

Instrument Development: Reliability and Validity of the Strong Interest Explorer™

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This paper describes the development of the Strong Interest Explorer (SIE), a self-scorable interest assessment designed for students and early career explorers. The history of the SIE, and its relationship to the Strong Interest Inventory™ assessment are discussed, along with evidence of reliability and validity.

Purpose of the Strong Interest Explorer and Comparison to the Strong Interest Inventory

The Strong Interest Explorer (SIE) is designed to provide students and early career explorers with an estimate of their interests and a way to link those interests to educational and occupational information. The primary application for the SIE is a classroom or group setting, led by a teacher or counselor. This paper describes the development, application, scoring, and reliability and validity research to date on the SIE.

The SIE was developed as a simplified alternative to the Strong Interest Inventory instrument for use in applications where a self-scorable tool was needed. SIE differs from the Strong Interest Inventory instrument in a number of ways. First, the SIE contains items that are at a more basic level than the SII (medical doctor vs physician) and has fewer occupation and more school subject items than the SII. Second, the SIE scales measure 14 basic interest areas, whereas the SII has a much larger set of scales, including the 6 General Occupational Themes, 25 Basic Interest Scales, four Personal Style Scales, and 211 Occupational Scales. Third, the

SIE is an ipsative measure in which an individual compares his or her own interests across the 14 basic interest scales. Alternatively, the SII provides extensive normative data and comparisons and is backed by 75 years of research. Fourth, in the SIE booklet the assessment items and interpretive information has been integrated with educational and occupational information. And finally, as noted previously, the SIE is self-scored whereas the SII is computer scored, which is a more accurate method of scoring.

Item Selection

In the first step in item selection involved analytic work conducted on the 1994 SII using data drawn from the CPP customer database. An iterative combination of factor analyses and item response analyses were used to derive a subset of items from the 317 items of the SII. The sample included 2,397 respondents drawn to create a national and ethnically diverse sample of adolescents between the ages of 14-18. Items that provided information and did not appear to function differently across ethnic groups were selected.

The factors derived from the analyses suggested that some of the scales were too narrow and that many items were repetitive. For example, the “science” factor was very narrow and did not capture health and science, which is a broader content area that is more applicable for career planning. Similarly, the mathematics factor had many similar items and appeared repetitive. These results suggested that additional items would be needed to supplement the existing item pool.

The CPP research staff wrote a pool of new items. In addition, items that were being used for the 2002 SII revision were included. Finally, some of the items from the 1994 SII and 2002 SII revision research form were modified and included.

Once this initial item pool was developed, a thorough review of the items was conducted. As a first step, twenty-five high school students from a local high school reviewed the items and gave their feedback on face validity and reading level. The students favored simple items (e.g., “lawyer” rather than “copyright lawyer”). Several experts reviewed the items and commented on the datedness of a few items.

Based on the feedback, a 181-item research form was developed and given to 321 freshman college students at a large midwestern university. Of those responding to gender and ethnicity questions (see Table 1), 55% were female and 45% were male. Sixty-five percent were Caucasian, and many other ethnicities were represented. Initial analyses and item selection was done based on these data, and the list of items was narrowed.

Following the initial narrowing of items, a 154-item research form of the SIE was given to 343 high school students, from which final item selections were made. Of those who responded to gender and ethnicity questions (see Table 2), 70% were female and 30% were male, and 84% were Caucasian. At least 3% of the sample reported that they were either African-American (7%), Asian-American/Pacific Islander (3%), Latino(a)/Hispanic (3%), or Other (3%).

In the final 140-item version of the SIE, 60 items came from the 1994 SII, 33 items came

from the 2002 research on the SII, 35 were written by the research staff of CPP, and twelve were modifications of either 1994 SII items or 2002 SII research items.

Administration and Application

Administration and Intended Audience

The SIE is designed for early career exploration and planning and it is intended for use with younger (e.g., high school or community college) or early career populations. The instrument and interpretive feedback booklet was created for a class/group setting and is best used in concert with an instructor or guidance professional.

It typically takes 8-10 minutes to complete the 140 items. The assessment portion should be introduced within an education or career development context (i.e., the purpose is to help someone begin to identify interest areas). The utility of the assessment will depend on the motivation, and reading capacity, of the respondent. Careless responding or scoring, or inability to understand the items (i.e., the school subjects, occupations, activities) will lead to meaningless results. The class or group leader should provide sufficient support to insure that people understand and are willing to participate.

Based on the results presented in this paper, the SIE appears to work equally well for females and males and across ethnically diverse groups within the United States. Certainly additional data is needed to further support this claim. Research to support the use of the SIE in cross-cultural settings has not yet been collected, and as such, use with international groups should proceed with great caution.

Scoring and Interpretation

The SIE includes fourteen basic interest scales and scores for each scale are obtained by adding the number of items within a scale marked “like”. The scales are not normed and scores should not be interpreted as normative (i.e., there are no “high” scores or “low” scores). Instead, the SIE is an exploratory tool. If an individual expresses interest in an area (by virtue of marking a number of items “Like”), then he/she is encouraged to learn more about that interest area. Response bias patterns (yea-

saying) are possible and could negatively impact interpretation. Group leaders should be alert to the possible impact of response biases. If a respondent indicates that he/she likes almost all items, or alternatively dislikes almost all items, the instructor should discuss that pattern of responding with the individual.

The scales are intended to be self-descriptive (e.g., Helping Others measures interest in social service) and to match broad technical, professional, or university school areas (e.g., health and science). The items and the scales do not capture all possible interest areas, but rather 14 popular ones. The scales measure interest only, and in no way, should they be interpreted as indicators of ability or aptitude. Scores are not proscriptive and do not imply that someone “should” pursue a given educational or career path. Finally, the scales reflect a person’s interests at the current time. Interpretations about long-term interest stability are not warranted nor do they fit the purpose of the instrument.

Reliability and Validity Estimates: Method

Participants

Three samples completed the Strong Interest Explorer. First was a sample of 321 college students. Second was a sample of 343 high school students. Third was a sample of 143 employed adults. A subset of this third sample (N = 108) also completed the Strong Interest Explorer again six weeks later. A donation was given to a local church youth group in exchange for the adults’ participation. Sex and ethnicity information for the college and high school samples are presented in Table 1 and Table 2, respectively. Different ethnicity categories were used for the two samples.

Measures

Strong Interest Explorer. The Strong Interest Explorer consists of 140 items, such as accounting, sculptor, and instructing people on a new method. Participants placed checkmarks next to items that they liked, and skipped those they did not like. Total scores were calculated by summing the number of checked items within each of fourteen basic interest scales, such as

health and science, helping others, and law and politics.

Other interest items. The sample of employed adults completed a supplemental questionnaire at time one of the two part study. The supplemental questionnaire included questions that more directly assessed their interest in each of the fourteen basic interest scales measured by the Strong Interest Explorer. Participants indicated how much they would like to work in each of the areas, on a Likert-type scale ranging from 1 (dislike it very much) to 5 (like it very much). Participants also wrote about the type of work they were doing at the time, and about the type of careers that would interest them if they changed careers. Each of these responses was coded into one of the fourteen areas represented by the basic interest scales.

Reliability and Validity Estimates: Results

Reliability

Reliability refers to both the internal consistency and the stability of an instrument. Internal consistency, or relatedness of the scale items, is important for scales that purport to measure concepts that are defined by a unitary construct, such as interest in science. Stability over time is important for instruments that profess to measure relatively stable concepts that are unlikely to fluctuate dramatically over short periods of time (as opposed to mood, which can change hourly depending on the situation).

Reliability was assessed in these two ways, and results are presented in Table 3. Internal consistency was assessed on all three samples, and stability over time was assessed with the sample of employed adults.

Internal consistency was important of the SIE because it was designed to measure fairly unitary constructs. Over all the samples and across all basic interest scales, there was a high level of internal consistency. Almost all basic interest scales had alphas of at least .80 in all samples, although there were isolated exceptions in some samples for some scales.

To assess stability across time, the sample of 108 employed adults completed the Strong Interest Explorer twice at a six-week interval.

All basic interest scales showed stability of at least .70, with a mean of .79 across all basic interest scales. It is possible that stability over

time will not be as high for a high school sample, given the changing nature of attitudes and learning of that age. The SIE did show a

Table 1

College sample sex and ethnicity frequencies.

	African-American	Asian	Caucasian	Latino or Hispanic	American Indian/Alaskan	Middle Eastern	Multi-ethnic	Other
Female	7	5	96	5	2	2	14	12
Male	2	6	109	6	4	6	15	24

Note. Total N does not match that of the other analyses due to missing data.

Table 2

High school sample sex and ethnicity frequencies.

	African-American	Asian-American/Pacific Islander	Caucasian	Latino(a)/Hispanic	Native American	Other
Female	17	7	185	7	1	6
Male	6	3	83	1	0	3

Note. Total N does not match that of the other analyses due to missing data.

high degree of stability for our adult sample, though.

In summary, the basic interest scale scores showed good internal consistency and stability across a six-week interval.

Validity

Validity refers to the extent to which an instrument actually measures what it purports to measure. Here, validity was assessed with the sample of employed adults, who in addition to completing the Strong Interest Explorer also completed a supplemental questionnaire. Two sets of analyses were done, first on the self-expressed interest in each of the fourteen basic interest scale areas, second on the open-ended responses about their current work and their desired work if they were to change careers.

We expected that self-expressed interests would be positively and strongly related to the basic interest scale scores in the same area. Correlations between participants' self-expressed interest in each of these areas and their basic interest scale scores are presented in Table 3. Results indicated significant and

positive correlations for all basic interest scales, with a mean correlation of .55 across all scales. These strong correlations show that basic interest scales measured by the Strong Interest Explorer are consistent with the self-expressed interest in each area.

We also expected that people would be working in areas that they were more interested in, and that if they were to change careers, they were likely to pick careers that they had interest in. Two coders familiar with the fourteen areas of the Strong Interest Explorer coded responses to the open ended questions about their current work and desired work. Each response was coded as one of the fourteen areas, and disagreements were resolved through discussion. Interrater agreement before discussion was 79%. Because of missing values, there were 92 responses to the current work question and 61 responses to the desired work question.

To analyze the responses to the current work question, each participant's coded responses was recoded into fourteen dummy variables, representing the fourteen basic interest areas of

the Strong Interest Explorer. This meant that each participant received a one on one of the fourteen variables and zeros on all the others (missing responses were recoded as missing, so that only those who responded to the question were compared). The same process was done for the desired work question, meaning there were two sets of fourteen variables, for 28 total.

By correlating one of these dummy variables (e.g., the current work Music and Arts variable) with the basic interest Music and Arts variable we can determine if those who currently work in music and arts have higher interest in that area than others who do not work in music and arts. This was done for each of the fourteen areas for both the current work and desired work questions. We expected those who worked or desired to work in a particular area to have higher interest levels as measured by the SIE basic interest scales than those who did not work in that area.

Results (shown in Table 3) indicated that those who currently worked in the areas of Health and Science, Teaching and Training, Law and Politics, Working with Computers, Outdoor Environment, Plants and Animals, and Construction and Engineering indicated higher interest in those areas than those who did not

work in those areas, consistent with hypotheses. For desired work, we found that the basic interest scales correlated for Music and Arts, Writing and Mass Communications, Helping Others, and Outdoor Environment. It is important to note that several categories had no responses, making it impossible to conduct this analysis for all categories. In total, there were ten significant correlations found out of 22 possible, impressive results given the low number of responses for many categories and the relatively low statistical power for these analyses.

Together these results show good evidence of the validity of the SIE. First, peoples' self-expressed interests in a variety of areas correlate with the basic interest scale scores from the SIE. Second, people generally indicate higher interest on the SIE in the area in which they are currently working. Third, people generally indicate higher interest on the SIE in the area in which they desire to work if they were to change careers.

Table 3

Internal consistency, test-retest, correlations with self-expressed interests, and correlations with current and desired work for Strong Interest Explorer basic interest scales.

	Internal consistency			Correlations with self-expressed interests			Correlations with open-ended questions	
	High School Students (N = 343)	College Students (N = 321)	Employed Adults (N = 143)	Employed Adults (N = 108)	Employed Adults (N = 143)	Current type of work (N = 92)	Type of work if switching (N = 61)	
Basic Interest Scale								
Working with Numbers	.85	.84	.84	.84	.68	.18 ⁺	N/A	
Health and Science	.83	.87	.77	.77	.47	.27**	.19	
Music and Arts	.82	.85	.82	.81	.51	.11	.34**	
Writing and Mass Communications	.85	.84	.82	.78	.67	N/A	.32*	
Cultural Relations	.88	.89	.86	.70	.64	N/A	.10	
Helping Others	.84	.84	.81	.76	.41	.18 ⁺	.32*	
Teaching and Training	.83	.84	.83	.80	.60	.22*	-.06	
Law and Politics	.87	.90	.83	.87	.64	.45**	.11	
Office and Project Management	.80	.76	.81	.76	.54	-.05	-.06	
Business, Sales, and Marketing	.83	.84	.69	.77	.48	.06	-.15	
Working with Computers	.91	.90	.90	.78	.46	.30**	N/A	
Outdoor Environment	.83	.82	.81	.76	.58	.23*	.31*	
Construction and Engineering	.85	.85	.86	.82	.57	.29**	.12	
Protective Services	.83	.78	.85	.77	.43	N/A	N/A	

Notes. Some coded categories had no responses, thus correlations could not be computed. For the current type of work, all non-significant and marginally significant correlations except Office and Project Management and Helping Others had three or fewer responses in that category. For the switching work question, all non-significant correlations had six or fewer responses in that category.

All test-retest and correlations with self-expressed interests were significant, $p < .05$.

⁺ $p < .10$, * $p < .05$, ** $p < .01$, N/A = could not be calculated because there were no responses for that category.

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