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# **Development of an O\*NET® Mini Interest Profiler (Mini-IP) for Mobile Devices: Psychometric Characteristics**

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## **O\*Net Mini Interest Profiler (Mini-IP): Executive Summary**

The O\*NET Interest Profiler Short Form (Short-IP; Rounds, Su, Lewis, & Rivkin, 2010) is a 60-item instrument which assesses vocational interests according to Holland's (1997) Realistic, Investigative, Artistic, Social, Enterprising and Conventional (RIASEC) personality types. This report summarizes the developmental research to create a shorter 30-item version of the Short-IP, called the Mini Interest Profiler (Mini-IP). The impetus for shortening the Interest Profiler was to develop brief RIASEC scales for use in mobile settings where it is ideal to have an interest measure that can be completed rapidly and easily. Researchers at the University of Illinois at Urbana-Champaign collaborated with the U.S. Department of Labor's Office of Policy and Research, and the National Center for O\*NET Development to create the shortened scale. They used item selection criteria based on Item Response Theory, RIASEC structural fidelity, content coverage, and gender balance to reduce the length of the scale. Researchers selected five items from each RIASEC scale to ensure that the final measure was not too short that reliability and validity would be significantly compromised.

This report details the development and validation process of the Mini-IP in two independent and diverse samples of 1061 and 575 participants. The Mini-IP RIASEC scales showed acceptable internal consistencies. Equivalent scales from the short and mini IP measures were highly correlated, supporting the convergent validity of these measures. Cross-classification analysis of the Short-IP and Mini-IP showed that 73% of the participants would be assigned the same first-letter RIASEC code. Multidimensional scaling analysis successfully reproduced Holland's (1997) circular-structure of interests. The relationship between the Mini-IP scales and Big Five personality traits were similar to meta-analytic correlations between interests and personality traits, further supporting the validity of the Mini-IP. Overall, the results indicate that the Mini-Interest Profiler is a psychometrically sound measure of vocational interests, brief enough for administration through mobile devices.

## **History of the O\*NET Interest Profiler**

The O\*NET Interest Profiler (Lewis & Rivkin, 1999) is a 180-item self-scoring career exploration tool which measures vocational interests according to Holland's (1997) RIASEC personality types. All items in the Interest Profiler describe work activities (e.g., "Act in a movie", "Sell houses"), and the 30 items from each scale are organized such that they appear in pairs in RIASEC order (2 items from the R scale, followed by 2 items from the I scale, and so on). Respondents state their interest for each item by marking one of three options, "like," "dislike" or "not sure." The O\*NET Interest Profiler has been found to yield reliable and valid scores in diverse samples of adults (Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999b).

The O\*NET Interest Profiler has often been updated to improve ease of use and keep up with technological advances. In 1999, a computerized form of the 180-item Interest Profiler was developed to provide automated scoring and instant feedback to participants about their vocational interests, and make interest assessment more accessible through computer labs in schools (Rounds, Mazzeo, Smith, Hubert, Lewis, & Rivkin, 1999a). In 2010, a 60-item version of the Interest Profiler, called the Interest Profiler Short Form (Short-IP; Rounds, Su, Lewis, & Rivkin, 2010) was developed for use in counseling and consulting settings, where it is beneficial to have a measure that can be completed in 15-20 minutes. Similar to the original version, the items in the Short-IP were organized in pairs in RIASEC order. A free-access, online version of the Short-IP (<http://www.mynextmove.org/>) was later implemented to aid individuals in career exploration and planning. Completing the online Interest Profiler links individuals to information on more than 900 occupations within the O\*NET database. Individuals can then browse occupations within the local labor market to find an ideal match with their interests. The Short-IP has also been translated into Spanish and is available within Mi Proximo Paso (<https://www.miproximopaso.org/explore/ip>). Developers are encouraged to integrate the Short-IP within their products and tools using O\*NET Web Services (<https://services.onetcenter.org/ip>). With the transition from a paper-and-pencil instrument to an online computerized short form, the Interest Profiler switched from a "like," "dislike," or "not sure" response format to a five-point scale ranging from "strongly dislike" to "strongly like" to increase internal consistency and accuracy of measurement. In each variation of the Interest Profiler, research was conducted to examine the impact of the revisions on the reliability of scores and the structural validity of the scales.

## **Need for a Mobile Form**

Advancements in technology have catalyzed a new age of mobile assessment. Researchers now use mobile phones and related devices as platforms to administer surveys for longitudinal and experience sampling studies (Shiffman, Stone, & Hufford, 2008), mood research (Song, Foo, & Uy, 2008), and clinical interventions (Mulvaney et al., 2012). To stay up-to-date with technology and increase the accessibility of the O\*NET Interest Profiler to a younger, more tech-savvy audience, it would be beneficial to create an interest measure that can quickly and easily be administered through mobile devices.

There are several benefits for adapting the current 60-item Short-IP to a 30-item Mini-IP. The use of short scales can enhance face validity of the measure because the respondent does not get the impression that there are an excessive amount of redundant items (Rammstedt & Beierlin, 2014). A 30-item interest measure is more flexible regarding when and where it can be administered. For example, short measures are cheaper and more suitable to include as part of a longer survey or a large-scale panel study where participants are assessed on multiple constructs. Longer questionnaires are more likely to induce negative moods and increase measurement errors (Schmidt, Le, & Ilies, 2003). It is also more practical to administer short measures through portable mobile devices. The nature in which items are presented on computer and phone screens disallow for a comparable density of items to pen-and-paper tests, thus web-based surveys typically require more “pages” than paper tests (Stanton, Sinar, Balzer, & Smith, 2002). The increased number of pages to scroll through can be more tedious and give the illusion that a test is longer than its paper-and-pencil version. Furthermore, attention span while on mobile phones is markedly lower than on computers, averaging about 72 seconds (Budiu, 2015). Attention on mobile is often fragmented and in short sessions, and individuals often explore content on their mobile phones only while commuting. In sum, psychological assessments conducted through mobile devices need to be extremely brief and quick to administer.

The demand for a ‘Mini’ version of the Interest Profiler does not make the 60-item, Short-IP obsolete. Scale reduction comes with an inherent decrease in scale reliability and accuracy of measurement (Smith, McCarthy, & Anderson, 2000). Validity of a short scale can also be diminished if the items removed reduce the range or breadth of content covered by the shortened measure. Thus, the Short-IP should still be the preferred measure of choice when time is not a constraint and accuracy is prioritized over speed. While the Short-IP was developed

specifically for educational purposes, career interventions and organizational consulting, the Mini-IP will be more suitable for situations where interests are to be assessed along with other constructs (e.g., work values, abilities, and personality traits), or where portability and accessibility are important (e.g., social network distribution and commuting). In conclusion, the development of a 30-item Mini-IP should expand the range of scenarios where O\*NET's measure of interests can be administered while not replacing the paper-and-pencil 180-item, self-scoring Interest Profiler or the 60-item Interest Profiler Short Form.

### **Development of the O\*NET Mini-IP**

#### **Item Selection Criteria**

Only items currently in the 60-item Interest Profiler Short Form (Short-IP) were evaluated for inclusion in the mini version of the IP. The primary criterion that guided the selection of Mini-IP items was the item's discrimination and difficulty parameters derived from Item Response Theory (IRT) analysis. IRT involves the use of mathematical models to represent the relationship between an individual's observed responses to scale items and the true underlying trait score (Hambleton & Swaminathan, 1985, 1991). This method of test evaluation is commonly used in educational and psychological assessment, including the appraisal of personality traits (Chernyshenko, Stark, Chan, Drasgow, & Williams, 2001), attachment styles (Fraley, Waller, & Brennan, 2000), and interest traits (Pommerich, 2004). In IRT, the underlying trait (e.g. realistic interests) is commonly designated the Greek letter theta ( $\theta$ ). An individual's probability of endorsing a realistic item can then be modeled in terms of his or her underlying trait level and several item characteristics such as discrimination ( $a$ ) and difficulty ( $b$ ). A simple example of one such item response model is Birnbaum's (1968) two-parameter logistic (2PL) model:

$$P_j(\theta_i) = 1 / \{1 + \exp[-a_j(\theta_i - b_j)]\},$$

where  $P_j(\theta_i)$  denotes the probability of endorsing item  $j$  for respondent  $i$  with trait level  $\theta_i$ , and  $a_j$ ,  $b_j$  represent the item discrimination and difficulty parameters of item  $j$ , respectively.

By applying an IRT measurement model to RIASEC scale data comprising responses from individuals with varying trait levels, one can estimate the item parameters ( $a$  &  $b$ ) that provide information on how well the item assesses the entire continuum of an interest dimension. The item discrimination parameter ( $a$ ) represents an item's ability to differentiate between

individuals with similar but not identical trait levels. By selecting high-discrimination items, it is possible to create scales with fewer items and relatively high measurement precision. The item difficulty parameter ( $b$ ) represents the trait level of an individual who will endorse the item with a 50% chance. While the concept of item difficulty in interest measures is somewhat disjoint,  $b$ -values across items will inform us on the extent to which the scale suitably assesses individuals with different levels of interests. We can prevent inaccurate measurement of individuals with relatively extreme interests by ensuring a balanced distribution of items across all difficulty levels. The 2PL IRT model also highlights possible item dependencies. IRT assumes that responses to each item are independent from one another, and an IRT model fit index will flag sets of items that show dependency (Drasgow, Levine, Tsien, Williams, & Mead, 1995). Items whose responses are dependent on one another are likely to have overlapping item content, thus only one item among the set of dependent items should be included to maintain content balance. In sum, by applying item response principles to each item within the individual RIASEC scales, we are able to select the most discriminating items while maintaining a balanced distribution of item difficulty and avoiding items with overlapping content.

One of the key requirements for the Mini Interest Profiler would be the preservation of the structural fidelity of the RIASEC hexagon (Holland, 1997). Thus, the second criterion we prioritized was the multidimensional scaling coordinates of each item. Multidimensional scaling converts an inter-item correlation matrix into a spatial two-dimensional map depicting each item's relationship with one another (Kruskal & Wish, 1978). Items were selected on the basis of their locations in the two-dimensional space, and their effect on the coordinates of the multidimensional scaling of the inter-scale correlation matrix. In other words, we studied the item-level multidimensional scaling output and tried different combinations of 5 items for each RIASEC scale such that the scale-level multidimensional scaling output satisfactorily reproduced Holland's RIASEC hexagon. The selection process was both backwards (deleting items) and forward (adding items).

The remaining criteria used for item selection were to ensure balanced content coverage of the selected items and minimize gender differences within RIASEC scales. For the former criterion, three judges with experience in vocational psychology and test construction (James Rounds, Colin Wee, and Phil Lewis) checked each selected item for redundancy of verbs and activities. For example, there were three items in the Investigative scale describing activities

conducted within science labs. Both the IRT analysis and judges' discussions indicated that only one of the three lab items should be included in the Mini-IP. The latter criterion of gender balance scales involved calculating effect sizes for the mean differences between males and females for each item. We then selected items such that the net gender difference for each RIASEC scale was acceptably small and matched common gender differences found in interest measurement (Su, Rounds, & Armstrong, 2009). After reviewing past scale reduction studies in personality trait studies (Donnellan, Oswald, Baird, & Lucas, 2006; Gosling, Rentfrow, & Swan; 2003), we decided on five items per interest scale because too few items reduces internal consistency, limits the breadth of interest activities that can be tested, and restricts the type of analyses that can be done with the data. For example, factor analysis requires at least four primary indicators for each common factor (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Floyd & Widaman, 1995). Thus, we erred on the side of caution and selected five items per interest scale.

## **Study 1: Developmental Sample**

### **Participants**

Developmental analyses were based on an archival sample of 1061 individuals (437 male 624 female), reporting various ethnic backgrounds (59% White, 25.1% African American, 10.2% Hispanic, 2.6% Native American, 1.5% Asian or Pacific Islander). Data from this developmental sample were collected across 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. For a complete description of the developmental sample, see Rounds et al. (1999b) or Table 1 in the Appendix.

### **Procedure**

The archival sample contained responses to the 180-item Interest Profiler. The items were designed with a binary response scale of 'Like' or 'Dislike.' The present item analysis used the subset of the 60-items from the Short-IP (Rounds et al., 2010). BILOG Software (Thissen, 1991) was used to estimate the 2PL item parameters ( $a$  &  $b$ ) for each item within each RIASEC dimension. Model fit was assessed with Stark's (2001) MODFIT program. This program also identified items whose responses were not locally independent from one another. We also performed Kruskal monotonic multidimensional scaling of the inter-item correlation matrix to



identify items that contributed to satisfactory positioning of the RIASEC scales according to Holland's (1997) hexagonal model. Next, we calculated the gender balance for each item. From these sources of information, we prioritized selecting five items with the highest discrimination parameters while disregarding items with extremely low discrimination parameters ( $a < .60$ ). Our second priority was to ensure broad content coverage among the five items. Part of this step was to avoid selecting more than one item which violated local independence. Discussions among the researchers constituted the other part of ensuring adequate content balance in selected items. For example, MODFIT identified the following items as linearly dependent: I8 (Work in a biology lab,  $a = 1.77$ ), I10 (Do laboratory tests to identify diseases,  $a = 1.6$ ) and I5 (Examine blood samples using a microscope,  $a = 1.31$ ). From discussions among researchers, these items were also flagged as having high content overlap (i.e., the laboratory context). Although all 3 items have high discrimination parameters, we selected the item that best contributed to the RIASEC structure and gender balance. To aid our selection of items that contributed to RIASEC structural fidelity, we referred to the two-dimensional multidimensional scaling plot of the inter-item correlations (Figure 1). We followed an iterative procedure of entering and removing different items for each RIASEC scale, and reviewing the changes to the multidimensional scaling plot to decide which items to select. For example, while the four Social 'teaching' items (S1, S6, S7, & S10) had very similar discrimination parameters, we selected the item that made the final social scale roughly equidistant to from the enterprising scale and artistic scale (See Figure 2). The final criterion for selecting items was based on the gender balance. Scale scores from our final set of items should not be highly skewed to one gender, thus we endeavored to include a balance of items that favored both males and females.

### **Psychometric Characteristics**

Results for the IRT item analysis are presented in Tables 2a to 2f in the Appendix. The selected items for each scale are highlighted in bold. Multidimensional scaling coordinates for the RIASEC scales of the Mini-IP are overlaid against the Short-IP coordinates in Figure 2. The coordinates for the R and C scales of the 60-item Short-IP were fairly far away from each other so Mini-IP items were selected to attempt to reduce this distance. Overall, a similar structure was obtained for the Mini-IP and the Short-IP.

Using the data from the developmental sample, psychometric characteristics for the Mini-IP were calculated and compared with the Short-IP. Table 3 and 4 in the Appendix provides the

full details on scale reliabilities and gender balance for the Mini-IP and the Short-IP. Cronbach's alpha for the Mini-IP RIASEC scales ranged from .70 to .75 ( $M = .73$ ) compared to the alpha coefficients for the Short-IP, which ranged from .78 to .87 ( $M = .81$ ). Gender differences for each scale in the Mini-IP showed similar effect sizes to the respective gender differences in the Short-IP. Across the Short-IP and Mini-IP, males exhibited a higher score on the Realistic scale ( $d = .84$  for the Short-IP and  $.86$  for the Mini-IP) and Investigative scale ( $d = .25$  and  $.26$ ). Females on average scored higher on the Social scale ( $d = .42$  and  $.59$ ) and Conventional scale ( $d = .31$  and  $.36$ ). There were minimal effect size differences for the Artistic and Enterprising scales. The magnitude of gender differences obtained in the Mini-IP is less than those found in other measures of vocational interest (Su, Rounds, & Armstrong, 2009).

## **Study 2: Validation Sample**

### **Participants**

The Mini Interest Profiler was validated using new data from a sample of 600 participants collected through Amazon's Mechanical Turk (<https://www.mturk.com>). Participants were required to have IP addresses within the United States and have at least 90% approval rating on MTurk. Participants were compensated with USD 2.00 for completion of the online questionnaire. The 60-item Short-IP with the 30-item Mini-IP embedded was administered to the MTurk sample along with a short 20-item measure of the Big Five personality traits (Mini-IPIP Scales; Donnellan et al., 2006). During data cleaning, we first excluded all participants aged above 65 (retirement age). We also filtered out insufficient effort responders by removing participants who failed at least one of the two quality control items (e.g., "Please select the 'Strongly Like' option"). The final sample comprised 575 participants (298 male 276 female). The age of the participants ranged from 18 years old to 65 years old ( $M = 35.66$ ,  $SD = 11.38$ ), and 77% of the sample was White, 9.4% was African-American, and 9% was Asian. 7.3% of the sample referred to themselves as Hispanic or Latino. 95.8% of the sample was employed. All measured characteristics of the sample can be found in Table 6.

### **Procedure**

Since the present-day version of the Interest Profiler Short Form has a five-point response scale, we recoded all responses from 1- (Strongly Dislike) to 3-(Unsure) as '0' and responses from 4-(Like) and 5-(Strongly Like) as '1' in order to analyze the data with the 2-Parameter

Logistic IRT model used in Study 1. Procedures for estimating item discrimination ( $a$ ) and difficulty ( $b$ ) parameters were otherwise unchanged from Study 1.

### **Psychometric Characteristics**

Results for our item and scale analyses are presented in Tables 7a-f to 13 in Appendix B. Compared to the original item analysis with the developmental sample, the IRT analysis only recommended switching out one item from the Conventional scale C3 (Load computer software into a large computer network,  $a = .56$ ) on the basis of lower discrimination. We decided to retain the selected item based on its content coverage and previous viability in the developmental sample. We also chose to rephrase the item for the final version of the Mini-IP to “Install software across computers on a large network” both to update the item and to increase the specificity of the action (‘Load’ versus ‘Install’) and perhaps improve the discrimination of the item. Gender balance of the Mini-IP RIASEC Scales were similar to those of the Short-IP, with the exception of the Conventional Scale which slightly favored females ( $d = .12$ ) in the Short-IP, while showing no gender difference in the Mini-IP ( $d = .00$ ). Multidimensional scaling of the inter-scale correlation matrix for the Mini-IP once again preserved the RIASEC structure of the Interest Profiler Short Form (Figure 3).

**Reliability.** Cronbach’s Alpha was calculated for the five-item scales of the Mini Interest Profiler and the 10-item scales of the Short-IP (Table 9). The five-item interest scales had alpha coefficients ranging from .74 to .81 and the ten-item RIASEC scales had coefficients ranging from .85 to .90, indicating that the 30-item version meets satisfactory reliability standards for a five-item scale. The high-point codes for each participant were determined for both the Mini Interest Profiler and the original 60-item Short-IP and a Cohen’s Kappa statistic was calculated to determine the degree of agreement between the two measures (Table 10). The Cohen’s Kappa was .73, indicating a high degree of consistency between first-letter profiles produced by the Mini-IP and the Short-IP. RIASEC profile correlations for the Short-IP and Mini-IP were also calculated within individuals to provide more evidence for agreement between measures ( $r_{Mdn} = .95$ ,  $r_{Mean} = .92$ ,  $SD = .12$ )

**Validity.** To assess convergent validity, the correlations between RIASEC scales of the Mini Interest Profiler and a brief measure of Big Five personality traits were compared to past meta-analytic correlations between interests and personality traits (Mount, Barrick, Scullen & Rounds, 2005). As expected, Social and Enterprising interests were significantly correlated with

Extraversion ( $r = .28$  and  $.34$  respectively), and Investigative and Artistic interests were correlated significantly with Openness ( $r = .15$  and  $.35$  respectively). These correlations are very similar to those reported in past personality trait and interest meta-analyses (Barrick, Mount, & Gupta, 2003; Larson, Rottinghaus, & Borgen, 2002). Furthermore, the personality by interest correlation matrix for the Mini-IP was very similar to the correlation matrix for the Short-IP (Table 13), providing further support for the shortened measure.

### **Scoring for Paper-and-Pencil and Computerized IP (Long, Short, Mini)**

The O\*NET currently has three forms of the Interest Profiler: 180-item form (Long-IP), 60-item form (Short-IP), and 30-item form (Mini-IP). Each of these IP forms can be used as a self-scored assessment and computer-based assessment. In the case of the self-scored paper-and-pencil IP (Long, Short, Mini), 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 and Mini Form, a five-point response format is recommended (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 for the Short and 0 to 20 for the Mini.

### **Final Comments**

A 30-item mini version of the Interest Profiler Short Form was developed for quick and easy administration through mobile devices using item selection criteria from an IRT analysis, content coverage, and gender balance. Results obtained between the initial developmental sample and the results from the online validation sample from Amazon's MTurk were similar, supporting the validity of the Mini-IP. The Mini Interest Profiler showed acceptable levels of reliability, and structural properties that reflect the organized structure of the RIASEC model. The Mini-IP also shows expected correlations with a measure of the Big Five personality traits, lending construct validity support. The Mini-IP is suitable for administration in mobile contexts or as a measure embedded within a longer survey of multiple individual difference constructs.

## References

- Barrick, M. R., Mount, M. K., & Gupta, R. (2003). Meta-analysis of the relationship between the five-factor model of personality and Holland's occupational types. *Personnel Psychology*, *56*, 45-74.
- Birnbaum, A. (1968). Some latent trait models and their use in inferring an examinee's ability. In F. M. Lord & M. R. Novick, *Statistical Theories of Mental Test Scores* (pp. 397 - 472). Reading, MA: Addison-Wesley Publishing.
- Budiu, R. (2015, April 19). *Mobile user experience: Limitations and strengths*. Retrieved from <https://www.nngroup.com/articles/mobile-ux/>
- Chernyshenko, O. S., Stark, S., Chan, K. Y., Drasgow, F., & Williams, B. (2001). Fitting item response theory models to two personality inventories: Issues and insights. *Multivariate Behavioral Research*, *36*, 523-562.
- Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The mini-IPIP scales: tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment*, *18*, 192-203.
- Drasgow, F., Levine, M. V., Tsien, S., Williams, B. A., & Mead, A. D. (1995). Fitting polytomous item response models to multiple-choice tests. *Applied Psychological Measurement*, *19*, 145-165.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*, 272-299.
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, *7*, 286-299.
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*, 350-365.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*, 504-528.
- Hambleton, R. K., & Swaminathan, H. (1985). *Item response theory: Principles and applications*. Boston, MA: Kluwer Academic Publishing.

- Hambleton, R. K., Swaminathan, H., & Rogers, J. (1991). *Fundamentals of Item response theory: Principles and applications*. Newbury Park, CA: Sage Publishing.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Kruskal, J.B. and Wish, M. (1978). *Multidimensional Scaling*. Sage University Paper series on Quantitative Applications in the Social Sciences, 07–011, Beverly Hills and London: Sage Publications.
- Larson, L. M., Rottinghaus, P. J., & Borgen, F. H. (2002). Meta-analyses of big six interests and big five personality factors. *Journal of Vocational Behavior*, 61, 217-239.
- Lewis, P. & Rivkin, D. (1999). *Development of the O\*NET interest profiler*. National Center for O\*Net Development, Raleigh, NC. <<http://www.onetcenter.org/reports/IP.html>>
- Mount, M. K., Barrick, M. R., Scullen, S. M., & Rounds, J. (2005). Higher-order dimensions of the big five personality traits and the big six vocational interest types. *Personnel Psychology*, 58(2), 447-478.
- Mulvaney, S. A., Rothman, R. L., Dietrich, M. S., Wallston, K. A., Grove, E., Elasy, T. A., & Johnson, K. B. (2012). Using mobile phones to measure adolescent diabetes adherence. *Health Psychology*, 31, 43-50.
- Pommerich, M. (2004). *Using item response theory to develop an interest inventory*. Armed Services Vocational Aptitude Battery Career Exploration Program, Seaside, CA.
- Rammstedt, B., & Beierlein, C. (2014). Can't we make it any shorter? The limits of personality assessment and ways to overcome them. *Journal of Individual Differences*, 35, 212-220.
- Rounds, J., Su, R., Lewis, P., Rivkin, D. (2010). *O\*NET® Interest Profiler short form: Psychometric characteristics*. National Center for O\*NET Development, Raleigh, NC. [http://www.onetcenter.org/reports/IPSF\\_Psychometric.html](http://www.onetcenter.org/reports/IPSF_Psychometric.html)
- Rounds, J., Mazzeo, S. E., Smith, T. J., Hubert, L., Lewis, P. & Rivkin, D. (1999a). *O\*NET® computerized Interest Profiler: Reliability, validity, and comparability*. National Center for O\*NET Development, Raleigh, NC. <[http://www.onetcenter.org/reports/CIP\\_RVC.html](http://www.onetcenter.org/reports/CIP_RVC.html)>
- Rounds, J., Walker, C. M., Day, S. X., Hubert, L., Lewis, P. & Rivkin, D. (1999b). *O\*NET® Interest Profiler: Reliability, validity, and self-scoring*. National Center for O\*NET Development, Raleigh, NC. <[http://www.onetcenter.org/reports/IP\\_RVS.html](http://www.onetcenter.org/reports/IP_RVS.html)>

- Schmidt, F. L., Le, H., & Ilies, R. (2003). Beyond alpha: An empirical examination of the effects of different sources of measurement error on reliability estimates for measures of individual-differences constructs. *Psychological Methods, 8*, 206-224.
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology, 4*, 1-32.
- Smith, G. T., McCarthy, D. M., & Anderson, K. G. (2000). On the sins of short-form development. *Psychological Assessment, 12*, 102-111.
- Song, Z., Foo, M. D., & Uy, M. A. (2008). Mood spillover and crossover among dual-earner couples: A cell phone event sampling study. *Journal of Applied Psychology, 93*, 443-450.
- Stanton, J. M., Sinar, E. F., Balzer, W. K., & Smith, P. C. (2002). Issues and strategies for reducing the length of self-report scales. *Personnel Psychology, 55*, 167-194.
- Stark, S. (2001). *MODFIT: A computer program for model-data fit*. Unpublished manuscript. 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.
- Thissen, D. (1991). *Multilog user's guide: Multiple categorical item and test scoring using item response theory* (Version 6.0) [Computer software]. Chicago, IL: Scientific Software.



## **Appendix A**

### **O\*NET Mini Interest Profiler Items**

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<b>Realistic Items</b>	
Item #	Content
1	Build kitchen cabinets
7	Repair household appliances
13	Assemble electronic parts
19	Drive a truck to deliver packages to offices and homes
25	Test the quality of parts before shipment

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<b>Investigative Items</b>	
Item #	Content
2	Develop a new medicine
8	Study ways to reduce water pollution
14	Conduct chemical experiments
20	Examine blood samples using a microscope
26	Develop a way to better predict the weather

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<b>Artistic Items</b>	
Item #	Content
3	Write books or plays
9	Compose or arrange music
15	Create special effects for movies
21	Paint sets for plays
27	Write scripts for movies or television shows

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*Note.* Item # refers to the suggested position of the item within the 30 items. Order was determined using the original 60-item Short-IP as a guideline.

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<b>Social Items</b>	
Item #	Content
4	Help people with personal or emotional problems
10	Give career guidance to people
16	Perform rehabilitation therapy
22	Do volunteer work at a non-profit organization
28	Teach a high-school class

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<b>Enterprising Items</b>	
Item #	Content
5	Manage a department within a large company
11	Start your own business
17	Negotiate business contracts
23	Market a new line of clothing
29	Sell merchandise at a department store

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<b>Conventional Items</b>	
Item #	Content
6	Install software across computers on a large network
12	Operate a calculator
18	Keep shipping and receiving records
24	Inventory supplies using a hand-held computer
30	Stamp, sort, and distribute mail for an organization

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*Note.* Item # refers to the suggested position of the item within the 30 items. Order was determined using the original 60-item Short-IP as a guideline.

## **Appendix B**

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

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## TABLES

Table 1.

**Description of Developmental Sample**

Characteristic	n	%
Gender		
Male	437	41.2
Female	624	58.8
Age		
18 or less	101	9.6
19 to 22	171	16.2
23 to 30	257	24.3
31 to 40	250	23.6
41 to 50	181	17.1
>50	98	9.3
Education		
Less than high school	216	20.6
High school degree	405	38.5
Some college to BA	386	36.7
> 16 years	44	4.2
Ethnicity		
White	620	59
African American	264	25.1
Hispanic	107	10.2
Native American	27	2.6
Asian or Pacific Is.	16	1.5
Other	17	1.6
Employment Status		
Unemployed	658	62.4
Part-time	216	20.5
Full-time	179	17
Military	1	0.1
Student Status		
High school	83	26.7
Junior coll/vocational	84	27
College	144	46.3
Region		
East (New York)	292	27.5
West (Utah)	272	25.6
North (Michigan)	217	20.5
South (North Carolina)	280	26.4

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



Table 2a.

**Item Parameters for Short-IP Realistic Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Males ( <i>N</i> = 437)		Females ( <i>N</i> = 624)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Build kitchen cabinets</b>	1.29	0.19	0.50	0.50	0.23	0.42
2	Lay brick or tile	1.35	0.57	0.42	0.50	0.23	0.42
3	<b>Repair household appliances</b>	1.63	0.26	0.51	0.50	0.25	0.43
4	Raise fish in a fish hatchery	0.70	1.40	0.40	0.49	0.16	0.37
5	<b>Assemble electronic parts</b>	1.22	0.43	0.54	0.50	0.25	0.43
6	<b>Drive a truck to deliver packages to offices and homes</b>	1.08	0.30	0.54	0.50	0.29	0.45
7	<b>Test the quality of parts before shipment</b>	1.03	0.19	0.49	0.50	0.26	0.44
8	Repair and install locks	1.62	0.45	0.44	0.50	0.16	0.37
9	Set up and operate machines to make products	1.32	0.43	0.46	0.50	0.19	0.39
10	Put out forest fires	0.75	0.54	0.47	0.50	0.19	0.39

*Note.* Items in bold were selected for the Mini-IP.

Table 2b.

**Item Parameters for Short-IP Investigative Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Males ( <i>N</i> = 437)		Females ( <i>N</i> = 624)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Develop a new medicine</b>	1.27	-0.16	0.55	0.50	0.45	0.50
2	<b>Study ways to reduce water pollution</b>	1.04	0.01	0.53	0.50	0.45	0.50
3	<b>Conduct chemical experiments</b>	1.25	0.34	0.44	0.50	0.31	0.46
4	Study the movement of planets	1.10	0.20	0.52	0.50	0.34	0.47
5	<b>Examine blood samples using a microscope</b>	1.31	0.25	0.37	0.48	0.40	0.49
6	Investigate the cause of a fire	0.71	-0.07	0.62	0.49	0.44	0.50
7	<b>Develop a way to better predict the weather</b>	0.88	0.17	0.48	0.50	0.34	0.47
8	Work in a biology lab	1.77	0.22	0.42	0.49	0.39	0.49
9	Invent a replacement for sugar	0.88	0.50	0.36	0.48	0.30	0.46
10	Do laboratory tests to identify diseases	1.60	0.05	0.40	0.49	0.43	0.50

*Note.* Items in bold were selected for the Mini-IP.

Table 2c.

**Item Parameters for Short-IP Artistic Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Males ( <i>N</i> = 437)		Females ( <i>N</i> = 624)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Write books or plays</b>	1.18	0.15	0.44	0.5	0.56	0.5
2	Play a musical instrument	0.91	-0.26	0.62	0.49	0.61	0.49
3	<b>Compose or arrange music</b>	1.37	0.3	0.41	0.49	0.35	0.48
4	Draw pictures	0.79	-0.08	0.53	0.5	0.53	0.5
5	<b>Create special effects for movies</b>	1.2	-0.27	0.68	0.47	0.49	0.5
6	<b>Paint sets for plays</b>	0.8	0.35	0.35	0.48	0.42	0.49
7	<b>Write scripts for movies or television shows</b>	1.56	0.05	0.45	0.5	0.47	0.5
8	Perform jazz or tap dance	0.84	0.72	0.25	0.44	0.33	0.47
9	Sing in a band	1.13	0.38	0.42	0.49	0.4	0.49
10	Edit movies	1.28	-0.11	0.46	0.5	0.41	0.49

Note. Items in bold were selected for the Mini-IP.

Table 2d.

**Item Parameters for Short-IP Social Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Males ( <i>N</i> = 437)		Females ( <i>N</i> = 624)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	Teach an individual an exercise routine	0.96	0.12	0.39	0.49	0.53	0.5
2	<b>Help people with personal or emotional problems</b>	1.38	-0.4	0.58	0.49	0.75	0.44
3	<b>Give career guidance to people</b>	1.14	-0.35	0.49	0.5	0.62	0.49
4	<b>Perform rehabilitation therapy</b>	1.37	0.05	0.37	0.48	0.56	0.5
5	<b>Do volunteer work at a non-profit organization</b>	0.75	-0.21	0.48	0.5	0.67	0.47
6	Teach children how to play sports	0.99	-0.44	0.69	0.47	0.61	0.49
7	Teach sign language to people with hearing disabilities	0.94	0.08	0.31	0.46	0.58	0.49
8	Help conduct a group therapy session	1.06	-0.1	0.37	0.48	0.61	0.49
9	Take care of children at a day-care center	0.89	-0.01	0.27	0.44	0.57	0.5
10	<b>Teach a high-school class</b>	0.85	0.03	0.41	0.49	0.4	0.49

Note. Items in bold were selected for the Mini-IP.

Table 2e.

**Item Parameters for Short-IP Enterprising Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		A	b	Males (N = 437)		Females (N = 624)	
				M	SD	M	SD
1	Buy and sell stocks and bonds	0.58	-0.04	0.45	0.5	0.38	0.49
2	Manage a retail store	2.2	-0.07	0.46	0.5	0.54	0.5
3	Operate a beauty salon or barber shop	0.99	0.45	0.18	0.39	0.4	0.49
4	<b>Manage a department within a large company</b>	1.18	-0.36	0.53	0.5	0.53	0.5
5	<b>Start your own business</b>	0.87	-1.4	0.84	0.36	0.74	0.44
6	<b>Negotiate business contracts</b>	0.95	0.16	0.5	0.5	0.39	0.49
7	Represent a client in a lawsuit	0.59	0	0.42	0.49	0.36	0.48
8	<b>Market a new line of clothing</b>	0.98	-0.14	0.4	0.49	0.48	0.5
9	<b>Sell merchandise at a department store</b>	1.26	0.23	0.27	0.44	0.38	0.49
10	Manage a clothing store	2.29	-0.07	0.37	0.48	0.46	0.5

Note. Items in bold were selected for the Mini-IP.

Table 2f.

**Item Parameters for Short-IP Conventional Scale Using Developmental Sample (N = 1061)**

Item #	Content	2PL		Item Averages			
		a	b	Males (N = 437)		Females (N = 624)	
				M	SD	M	SD
1	Develop a spreadsheet using computer software	1.03	-0.05	0.43	0.5	0.47	0.5
2	Proofread records or forms	1.18	0.15	0.31	0.46	0.49	0.5
3	<b>Load computer software into a large computer network</b>	0.92	-0.17	0.44	0.5	0.45	0.5
4	<b>Operate a calculator</b>	1.1	-0.5	0.55	0.5	0.7	0.46
5	<b>Keep shipping and receiving records</b>	1.61	-0.07	0.42	0.49	0.47	0.5
6	Calculate the wages of employees	1.7	0.05	0.35	0.48	0.48	0.5
7	<b>Inventory supplies using a hand-held computer</b>	1.19	-0.06	0.4	0.49	0.48	0.5
8	Record rent payments	1.61	-0.07	0.33	0.47	0.51	0.5
9	Keep inventory records	2.09	-0.02	0.36	0.48	0.48	0.5
10	<b>Stamp, sort, and distribute mail for an organization</b>	1.09	0.06	0.27	0.44	0.5	0.5

Note. Items in bold were selected for the Mini-IP.

Table 3.

**Scale Means and Standard Deviations for the Developmental Sample**

	Total		Male ( <i>N</i> = 437)		Female ( <i>N</i> = 624)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Mini Interest Profiler</b>						
R	0.36	0.33	0.52	0.34	0.25	0.28
I	0.42	0.34	0.47	0.34	0.39	0.34
A	0.46	0.35	0.47	0.33	0.46	0.36
S	0.54	0.33	0.46	0.33	0.60	0.32
E	0.51	0.32	0.51	0.31	0.50	0.33
C	0.48	0.35	0.42	0.34	0.52	0.34
<b>60-Item Interest Profiler Short Form</b>						
R	0.33	0.29	0.48	0.30	0.22	0.24
I	0.42	0.33	0.47	0.33	0.38	0.33
A	0.46	0.31	0.46	0.30	0.46	0.32
S	0.53	0.30	0.43	0.30	0.59	0.29
E	0.46	0.30	0.44	0.30	0.46	0.31
C	0.46	0.33	0.39	0.32	0.50	0.33

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

Table 4.

**Scale-level Reliability and Gender Balance for Developmental Sample**

Scale	30-Item Mini-IP		60-item Short-IP	
	Gender Difference		Gender Difference	
	Effect Size ( <i>d</i> )	Cronbach's Alpha	Effect Size ( <i>d</i> )	Cronbach's Alpha
R	0.84	0.73	0.95	0.78
I	0.25	0.74	0.26	0.82
A	0.03	0.75	0.02	0.78
S	-0.41	0.70	-0.52	0.78
E	0.02	0.71	-0.07	0.87
C	-0.31	0.74	-0.36	0.83

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

Table 5.

**RIASEC Scale Intercorrelations for the 30-Item Mini Interest Profiler (Lower Triangle) and the 60-Item Interest Profiler Short Form (Upper Triangle) for the Developmental Sample**

	R	I	A	S	E	C
R		.35	.20	.12	.23	.20
I	.32		.44	.33	.29	.15
A	.20	.41		.38	.41	.15
S	.09	.32	.34		.43	.30
E	.26	.29	.42	.36		.47
C	.30	.17	.16	.23	.42	

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

Table 6.  
**Description of Amazon Mturk Validation Sample**

Characteristic	n	%
Gender		
Male	298	51.8
Female	276	48.0
Age		
18 or less	1	0.2
19 to 22	40	7.0
23 to 30	198	34.4
31 to 40	165	28.7
41 to 50	92	17.0
51 to 60	57	9.9
61 to 65	22	3.8
Race		
White	443	77.0
Asian	52	9.0
Black or African American	54	9.4
American Indian or Alaskan Native	5	0.9
Native Hawaiian or Other Pacific Islander	2	0.3
Other	17	3.0
Ethnicity		
Hispanic or Latino	42	7.3
Not Hispanic or Latino	532	92.5
Employment Status		
Not employed (including students)	19	3.3
Employed	551	95.8
Missing	5	0.9

*Note.*  $N = 575$ . Column n's may not always sum up to the total N because of missing data

Table 7a.

**Item Parameters for Short-IP Realistic Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
				Male (N = 298)		Female (N = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Build kitchen cabinets</b>	1.21	0.37	3.04	1.18	2.64	1.14
2	Lay brick or tile	0.89	0.90	2.67	1.20	2.38	1.18
3	<b>Repair household appliances</b>	1.26	0.49	3.04	1.22	2.54	1.17
4	Raise fish in a fish hatchery	0.47	0.58	3.02	1.29	2.79	1.37
5	<b>Assemble electronic parts</b>	1.10	0.21	3.42	1.14	2.59	1.13
6	<b>Drive a truck to deliver packages to offices and homes</b>	0.85	0.75	2.83	1.25	2.47	1.24
7	<b>Test the quality of parts before shipment</b>	1.49	0.38	3.17	1.15	2.63	1.14
8	Repair and install locks	2.26	0.61	2.90	1.23	2.28	1.08
9	Set up and operate machines to make products	1.32	0.41	3.15	1.20	2.51	1.09
10	Put out forest fires	0.60	0.80	3.00	1.33	2.41	1.23

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.

Table 7b.

**Item Parameters for Short-IP Investigative Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
				Male (N = 298)		Female (N = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Develop a new medicine</b>	1.08	-0.19	3.43	1.11	3.33	1.20
2	<b>Study ways to reduce water pollution</b>	0.80	-0.27	3.48	1.17	3.30	1.19
3	<b>Conduct chemical experiments</b>	1.31	0.09	3.29	1.25	2.93	1.28
4	Study the movement of planets	0.82	-0.39	3.67	1.17	3.40	1.23
5	<b>Examine blood samples using a microscope</b>	1.46	0.00	3.17	1.18	3.27	1.27
6	Investigate the cause of a fire	0.80	-0.19	3.43	1.16	3.18	1.23
7	<b>Develop a way to better predict the weather</b>	0.96	-0.04	3.46	1.20	3.14	1.17
8	Work in a biology lab	2.01	-0.06	3.32	1.21	3.33	1.21
9	Invent a replacement for sugar	1.09	0.28	3.10	1.23	2.93	1.23
10	Do laboratory tests to identify diseases	2.17	-0.08	3.28	1.28	3.26	1.28

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.



Table 7c.

**Item Parameters for Short-IP Artistic Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Male ( <i>N</i> = 298)		Female ( <i>N</i> = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	<b>Write books or plays</b>	1.57	-0.26	3.20	1.42	3.84	1.21
2	Play a musical instrument	1.62	-0.52	3.60	1.34	3.88	1.17
3	<b>Compose or arrange music</b>	1.40	-0.12	3.32	1.35	3.43	1.25
4	Draw pictures	1.21	-0.28	3.23	1.29	3.68	1.21
5	<b>Create special effects for movies</b>	0.68	-0.82	3.75	1.19	3.64	1.22
6	<b>Paint sets for plays</b>	0.77	-0.04	2.88	1.25	3.60	1.26
7	<b>Write scripts for movies or television shows</b>	1.71	-0.25	3.31	1.36	3.60	1.29
8	Perform jazz or tap dance	1.22	0.57	2.32	1.23	3.01	1.35
9	Sing in a band	1.17	-0.05	3.07	1.43	3.37	1.37
10	Edit movies	0.98	-0.47	3.62	1.22	3.54	1.22

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.

Table 7d.

**Item Parameters for Short-IP Social Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>B</i>	Male ( <i>N</i> = 298)		Female ( <i>N</i> = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	Teach an individual an exercise routine	0.71	0.29	2.95	1.28	3.09	1.29
2	<b>Help people with personal or emotional problems</b>	1.61	0.01	3.04	1.35	3.50	1.30
3	<b>Give career guidance to people</b>	1.16	0.10	2.92	1.23	3.31	1.23
4	<b>Perform rehabilitation therapy</b>	1.31	0.42	2.71	1.20	3.12	1.27
5	<b>Do volunteer work at a non-profit organization</b>	0.81	-0.47	3.23	1.19	3.81	1.05
6	Teach children how to play sports	0.81	0.27	3.05	1.32	2.92	1.31
7	Teach sign language to people with hearing disabilities	1.24	0.35	2.60	1.20	3.29	1.27
8	Help conduct a group therapy session	1.71	0.44	2.48	1.21	3.16	1.27
9	Take care of children at a day-care center	0.78	0.99	2.17	1.20	2.73	1.37
10	<b>Teach a high-school class</b>	0.66	0.84	2.62	1.28	2.69	1.30

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.

Table 7e.

**Item Parameters for Short-IP Enterprising Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Male ( <i>N</i> = 298)		Female ( <i>N</i> = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	Buy and sell stocks and bonds	0.35	0.79	3.16	1.30	2.64	1.29
2	Manage a retail store	1.86	0.63	2.48	1.15	2.78	1.26
3	Operate a beauty salon or barber shop	0.87	1.19	2.08	1.07	2.64	1.30
4	<b>Manage a department within a large company</b>	1.09	0.54	2.88	1.24	2.72	1.27
5	<b>Start your own business</b>	0.79	-0.70	3.76	1.13	3.78	1.15
6	<b>Negotiate business contracts</b>	0.78	0.69	2.90	1.30	2.55	1.26
7	Represent a client in a lawsuit	0.79	0.66	2.78	1.31	2.64	1.32
8	<b>Market a new line of clothing</b>	0.88	0.62	2.60	1.24	2.95	1.30
9	<b>Sell merchandise at a department store</b>	1.27	0.87	2.28	1.09	2.57	1.22
10	Manage a clothing store	2.43	0.61	2.39	1.18	2.71	1.30

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.

Table 7f.

**Item Parameters for Short-IP Conventional Scale Using Validation Sample (N = 575)**

Item #	Content	2PL		Item Averages			
		<i>a</i>	<i>b</i>	Male ( <i>N</i> = 298)		Female ( <i>N</i> = 276)	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	Develop a spreadsheet using computer software	0.72	0.29	3.14	1.26	2.92	1.28
2	Proofread records or forms	1.01	0.39	2.59	1.24	3.20	1.25
3	<b>Load computer software into a large computer network</b>	0.56	0.22	3.38	1.22	2.76	1.26
4	<b>Operate a calculator</b>	0.85	0.12	3.16	1.14	3.11	1.22
5	<b>Keep shipping and receiving records</b>	2.00	0.39	2.75	1.19	2.94	1.21
6	Calculate the wages of employees	1.53	0.37	2.77	1.17	2.96	1.24
7	<b>Inventory supplies using a hand-held computer</b>	1.55	0.33	2.87	1.22	2.91	1.19
8	Record rent payments	1.73	0.42	2.68	1.17	2.95	1.20
9	Keep inventory records	2.86	0.28	2.79	1.19	3.03	1.25
10	<b>Stamp, sort and distribute mail for an organization</b>	1.35	0.39	2.66	1.19	3.09	1.26

Note. Items in bold were selected for the Mini-IP. Item # represents the order of items within the scale.

Table 8.

**RIASEC Scale Means and Standard Deviations for the Validation Sample**

	Total		Male ( <i>N</i> = 298)		Female ( <i>N</i> = 276)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Mini Interest Profiler</b>						
R	2.85	0.91	3.10	0.91	2.58	0.83
I	3.28	0.89	3.36	0.90	3.19	0.89
A	3.45	0.98	3.29	0.99	3.62	0.93
S	3.09	0.93	2.91	0.92	3.28	0.90
E	2.90	0.87	2.88	0.84	2.91	0.89
C	2.97	0.90	2.96	0.88	2.96	0.93
<b>60-Item Interest Profiler Short Form</b>						
R	2.79	0.85	3.02	0.86	2.52	0.76
I	3.29	0.88	3.36	0.87	3.21	0.87
A	3.39	0.94	3.23	0.94	3.56	0.91
S	2.96	0.90	2.78	0.89	3.16	0.87
E	2.76	0.82	2.73	0.80	2.80	0.84
C	2.93	0.89	2.88	0.87	2.99	0.91
<b>Mini-IPIP Personality Scale</b>						
Extraversion	2.62	1.03	2.65	1.04	2.58	1.02
Agreeableness	3.78	0.85	3.61	0.86	3.94	0.80
Conscientiousness	3.66	0.81	3.61	0.81	3.71	0.82
Neuroticism	2.55	0.96	2.43	0.96	2.69	0.94
Intellect	3.87	0.82	3.87	0.86	3.86	0.79

*Note.* *N* = 575. R = realistic, I = investigative, A = artistic, S = Social, E = enterprising, C = conventional.

Table 9.

**Scale-level Reliability and Gender Balance for Validation Sample**

Scale	30-Item Mini-IP		60-item Short-IP	
	Gender Difference Effect Size ( <i>d</i> )	Cronbach's Alpha	Gender Difference Effect Size ( <i>d</i> )	Cronbach's Alpha
R	0.60	0.81	0.62	0.88
I	0.19	0.80	0.18	0.90
A	-0.34	0.81	-0.35	0.90
S	-0.41	0.79	-0.43	0.89
E	-0.03	0.74	-0.08	0.85
C	0.00	0.79	-0.12	0.90

*Note.* *N* = 575. R = realistic, I = investigative, A = artistic, S= Social, E =enterprising, C = conventional.

Table 10.

**Cross Classification of the RIASEC High Point Codes for the 60-Item Interest Profiler Short Form and 30-Item Mini Interest Profiler for the Validation Sample**

		60-Item Interest Profiler Short Form						
30-Item Mini- IP	R	I	A	S	E	C	Total N	
R	<b>47</b>	4	3	2	2	4	62	
I	3	<b>117</b>	4	4	1	3	132	
A	3	13	<b>177</b>	6	1	8	208	
S	1	3	9	<b>46</b>	2	5	66	
E	0	6	5	3	<b>25</b>	6	45	
C	6	6	1	1	2	<b>45</b>	61	
Total N	60	149	199	62	33	71	574	

*Note.* Cohen's *Kappa* was calculated for at least one match between the highest scoring RIASEC code for each person,  $\kappa = 0.73$ .

Table 11.

**RIASEC Scale Intercorrelations for the 30-Item Mini Interest Profiler (Lower Triangle) and the 60-Item Interest Profiler Short Form (Upper Triangle) for the Validation Sample**

	R	I	A	S	E	C
R		.39	.11	.16	.25	.40
I	.29		.27	.27	.19	.14
A	.08	.27		.44	.25	.05
S	.08	.24	.38		.43	.14
E	.23	.19	.27	.37		.37
C	.48	.16	.05	.10	.31	

*Note.*  $N = 575$ . R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 12.

**Cross Correlations of the 30-Item Mini Interest Profiler and the 60-Item Interest Profiler Short Form for the Validation Sample**

		30-Item Mini Interest Profiler					
		R	I	A	S	E	C
60-Item	R	.95	.38	.11	.12	.25	.47
Interest	I	.29	.96	.28	.27	.21	.17
Profiler	A	.09	.25	.96	.41	.27	.05
Short	S	.12	.25	.41	.95	.41	.13
Form	E	.23	.17	.24	.39	.95	.34
	C	.41	.14	.06	.12	.33	.95

*Note.*  $N = 575$ . R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 13.

**Personality Trait by RIASEC Scale Correlations for the 30-Item Mini Interest Profiler and the 60-Item Interest Profiler Short Form for the Validation Sample**

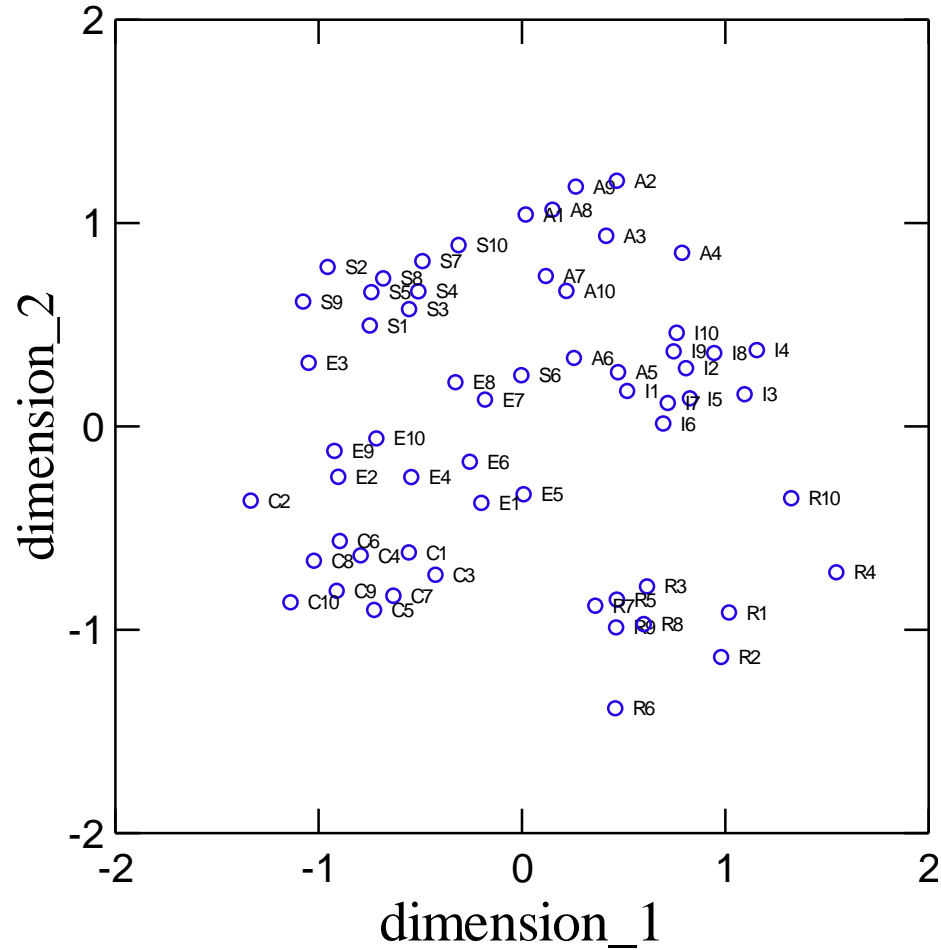
	30-Item Mini Interest Profiler					
	R	I	A	S	E	C
Extraversion	-.02	.08	.07	.28*	.34*	-.12*
Agreeableness	-.04	.06	.21*	.40*	.08	-.01
Conscientiousness	-.01	-.07	-.05	-.05	.10*	.00
Neuroticism	-.04	-.02	.04	-.01	-.13*	.06
Intellect	.06	.15*	.35*	.16*	.10*	-.05
	60-Item Interest Profiler Short Form					
	R	I	A	S	E	C
Extraversion	.00	.10*	.10*	.28*	.32*	-.11*
Agreeableness	-.04	.08	.22*	.38*	.08	-.01
Conscientiousness	-.02	-.07	-.05	-.04	.09*	.03
Neuroticism	-.03	-.00	.05	-.02	-.10*	.06
Intellect	.07	.18*	.31*	.13*	.05	-.08

*Note.*  $N = 575$ . R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional. \* =  $p < .05$ .



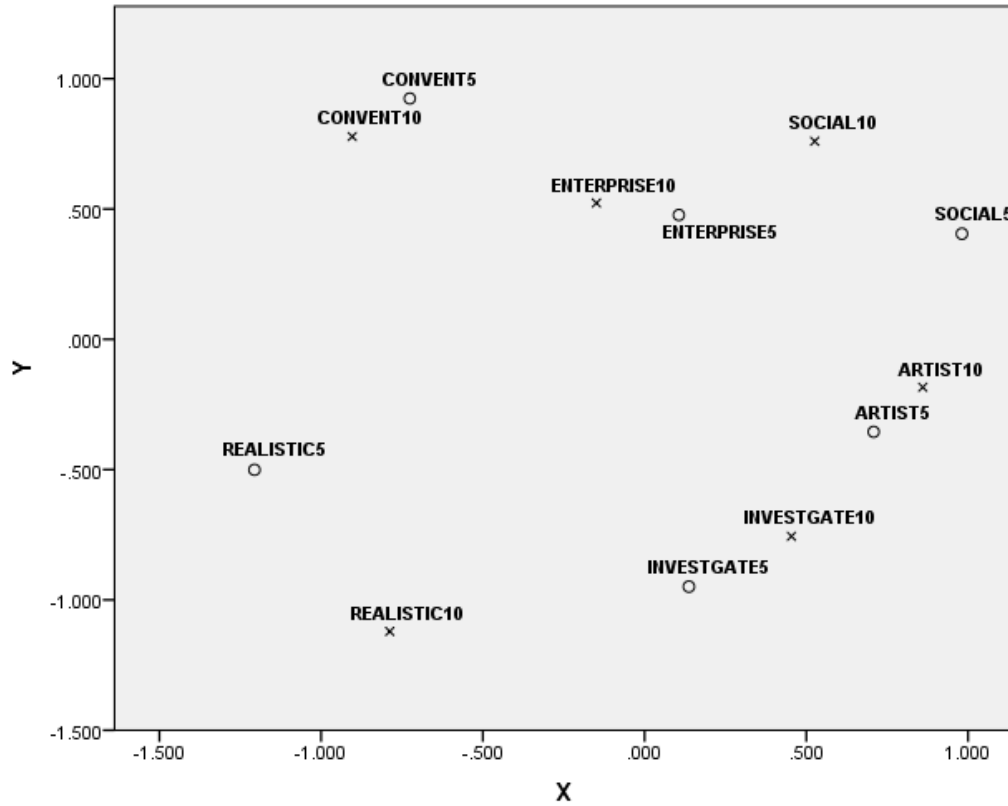
## FIGURES

**Figure 1. Kruskal Monotonic Multidimensional Scaling of the item-level correlation matrix for the 60-item Interest Profiler Short Form for the Developmental Sample**



*Note.* Labels for each point correspond to the individual item number in the Short-IP. The purpose of this graph was to select items from each RIASEC scale such that the resultant scale correlations would give a good circular structure corresponding to Holland's (1997) model. Kruskal STRESS = .20 and RSQ = .78.

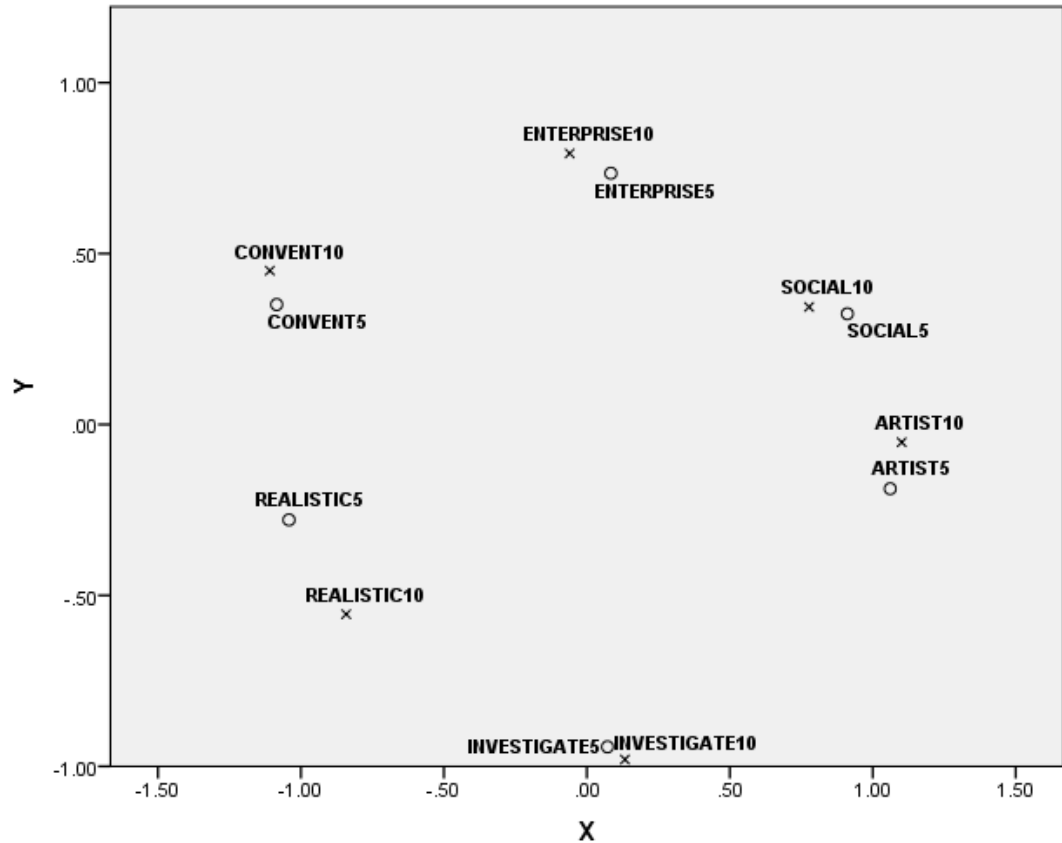
**Figure 2. Kruskal Monotonic Multidimensional Scaling of the RIASEC subscale correlation matrix for both the 30-Item Mini Interest Profiler and the 60-item Interest Profiler Short Form for the Developmental Sample, overlaid onto one two-dimensional space**



MDS Coordinate Values				
	30-Item Mini-IP	60-Item Short-IP		
R	-1.21	-0.50	-1.12	0.79
I	0.14	-0.95	-0.76	-0.45
A	0.71	-0.36	-0.18	-0.86
S	0.98	0.41	0.76	-0.53
E	0.11	0.48	0.52	0.15
C	-0.73	0.92	0.78	0.90
	<b>I</b>	<b>II</b>	<b>I</b>	<b>II</b>

*Note.* A 90-degree anticlockwise rotation was applied to the coordinates for the 60-item Interest Profiler. The Short Form and Long Form were scaled separately. Numbers next to the letters indicate the number of items in the RIASEC subscale. Interest Profiler Short Form: Kruskal STRESS = .03 and RSQ = .99; 30-Item Mini Interest Profiler: Kruskal STRESS = .04 and RSQ = .98. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

**Figure 3. Kruskal Monotonic Multidimensional Scaling of the RIASEC subscale correlation matrix for both the 30-Item Mini Interest Profiler and the 60-item Interest Profiler Short Form for the Validation Sample, overlaid onto one two-dimensional space**



	MDS Coordinate Values			
	30-Item Mini-IP	60-Item Short-IP	30-Item Mini-IP	60-Item Short-IP
R	-1.04	-0.28	-0.84	-0.56
I	0.07	-0.94	0.13	-0.98
A	1.06	-0.19	1.10	-0.05
S	0.91	0.32	0.78	0.34
E	0.08	0.74	-0.06	0.79
C	-1.09	0.35	-1.11	0.45
	<b>I</b>	<b>II</b>	<b>I</b>	<b>II</b>

*Note.* The Short Form and Long Form were scaled separately. Numbers next to the subscales indicate the number of items in the RIASEC subscale. Interest Profiler Short Form: Kruskal STRESS = .02 and RSQ = .99; 30-Item Mini Interest Profiler: Kruskal STRESS < .01 and RSQ = .99. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.