

---

---

# **O\*NET® Interest Profiler Short Form Psychometric Characteristics: Summary**

James Rounds  
University of Illinois at Urbana-Champaign, Department of Educational  
Psychology and Psychology

Rong Su  
University of Illinois at Urbana-Champaign, Department of Psychology

Phil Lewis & David Rivkin  
National Center for O\*NET Development

**Prepared for**

**U.S. Department of Labor  
Employment and Training Administration  
Office of Workforce Investment  
Division of Workforce System Support  
Washington, DC**

**Submitted by**

**The National Center for O\*NET Development  
2010**



[www.onetcenter.org](http://www.onetcenter.org)

## Table of Contents

<b>O*NET INTEREST PROFILER SHORT FORM PSYCHOMETRIC CHARACTERISTICS: SUMMARY ....</b>	<b>3</b>
<b>DEVELOPMENT OF SHORT FORM.....</b>	<b>4</b>
<b>PSYCHOMETRIC CHARACTERISTICS OF SHORT FORM .....</b>	<b>5</b>
<i>Reliability</i> .....	5
<i>Validity</i> .....	5
<b>SCORING FOR PAPER-AND-PENCIL AND COMPUTERIZED SHORT FORM.....</b>	<b>6</b>
<b>FINAL COMMENTS .....</b>	<b>6</b>
<b>REFERENCES .....</b>	<b>7</b>
<b>APPENDIX A.....</b>	<b>8</b>
<b>APPENDIX B.....</b>	<b>11</b>

## **O\*NET® Interest Profiler Short Form Psychometric Characteristics: Summary**

The Interest Profiler is one of several O\*NET Career Exploration Tools designed for career counseling, career planning, and career exploration. The O\*NET Interest Profiler (Lewis & Rivkin, 1999) measures six types of Holland (1997) occupational interests: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C), collectively called RIASEC. The Interest Profiler is a self-scored interest assessment and has been adapted for computer-based assessments. During all stages of the development of the Interest Profiler, extensive efforts were made to include client and counselor input. Studies were conducted to provide construct validity and reliability evidence (Rounds, Mazzeo, Smith, Hubert, Lewis, & Rivkin, 1999a; Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999b).

The Interest Profiler, a 180-item instrument, helps individuals identify their work-related interests and translates these interests into occupations that closely fit. The Interest Profiler can help workers consider career options and plan career preparation and transitions more effectively. Users of the Interest Profiler may link information on more than 900 occupations described in the O\*NET database to occupational information in America's Career InfoNet and to information in other career and labor market information systems. The Interest Profiler also allows individuals to relate their interest assessment results to the requirements of occupations in the local labor market.

This report summarizes the initial development research to create a short form of the Interest Profiler. The primary objective was to develop brief RIASEC scales for use in counseling and consulting settings where it is helpful to have an interest measure that can be completed in a very short period of time. In group counseling and workshop settings, it is particularly important that participants can complete brief self-scoring assessments and have time for discussion and other group activities. For online computerized interest assessment, brevity is especially important because longer online questionnaires can lead to lower participation rates and poorer answer quality (e.g., Galesic & Bosnjak, 2009).

The Interest Profiler, constructed to measure the six Holland RIASEC types, has 180 items with 30 items per RIASEC scale (called the Long Form). Based on an application of the Spearman-Brown formula to the reliabilities of the Interest Profiler, a decision was made to develop 10-item Interest Profiler RIASEC scales. The internal consistency reliabilities for the Long Form RIASEC scales range from .95 to .97 (Lewis & Rivkin, 1999). Given the assumptions of the Spearman-Brown formula were met, we expected, the reliabilities of the 10-item short form would range from .80 to .85.

The challenge of developing an Interest Profiler Short Form involved selecting items to ensure that the RIASEC domains are adequately sampled and that the relations among items retain the hexagonal structure found in RIASEC measures. Although the focus was on shortening the Long Form, an additional objective was to improve the endorsement rate on the Enterprising scale. In the Rounds et al. (1999b) study of the

psychometric characteristics of the Interest Profiler RIASEC scales, we found that the endorsement rate for the Interest Profiler Enterprising scale was low when compared to the Interest Finder (Wall & Baker, 1997). Thus, a secondary objective in the development of the O\*NET Interest Profiler Short Form was to increase the endorsement rate for the Enterprising scale. In summary, the criteria for Short Form item selection were: content coverage of RIASEC types, structural fidelity, and increased endorsement rates for the Enterprising scale.

### **Development of Short Form**

The Short Form developmental analysis was based on a sample (referred to as the developmental sample; see Rounds et al., 1999b for a complete description) that represented a wide range of persons in career development situations, particularly those seeking positions that require lower levels of formal training or education. The developmental sample ( $N = 1061$ ) was collected in four states (Michigan, New York, North Carolina, and Utah). Data collection sites included employment service offices, high schools, junior colleges, technical-trade schools, universities, and government agencies. The sample was 41% male and 59% female. Participants were heterogeneous in terms of ethnic diversity (25% African-American, 59% White non-Hispanics, 10% Hispanic, and 6% members of other racial/ethnic groups). A second sample ( $N = 132$ ), referred to as the stability sample from Rounds et al., 1999b, was used to evaluate the stability of the RIASEC scales. The stability sample was 27% male and 73% female. The breakdown of race and ethnicity was: 16% African-American, 73% White non-Hispanics, 5% Hispanic, and 6% members of other racial/ethnic groups.

An iterative procedure was used to select items from the 180-item Interest Profiler. We first created a two-dimensional spatial map of the Interest Profiler items. The 180 by 180 correlation matrix was scaled in two dimensions using multidimensional scaling (Kruskal & Wish, 1978). Items were selected on the basis of their locations in the two-dimensional space and on their content coverage. The selection process was both forward (adding items) and backward (deleting items). We recreated the spatial map when 20, 15, and 10 items were selected per RIASEC scale. For Enterprising items, the mean endorsement rate was also examined and used in item selection. These analyses and judgments yielded 10-item RIASEC scales.

The preliminary 10-item RIASEC scales underwent a final examination by a panel of three judges who have extensive backgrounds in vocational psychology and test construction (Phil Lewis, David Rivkin, and James Rounds). With information on all 180-items of the Long Form, we re-examined item means, standard deviations, item cross-correlations with RIASEC scale scores from both the Interest Profiler and Interest Finder, and two-dimensional spatial item maps for the 180 Interest Profiler items. At the RIASEC scale level, we also examined the reliabilities for the 10-item RIASEC scales and cross-correlations and cross-classification of Interest Profiler Short Form with Interest Finder RIASEC scales. The review resulted in four items being replaced on four different RIASEC scales.

In the following sections, we present a summary of the psychometric characteristics for the 10-item O\*NET Interest Profiler Short Form. Appendix A contains a list of the RIASEC items for the Interest Profiler Short Form. Appendix B contains detailed psychometric information to support the reliability and validity of the Interest Profiler Short Form.

## **Psychometric Characteristics of Short Form**

### *Reliability*

Internal consistency estimates were calculated on the developmental sample ( $N = 1061$ ) and the stability sample ( $N = 132$ ). In the developmental sample, Cronbach's alpha for the Short Form ranged from .78 to .87 ( $M = .81$ ). The coefficients based on the stability sample ranged from .78 to .89 ( $M = .84$ ) and .82 to .90 ( $M = .86$ ) for time 1 and time 2, respectively, showing that the Short Form has sufficient internal consistency for practical implications. Analysis of correlations between two test occasions showed that the Short Form scales are highly stable, with test-retest correlations for RIASEC scales ranging from .78 to .86 ( $M = .82$ ).

### *Validity*

Evidence for convergent and discriminant validity is supported by examining the cross correlations between the Interest Profiler and the Interest-Finder RIASEC scales (Wall & Baker, 1997). The correlations for same-named scales ranged from .74 to .82. In comparison, the correlations for dissimilar scales ranged from .12 to .48.

Profile analyses were conducted comparing the Short Form with the Long Form and the Interest Finder. Results showed that the Short Form profile is slightly different than the profiles for the Long Form and the Interest Finder (see Rounds et al., 1999). The RIASEC profiles of the Short Form compared to the Long Form provide a better fit with the Interest Finder. Cross-classification analyses on the RIASEC high-point code showed that the Short Form has high agreement with the Long Form, as well as much improved agreement with the Interest Finder compared to the Long Form, particularly for the Enterprising scale.

The intercorrelations of the Short Form RIASEC scales provide structural validity support. These intercorrelations conform to a circular order pattern, with the correlations decreasing as one scale moves farther away from the other and then increasing as the scale again moves closer along the circular structure. A Correspondence Index (CI) of .69 from the randomization test confirmed that the Short Form has a good fit to the RIASEC circular structure. Multidimensional scaling (MDS) and circular unidimensional scaling (CUS) conducted on the Short Form intercorrelation matrix provided additional support for its structural validity. A two-dimensional MDS solution fits the data well, explaining 99% of the variation in the Short Form (compared to 93% for the Long term).

CUS results also suggested a good fit of the Short Form to a circular structure, explaining 86% of the variance, a major improvement from 60% for the Long Form.

Gender differences in the RIASEC scales for the Short Form showed a large difference favoring men in Realistic interests ( $d = .86$ ), moderate gender difference favoring female in Social ( $d = -.59$ ), and small to non-existent gender difference in Investigative and Enterprising ( $d = .26$  and  $d = -.07$ , respectively). The magnitude of gender differences shown in the Short Form RIASEC scales is less than differences found in highly regarded vocational interest measures (e.g., Strong Interest Inventory, Self-Directed Search, Kuder Occupational Interest Survey; see Su, Rounds, & Armstrong, 2009).

### **Scoring for Paper-and-Pencil and Computerized Short Form**

The O\*NET Interest Profiler Short Form can be used as a self-scored assessment and has also been adapted for computer-based assessment. In the case of the self-scored paper-and-pencil form for either the Short or Long Form, the three-point response format is recommended where participants are asked for “like,” “dislike,” or “unsure” responses to the items. Scores are then computed by summing the number of “like” responses.

In the case of the computerized assessment for the Short Form, a five-point response format is used (note that the computerized Long Form has retained a three-point response format). In the five-point response format, participants indicate their interest in each activity from 0 = “strongly dislike,” 1 = “dislike,” 2 = “unsure,” 3 = “like,” and 4 = “strongly like.” Scores are computed by summing responses for each of the six Holland types with a score range of 0 to 40. The change in response format for the computerized Short Form follows the rationale given by Donnay, Morris, Schaubhut, and Thompson (2005) in the revision of the Strong Interest Inventory from a response format of three options to five options. With fewer items for the Short Form, increasing the response options to five points may improve the internal consistency reliability and accuracy of measurement.

### **Final Comments**

A 60-item form of the Interest Profiler was developed for use in counseling and consulting settings where it is useful to have a RIASEC measure that can be completed in a short period of time. Results obtained in the initial development and validation process suggest that the brief RIASEC scales have acceptable levels of reliability. The O\*NET Interest Profiler Short Form scales show convergent and discriminant validity with the Interest Finder RIASEC scales and structural properties that mirror the theoretical basis of the RIASEC model. An important next step in examining these brief RIASEC scales is to generalize the findings found in the present study to other RIASEC measures and samples.

## References

- Donnay, D. A. C., Morris, M. L., Schaubhut, N. A., & Thompson, R. C. (2005). *Strong Interest Inventory manual: Research, development, and strategies for interpretation*. Mountain View, CA: CPP.
- Galesic, M., & Bosnjak, M. (1999). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly*, *73*, 349–360.
- Kruskal, J. P., & Wish, M. (1978). *Multidimensional scaling*. Newbury Park, CA: Sage.
- Lewis, P., & Rivkin, D. (1999). *Development of the O\*NET Interest Profiler*. Retrieved October 30, 2009, [http://www.onetcenter.org/dl\\_files/IP.pdf](http://www.onetcenter.org/dl_files/IP.pdf)
- Rounds, J., Mazzeo, S.E., Smith, T.J., Hubert, L., Lewis, P., & Rivkin, D. (1999a). *O\*NET Computerized Interest Profiler: Reliability, validity, and comparability*. Retrieved October 30, 2009, [http://www.onetcenter.org/dl\\_files/IP\\_RVS.pdf](http://www.onetcenter.org/dl_files/IP_RVS.pdf)
- Rounds, J., Walker, C. R., Day, S. X, Hubert, L., Lewis, P., & Rivkin, D. (1999b). *O\*NET Interest Profiler: Reliability, validity, and self-scoring*. Retrieved October 30, 2009, [http://www.onetcenter.org/dl\\_files/IP\\_RVS.pdf](http://www.onetcenter.org/dl_files/IP_RVS.pdf)
- Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin*, *135*, 859-884.
- Wall, J. E., & Baker, H. E. (1997). The Interest-Finder: Evidence of validity. *Journal of Career Assessment*, *5*, 255-273.

## **Appendix A**

### **O\*NET Interest Profiler Short Form: RIASEC Items (in order of presentation)**



---

**Realistic Items**

---

- \*1. Build kitchen cabinets
  - 14. Lay brick or tile
  - 26. Repair household appliances
  - 49. Raise fish in a fish hatchery
  - 61. Assemble electronic parts
  - 62. Drive a truck to deliver packages to offices and homes
  - 146. Test the quality of parts before shipment
  - 158. Repair and install locks
  - 169. Set up and operate machines to make products
  - 170. Put out forest fires
- 

---

**Investigative Items**

---

- 27. Develop a new medicine
  - 39. Study ways to reduce water pollution
  - 75. Conduct chemical experiments
  - 100. Study the movement of planets
  - 111. Examine blood samples using a microscope
  - 112. Investigate the cause of a fire
  - 135. Develop a way to better predict the weather
  - 136. Work in a biology lab
  - 147. Invent a replacement for sugar
  - 171. Do laboratory tests to identify diseases
- 

---

**Artistic Items**

---

- 29. Write books or plays
  - 30. Play a musical instrument
  - 54. Compose or arrange music
  - 77. Draw pictures
  - 90. Create special effects for movies
  - 113. Paint sets for plays
  - 137. Write scripts for movies or television shows
  - 149. Perform jazz or tap dance
  - 161. Sing in a band
  - 173. Edit movies
- 

*Note.* \* Item number from the Interest Profiler Long Form.

---

**Social Items**

---

- 7. Teach an individual an exercise routine
  - 20. Help people with personal or emotional problems
  - 44. Give career guidance to people
  - 67. Perform rehabilitation therapy
  - 68. Do volunteer work at a non-profit organization
  - 80. Teach children how to play sports
  - 92. Teach sign language to people with hearing disabilities
  - 104. Help conduct a group therapy session
  - 151. Take care of children at a day-care center
  - 176. Teach a high-school class
- 

---

**Enterprising Items**

---

- 9. Buy and sell stocks and bonds
  - 10. Manage a retail store
  - 22. Operate a beauty salon or barber shop
  - 93. Manage a department within a large company
  - 117. Start your own business
  - 118. Negotiate business contracts
  - 129. Represent a client in a lawsuit
  - 142. Market a new line of clothing
  - 154. Sell merchandise at a department store
  - 166. Manage a clothing store
- 

---

**Conventional Items**

---

- 11. Develop a spreadsheet using computer software
  - 12. Proofread records or forms
  - 36. Load computer software into a large computer network
  - 60. Operate a calculator
  - 96. Keep shipping and receiving records
  - 107. Calculate the wages of employees
  - 120. Inventory supplies using a hand-held computer
  - 155. Record rent payments
  - 167. Keep inventory records
  - 179. Stamp, sort, and distribute mail for an organization
- 

*Note.* \* Item number from the Interest Profiler Long Form.

## **Appendix B**

### **Materials to Support the O\*NET Interest Profiler Short Form Psychometric Characteristics**

## List of Tables

<b>Table 1</b>	Description of Developmental Sample .....	22
<b>Table 2</b>	Description of Stability Sample .....	23
<b>Table 3</b>	Interest Profiler Short Form and Long Form Coefficient Alphas.....	24
<b>Table 4</b>	Means, Standard Deviations, and Cronbach's Alphas for the Interest Profiler Short Form RIASEC Scales at Time 1 and Time 2.....	25
<b>Table 5</b>	Interest Profiler Short and Long Form Test-Retest Correlations .....	26
<b>Table 6</b>	Cross Correlations of the Interest Profiler Short Form with the Long Form and Interest Finder.....	27
<b>Table 7</b>	RIASEC Scale Intercorrelations for the Interest Profiler Short Form (lower-triangle) and Long Form (upper-triangle) .....	28
<b>Table 8</b>	Two-Dimensional MDS Coordinate Values for the Interest Profiler Short Form and Long Form .....	29
<b>Table 9</b>	Circular Unidimensional Scaling Coordinate Values for the RIASEC Scales of the Interest Profiler Short Form and Long Form.....	30
<b>Table 10</b>	Analysis of Variance for Interest Profiler Short Form/Long Form and RIASEC Codes .....	31
<b>Table 11</b>	Cross Classification of the RIASEC High Point Codes for the Interest Profiler Short Form and Long Form .....	32
<b>Table 12</b>	Analysis of Variance for Interest Profiler Short Form/Interest Finder and RIASEC Codes .....	35
<b>Table 13</b>	Cross Classification of the RIASEC High Point Codes for the Interest Profiler Short Form and Interest Finder.....	36
<b>Table 14</b>	Percentile Ranks, Means, and Standard Deviations of RIASEC Scale Scores for the Interest Profiler Short Form .....	39
<b>Table 15</b>	Effect Sizes of Gender Differences for the Interest Profiler Short Form and Long Form RIASEC Scales .....	40

## List of Figures

- Figure 1**    Multidimensional Scaling Solution for the RIASEC Scales of the Interest Profiler Short Form (Upper Graph) and Long Form (Lower Graph) ..... 42
- Figure 2**    Circular Unidimensional Scaling Solution for the RIASEC Scales of the Interest Profiler Short Form (Upper Graph) and Long Form (Lower Graph)..... 43

## **O\*NET Interest Profiler Short Form: Psychometric Properties**

The Interest Profiler has 30 items per RIASEC scale and 180 items in total (hereafter referred to as the Long Form). In the development of the O\*NET Interest Profiler Short Form (referred to as the Short Form), 10 items were selected for each RIASEC scale based on the criteria of structural fidelity to the RIASEC model and maximal item coverage of the RIASEC construct. We also attempted to increase the endorsement rates for the Enterprising scale since previous research (Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999) indicated that, relative to the other RIASEC scales, the Enterprising scale had a low endorsement rate.

### **Participants**

Two datasets were used to develop the Short Form and to examine its psychometric properties. The developmental sample ( $N = 1061$ ), previously used to evaluate psychometric characteristics of the Long Form (see Rounds et al., 1999 for details of sampling procedures), was used for item selection and for the examination of the reliability and validity of the Short Form. Table 1 depicts the characteristics of the participants. These participants are broadly representative of the individuals served by the Department of Labor programs. A different group of 132 participants (referred to as the stability sample) was used to examine the test-retest reliability of the Short Form. Table 2 depicts the characteristics of the test-retest participants.

### **Reliability and Validity Analysis**

To examine the internal consistency of the Short Form, coefficient alphas were calculated for each of the RIASEC scales on the developmental and stability samples and were compared to the coefficient alphas for the Long Form. The stability of the Short Form was evaluated by calculating the correlations between item responses from the stability sample for each of the RIASEC scales. In addition, coefficient alphas, means, and standard deviations for each of the scales were calculated for the stability sample.

To examine the validity of the Short Form, it was compared to the Long Form as well as the Interest Finder, a RIASEC measure with substantial validity evidence (e.g., Wall & Baker, 1997). First, convergent and discriminant validity of the Short Form were investigated by observing the patterns of the cross-correlations across the RIASEC scales. RIASEC cross-correlations consist of the correlations between the Short Form and the Long Form and between the Short Form and the Interest Finder.

Second, to evaluate the structural validity of the Short Form, a randomization test of hypothesized order (Rounds, Tracey, & Hubert, 1992) was conducted on the correlation matrix of the Short Form RIASEC scales, assuming Holland's circular model (Holland, 1997). In addition, a multidimensional scaling (MDS) and a circular unidimensional

scaling (CUS) were conducted to display the inter-relations among the RIASEC scales. For comparison purposes, these analyses were also carried out on the Long Form.

Third, to assess the comparability of the scores obtained on the Short Form to the Long Form and the Interest Finder, cross-classifications of RIASEC high-point codes that represent participants' primary interest areas were examined and Cohen's (1960) Kappa coefficient was calculated. A profile analysis using repeated measures ANOVA for two trial factors was also carried out to observe the degree of parallelism between the Short Form and each of the two RIASEC measures.

Lastly, we calculated the means, standard deviations, and distribution of RIASEC scale scores by gender for the Short Form. Gender differences on RIASEC scales of the Short Form and the Long Form were also examined.

### **Reliability Evidence**

Table 3 presents coefficient alphas obtained for both the O\*NET Interest Profiler Short Form and the Long Form. Compared with the Long form, the coefficient alphas for the Short Form decreased as the scale length decreased from 30 items to 10 items. The internal consistency estimates for the Short Form, ranging from .78 to .87 ( $M = .81$ ), are sufficient for practical applications.

Similar internal consistency results were obtained from the stability sample at time 1 and time 2. Table 4 depicts the coefficient alphas obtained for these two occasions. The coefficients range from .78 to .89 ( $M = .84$ ) and .82 to .90 ( $M = .86$ ) for time 1 and time 2, respectively. Means and standard deviations for the RIASEC scales from these two occasions are also shown in Table 4.

Table 5 shows the test-retest correlations for both the Short Form and the Long Form. The test-retest correlations for the Short Form ranged from .78 to .86 ( $M = .82$ ), only slightly lower than the test-retest correlations for the Long Form, ranging from .81 to .92 ( $M = .88$ ). For both measures, the Social and Conventional scales are the most stable, while the Investigative scale is the least stable.

### **Validity Evidence**

Table 6 illustrates the results of the RIASEC cross-correlations between the O\*NET Interest Profiler Short Form and the Long Form and between the Short Form and the Interest Finder. As expected, the highest correlations were found on the main diagonal of two correlation matrices. That is, the highest correlations were found between the scales of the Short Form and those of the other two measures measuring the same type, providing support for the convergent validity. As expected, the correlations along the main diagonal for the Short Form and the Long Form are very high, ranging from .90 to .95. Discriminant validity of the Short Form was supported by the significantly lower

correlations with the Long Form, ranging from .11 to .48, between scales measuring different RIASEC types. The Short Form also showed convergent and discriminant validity with the Interest Finder. Cross-correlations on the main diagonal ranged from .74 to .82 and the off-diagonal correlations ranged from .12 to .48.

The intercorrelations of scales within each measure are presented in Table 7 along with results of the randomization test of hypothesized order. Because of the circular nature of Holland's RIASEC model, it is expected that the correlations decrease as one scale moves farther away from the other and then increase as the scale again moves closer along the circular structure. This circular-order correlation pattern holds with a few exceptions for most of the Short Form and the Long Form scales. An issue with the Enterprising scale of the Long Form is that it is more highly correlated with the Artistic scale (positioned alternately) than the Social scale (positioned adjacently). A similar issue existed for the Realistic scale of the Long Form: it is more highly correlated with the Enterprising scale than the Conventional scale. As shown in the lower triangle of the correlation matrix in Table 7, these anomalies have been addressed in the Short Form. Results from the randomization test also show that the Short Form conforms to Holland's (1997) circular order structure (also called a hexagon). The correspondence index (CI) is a normalized descriptive statistic indicating the degree to which the ordered predictions are satisfied. The CI varies from -1 to 1, with positive values indicating stronger agreement and 0 indicating chance agreement or disagreement (Rounds et al., 1992). The Short Form has a much larger CI of .69 ( $p = .02$ ) compared to .40 ( $p = .02$ ) for the Long Form, showing that it has a better fit to the circular structure than the Long Form. Compared to mean CI for the US benchmark sample (CI = .67; Rounds & Tracey, 1996), the Short form fits Holland's model as well or better than many other RIASEC measures.

Table 8 displays the coordinates in two dimensions of the multidimensional scaling conducted separately on the Short Form intercorrelation matrix and the Long Form intercorrelation matrix. A two-dimensional solution fits the data well, explaining 93% of the variation in the Long Form and 99% of the variation in the Short Form. Figure 1 graphically displays the scale values for the Short Form and the Long Form. A circular RIASEC structure is evident for both measures. As shown in the figure for the Long Form, the Enterprising scale is found near the center of the plot, reflecting its stronger than expected relation with the Realistic and Artistic scales; whereas for the Short Form, the Enterprising scale is more on the periphery of the circular structure. In addition, for both measures the distance between the Realistic scale and the Conventional scale is greater than would be expected given a circular structure, a typical finding in the RIASEC structural literature (Rounds & Day, 1999). The circular structure of the Short Form is further supported by the circular unidimensional scaling results, as shown in Table 9. A circular model explains 86.48% of the variance in the Short Form, much higher than the cut-off value of 60% which indicates a good model fit (Armstrong, Hubert, & Rounds, 2003) and a major improvement in fit compared to 60.14% for the Long Form. These results support that the Short Form has a close fit to a circular RIASEC structure.



The results of the profile analyses for the Short Form compared to the Long Form and the Interest Finder are given in Table 10 and Table 12, respectively. A significant interaction term between interest inventory and RIASEC scale is present for both pairs of measures, indicating that the Short Form profile is slightly different than the profiles for the Long Form and Interest Finder. Importantly, the interaction term for the Short Form and the Interest Finder is much smaller compared to that between the Long Form and the Interest Finder (see Rounds et al., 1999), suggesting an improved fit of the RIASEC profiles. Means and standard deviations for RIASEC scales of the measures are also presented in Table 10 and Table 12. As shown in Table 10, the mean scale scores for the Short Form and the Long Form are very similar, except for a notably higher Enterprising scale score for the Short Form. This result indicates that item selection in the development of the Short Form has successfully increased the endorsement rate for the Enterprising scale. Although there is still a discrepancy between the mean Enterprising scale scores for the Short Form and that for the Interest Finder, as shown in Table 12, it is substantially reduced compared to the discrepancy between the Long Form and the Interest Finder (see Rounds et al., 1999). The discrepancies for the Realistic and the Conventional scales have also been reduced. Overall, the results suggest that the O\*NET Interest Profiler Short Form profile is more comparable with the Interest Finder profile than the Long Form profile.

Table 11 and Table 13 illustrate the results of the cross-classification analyses on high-point code agreement from the Short Form with the Long Form and the Short Form with the Interest Finder, respectively. As shown in the tables, the number of participants classified as primarily Enterprising individuals substantially increased in the Short Form ( $N = 145$ ) compared to the Long Form ( $N = 64$ ). This, in turn, led to a simultaneous increase in the number of participants classified as primarily Enterprising individuals by the Interest Profiler and Interest Finder (from  $N = 39$  for the Long Form to  $N = 98$  for the Short Form). When evaluating agreement of the Short Form with each of the other two measures using Cohen's (1960) Kappa coefficient, the Short Form and the Long Form had a Kappa coefficient of .74 and the Kappa coefficient between the Short Form and the Interest Finder was .59. Based on the criteria that a Kappa value smaller than .40 represents "poor" agreement, .41-.59 "fair," .60-.74 "good," and .75-1.00 "excellent" (see Cicchetti, Bronen, Spencer, Haut, Berg, Oliver, & Tyrer, 2006; Fleiss, Levin, & Paik, 2003), the Short Form has a very good agreement with the Long Form and a fair to good fit with the Interest Finder.

Another way to understand the level of agreement between RIASEC measures is to compare the present Kappa coefficients with Kappa coefficients between major RIASEC interest inventories reported by Russell (2007). Russell (2007) evaluated the agreement among four interest inventories designed to assess the RIASEC types (Strong Interest Inventory, Harmon, Hansen, Borgen, & Hammer, 1994; Self-Directed Search, Holland, Fritzsche, & Powell, 1994; Interest Profiler, Rounds et al., 1999; and Unisex Edition of ACT Interest Inventory, American College Testing Program, 1995). The highest agreement was found between the Strong Interest Inventory and the Self-

Directed Search (Kappa = .52). The Kappa coefficients for other pairs of interest inventories were low to very low (.45 for the Self-Directed Search and the Interest Profiler, .41 for the Interest Profiler and the Unisex Edition of ACT Interest Inventory, .36 between the Strong Interest Inventory and the Interest Profiler, .35 between the Self-Directed Search and the Unisex Edition of ACT Interest Inventory, and .26 between the Strong Interest Inventory and the Unisex Edition of ACT Interest Inventory). Compared to these results, the high-point code agreement for the Interest Profiler Short Form (Kappa = .59) with the Interest Finder is impressive.

### **Gender differences**

The means, standard deviations, and distribution of RIASEC scale scores by gender for the Short Form are presented in Table 14. As shown in Table 15, the Short Form effect sizes show that males have higher scores for the Realistic and the Investigative scales ( $d = .86$  and  $d = .26$ , respectively), and females have higher scores for the Social ( $d = -.59$ ) and the Conventional scales ( $d = -.36$ ). Gender differences for the Artistic and Enterprising scales are minimal ( $d = .00$ , and  $d = -.07$ , respectively). The Short Form and the Long Form have very similar patterns of mean-level gender differences for RIASEC scales, with the only exception being that the Short Form has much smaller gender difference for the Conventional scale ( $d = -.36$ ) as compared to the Long Form ( $d = -.53$ ). The magnitude of these gender differences is similar to or smaller than highly regarded vocational interest measures (e.g., Strong Interest Inventory, Self-Directed Search, Kuder Occupational Interest Survey; see Su, Rounds, and Armstrong, in press).

## References

- American College Testing Program (1995). *Technical manual: Revised Unisex Edition of the ACT Interest Inventory (UNIACT)*. Iowa City, IA: ACT.
- Armstrong, P. I., Hubert, L., & Rounds, J. (2003). Circular unidimensional scaling: A new look at group differences in interest structure. *Journal of Counseling Psychology, 50*, 297-308.
- Cicchetti, D., Bronen, R., Spencer, S., Haut, S., Berg, A., Oliver, P., & Tyrer, P. (2006). Rating scales, scales of measurement, issues of reliability: Resolving some critical issues for clinicians and researchers. *Journal of Nervous and Mental Disease, 194*, 557-564.
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Journal of Educational and Psychological Measurement, 23*, 37– 46.
- Fleiss, J.L., Levin, B., Paik, M. C. (2003). *Statistical Methods for Rates and Proportions* (3rd ed.). New York: Wiley.
- Harmon, L. Hansen, J., Borgen, F., & Hammer, A. (1994). *Strong Interest Inventory: Applications and technical guide*. Palo Alta, CA: Consulting Psychologists Press.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources, Inc.
- Holland, J. L., Fritzsche, B. A., & Powell, A. B. (1994). *Technical manual for the Self-Directed Search*. Odessa, FL: Psychological Assessment Resources.
- Rounds, J., & Day, S. X (1999). Describing, evaluating, and creating vocational interest structures. In M. L. Savickas & A. R. Spokane (Eds.), *Vocational interests: Their meaning, measurement and use in counseling* (pp. 103-133). Palo Alto, CA: Davies-Black.
- Rounds, J., & Tracey, T. J. (1996). Cross-cultural structural equivalence of RIASEC models and measures. *Journal of Counseling Psychology, 43*, 310-329.
- Rounds, J., Tracey, T. J., & Hubert, L. (1992). Methods for evaluating vocational interest structural hypotheses. *Journal of Vocational Behavior, 40*, 239-259.
- Rounds, J., Walker, C. R., Day, S. X, Hubert, L., Lewis, P., & Rivkin, D. (1999). *O\*NET Interest Profiler: Reliability, validity, and self-scoring*. Retrieved October 30, 2009, [http://www.onetcenter.org/dl\\_files/IP\\_RVS.pdf](http://www.onetcenter.org/dl_files/IP_RVS.pdf)

Russell, M. (2007). Assessing vocational interests: Convergence and divergence of inventories and informants. Unpublished doctoral dissertation, University of Illinois at Urbana–Champaign.

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: A meta-analysis of sex differences in interests. *Psychological Bulletin*, *135*, 859-884.

Wall, J. E., & Baker, H. E. (1997). The Interest-Finder: Evidence of validity. *Journal of Career Assessment*, *5*, 255-273.

## TABLES

**Table 1****Description of Developmental Sample**

Characteristic	n	%
Gender		
Male	437	41.19
Female	624	58.81
Age		
18 or less	101	9.55
19 to 22	171	16.16
23 to 30	257	24.29
31 to 40	250	23.63
41 to 50	181	17.11
> 50	98	9.26
Education		
Less than high school	216	20.55
High school degree	405	38.53
Some college to BA	386	36.73
> 16 years	44	4.19
Ethnicity		
White	620	58.99
African American	264	25.12
Hispanic	107	10.18
Native American	27	2.57
Asian or Pacific Is.	16	1.52
Other	17	1.62
Employment status		
Unemployed	658	62.43
Part-time	216	20.49
Full-time	179	16.98
Military	1	.09
Student status		
High school	83	26.69
Junior coll/vocational	84	27.01
College	144	46.30
Region		
East (New York)	292	27.52
West (Utah)	272	25.64
North (Michigan)	217	20.45
South (North Carolina)	280	26.39

*Note.*  $N = 1061$ . Column  $n$ 's may not always sum up to total  $N$  because of missing data.

**Table 2****Description of Stability Sample**

Characteristic	n	%
Gender		
Male	35	26.51
Female	97	73.49
Age		
18 or less	5	3.79
19 to 22	24	18.18
23 to 30	26	19.70
31 to 40	44	33.33
41 to 50	22	16.67
> 50	11	8.33
Education		
Less than high school	9	6.92
High school degree	62	47.69
Some college to BA	56	43.08
> 16 years	3	2.31
Ethnicity		
White	95	72.52
African American	21	16.03
Hispanic	7	5.34
Native American	1	.76
Asian or Pacific Is.	2	1.53
Other	5	3.82
Employment status		
Unemployed	50	37.88
Part-time	53	40.15
Full-time	29	21.97
Military	0	.00
Student status		
High school	7	6.60
Junior coll/vocational	48	45.28
College	51	48.11
Region		
East (New York)	0	.00
West (Utah)	40	30.30
North (Michigan)	44	33.33
South (North Carolina)	48	36.36

*Note.*  $N = 132$ . Column  $n$ 's may not always sum up to total  $N$  because of missing data.

**Table 3**

**Interest Profiler Short Form and Long Form Coefficient Alphas**

---

Scale	Interest Profiler Short	Interest Profiler Long
R	.78	.93
I	.82	.94
A	.78	.94
S	.78	.95
E	.87	.93
C	.83	.96

---

<i>M</i>	.81	.94
----------	-----	-----

---

*Note.*  $N = 1061$ . *R* = realistic, *I* = investigative, *A* = artistic, *S* = social, *E* = enterprising, *C* = conventional.



**Table 4**

**Means, Standard Deviations, and Cronbach's Alphas for the Interest Profiler Short Form  
RIASEC Scales at Time 1 and Time 2**

---

	Time 1			Time 2		
	<i>M</i>	<i>SD</i>	Alpha	<i>M</i>	<i>SD</i>	Alpha
R	.25	.25	.78	.25	.27	.82
I	.41	.32	.87	.41	.31	.86
A	.44	.32	.85	.45	.34	.88
S	.53	.31	.83	.50	.32	.85
E	.40	.28	.79	.40	.30	.83
C	.46	.35	.89	.45	.36	.90
Mean			.84			.86

---

*Note.*  $N = 125$ . *R* = realistic, *I* = investigative, *A* = artistic, *S* = social, *E* = enterprising, *C* = conventional.

**Table 5**

**Interest Profiler Short Form and Long Test-Retest Correlations**

---

Scale	Interest Profiler Short	Interest Profiler Long
R	.79	.87
I	.78	.81
A	.82	.88
S	.85	.92
E	.82	.88
C	.86	.91

---

<i>M</i>	.82	.88
----------	-----	-----

---

*Note.*  $N = 125$ . *R* = realistic, *I* = investigative, *A* = artistic, *S* = social, *E* = enterprising, *C* = conventional.

**Table 6**

**Cross Correlations of the Interest Profiler Short Form with the Long Form and Interest Finder**

Interest Profiler Short	Interest Profiler Long Form						Interest Finder					
	R	I	A	S	E	C	R	I	A	S	E	C
R	.91	.27	.13	.14	.33	.15	.76	.30	.16	.14	.22	.19
I	.34	.92	.38	.33	.26	.12	.31	.77	.41	.35	.35	.15
A	.20	.48	.91	.32	.41	.16	.20	.35	.80	.41	.44	.15
S	.11	.38	.42	.90	.42	.35	.12	.27	.41	.74	.41	.33
E	.23	.29	.48	.43	.92	.50	.20	.22	.40	.48	.75	.45
C	.18	.15	.14	.29	.47	.95	.17	.15	.15	.29	.35	.82

*Note. N = 1061. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.*

**Table 7**

**RIASEC Scale Intercorrelations for the Interest Profiler Short Form (lower-triangle) and Long Form (upper-triangle)**

---

	<u>R</u>	<u>I</u>	<u>A</u>	<u>S</u>	<u>E</u>	<u>C</u>
R	--	.31	.17	.17	.36	.10
I	.31	--	.45	.38	.30	.13
A	.18	.41	--	.38	.49	.17
S	.10	.31	.37	--	.45	.33
E	.22	.26	.40	.41	--	.50
C	.22	.14	.15	.30	.46	--

---

*Note.*  $N = 1061$ . R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional. Randomization test: Interest Profiler Short Form  $Cl = .69$ ,  $p = .02$ ; Interest Profiler Long Form  $Cl = .40$ ,  $p = .02$ .

**Table 8**

**Two-Dimensional MDS Coordinate Values for the Interest Profiler Short Form and Long Form**

---

	Interest Profiler Short		Interest Profiler Long	
	I	II	I	II
R	-1.20	.68	-.83	1.12
I	-.69	-.63	-.86	-.34
A	-.03	-.84	-.27	-.82
S	.84	-.42	-.26	-.53
E	.48	.22	.36	.22
C	.59	1.01	1.35	.35

---

*Note.*  $N = 1061$ . The Short Form and Long Form were scaled separately. Interest Profiler Short Form: Kruskal STRESS = .03 and RSQ = .99; Interest Profiler Long Form: Kruskal STRESS = .09 and RSQ = .93. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 9**

**Circular Unidimensional Scaling Coordinate Values for the RIASEC Scales  
of the Interest Profiler Short Form and Long Form**

---

	Interest Profiler Short		Interest Profiler Long	
	I	II	I	II
R	-.0934	-.0909	-.0629	-.0859
I	-.0803	.1027	.0980	-.0415
A	.0000	.1304	.1034	.0255
S	.0938	.0906	.0668	.0829
E	.1292	.0173	.0000	.1065
C	.1100	-.0700	-.0463	.0959

---

*Note.*  $N = 1061$ . The Short Form and Long Form were scaled separately. Interest Profiler Short Form:  $VAF = 0.8648$ ; Interest Profiler Long Form:  $VAF = 0.6014$ .  
R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 10**

**Analysis of Variance for Interest Profiler Short Form/Long Form and RIASEC Codes**

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i> -value
Inventory	1	17.295	17.295	161.872	.000
Error	1060	113.251	.107		
RIASEC	5	29.394	5.879	96.595	.000*
Error	5300	322.558	.061		
Inventory * RIASEC	5	5.527	1.105	25.793	.000*
Error	5300	227.148	.043		

\*Geisser-Greenhouse / Huynh-Feldt corrections or Wilks lamda provide *p*-values of the same magnitude.

Listing of means:

	R	I	A	S	E	C	Marginal Mean
IP Short	.33	.42	.46	.53	.46	.46	.44
IP Long	.30	.45	.44	.52	.37	.44	.42
Marginal Mean	.32	.44	.45	.53	.42	.45	.43

Listing of standard deviations:

	R	I	A	S	E	C
IP Short	.27	.31	.29	.28	.30	.33
IF Long	.26	.30	.30	.31	.27	.33

*Note.* R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 11**

**Cross Classification of the RIASEC High Point Codes for the Interest Profiler  
Short Form and Long Form**

Interest Profiler Short	Interest Profiler Long Form						Total N
	R	I	A	S	E	C	
R	<b>85</b>	3	1	5	0	2	96
I	3	<b>142</b>	4	11	0	0	160
A	1	19	<b>133</b>	6	2	3	164
S	0	13	14	<b>209</b>	2	9	247
E	7	10	26	23	<b>59</b>	20	145
C	3	9	12	20	1	<b>204</b>	249
Total N	99	196	190	274	64	238	1061

*(Continued)*



**Table 11 (Continued)**

Row Percents

Interest Profiler Short	Interest Profiler Long Form						Total N
	R	I	A	S	E	C	
R	<b>88.54</b>	3.13	1.04	5.21	0.00	2.08	96
I	1.88	<b>88.75</b>	2.50	6.88	0.00	0.00	160
A	0.61	11.59	<b>81.10</b>	3.66	1.22	1.83	164
S	0.00	5.26	5.67	<b>84.62</b>	0.81	3.64	247
E	4.83	6.90	17.93	15.86	<b>40.69</b>	13.79	145
C	1.20	3.61	4.82	8.03	0.40	<b>81.93</b>	249
Total %	9.33	18.47	17.91	25.82	6.03	22.43	
Total N	99	196	190	274	64	238	1061

***(Continued)***

**Table 11 (Continued)**

Column Percents

Interest Profiler Short	Interest Profiler Long Form						%	Total <i>N</i>
	R	I	A	S	E	C		
R	<b>85.86</b>	1.53	0.53	1.82	0.00	0.84	9.05	96
I	3.03	<b>72.45</b>	2.11	4.01	0.00	0.00	15.08	160
A	1.01	9.69	<b>70.00</b>	2.19	3.13	1.26	15.46	164
S	0.00	6.63	7.37	<b>76.28</b>	3.13	3.78	23.28	247
E	7.07	5.10	13.68	8.39	<b>92.19</b>	8.40	13.67	145
C	3.03	4.59	6.32	7.30	1.56	<b>85.71</b>	23.47	249
Total <i>N</i>	99	196	190	274	64	238		1061

*Note.* Cohen Coefficient Kappa = 0.74. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 12**

**Analysis of Variance for Interest Profiler Short Form/Interest Finder and RIASEC Codes**

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i> -value
Inventory	1	5.85	5.85	71.205	.000
Error	1060	87.079	.082		
RIASEC	5	28.034	5.607	89.357	.000*
Error	5300	332.55	.063		
Inventory * RIASEC	5	5.74	1.148	27.887	.000*
Error	5300	218.193	.041		

\*Geisser-Greenhouse / Huynh-Feldt corrections or Wilks lamda provide *p*-values of the same magnitude.

Listing of means:

	R	I	A	S	E	C	Marginal Mean
IP	.33	.42	.46	.53	.46	.46	.44
IF	.40	.46	.46	.53	.52	.50	.48
Marginal Mean	.36	.44	.46	.53	.49	.48	.46

Listing of standard deviations:

	R	I	A	S	E	C
IP	.27	.31	.29	.28	.30	.33
IF	.26	.30	.27	.27	.27	.31

*Note.* R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 13**

**Cross Classification of the RIASEC High Point Codes for the Interest Profiler  
Short Form and Interest Finder**

---

Interest Profiler Short	Interest Finder						Total <i>N</i>
	R	I	A	S	E	C	
R	<b>83</b>	4	1	2	7	2	99
I	4	<b>123</b>	4	8	10	4	153
A	12	19	<b>80</b>	16	15	5	147
S	9	27	11	<b>130</b>	29	28	234
E	6	9	8	18	<b>98</b>	32	171
C	10	18	11	7	22	<b>189</b>	257

---

Total <i>N</i>	124	200	115	181	181	260	1061
----------------	-----	-----	-----	-----	-----	-----	------

***(Continued)***

**Table 13 (Continued)**

Row Percents

Interest Profiler Short	Interest Finder						Total <i>N</i>
	R	I	A	S	E	C	
R	<b>83.84</b>	4.04	1.01	2.02	7.07	2.02	99
I	2.61	<b>80.39</b>	2.61	5.23	6.54	2.61	153
A	8.16	12.93	<b>54.42</b>	10.88	10.20	3.40	147
S	3.85	11.54	4.70	<b>55.56</b>	12.39	11.97	234
E	3.51	5.26	4.68	10.53	<b>57.31</b>	18.71	171
C	3.89	7.00	4.28	2.72	8.56	<b>73.54</b>	257
Total %	11.69	18.85	10.84	17.06	17.06	24.51	
Total <i>N</i>	124	200	115	181	181	260	1061

***(Continued)***

**Table 13 (Continued)**

Column Percents

Interest Profiler Short	Interest Finder						%	Total <i>N</i>
	R	I	A	S	E	C		
R	<b>66.94</b>	2.00	0.87	1.10	3.87	0.77	9.33	99
I	3.23	<b>61.50</b>	3.48	4.42	5.52	1.54	14.42	153
A	9.68	9.50	<b>69.57</b>	8.84	8.29	1.92	13.85	147
S	7.26	13.50	9.57	<b>71.82</b>	16.02	10.77	22.05	234
E	4.84	4.50	6.96	9.94	<b>54.14</b>	12.31	16.12	171
C	8.06	9.00	9.57	3.87	12.15	<b>72.69</b>	24.22	257
Total <i>N</i>	124	200	115	181	181	260		1061

*Note.* Cohen Coefficient Kappa = 0.59. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 14**

**Percentile Ranks of RIASEC Scale Scores for the Interest Profiler  
Short Form by Gender**

Score	R		I		A		S		E		C	
	M	F	M	F	M	F	M	F	M	F	M	F
10	100	100	96	99	99	99	98	97	98	97	97	94
9	96	99	89	94	94	92	94	87	93	90	91	83
8	87	97	81	88	85	83	88	73	84	82	85	74
7	75	94	73	80	77	75	79	59	75	74	78	65
6	65	90	65	71	67	66	70	46	67	64	72	58
5	54	85	57	63	57	56	61	36	58	55	64	50
4	44	78	48	56	47	45	51	28	49	45	56	43
3	35	68	37	48	34	35	39	18	39	34	48	34
2	25	55	25	38	20	25	26	10	27	25	38	25
1	14	34	13	22	10	13	12	4	14	15	26	15
0	4	11	4	6	3	4	2	1	4	5	10	5
<i>M</i>	4.53	2.38	4.64	3.86	4.57	4.58	4.31	5.91	4.43	4.65	3.86	5.04
<i>SD</i>	2.81	2.28	3.07	2.99	2.76	2.91	2.77	2.69	2.96	3.06	3.23	3.34

*Note.* M = Males ( $N = 437$ ), F = Females ( $N = 624$ ); R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Table 15**

**Gender Difference Effect Size (*d*) for the Interest Profiler Short Form and Long Form RIASEC Scales**

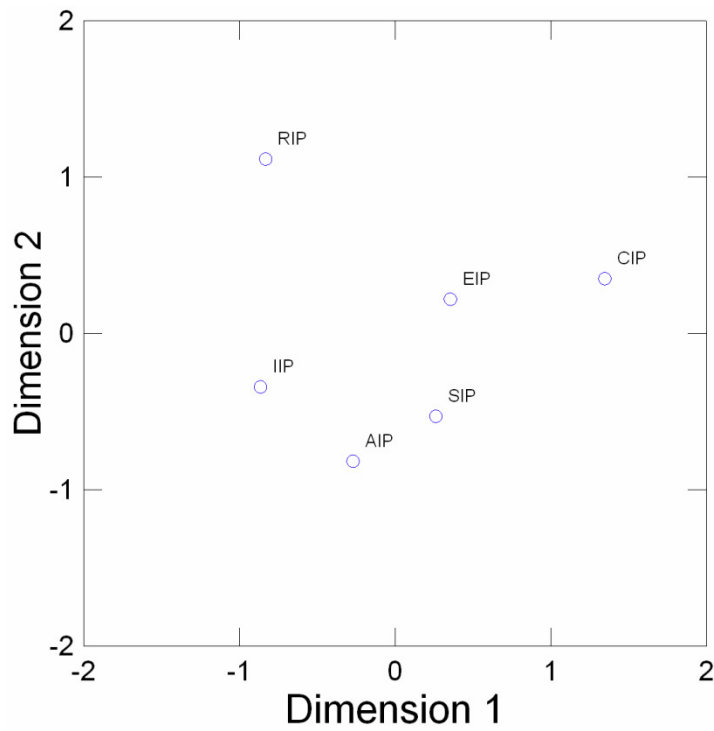
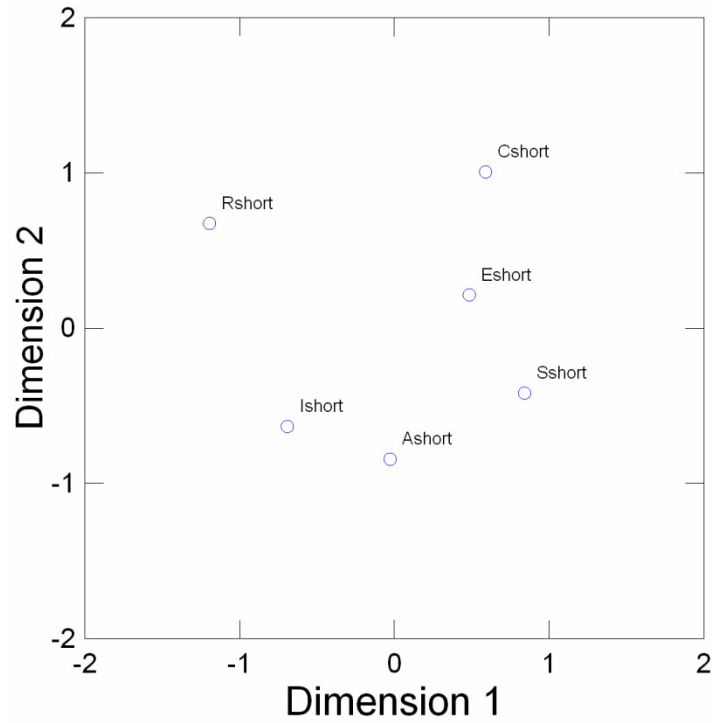
	R	I	A	S	E	C
IP Short	.86	.26	.00	-.59	-.07	-.36
IP Long	.93	.21	-.05	-.54	.06	-.53

*Note.* R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.



## FIGURES

**Figure 1. Multidimensional Scaling Solution for the Interest Profiler Short Form (Upper Graph) and Long Form (Lower Graph)**



**Figure 2. Circular Unidimensional Scaling Solution for the Interest Profiler Short Form (Upper Graph) and Long Form (Lower Graph)**

