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HOLLAND'S SELF-DIRECTED SEARCH: A MEASURE
OF INTERESTS OF ABILITIES?

THESIS

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Richard Earl Williams, B. A.

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This study examined the relationship between the sub-components of Holland's Self-Directed Search and independent, objective measures of ability using a comprehensive battery of well-validated tests of primary abilities corresponding to each of Holland's six vocational interest types. The sample consisted of 149 female undergraduate students, ages 18-25. Correlation of the ability measure test scores with the four Self-Directed Search subcomponents revealed that the subtests were not related to corresponding measures of ability in a consistent fashion. Implications for the use of the Self-Directed Search in assessing abilities are discussed along with suggestions for future research investigating the relationship between interest inventories and the measurement of primary abilities.

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HOLLAND'S SELF-DIRECTED SEARCH: A MEASURE
OF INTERESTS OR ABILITIES?

Vocational interest inventories traditionally have been employed to provide guidance to students seeking academic direction and specific alternatives. Individuals' expressed interests--what they say they enjoy or would like to do--have also been used by professionals and counselors in the development of vocational plans. The present study focuses on the Self-Directed Search (SDS), a self-administering, self-scoring, and self-interpreting instrument based on Holland's (1985) theory of vocational choice. Holland's theory postulates that people and work environments can be described as one (or a combination of) six occupational-interest personality types. His basic premise asserts that there are six major types of vocational interest, or "occupational personalities:" Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. While no "pure" type exists, there are five to 16 subcategories within each category, i.e., Realistic-Investigative-Artistic, Realistic-Investigative-Social, and so on.

Realistic types are believed to be masculine, asocial, mechanically inclined, and prefer concrete to abstract problems. Investigative types are thought to be task-oriented, enjoy ambiguity in their work, are asocial, and

prefer to think through rather than act out problems. Artistic types are believed to dislike structured environments or problems, are asocial, and desire individualistic expression of their creative talents. Social types are thought to be socially oriented and prefer to work with others from a helping standpoint. Enterprising types are believed to prefer leadership or dominating roles which give them the opportunity to get work accomplished through others, and they usually have a great concern with power, status, and leadership. Conventional types are thought to prefer structured tasks involving clerical or computational skills, avoid ambiguity, and prefer subordinate roles (Holland, 1973, 1979).

Holland's theory has stimulated much research in the years since first formulated, and reviews of that research (Holland, 1973, 1979, 1985; Lackey, 1975; Osipow, 1973) indicate general support for many of his constructs. The theoretically expected factorial structure of the six types has been substantiated by several investigators. Edwards and Whitney (1972) performed separate factor analyses on each of the four subcomponents of the SDS (Activities, Competencies, Occupations, and Self-Estimates) and found that the same main factors showed up within each subcomponent and that the factor loadings were similar from one subcomponent to the next. Rachman, Amernic, and Aranya (1981) factor analyzed the items in each subcomponent of

the SDS and the entire inventory. Their results support the hexagonal model originally proposed by Holland, Whitney, Cole, and Richards (1969), and their confirmatory factor analysis strengthens the long-standing assertion that the SDS measures six factors. Lowman and Schurman (1982) also provided indirect support for the validity of Holland's basic constructs and theories by designing and validating a shortened version of the Vocational Preference Inventory. Holland (1963, 1964, 1973, 1976) has provided additional evidence to support the typologies employed in his theory and the interrelationships among them.

Studies have been examined the external validity of Holland's SDS using criterion groups of college students have shown generally consistent findings and have provided support for the efficiency of the instrument to predict academic and nonacademic achievements (Baird, 1969), occupational choice (Gottfredson & Holland, 1975), ultimate college major and immediate and future vocational plans (O'Neil & Magoon, 1977), and actual job entry (O'Neal, Magoon, & Tracey, 1978). Predictability of vocational plans, academic achievement, and occupational success based on the SDS summary code and/or high point code has generally been substantiated by Holland and Gottfredson (1976b) and Holland, Gottfredson, and Nafzinger, (1975), among others (Holland & Lutz, 1968; Touchton & Magoon, 1977; Wiley & Magoon, 1982). Results from similar studies indicate that college students in

various fields have SDS summary codes, interest profiles, or other characteristics that support the rationale for the six types (Abe & Holland, 1965a, 1965b; Brue, 1969; Holland, 1966a, 1968; Osipow, Ashby, & Wall, 1966; Scott & Sedlacek, 1975; Urtz & Hartman, 1978; Wall, 1969; Wall, Osipow, & Ashby, 1967; Williams, 1972).

Holland's interest typologies have typically been correlated with achievement test results (Baird, 1969), self ratings of either perceived abilities or actual accomplishments in each of the six occupational categories (Holland, 1963, 1964, 1968), scholastic aptitude test scores (Holland, 1963; Holland & Nichols, 1964), and measures of overall intellectual ability (Schaefer, 1976). Kelso, Holland, and Gottfredson (1977) attempted to provide some evidence of the validity for the SDS using the Armed Services Vocational Aptitude Battery (ASVAB) as a criterion measure. These researchers correlated the four subcomponents of the SDS with scores on the ASVAB to support the hypothesis that self-reported abilities on the SDS and actual competencies have some concurrent validity. This study was however, limited by the lack of scales on the ASVAB to measure musical, artistic, or social/interpersonal abilities and by questionable measures of investigative ability - the Word Knowledge and Arithmetic Reasoning subscales. The results of this study suggest that the subcomponents of the SDS are positively related to objective assessment of abilities, but the

appropriateness of the ability measures employed and the comprehensiveness of the ASVAB scales presents a cloudy picture of the differential relationship between the sub-components on the SDS and the domain of abilities.

Strong (1955) has pointed out that most of what is known about the relationships between interests and abilities is based on correlations between scores on interest measures and scores on intelligence tests, scholastic achievement tests, or grades (GPA). Most researchers have found low, positive correlations (about .20) between interests and their corresponding abilities (Adkinson & Kudger, 1940; Arsenian, 1942; Berdie, 1955; Crosby & Winsor, 1941; Johnson, 1965; Kelso et al., (1977); Ker & Willis, 1966; Long, 1945; Lowman, Williams, & Leeman, in press). Those studies such as Scharf's (1970) which have focused on how vocational interests and abilities are related have typically made use of only a few abilities and often relied on self-ratings of ability rather than objective measures. Results based on research investigations of this type are tenuous at best and provide little valid information regarding the interrelationship between the two domains of interests and abilities.

In the design and usage of the SDS, certain assumptions concerning the interaction between interests and abilities are made. For instance, Holland (1985) postulates that vocational achievement and personal competencies (abilities)

are dependent on personality and environment (interests). In order to sufficiently gauge these interests, the SDS consists of several different, but related subcomponents (Self-Estimates of ability, Competencies, Activities, and Occupational preferences). Of these four subsections, the Self-Estimates and Competencies components can be generally regarded as indexes of ability. The Activities and Occupations sections are perhaps more direct measures of interest. Rachman et al. (1981) have recently suggested that the SDS subcomponents require improvement. Their findings indicate that the structure of the Activities and Competencies subtests are similar but different from the Occupations subsection and that the Activities and Competencies subparts can not discriminate adequately between the Enterprising and Social occupational types. They hypothesize that these subtests (Activities and Competencies) may contain ambiguous items which do not differentiate between the Enterprising and Social types or that the Occupations and Self-Estimates subtests are confounding the manner in which the types are measured. Suggested by their results, the four SDS subtests may be in need of revision to make them more psychometrically independent of each other. Holland (1985) asserts that "there seems to be no one best method to assess a person's personality type" and that "at this time, no single (interest) assessment technique stands out as being the most advantageous for all purposes" (p. 24). Thus, even the author of the SDS attests to the limitations of personality and interest

assessment by use of the instrument and his comments are reinforced by the research findings of others such as Harmon and Zytowski (1980) who found that an individual woman's Holland code will be different depending on which instrument or what set of scales within an instrument is used to determine that code. In their study, Harmon and Zytowski derived three-letter codes representing Holland's personality types from three inventories, the SDS, the Strong-Campbell Interest Inventory, and Kuder Occupational Interest Survey for a sample of adult women. The grandmean value of agreement for comparisons of Holland summary codes among the three tests suggested that, on the average, the first letter of one code in a pair matched the first letter in the other code. However, comparisons between two and three letter codes derived from these measures revealed that agreement between any two sources of codes was quite varied.

Correlational in design, the purpose of the present study is to attain some indication as to the nature of the relationship between each of the four SDS subcomponents and the related abilities. Research which has simultaneously examined vocational interests and actual abilities was conducted most recently by Lowman et al (in press). These investigators found that while abilities and interests appear to be similarly structured, the two spheres may be relatively independent of each other. It is reasonable to expect that the subcomponents on the SDS, particularly the Self-Estimates

and Competencies sections, should correlate with specific abilities. This in turn raises the issue of what exactly does the SDS measure, interests or abilities? Attempting to address this question, the present study is concerned with the following hypothesis.

The Self-Estimates and Competencies subcomponents of the SDS will correlate more highly with the ability test scores than will the Activities and Occupations subcomponents. In other words, the Self-Estimates and Competencies subtests reflect one's ability, rather than interest, in each of Holland's six vocational categories.

Method

Subjects

Female college students ($n = 149$), ages 18-25, were subjects for this study. Females were selected for two main reasons. First, there was not enough funding to include both sexes. Second, there was less known about the primary abilities and interests of females than males. All participants were undergraduate students at a large, state-supported university located near a large metropolitan area in the southwest United States. Participants were obtained in response to newspaper announcements, notices posted on campus, and appeals made to classes. In order to ensure a heterogeneous sample of interests and abilities, students from all areas of academic study on campus were chosen to take part in the investigation. In return for their participation in the

project, detailed feedback of individual results on the various tests was provided. A few subjects also received extra credit points in class for participation.

Instruments

Abilities measured in this study were selected on the basis of their correspondence to each of the six Holland occupational types. Due to limited literature empirically establishing the relationship of specific abilities to Holland personality types, expert judgement was used to select the abilities theoretically expected to correspond to each of the six Holland types. The individual ability measures employed in the study were selected based on expert judgement as well as a thorough review of the literature concerning the assessment of abilities. Table 1 summarizes the abilities measured in the study, the Holland interest type to which the abilities were judged to correspond, and the specific measures of ability employed in the investigation. When available, instruments with proven reliability and validity and long research histories were chosen.

Information regarding the reliability and validity of each of the ability measures used follows:

Bennett Mechanical Comprehension Test, Form S (BMCT). The BMCT contains 68 items which are designed to measure the ability to understand mechanical and physical principles (Bennett, 1969, 1980). Odd-even reliabilities, corrected by the Spearman-Brown formula, range from .81 to .93; the 26

Table 1

Holland Personality Type, Corresponding Abilities,
and Specific Measures Used in This Study

Holland Type	Correlates	Ability Measure(s)
Realistic	Mechanical Comprehension	Bennett Mechanical Comprehension Test
Investigative	Spatial Ability	Revised Minnesota Paper Form Board Test
	General Intelligence	Raven's Standard Progressive Matrices
	Verbal Reasoning	Watson-Glaser Critical Thinking Appraisal
Artistic	Aesthetic Judgement	Seashore Measures of Musical Talent
	Musical Abilities	Meier Art Judgement Test
	Interpersonal Effectiveness	Interpersonal Problem Solving Assessment Technique
Enterprising	Leadership Skills	Leaderless Group Discussion
Conventional	Clerical Aptitude	Minnesota Clerical Test
	Arithmetic Computation	Wide Range Achievement Test

validity coefficients reported in the test manual range from .12 to .64, with a median of .39 (Bennett, 1969). Test scores are higher, on average, for men than for women, consistent with evidence of a sex difference in favor of men for this ability (Hakstian & Cattell, 1975).

Revised Minnesota Paper Form Board Test, Form AA (MPFB). The MPFB is designed to measure spatial abilities, thought to be important in mechanical aptitude. This form consists of 64 items to be completed in 20 minutes. Subjects must select from among five alternatives how the disarranged parts of a two-dimensional object would look when correctly assembled. Inter-item reliability has been estimated to be .85, while alternate form reliability coefficients range from .71 to .78. Predictive validity coefficients range from .04 to .61 (Likert & Quasha, 1970), making the test "one of the most valid instruments" for measuring spatial abilities (Anastasi, 1982, p. 445). Although small in magnitude, there is a consistent sex bias in favor of men in test scores (Hakstain & Cattell, 1975).

Raven's Standard Progressive Matrices (RSPM). The RSPM is a non-verbal measure of general intellectual ability, similar to Cattell's (1971) concept of fluid intellectual ability. Since the subjects in this study were primarily freshman or sophomore undergraduates in a large, state-supported university with minimum standard entry requirements, the Standard rather than the Advanced version of the test was

used. Reliability estimates for the RSPM range from .89 to .97 in a sample of American adults, while criterion validity coefficients ranged from .75 to .88 when the test was correlated with other measures of general intellectual ability such as the Wechsler scales and Stanford Binet in a sample of American adults (Raven, Court, & Raven, 1977). The authors of the instrument state that test score correlations with relevant criteria of academic performance and occupational level are acceptably high. The RSPM correlates somewhat higher with Wechsler Performance than with Verbal IQ (Anastasi, 1982). This is consistent with the finding that the RSPM correlates not just with general intelligence, but also with spatial aptitude, inductive reasoning, and perceptual accuracy.

Watson-Glaser Critical Thinking Appraisal (WGCTA). The WGCTA is composed of five subtests: Inference, Recognition of Assumptions, Deduction, Interpretation, and Evaluation of Arguments. This test measures verbal reasoning ability requiring use of verbal-logical reasoning, scientific type thinking processes, and knowledge of the nature of valid inferences, abstractions, and generalizations. Reliability values include split-half correlations ranging from .69 to .85 and a test-retest correlation (after three months) of .73. The WGCTA's manual provides extensive validity findings demonstrating that test scores have moderate to high correlations with other measures of intellectual aptitude and that

the scores follow a fairly predictable relationship. That is, test scores increasing in general with the increasing intellectual demands of academic requirements when administered to appropriate criterion groups (Watson & Glaser, 1980).

Meier Art Judgement Test (MAJT). The MAJT is designed to measure aesthetic judgement, a dimension considered to be rudimentary in general artistic ability, and has split-half reliability estimates ranging from .70 to .84 (Meier, 1942). Aesthetic judgement is believed to be associated with artistic accomplishment in several areas, not just representational drawing skills (Child, 1964, 1965). Validity studies have demonstrated that the MAJT correlates highly with grades in art courses and experts' ratings of artistic abilities (Anastasi, 1982; Barrett, 1945).

Seashore Measures of Musical Talent, Pitch, Rhythm, and Tonal Memory subtests (SMMT-P, SMMT-R, and SMMT-TM). The SMMT is one of the most widely used measures of musical ability. The test is designed to assess six component characteristics of musical talent; Pitch Discrimination, Loudness, Time, Timbre, Rhythm, and Tonal Memory (Seashore, Lewis, & Saetveit, 1960). Although there are now more comprehensive measures of musical ability (i.e., Gordon, 1965), the SMMT is utilized in this study because it provides very reliable subtest scores in several areas demonstrated to be important in musical talent and because of the

instrument's brevity. The choice of the three subtests used in this study was made on the basis of studies and reviews of the test which reported these subtests to be the best predictors of musical achievement from among the Seashore measures. In addition, the SMMT-P and SMMT-TM are the most reliable Seashore subtests. Finally, the constructs measured by these three subtests are also the most theoretically sound (Lundin, 1949, 1967; Rainbow, 1965; Seashore, 1938; Shutter, 1968). Kuder-Richardson reliability estimates for the three subtests used in this study are: SMMT-P, .82 to .84; SMMT-R, .64 to .69; SMMT-TM, .81 to .84.

Interpersonal Problem Solving Assessment Technique,
College Form (IPSAT). The IPSAT was included to provide a paper and pencil test of interpersonal skills. A review of the literature revealed that there were very few interpersonal competency measures designed for the normal population. The IPSAT (Getter & Nowinski, 1981) was the only measure found which was behaviorally rather than attitudinally based. Although limited reliability and validity estimates for the IPSAT were available at the time of this study, preliminary reports from the instrument's developers were encouraging, with inter-rater reliabilities for the various scoring categories ranging from .82 to .99 and correlations generally as predicted with the Edwards Personal Preference Schedule and the instrument's ability to discriminate between normals and clinic patients. In the present study, the

subject's total number of responses scored in the "Effective" classification constituted the IPSAT score. Inter-rater reliability for the scoring of the "Effective" responses by the two expert judges in this investigation was .89.

Leaderless Group Discussion (LGD). One of the most predictive measures of leadership ability is performance in assessment center exercises (Bray, Campbell, & Grant, 1974; Huck, 1973, 1976), and the LGD (Bass, 1954) is a central feature of most such centers (Thornton & Byham, 1982; Wollowick & McNamara, 1969). The LGD has satisfactorily demonstrated reliability and validity in a variety of predictive validity studies (Anastasi, 1982). In the present study, the LGD was comprised of a discussion task in which subjects (randomly assigned to each group) were required to reach consensus on a controversial topic (the rank ordering of candidates for a scarce medical procedure). Participants were rated on their demonstrated leadership abilities using a scale originally developed by Bass in 1954. The estimate of reliability among the three observers in this investigation was .76.

Minnesota Clerical Test, Name Comparison and Number Comparison subtests (MCT-Na; MCT-Nu). The MCT measures perceptual speed and accuracy of the type that is important in clerical activities (Andrew, Paterson, & Longstaff, 1979). In both the MCT-Na and the MCT-Nu subtests, the subjects are required to rapidly check all pairs of items which are

identical. Test-retest reliabilities are reported to be .80 for the MCT-Nu and .85 for the MCT-Na subtests. The subtests correlate with each other from .58 to .73 (median $r = .66$), suggesting that the subtests are measuring slightly different perceptual abilities. Validity coefficients for the two subtests are mostly in the moderate range with relevant criteria, primarily supervisory ratings of performance (Anastasi, 1982).

Wide Range Achievement Test, Arithmetic subtest (WRAT-A). The WRAT is a widely used measure of abilities in the three basic areas of reading, writing, and arithmetic. The WRAT-A is designed to measure ability in performing basic arithmetic processes, thought to be a competency related to Conventional vocational interests (Holland, 1973, 1979). The test is well normed on the general American population throughout all ages (Thorndike, 1972), having reliability estimates ranging into the .90's. Correlations between the Arithmetic Grade Level scores and scores on other arithmetic achievement tests range from .49 to .86. Correlations with grades in relevant courses range from .35 to .68 (Jastak & Jastak, 1978).

Self-Directed Search (SDS). Holland's vocational interest constructs were assessed by the SDS, Holland's preferred instrument for measuring vocational interests (Holland, 1973). This inventory has acceptable reliabilities on both odd-even and test-retest correlations

and has been shown to yield high correlations with relevant criteria, such as predicting future occupational choices, and consistently shows factorial and construct validity (i.e., Edwards & Whitney, 1972; Garbin & Stover, 1980; Harmon & Zytowski, 1982; Holland, 1979; Rachman et al., 1981; Zytowski, 1978). The SDS summary codes were computed by the subject, with the arithmetic calculations checked for accuracy by research assistants.

Procedure

The SDS and battery of ability tests were administered in a group setting in two administrations. Prior to participating in the research, each subject signed a Background and Demographic Information/Consent form (see Appendix A). The following order of test administrations was used for all participants: Self-Directed Search, Wide Range Achievement Test-Arithmetic subtests, Minnesota Paper Form Board Test, Watson-Glaser Critical Thinking Appraisal, Seashore Measures of Musical Talent, and Interpersonal Problem Solving Assessment Technique in the first of two testing sessions and the Minnesota Clerical Test, Raven's Standard Progressive Matrices, Bennett Mechanical Comprehension Test, Leaderless Group Discussion, and Meier Art Judgement Test for the second session. The elapsed time between the testing sessions averaged two weeks. No more than 10 participants were tested at one time in the second testing session to allow for accurate assessment of each

subject's behavior during the LGD. The average number of subjects who participated in the LGD exercise was seven and the range of LGD participants was from six to 10.

Each test of the battery was administered using standardized instructions from the test manuals. The LGD was introduced with instructions specifically developed for this study (see Appendix B). All of the testing sessions were proctored by at least two research assistants to ensure that uniform administration procedures were followed.

After the test batteries were scored and recorded for all 149 participants, individual feedback sheets were prepared using the research data base and computer program for insertion of appropriate numerical values into a standard text. All subjects were notified either by phone or mail as to several feedback sessions which were made available to them. For those who so desired, more detailed individual feedback and discussion meetings were arranged.

Standard correlational procedures were used to assess the relationships between the four SDS subcomponents and the ability measures. In addition, descriptive statistics were calculated for the SDS and the 10 ability tests.

Results

Table 2 provides the descriptive statistics for the ability measures and the SDS. Generally, these summary statistics indicate (except for the Leaderless Group Discussion and the Interpersonal Problem Solving Assessment

Table 2

Descriptive Statistics for the Ability
and Interest Measures^a

Name of Test	Range	Mean	S.D.	Normative Data ^b
Bennett Mechanical Comprehension Test	25-55	41.75	6.05	65%ile
Minnesota Paper Form Board	16-64	43.47	9.09	52.5%ile
Ravens Standard Progressive Matrices	31-60	50.82	4.98	80.5%ile
Watson Glaser Critical Thinking Appraisal	27-74	56.11	8.86	35.6%ile
Meier Art Judgement Test	50-112	93.95	10.45	28.8%ile
Seashore Measures of Musical Talent				
Pitch	14-49	38.96	7.95	34.8%ile
Rhythm	20-30	27.59	2.20	65.6%ile
Tonal Memory	8-30	25.48	4.63	47.3%ile
Interpersonal Social Abilities Test	6-21	12.97	3.02	--- ^c
Leaderless Group Discussion	0-3.23	1.72	1.12	--- ^c
Wide Range Achievement Test - Arithmetic	14-39	27.13	4.86	47.6%ile
Self-Directed Search				
Realistic	2-32	13.75	7.44	73%ile
Investigative	5-42	20.02	8.43	45%ile
Artistic	2-49	25.31	10.85	52%ile
Social	15-47	34.40	6.78	48%ile

Table 2--Continued

Name of Test				Normative Data ^b
Enterprising	4-47	26.60	9.58	83%ile
Conventional	3-48	21.73	9.40	74%ile

^a_n = 149.

^bComparisons of the mean score in this sample to relevant normative groups. Comparison was made to the standard referent group for that test except where multiple normative groups were provided. For the latter, the following norms were used: Bennett Mechanical Comprehension Test, 12th grade norms, sex unspecified; Minnesota Paper Form Board, grade 12 female norms; Critical Thinking Appraisal, upper division college students; Wide Range Achievement Test (Arithmetic), age 20-24 norms; Minnesota Clerical Test, first figures are comparisons to college applications for clerical positions, the second, to female bank clerks; Self-Directed Search comparisons are to a sample of 860 college women (Holland, 1979, p. 66).

^cNo normative data are presently available for this measure.

Technique, for which normative data are not yet available) considerable variability in test scores for the sample. The normative comparisons evidence no unusual characteristics or deviances, on average, in the ability measure scores or the SDS vocational interest areas.

Tables 3 through 8 present the simple Pearson correlations between the four SDS subcomponents, the total numerical value for each of the Holland types and the ability measures. Scatter-plot analysis was performed between the raw ability measure test scores and their theoretically corresponding Holland interest area. This analysis shows that the relationships between ability measures and interest areas are non-curvilinear. Although the correlations in each table are provided for the six Holland interest categories within the various subcomponents, the pertinent correlations are identified for each ability measure.

The results of Table 3 indicate that neither of the measures theoretically expected to assess abilities corresponding to the Realistic type are related in any consistent manner with the Realistic sections of the SDS subcomponents, thus unconfirming the research hypothesis. However, the table also shows that both the Minnesota Paper Form Board Test and the Bennett Mechanical Comprehension Test correlate significantly with the majority of Artistic sections included in the SDS subcomponents. Given the generally high reliability and well established validity of these instruments, their relationship with the Artistic sections of the subcomponents may be explained by the nature of this sample, i.e., women may tend to express what could possibly be classified as Realistic type abilities in the Artistic domain. It should also be noted that the Minnesota Paper

Table 3

Correlations between the Realistic Ability Measures and the Realistic Components of the SDS Subparts

Realistic	Minnesota Paper Form Board Test						M ₂	
	Investigative	Artistic	Social	Enterprising	Conventional	M ₁		
Activities	.07	.06	.16*	-.09	-.17*	-.06	.00	.10
Competencies	.02	.01	.16*	-.05	-.04	-.16*	-.01	.07
Occupations	-.05	-.04	.04	-.13*	-.12	-.09	-.06	.08
Self-Estimates	.05	.17*	.22**	-.02	-.07	-.14*	.04	.11
Total	.06	.09	.17*	-.13	-.07	-.13*	.00	.11
Bennett Mechanical Comprehension Test								
Activities	.14*	.14*	.20**	-.10	-.05	-.12	.04	.12
Competencies	.11	.04	.10	-.04	-.02	-.08	.02	.06
Occupations	.08	.07	.05	-.08	-.11	-.13	-.02	.09
Self-Estimates	.26**	.26**	.21**	.07	-.03	-.09	.11	.15
Total	.22**	.18**	.16*	-.07	-.04	-.12	.06	.13

Note. M₁ is the column containing the average for the correlation coefficients across the six Holland types. M₂ is the column containing the absolute value average for these same coefficients.

*p < .05, **p < .01.

Form Board Test measures spatial abilities which are likely to be important in the various disciplines of art and the artistic occupations such as architect, photographer, interior decorator, and the like. This may help to explain the statistically significant correlations between this instrument and the Artistic sections of the subcomponents.

As shown in Table 4, neither of the measures thought to gauge abilities related to the Investigative domain correlate in any consistent fashion with the Investigative sections of the subcomponents. This result also lends no support for the hypothesized pattern of relationships below the SDS subtests and the ability measures. For both the Watson-Glaser Critical Thinking Appraisal and the Raven's Standard Progressive Matrices Test, the highest correlations are with the Investigative sections of the Self-Estimates subcomponent. Even so, three of the correlations between the Watson-Glaser Critical Thinking Appraisal and the Investigative sections of the SDS subcomponents are practically zero. The significant correlations between these tests and the Artistic sections of the subcomponents may suggest, for this sample, that these measures are related more closely to Artistic abilities than Investigative ones. These findings are consistent with close psychological resemblances between the Investigative and Artistic types as presented in Holland's (1985) hexagonal model.

Table 4

Correlations between the Investigative Ability Measures and the Investigative Components of the SDS Subparts

	Watson-Glaser Critical Thinking Appraisal							
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	M ₁	M ₂
Activities	-.06	.01	.11	-.16*	-.01	-.16*	-.04	.08
Competencies	-.01	.00	.05	-.02	.01	.00	.00	.02
Occupations	.10	.06	.16*	.18*	-.12	-.09	.05	.12
Self-Estimates	.08	.18*	.17*	.13	.00	.03	.10	.10
Total	.01	.07*	.15	.09	-.04	-.06	.04	.07

Raven's Standard Progressive Matrices Test								
Activities	.21**	.13*	.18*	-.13	-.21**	.10	.05	.16
Competencies	.06	.10	.12	-.15*	-.13*	.03	.00	.10
Occupations	.16*	.14*	.12	-.03	-.28**	-.05	.01	.13
Self-Estimates	.16*	.35**	.26**	-.02	-.17*	-.03	.09	.16
Total	.19**	.24**	.20**	-.08	-.23**	.05	.06	.16

Note. M₁ is the column containing the average for the correlation coefficients across the six Holland types. M₂ is the column containing the absolute value average for these same coefficients.

* $p < .05$, ** $p < .01$.

The findings presented in Table 5 do not support the hypothesis of this study and evidence that the ability measures believed to test skills associated with the Artistic domain are not related to the corresponding sections of the SDS subcomponents in any consistent manner. The Artistic sections of the SDS subcomponents do not correlate in any consistent fashion with either the Meier Art Judgement Test or the Seashore Measures of Musical Talent.

The higher correlations for the musical ability test could possibly be due to instrument and/or ability specificity. That is, the highly specific nature of musical skills and the tests designed to measure them may enable persons to better gauge their relative strengths and weaknesses in musical talent and thus increase the correlation coefficients between actual and expressed musical abilities. One possible explanation for the higher correlations (averaged together) between the "ability" related subcomponents and the Seashore instrument may be that musical ability is actually assessed to some degree by these SDS subcomponents and therefore, they would tend to correlate higher with musical ability tests than would the "interest" related subcomponents.

Also shown in Table 5 are the significant correlations between the Artistic related ability tests and the Realistic and Investigative sections of the SDS subcomponents. This finding supports earlier contentions that a) for women,

Table 5

Correlations Between the Artistic Ability Measures
and the Artistic Components of the SDS Subparts

	Meier Art Judgement Test						M ₂	
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional		M ₁
Activities	.18*	.14*	.23**	-.10	-.06	-.08	.05	.13
Competencies	.16*	.03	.13*	-.02	-.05	-.12	.02	.08
Occupations	.06	.06	.05	-.02	-.09	-.30**	-.04	.10
Self-Estimates	.12	.03	.16*	-.07	-.04	-.11	.02	.09
Total	.19**	.11	.16*	-.06	-.04	-.21**	.02	.13
Seashore Measures of Musical Talent								
Activities	.17*	.09	.35**	-.02	-.08	-.08	.07	.13
Competencies	.04	.02	.31**	.01	-.04	-.04	.05	.08
Occupations	-.01	.01	.24**	-.10	-.15*	-.16*	-.03	.11
Self-Estimates	.03	.24**	.50**	-.04	-.16*	-.04	-.09	.17
Total	.10	.12	.41**	-.07	-.11	-.07	.06	.15

Note. M₁ is the column containing the average for the correlation coefficients across the six Holland types. M₂ is the column containing the absolute value average for these same coefficients.

*p < .05, **p < .01.

Realistic interests and abilities may be expressed in the Artistic area and b) there is an Investigative (intellectual) component associated with Artistic abilities and occupations.

In Table 6, no clear pattern is shown between the correlations of the Social dimensions of the SDS subcomponents and the Interpersonal Problem Solving Assessment Technique, with the coefficients being statistically zero for the Competencies, Activities, and Occupations subtests. Once again, the hypothesis is unsupported by the results. Also evident are the statistically significant correlations between the Enterprising sections of the SDS subcomponents and the Interpersonal Problem Solving Assessment Technique, suggesting that this measure may be more directly related to the assessment of Enterprising skills than Social abilities. An alternative explanation, and one is that is supported by previous research (i.e., Rachman et al., 1981), is that the definition/measurement of the Enterprising and Social types is not clearly differentiated by the SDS.

Table 7, unresponsive of the hypothesis, presents results which indicate that the Leaderless Group Discussion, a measure of ability thought to be associated with the Enterprising type, is not related in a consistent manner with the corresponding sections of the SDS subtests. The test does however correlate significantly with the Activities, Competencies, and Self-Estimates subcomponents. This may suggest that the Activities, Competencies, and Self-Estimates

Table 6

Correlations Between the Interpersonal Problem Solving Assessment Technique
and the Social Components of the SDS Subparts

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	M ₁	M ₂
Activities	-.04	-.12	-.05	.10	.18*	-.10	.00	.10
Competencies	.02	-.03	.04	.12	.15*	.04	.06	.07
Occupations	.02	-.07	.10	.00	.22**	.00	.04	.07
Self-Estimates	.02	-.12	-.08	.19**	.26**	-.05	.04	.12
Total	-.01	-.10	.01	.03	.23**	-.04	.02	.07

Note. M₁ is the column containing the average for the correlation coefficients across the six Holland types. M₂ is the column containing the absolute value for these same coefficients.

*p < .05, **p < .01.

Table 7

Correlations Between the Leaderless Group Discussions and the
Enterprising Components of the SDS Subparts

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	M ₁	M ₂
Activities	.00	.05	.17*	-.05	.25**	-.14*	.05	.11
Competencies	.06	.07	.21*	.24**	.26**	.03	.14	.14
Occupations	-.04	.10	.23*	.12	.05	-.12	.06	.11
Self-Estimates	.06	.16*	.13	.18*	.20**	-.04	.12	.13
Total	.04	.13	.22**	.19**	.23**	-.08	.12	.15

Note. M₁ is the column containing the average for the correlation coefficients across the six Holland types. M₂ is the column containing the absolute value for these same coefficients.

* $p < .05$, ** $p < .01$.

components of the SDS can possibly serve as measures of ability corresponding to the Enterprising domain. As indicated by the significant correlations between two of the Social dimensions of the subcomponents and the Leaderless Group Discussion scores, the issue of adequate differentiation between the Social and Enterprising areas by the SDS has again surfaced.

Shown by the results in Table 8, the Conventional portions of the SDS subcomponents correlate in no established pattern with the two measures of ability presumed to pertain to the Conventional area. These findings also give no support for the hypothesized pattern of relationship between the SDS and ability tests. For the Minnesota Clerical Test, the Conventional sections of the SDS subcomponents do not correlate in any consistent fashion given that most of the correlation coefficients shown for this measure are relatively low and statistically non-significant. The Wide Range Achievement Test-Arithmetic subtest scores are significantly correlated with the Conventional sections for three of the four SDS subcomponents, but they do not reflect the hypothesized pattern of relationship with the ability measure.

Note also that both the Minnesota Clerical Test and the Wide Range Achievement Test-Arithmetic subtest scores are each correlated significantly with Investigative sections of certain SDS subcomponents. This may possibly indicate that, for some college women, Conventional abilities or interests may be expressed within the Investigative area and

Table 8

Correlations Between the Conventional Ability Measures and
the Conventional Components of the SDS Subparts

	Minnesota Clerical Test						M_1	M_2
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional		
Activities	.09	.00	-.04	-.12	-.01	.02	-.01	.05
Competencies	.07	.07	-.01	.01	.02	.09	.04	.04
Occupations	.04	.06	.02	.08	-.09	.03	.02	.05
Self-Estimates	.15*	.17*	.11	.04	.03	.11	.10	.10
Total	.11	.11	.02	.05	-.07	.09	.05	.08
Wide Range Achievement Test-Arithmetic Subtests								
Activities	-.01	.13	.01	.00	-.01	.15*	.04	.05
Competencies	-.08	.16*	.03	-.02	-.07	.11	.02	.08
Occupations	-.02	-.05	-.09	-.04	-.17	.17*	-.03	.09
Self-Estimates	.04	.46**	.18*	.07	.00	.20**	.16	.16
Total	-.02	.20**	.03	.02	.08	.22**	.09	.10

Note. M_1 is the column containing the average for the correlation coefficients across the six Holland types. M_2 is the column containing the absolute value for these same coefficients.

* $p < .05$, ** $p < .01$.

vice-versa. Supporting this hypothesis is the Investigative component associated with certain conventional occupations such as certified public accountant, time study analyst, bookkeeper, estimator, and so on.

Table 9 provides the averaged Pearson correlation coefficients between the ability measures and their theoretically corresponding interest area by subcomponent. This information is presented for each of the four SDS subcomponents as well as the total numerical value for each of the six interest categories. The results indicate that, overall, the four SDS subcomponents correlate in a definite pattern with the ability test scores. The pattern of this relationship is as follows: The Self-Estimates and Activities subtests are correlated higher, on average, with the ability measures than are the Competencies and Occupations subcomponents with the same ability tests. Table 9 also indicates that, for the abilities assessed in this study, the SDS may be able to provide the best estimates of ability in the Artistic and Enterprising areas. This is suggested by the higher averaged ability measure test scores corresponding to these two areas.

Discussion

Specifically addressing the central thesis of this study--is the Self-Directed Search a measure of interests or abilities?--the results of this study suggest that, overall the four SDS subcomponents are not related in a consistent fashion to any of the corresponding measures of ability. Had each of the four subcomponents consistently

Table 9

Average of the Correlations Between each of the Ability Measures and the Theoretically Predictive Holland Type of SDS Subcomponents

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	m
Activities	.10	.07	.29	.10	.25	.08	.15
Competencies	.06	.05	.22	.12	.26	.10	.14
Occupations	.02	.10	.14	.00	.05	.10	.07
Self-Estimates	.16	.26	.33	.19	.20	.16	.22
Total	.14	.16	.28	.03	.23	.16	.17
m	.10	.13	.25	.09	.20	.10	

correlated significantly with the appropriate ability measures, the case could then be made that the SDS does measure abilities in each of Holland's six occupational interest categories rather than vocational interests. If few or none of the correlations between the ability measures and corresponding sections of the subcomponents had been statistically significant, the SDS could then be regarded as measuring vocational interests rather than the ability in the six categories. As borne out by the data however, one-half of the correlations between the SDS components and appropriate ability measures are significant. This essentially allows one to surmise that the SDS is not a pure measure of either interests or abilities, but perhaps an interest measure which addresses abilities as part of its assessment. Since the Activities, Competencies, and Self-Estimates subcomponents correlated higher, on average, with their predicted corresponding ability tests than did the Occupations subcomponent, the conclusion is reached that these SDS subcomponents may possibly measure aspects of a person's ability in the primary abilities. This statement must be qualified, however, by the finding that the abilities assessed in this investigation did not all correlate significantly with the various SDS subcomponents. Based on the findings, the SDS does appear to be capable of predicting a person's ability in the following areas: Artistic, Entertaining, and to a lesser extent, Investigative and Conventional. This conclusion may suggest new purpose for

an instrument which was initially designed not as an ability measure, but rather, as a vocational/occupational interest measure. The SDS appears to be least appropriate for assessing a person's relative strengths (at least for the women in this sample) in the Realistic and Social areas. Furthermore, the best overall indicator of ability in these areas is the Self-Estimates subcomponent, while the least effective measure of ability in the six Holland categories is the Occupations area.

When averaged across all six Holland types, the Activities and Self-Estimates subcomponents correlate higher with the appropriate ability measures than do the Competencies and Occupations subtests. This finding suggests that, although the SDS is presented commercially as a measure of interests, the activities and Self-Estimates subcomponents may imply that the measure of interests overlaps with abilities.

An interesting exception to this assessment of abilities is the measurement of college women's Realistic skills. In this study, neither of the ability measures theoretically expected to correspond to the Realistic interest area were highly correlated with expected abilities. Both of these ability measures did however, correlate significantly with the Artistic sections of the Activities and Self-Estimates subcomponents as well as with the total numerical value obtained for the Artistic category. Each of the "Realistic" ability measures also correlated significantly with the

Investigative portion of the Self-Estimates subcomponent. It should also be noted that both the range and mean of the numerical value for the Realistic interest category in this sample is smaller than the range and mean for the values of the other five interest areas. These findings may imply that, women's interests, at least as measured by the SDS, would be anchored with abilities in domains other than mechanical or other stereotypically "Realistic" areas. Alternatively, Holland's conceptualizations of women's realistic interest may need modification.

Noting the moderately high, statistically significant correlations between each of the Artistic sections of the SDS subcomponents and the Seashore Measures of Musical Talent, the issue of ability and instrument specificity arises. If the ability (musical aptitude) is essentially a variable which is easy to rate subjectively (one either has it or does not) and the measure designed to assess this ability is highly specific (as is the Seashore test), the clearer are the results because the person can assess their ability with accuracy and thus increase the correlation between objective and subjective assessment. As additional support for this statement, the apparent overlap between the Social and Enterprising abilities, as measured by the Interpersonal Problem Solving Assessment Technique and the Leaderless Group Discussion, respectively, suggests that as abilities become less unique and more highly related to one

another (Holland places the Enterprising and Social types adjacent on the hexagonal model) the more difficult they become to gauge accurately as separate abilities. One alternative explanation for the moderately high, statistically significant correlations of the Seashore test with the Artistic sections of the four SDS subcomponents and the lower correlations for the Leaderless Group Discussion and the Interpersonal Problem Solving Assessment Technique with the Social and Enterprising sections of the subcomponents is that it may be easier for people to acknowledge the fact that they do or do not have ability in a particular area if the ability (musical skills) is not tied into self-esteem or social desirability (as are interpersonal and leadership skills).

Referring back to the finding that among the four SDS subcomponents, the Self-Estimates subtest correlates highest, on average, with the corresponding ability measures, the implication is suggested that people can reasonably assess their relative degree of ability in a given area. This might serve as additional support for interest inventories to include self-report data regarding abilities.

The homogeneity of the sample (all undergraduate female students predominately freshman and sophomores, all between the ages of 18 and 25 and attending the same university) obviously limits the generalizability of the present findings. Of special importance in terms of a limiting

factor for this study is the lack of an independent criterion measure for the interests assessed by the SDS. Although the validity of the classification system utilized by the SDS has been demonstrated enough times (i.e., Gottfredson, 1980a; Holland, 1973; Nafziger & Helms, 1974; Temme, 1975; Viernstein, 1972) so as not to warrant that it be done in the present investigation, the absence of such a measure nonetheless detracts from the conclusiveness of the findings. In acknowledging this limitation, the author suggests that in future similar studies (especially since the SDS is being revised), a well validated interest measure should be used in conjunction with the ability tests.

A secondary, though highly relevant, issue to the focus of this investigation is the general theoretical question-- are interests and abilities separate, or is it reasonable to expect that the two domains are related? Lowman et al. (in press) have suggested that abilities and interests may be relatively independent of each other. The present findings generally support this, as evidenced by one-half of the correlations between the subcomponents of the SDS and appropriate objective ability measures being statistically zero and none of the ability tests relating to the subcomponents in a consistent pattern. Evidence for the relative separation of abilities and interests was provided by the overall low, statistically non-significant correlations between the Occupations subcomponent (perhaps more of a "pure"

measure of interest) and the ability measures. If abilities and interests are independent of each other, and the SDS is supposed to be a vocational and occupational interest inventory, then it might be reasonable to remove any implicit measure of abilities from it. While the current study suggests that the domains of expressed interests and objectively measured abilities are independent, future research of a similar nature is needed to help determine the relative degree of independence. Until such research can conclusively demonstrate this exclusivity of interests and abilities, the SDS might prove to be a more viable (useful) instrument if it continues to address abilities (most strongly in the Self-Estimates subcomponent) as well as interests in attempting to provide a valid framework from which to measure human interests and develop vocational choices.

Is Holland's SDS a measure of interests of abilities? Although the instrument is supposedly a vocational interest inventory, some of the SDS subtests do correlate significantly and appropriately measures of ability related to the Realistic, Investigative, Artistic, Social, Enterprising, and Conventional areas. In answering the question posed by the title of this paper, it must first be stated that the specific hypothesis set forth at the beginning of the study is unsupported by the results. None of the ability tests are correlated in any established pattern with the four

subcomponents of the SDS. The Self-Directed Search thus appears to primarily measure interests, but certain aspects of abilities are no doubt also assessed by the instrument. The restriction of variability within the sample tested might possibly be the cause for the rather vague findings. In other words, had wider ranges of interest, age, educational level, and area of academic study been included in the analyses, the result would have been a sample of greater variability and thus potentially increase the magnitude and significance level of the correlations between interest and ability measures.

Additional research with large sample sizes will help determine if the present findings merit consideration in the development of future interest inventories or if they were largely artifactual. Replications of this study with other interest inventories, such as the Strong-Campbell and the Kuder Occupational Interest Survey, are needed to examine whether they can provide measurement of both interests and abilities as well. Also desirable would be a similar investigation of the new edition of Holland's SDS in order to assess the degree to which it has addressed some of the potential shortcomings of its predecessor.

Appendix A

CONFIDENTIALBackground and Demographic Information

1. Name _____
2. Are You: (Check one)
 A. Female
 B. Male
3. What is your marital status? (check one)
 A. Married
 B. Widowed
 C. Separated
 D. Divorced
 E. Never married
4. How old were you on your last birthday? _____ years.
5. Are you: (check one)
 A. Black
 B. Asian or Pacific Islander
 C. American Indian or Alaskan
 D. White
 E. Other
6. Are you of Hispanic origin? (i.e.,; Chicano, Carribean-Spanish, Filipino-Spanish, etc.)
 A. Yes
 B. No
7. What is your father's educational level? (Indicate highest level completed)
 A. Elementary (Grades 1 - 8)

- _____ B. Some high school or some technical training
- _____ C. Graduated from high school or GED (Graduate Equivalency Degree)
- _____ D. High school degree plus technical training or apprenticeship
- _____ E. Some college
- _____ F. Graduated from college (B.A., B.S., or other bachelors degree)
- _____ G. Some graduate school
- _____ H. Graduate degree (M.A., M.S., LL.B., Ph.D., M.D., etc.)
8. What is your mother's educational level? (Indicate highest level completed)
- _____ A. Elementary school (Grades 1 - 8)
- _____ B. Some high school or GED (Graduate Equivalency Degree)
- _____ C. High school degree plus technical training or apprenticeship
- _____ D. Some college
- _____ E. Graduated from college (B.A., B.S., or other bachelors degree)
- _____ F. Some graduate school
- _____ G. Graduate degree (M.A., M.S., LL.B., Ph.D., M.D., etc.)
9. What is your father's present occupation?
- _____
10. What is your mother's present occupation?
- _____
11. What is your present major in college? (If undecided, so state)
- _____

12. What is your present year in college? (Circle one)

Freshman Sophomore Junior Senior

Other (please specify) _____

13. Your Grade Point Average (GPA) as of last semester (If unsure, give approximation) is: _____

14. Your current telephone number and best time(s) to reach your is: _____

15. NTSU mailing address: _____

16. Your permanent mailing address where mail will always reach you:

Consent to Participate

I hereby agree to participate in this study, which I understand will consist of a series of aptitude, vocational interest, and personality measures. I agree to complete the entire testing battery (two testing sessions). I understand that I will be provided feedback on my test results (provided I complete the entire battery of tests) sometime later this term.

Signature

Date

Appendix B

LGD Administration Instructions

This is a test of leadership and social skills. The task of this group is to come up with a rank order, which the entire group can agree upon, of the five candidates for the Kidney Machine. You may be interested to know that there really is a Swedish Hospital in Seattle and that they really do have a committee similar to the one you will be simulating here today.

Although the group is expected to reach consensus on the ranking, a thorough discussion of the information provided on each candidate should be conducted. Effective groups gather the input of all their members. You should make sure that you put forth your own point of view to the group. Do not rely on others to speak for you. The group will have 20 minutes for the exercise. Any questions? OK, Begin.

Each member should have their ratings sheets in front of them throughout the discussion. Do not begin rating the participants until at least 10 minutes of discussion has elapsed. Make notes of each participant's behavior in the meantime. At the end of the 20 minute period, pass out the Peer Rating Forms and continue with the instructions.

Now we would like for you to rank order each person in the group according to your opinion of how they performed in this group on the four dimensions listed on the form in front

of you. You are to rate each person OTHER THAN YOURSELF in the group. In this group there are _____ persons, so you should have filled in _____ ($n - 1$) spaces for each of the questions. To save time, you are to list each person you are rating by NUMBER, not name. Each person's number is on the card in front of them. Any questions? OK, begin.

The staff observers should complete their rating forms while the group members are completing the Peer Rating Forms. Make sure that each participant is rated on each dimension. When all participants have completed their forms, collect them, making sure that each person has completed the appropriate number of ratings on all of the questions. Return any that are deficient. Only after all forms have been checked should the numbered cards be removed.

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