyone within the required age limits wishing to participate in this study was to voluntarily sign the signature sheet. The sign-up sheet had a column for phone numbers where the volunteers could be reached.

The introductory level psychology courses are taught by graduate teaching assistants (GTAs). A description of the study and its age requirements were presented to the GTAs and they were requested to present the study description to their classes. The study description included a copy of the informed consent form. The GTAs were also asked to inform their students of the location of the sign-up sheet.

The sign-up sheet allowed for 50 signatures. From the list of volunteers, 16 females and 16 males, 32 participants total, were selected on a first come basis. The remainder of the signatures were retained until all test data were collected. This process continued until thirty-two total participants were obtained with equal numbers for both genders represented.

The informed consent form, Appendix A, provided all participants with a description of their rights to withdraw from the study at any time without risk of reprimand or recourse of any nature. It informed them of their rights to privacy and described the measures taken to insure their confidentiality. Demographic material as to age, gender, and ethnicity was also voluntarily collected at the time of testing.

In order to insure confidentiality, individuals were assigned code numbers that were used on the test forms in lieu of their names. All completed testing materials, demographic information, and informed consent forms were kept in the possession of the primary researcher and were seen only by the researchers. All this material was destroyed after the research was completed.

Each participant was asked to complete both the SILS and the WAIS-R. A counterbalanced method of administration was implemented. That is, half of the men and half of the women were given the SILS first while the other half of the participants were given the WAIS-R first. Since the SILS can be administered as a group or individual test, it was given on an individual basis just prior to or just after the administration of the WAIS-R.

WAIS-Rs were administered and scored by two graduate students who had successfully completed a graduate level course that included administration and scoring of the WAIS-R. Both examiners had been trained in administration and scoring of the SILS at a local Mental Health Center. Settings for testing were well lighted rooms at the university library or student union that insured privacy during test administration.

Statistical Design

The SILS yielded two raw scores, vocabulary and abstract, that were added together to yield a total score. Using age corrected conversion tables total scores were converted to estimated WAIS-R FSIQs. The WAIS-R yielded Verbal (VIQ), Performance (PIQ), and Full Scale (FSIQ) IQs. Estimated WAIS-R FSIQs from the SILS tables and obtained VIQs, PIQs, and FSIQs on the WAIS-R were analyzed using the Pearson product-moment

method to determine the relationship between estimated WAIS-R FSIQs and obtained WAIS-R FSIQs, VIQs, and PIQs. To determine the relationship between the obtained raw scores for the WAIS-R vocabulary subtest and SILS vocabulary subtest were converted to t-scores and analyzed using the Person product-moment correlation.

To determine possible gender differences, estimated WAIS-R FSIQS, SILS vocabulary and abstract raw scores, obtained WAIS-R FSIQs, VIQs, and PIQs were separated into two groups based on the gender of the participant. After scores were separated into gender specific groups, t tests were computed for each group of scores.

CHAPTER 3

RESULTS

The purpose of the comparisons in this study were to examine the relationships among the Shipley Institute of Living Scale (SILS) scores and Wechsler Adult Intelligence Scale-Revised (WAIS-R) scores for 18- to 24-year-old normals. Advocates of the SILS have suggested correlations between the SILS estimated WAIS-R Full Scale IQs (FSIQs) and obtained WAIS-R FSIQs generally range from .78 to .90 (Zachary, 1991). Critics of the SILS have indicated correlations between the two tests fluctuate between .48 to .85 depending on the ages and psychiatric status of the sample groups (Johnson, 1986; Retzlaff, Slicner, & Gibertini, 1986). Little data for 18- to 24-year-old age groups and even less data on gender differences exists. This study was designed to add to the pool of information on the relationships among the scores of the two tests by analyzing obtained data from the tests using the Pearson product-moment method.

Data were collected from a sample of 32 undergraduate college students, ages18 to 23. The sample selection process allowed for an age range of 18- to 24-year-olds but, by chance, no 24-year-olds were selected. Descriptive statistics were computed for obtained WAIS-R FSIQs, Verbal IQs (VIQs), Performance IQs (PIQs), obtained SILS Vocabulary subtest and Abstract subtest scores, SILS estimated WAIS-R FSIQs, and the WAIS-R Vocabulary subtest raw score. The participants were average in terms of intellectual ability as all, with the exception of the WAIS-R Vocabulary subtest, of the means of scores fell within the average range according to the WAIS-R and SILS manuals. The WAIS-R

Vocabulary subtest raw score mean was 1.7 points below the vocabulary raw score mean as shown in the WAIS-R manual.

Standard deviations (SDs) of scores tend to be lower in homogeneous groups than heterogeneous groups of equal size. Because the members of this sample group were college students attending the same university and their ages were within a reasonably small age range, 18- to 23-years-old, they are considered a reasonably homogeneous group. The correlation coefficient, r, becomes larger as the scores deviate farther from their respective means (McCall, 1975). Since the scores of homogeneous groups tend not to deviate as far from the means as heterogeneous groups, the homogeneity of this group may tend to lower the correlations among the test scores. Descriptive statistics are shown in Table 1.

Estimated WAIS-R FSIQs from the SILS were correlated ($p < .05$) with the three obtained WAIS-R IQs scores. The correlation coefficient between the SILS estimated WAIS-R FSIQs and the obtained FSIQs was a significant $r = 0.39$. The correlation coefficient between the SILS estimated WAIS-R FSIQ and the obtained VIQs was $r = 0.33$ which is below the significant critical value of .3494. The correlation coefficient between the SILS estimated WAIS-R FSIQs and the obtained PIQs was $r = 0.30$ which is also below the significant critical value of .3494. The results are shown in Table 2.

The obtained WAIS-R Vocabulary and SILS Vocabulary raw scores were correlated using the Pearson product-moment method. In order to compare like scores the subtests raw scores were converted to t-scores prior to analysis. The result as shown in Table 3 was a significant .65 coefficient ($p < .05$).

Table 1

Descriptive Statistics for WAIS-R and SILS Scores

Tests	M	SD	Range
WAIS-R FSIQ	105.5	8.44	88-123
WAIS-R VIQ	102.0	9.20	86-119
WAIS-R PIQ	108.0	10.20	90-124
WAIS-R Vocabulary Raw Score	45.3	10.30	21-63
SILS estimated WAIS-R IQ	105.0	8.73	78-120
SILS Vocabulary	27.7	3.70	14-33
SILS Abstract	32.2	5.35	14-40

Table 2

Correlations Among SILS Estimated WAIS-R FSIQs and Obtained WAIS-R IQs

Tests	r
WAIS-R Full Scale IQ - Estimated WAIS-R IQ	.39*
WAIS-R Verbal IQ - Estimated WAIS-R IQ	.33
WAIS-R Performance IQ - Estimated WAIS-R IQ	.30

* $p < .05$

Table 3

Correlation between SILS and WAIS-R Vocabulary Subtests

Test	r
WAIS-R Vocabulary Subtest - SILS Vocabulary	.65*

* $p < .05$

To determine possible gender-based test response differences, t tests were computed for each obtained WAIS-R IQ, SILS estimated WAIS-R FSIQ, and Vocabulary subtests for both tests. The t-tests results for each group of scores were WAIS-R FSIQs = .484, VIQs = .324, PIQs = .227, SILS FSIQs = .262, SILS Vocabulary = .254, and WAIS-R Vocabulary = .299. The t critical value for this sample group is 1.697. Results of the t-test analyses indicated there were no significant gender differences with this sample group.

CHAPTER 4

DISCUSSION

According to advocates of the Shipley Institute of Living Scale (SILS), it is an acceptably accurate test for estimating Wechsler Adult Intelligence Scale-Revised Full Scale IQs (WAIS-R FSIQs). The main focus of this study was to determine the accuracy of the SILS in estimating WAIS-R FSIQs with 18- to 23-year-old undergraduate college students. There are few recent studies for individuals in this age range. What studies exist are dated and have conflicting results which indicates a need for more current information. Retzlaff et al. (1986) suggested caution be exercised when interpreting SILS scores for people in this age group who are not psychiatrically impaired.

The descriptive statistics in this study indicate the participants are average in intellectual ability with means for the WAIS-R FSIQ, Verbal IQs, and Performance IQs, 105.5, 102.0, and 108.0 respectively, falling within the average range of 90-109 as reported in the WAIS-R manual (Wechsler, 1981). SILS raw score means also fell within the average range which support the contention the sample group was average in intellectual ability. The means of the WAIS-R IQs were in the anticipated range for this homogeneous sample group and were similar to the means of WAIS-R IQs from studies with other homogeneous groups consisting of undergraduate college students (Carvajal, Gerber, Hewes, & Weaver, 1987; Carvajal, Schrader, & Holmes, 1996).

The SDs for the WAIS-R IQs, FSIQ = 8.44, VIQ = 9.20, and PIQ = 10.20, were consistent with what was expected for a homogeneous sample group and indicated, overall, the IQs did not deviate excessively from the means. Although the ranges of scores or each

test were rather broad, again, as demonstrated by the SDs, overall the scores tended to cluster around the means for each test.

The mean of SILS estimated WAIS-R FSIQs was 105.0 which is within the average range and only .5 below the mean of 105.5 for obtained WAIS-R FSIQs. These FSIQ means are similar to the mean of 105.3 for WAIS-R FSIQs obtained by the Retzlaff et al. 1986 study with 18- to 24-year-old military personnel. SILS Vocabulary and Abstract raw score means, 27.7 and 32.2 respectively, are also consistent with those obtained in the Retzlaff et al. study. Although the mean for estimated FSIQs in this study was in the average range, the individual estimated FSIQs varied from an over-estimation for one participant of 19 IQ points and under-estimations of 19 and 20 IQ points for two other participants. The size of the over-estimation and under-estimations are alarming and support Retzlaff's contention that caution should be exercised when interpreting SILS scores with this particular age group. The over-estimation and under-estimations also support the stance by SILS critics that more accurate WAIS-R short form tests are available and should be used in lieu of the SILS test (Deaton 1992; Johnson, 1986). It should be noted for the remaining 29 participants, the SILS accurately estimated WAIS-R FSIQs within a range of 0 to 10 IQ points in 23 of the cases and 11-14 IQ points for the remaining 6 cases, all of which are within one SD for the WAIS-R FSIQ.

Supporters of the SILS point out the time saving element and ease of administration of the test in individual or group settings is reason enough to use the SILS instead of WAIS-R short form tests, which must be individually administered (Fowles & Tunick, 1986; Zachary, 1991). Critics have suggested the time saving element is not reason enough to risk

misdiagnosing a client by using a suspect test in lieu of a more accurate WAIS-R short form (Dalton et al., 1987; Deaton, 1992).

The relationship between the SILS estimated FSIQs and the obtained FSIQs was the only one of the three IQ correlations that was significant, $r = .39$ ($p < .05$), critical value .3494. The correlations between the SILS estimated FSIQs and the obtained VIQs and PIQs were not significant. The correlation between the estimated WAIS-R FSIQ and obtained WAIS-R FSIQ is lower than that obtained by Retzlaff et al. (1986), $r = .48$ ($p < .01$) in their study with 18- to 24-year-old military personnel. Retzlaff did not analyze data between estimated FSIQs and VIQs or PIQs, so that information is not available. The degree and frequency of over-estimations and under-estimations on the SILS FSIQs adversely affected the correlations between the SILS FSIQs and obtained WAIS-R IQs. These results call into question the accuracy of using the SILS with this particular age group and further support Retzlaff's recommendation of interpreting SILS results with caution. These results also indicate a need for further study with larger, age specific, psychiatrically normal samples.

Analysis of the obtained WAIS-R and SILS vocabulary raw scores yielded a significant correlation, $r = .65$. The relationship of the two subscales is not as high as was anticipated with this particular sample group. There were not enough data from this study to make any assumptions about the utility of SILS Vocabulary subtest other than to suggest a need for further study with larger, age specific samples.

In order to determine if differences in test scores on the SILS and WAIS-R with this sample group were related to differences in gender, the sample group was divided into two gender specific groups for further analysis. A series of t tests on mean differences were

computed for the SILS and WAIS-R test scores that were obtained in this study. The results indicated there were no statistically significant gender specific differences in relation to test scores.

It should be noted the small size of this sample group, due to financial and time restraints, and accessibility to larger sample populations, may have impacted the results of the study and should be taken into consideration when generalizing results of the study. Eighteen of the 32 participants were tested on Friday and Saturday of Veterans Day weekend which may have had some impact on the results of the study. Nine of the participants were tested on Friday, 5 by one examiner and 4 by the other examiner, and 9 participants were tested on Saturday, again, 5 by one examiner and 4 by the other. Individuals willing to be tested on this weekend may be somewhat atypical to the general student population in that, by participating on a long holiday weekend, the participants may have been more motivated than their peers to participate in the study. Motivation during test administration is difficult to control for and may have influenced test scores.

The statistically significant low correlation between the SILS and WAIS-R FSIQ scores for this particular population suggests a need for further study with larger sample groups, within specific age ranges. Larger sample groups may help control for motivation factors that may have influenced the results of this study. Based on the results of this and past studies, studies with other sample groups comprised of psychiatrically normal participants is recommended.

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Appendix A

Informed Consent Form

Informed Consent Document

The Department of Psychology and Special Education supports the practice of protection for human subjects participating in research and related activities. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you will not be subjected to reprimand or any other form of reproach.

In order to assess the Shipley Institute for Living Scale's accuracy as a quick screening device of intellectual impairment, the Shipley and the Wechsler Adult Intelligence Scale-Revised will be administered to 32, 18-24 yr.-old, undergraduate, college students. By comparing obtained scores of non-impaired subjects on both tests, the researchers hope to determine the accuracy of the Shipley with this particular sample group. Half of the participants will take the Shipley first and half will take the Wechsler first. You will be asked to complete both tests. At time of testing, you will be assigned a code number in order to match the two tests with the test taker as well as to protect your identity. The list of names with code numbers will be seen only by the researchers as will the individual test scores. Upon completion of the testing procedures, the list of names with matching code numbers will be destroyed. At no time during or after the testing procedure will you be placed at risk of physical or psychological harm from your participation in this study. As the tests will be administered by two graduate students, individual test scores are not considered valid and will not be made known to you. The cumulative test results will be considered valid only for the purpose of this study. The results of the study will be made known to you upon your request.

"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from this study at any time without being subjected to reproach.

_____ _____

Subject and/or Authorized Representative Date

This study has been designed to protect your privacy and the confidentiality of your responses to the fullest extent possible. Your voluntary articipation in this study is deeply appreciated.

I, Carl Kobler, hereby submit this thesis to Emporia State University as partial fulfillment of the requirements for an advanced degree that the Library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.

Carl D. Kobler Jr.
Signature of Author

December 13, 1996
Date

Relationships Among Scores of the Shipley Institute of Living Scale and the Wechsler Adult Intelligence Scale-Revised
Title of Thesis

Doug Cooper
Signature of Graduate Office Staff Member

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