O*NET Computerized Interest Profiler: Reliability, Validity, and Comparability

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Executive Summary

This report summarizes a study conducted by researchers at the University of Illinois at Urbana-Champaign, the U.S. Department of Labor's Office of Policy and Research, and the National Center for O*NET Development, designed to further the development of the computerized version of the **O*NET Interest Profiler** (Lewis & Rivkin, 1999b). The **O*NET Interest Profiler** (IP) is an innovative, self-scoring vocational interest measure that has been found to yield reliable and valid scores in diverse samples of adults (Lewis & Rivkin, 1999a; Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999). Recently, a computerized version of the IP was developed. This study's purpose was twofold: first, to assess the psychometric properties of the **O*NET Computerized Interest Profiler**, and, second, to evaluate its comparability with the paper-and-pencil (P&P) version of the **O*NET Interest Profiler**.

Results from the internal-consistency reliability analyses show that the Computerized IP yields RIASEC scores that are as consistent as the P&P IP scores. Results from the stability analysis show that the Computerized IP yields similar RIASEC scores over one month. In sum, these findings suggest that the Computerized IP produces reliable scores.

Evidence for the validity of the Computerized and P&P IP RIASEC scores was provided. The criterion-related validity of the two forms of the IP was examined by comparing the first letter code of the participant's IP with first-letter code of the participants' current and ideal occupation. The evidence indicates that both forms have average predictive efficiency, similar to the hit rates reported for other RIASEC inventories. Additional support for the validity of the Computerized IP profiles was demonstrated by their relationship to participants' scores on the RIASEC Self-Description Questionnaire (SDQ). The SDQ is an instrument that allows an individual to self-rank RIASEC category descriptions according to the degree that each category describes him or herself. Congruence indices suggested that these measures were strongly related. These results indicate that the Computerized IP is as effective as other well-known vocational interest measures in predicting participants' rankings of interest areas.

The structural validity of the RIASEC scales was studied in two samples: the comparability sample and the test-retest sample. Individuals in the comparability sample completed both forms of the IP, while individuals in the test-retest sample completed the Computerized IP on two separate occasions. The test-retest sample consisted of individuals who tended to be more highly educated and employed; they were also less likely to be members of an ethnic minority group. The Computerized and P&P forms of the IP had similar structures in both samples. The fit to the RIASEC circular order model was poor in the comparability sample and good for the test-retest sample. Nevertheless, the test-retest sample multidimensional scaling solution showed that the Enterprising scale was located closer than expected to the Realistic scale. These mixed structural results mirror results obtained by Rounds, Walker, Day, Hubert, Lewis, and Rivkin (1999), suggesting a lack of coherent Enterprising items.

Results indicate that the O*NET Computerized Interest Profiler scores are comparable to the P&P version. Equivalent scales from both measures were highly correlated, supporting the convergent validity of these measures. Profile analysis results indicate that the two forms of the IP generate very similar RIASEC profiles. Cross-classification analysis of the IP forms showed that 80% of the participants would receive the same first-letter RIASEC code, close to the limits of the reliability of the IP.

Participants' comfort and satisfaction with the Computerized and P&P versions of the IP were also investigated. The average time to complete the Computerized IP was 19 minutes. The vast majority (84%) of participants indicated that the IP instructions were very clear. Most (72%) reported that they found the computer presentation and graphics to be interesting, and 94% reported that the information presented on the computer screen was "easy" or "very easy" to read. In addition, the majority (78%) indicated that they preferred the Computerized IP to the P&P IP. Furthermore, 88% of the participants reported that they would recommend the IP to a friend. In sum, the participants were very satisfied with the Computerized IP.

The O*NET Interest Profiler is a useful, efficient instrument that should prove helpful to individuals making career decisions. Overall, these results indicate that respondents receive similar scores on the IP, regardless of the test version (computerized vs. P&P) taken. However, the present study indicates that clients and students prefer the computerized form due to its interactive nature.

O*NET Computerized Interest Profiler: Reliability, Validity, and Comparability

Introduction

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The **O*NET Interest Profiler** (IP) is an innovative, self-scoring vocational interest measure that has been found to yield reliable and valid scores in diverse samples of adults (Lewis & Rivkin, 1999a; Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999). Recently, a computerized version of the IP was developed. The Computerized IP offers several advantages. The automated scoring provides participants with accurate and virtually instant feedback about their vocational interests. This career-counseling tool can be used in computer labs prevalent in schools and career centers. For those individuals new to computers, taking the Computerized IP can be an opportunity to learn basic computer skills while performing a "non-threatening" activity. Finally, pilot tests have indicated that clients and students enjoy the interactive nature of completing the Computerized IP.

Before the Computerized IP can be made available, its reliability and validity must be established. Frequently, organizations will be using both the Computerized IP and the Paper & Pencil (P&P) IP. In such cases, it is important to establish the comparability of IP forms. Thus, the two major purposes of this proposed study are: 1) to evaluate the psychometric properties of the Computerized IP, and 2) to investigate its comparability with the Paper & Pencil IP form. As the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1985) state: "When scores earned on two different forms of a test, including computer-presented…tests, are intended to be used interchangeably, data concerning the parallelism of the forms should be available" (Standard 4.6, p. 34).

Similarly, Vansickle and Kapes (1993) note: "the equivalence of mode of administration should not be assumed for any computer-based instrument unless there is evidence presented by the test author or publisher" (p. 448). Thus, the comparability analyses included in the current study were designed to assist the Department of Labor in fulfilling this ethical obligation.

Previous investigations of the equivalence of computerized and P&P vocational measures have primarily focused on the Strong-Campbell Interest Inventory (SCII; Hansen & Campbell, 1985). Brown (1984) found no significant differences between the two test forms. Vansickle and his colleagues (Vansickle, Kimmel, & Kapes, 1989; Vansickle & Kapes, 1993) found that in two independent studies the computerized version of the SCII exhibited higher test-retest reliability than did the paper-and-pencil version. In addition, they found that the computerized version could be completed more quickly than the paper-and-pencil version. Means, variances, and frequencies of item endorsements were equivalent across forms. However, neither Brown's nor Vansickle's

studies directly investigated the construct validity of the computerized form. Moreover, neither study established the structural equivalence between the computerized and paper-and-pencil forms. Thus, no evidence was provided to demonstrate that these computerized instruments measure the constructs outlined in Holland's (1997) RIASEC model. In the current study, the psychometric properties of the Computerized IP were rigorously evaluated, and its comparability to the P&P IP was thoroughly studied.

Method

Design

Two samples were collected: a comparability sample and a test-retest sample. The main study employed a repeated measures design, with the comparability sample consisting of 463 participants who completed both the Computerized and P&P forms of the IP. Participants were assessed in small groups of approximately 4 to 16 at various sites. The order of administration was balanced, so that approximately half the participants were first administered the Computerized IP, and the remaining half were first administered the P&P IP. Additionally, a second sample of 125 participants (test-retest sample) was twice administered the Computerized IP. For the test-retest group, the time interval between test administrations ranged from 28 to 35 days, with a mean interval of 29.8 days. Subscale scores were computed for all participants from their item responses (that is, the *self-scored* subscales of the P&P IP were *not* used in the analyses). Participants in the comparability sample were also asked to provide a ranking of their preferred RIASEC codes, indicate their most preferred occupation, answer various demographic questions, and respond to several questions evaluating the computerized test format.

Participants

Prior to the analyses, participants were eliminated if three or more responses were missing on the P&P Interest Profiler forms. Note that the Computerized IP format does not allow participants to skip items. Using this criterion, we dropped 13 of the 463 participants from the study. In addition, 15 participants were eliminated due to various data collection irregularities such as missing pages or forms, random-appearing item responses (as noted by observers), or observed difficulty with instructions. Consequently, analyses were conducted on 435 individuals from four regions across the United States: East (New York), West (California), North (Michigan), and South (North Carolina). Data collection sites included employment service offices, junior colleges, trade schools, high schools and other government agencies. Participants were each paid $15 to reimburse them for travel expenses. Table 1 depicts the characteristics of the comparability sample in terms of sex, age group, education, ethnicity, employment status, student status, and geographical region. As the table illustrates, the sample over-represented minority participants, especially African Americans. The majority of participants were female. Most were unemployed and did not hold a bachelor's degree.

A stability analysis of the Computerized IP (in the form of a test-retest reliability estimate) was conducted on a second sample of participants who differed from the comparability sample in several ways. Participants in this test-retest sample were better educated, more likely to be employed, and less likely to belong to an ethnic minority group than were participants in the comparability sample. Specifically,

only 10% of the test-retest sample had less than 12 years of education, and approximately 50% had some college experience. In contrast, about 25% of the comparability sample had less than 12 years of education, and approximately 67% did not have any college experience. In addition, ethnic minorities were over-represented in the comparability sample (60% of sample), while the test-retest sample was primarily Caucasian (68%), Over 50% of the comparability sample were unemployed, compared to 17% of the test-retest sample. Finally, the test-retest sample included a larger proportion of females than the comparability sample, and all participants were exclusively from the North Carolina area. The test-retest sample (n = 125) completed the Computerized IP on two separate occasions, with approximately four weeks elapsing between the two administrations. Table 2 depicts the characteristics of the test-retest group.

Measures

Demographic Questionnaire. All participants provided demographic information that included age, race/ethnicity, gender, educational level, current employment status, school status, current occupation or last job held, and their "ideal" job ("If you could choose an occupation for yourself, which would you choose?").

*Paper & Pencil **O*NET Interest Profiler**.* The Paper & Pencil version of the **O*NET Interest Profiler** (P&P IP; National Center for O*NET Development, 1999) is an interest inventory designed to assist respondents in making occupational choices. It includes 30 items per RIASEC type, for a total of 180 items, in a format that mixes the RIASEC types so that no string of three or more similar items occurs in a column of items. Items are presented by RIASEC category in sets of two, beginning with R and ending with C. All items are work activities (e.g., "Diagnose and treat sick animals," "Act in a movie," "Sell houses"). Participants respond with a "like," "dislike," or "not sure" to the items. Subscale scores (corresponding to the six RIASEC categories) are then computed by summing the number of "like" items endorsed within each category ("dislike" and "not sure" endorsements do not contribute to subscale scores). Scores for the RIASEC subscales may range from 0 to 30.

After completing the IP, the test-taker receives a summary code based on his or her top two or three RIASEC types in order of preference, such as IR, SEC, or AIS. In career reference materials, these RIASEC codes are linked to occupational areas and job titles so that the user can consider a range of pursuits that are likely to provide a good personality/work environment match. In addition, there is an associated score report that links the IP summary codes to relevant occupations (O*NET Occupational Units).

***O*NET Computerized Interest Profiler**.* The content of the Computerized IP is identical to that of the P&P IP version, except that it is presented on a computer screen. Respondents may answer each item by using either a mouse or computer keyboard. Unlike the P&P version, the Computerized IP does not allow respondents to skip items. Scoring of the Computerized IP is identical to that of the P&P version, as described above, except the subscales are automatically calculated by the program.

RIASEC Self-Description Questionnaire. The RIASEC Self-Description Questionnaire (SDQ) lists six narrative descriptions of the RIASEC types. These descriptions were

written to reflect Holland's (1997) RIASEC constructs. This questionnaire was administered to all participants. However, only 362 of the responses were usable, as several participants did not appear to understand the question format—either failing to complete the rankings or entering values that were not ranks. SDQ instructions request that the participants rank order each description according to "how much it is like you." Ranks were values ranging from 1 to 6, with the RIASEC category description most like a participant receiving a rank of 1, and the description least like a participant, ranked 6. Slaney (1978) has shown that it is possible to write descriptions of the RIASEC types that have adequate reliability and validity for research purposes.

Results

Reliability

To examine the internal consistency of the Computerized and P&P Interest Profiler, coefficient alpha was calculated for each of the RIASEC scales on both measures. Alpha ranged from .93 to .96 for the scales on both the Computerized and P&P versions, suggesting that the instruments yield reliable scores. Complete results are presented in Table 3. In addition, the test-retest correlations for each of the RIASEC scales of the Computerized IP ranged from .82 for the Investigative and Enterprising scales to .92 for the Conventional scale, suggesting that scores on this measure are stable across test administrations. The test-retest correlations presented in Table 4 are comparable to those found for the P&P IP in a previous study (Rounds, Walker, Day, Hubert, Lewis, & Rivkin, 1999). Thus, it seems that the form of the IP has little effect on the stability of scores. RIASEC scale means and standard deviations from the overall sample (n = 435) for both the Computerized and P&P IP versions are presented in Table 5.

Cross-classification analysis of the test-retest sample indicated that the Computerized IP yielded stable high-point RIASEC codes across administrations (Cohen's Coefficient Kappa = .67, hit rate = 75.2%). Yet, as Table 6 indicates, none of the 125 participants in the test-retest sample was classified as Enterprising on both administrations of the Computerized IP. In addition, only two participants were classified as Realistic on both administrations.

Validity

Three types of validity evidence for the Computerized IP were investigated: criterion-related validity, convergent validity, and structural validity. Although the focus of the validity analyses was on the Computerized IP, most analyses, unless otherwise noted, were conducted on both the Computerized and P&P versions of the IP.

Criterion-related validity. Criterion-related validity of the IP was evaluated by comparing participants' primary interest area, as measured by the Computerized IP, with their self-reported current and ideal occupations. Agreement between ideal occupation and primary interest area would suggest that the IP was accurately assessing respondents' vocational interests. Furthermore, agreement between current occupation and the IP primary interest area would suggest accuracy in vocational interest assessment to the

degree that an individual was satisfied with his or her current occupation. Agreement was measured in several ways, including circular scale scores, and analyses of "hit rates" across interest categories.

Participants' current (or last-held) and ideal occupations were coded by expert judges using the RIASEC profiles from the *Holland Dictionary of Occupational Codes* (Gottfredson & Holland, 1996). Next, a circular scale score was computed that assessed the degree of agreement between a participant's Computerized IP high-point code and RIASEC coded current/ideal occupation. The circular scale score is a value ranging from 0 to 3 that indicates the similarity of a pair of codes with respect to their proximity on the RIASEC hexagonal structure. Perfectly matched codes receive a circular scale score of 3, while the most dissimilar codes (e.g., R vs. S) receive a scale score of 0. Distributions of the circular scale scores are presented in Tables 7 through 10. Participants varied in the degree to which their Computerized IP score corresponded with their current occupation. In slightly more than one-half (51.7%) of cases, the Computerized IP score and the current occupation agreed perfectly or were one code type away from perfect agreement. The remainder of cases (48.3%) exhibited some disparity in coding (see Table 7). These agreement rates are comparable to those found in research using other well-established vocational interest measures (c.f., Slaney, 1978). Moreover, when ideal occupation was compared with Computerized IP first-letter code, the results demonstrated stronger agreement between the two indices. A majority (62.4%) of cases either agreed perfectly (i.e., circular scale score of 3) or were one code type away from perfect agreement (i.e., circular scale score of 2). Complete results are presented in Table 8. Similar results were found when the P&P IP was compared with participants' current and ideal occupation (see Tables 9 and 10).

Means and standard deviations of these circular scale scores for both the Computerized and P&P IP versions are presented in Table 11. These results suggest that for both versions, ideal occupation was more likely than current occupation (or last job held) to agree with participants' first-letter IP code ($p < .001$). These results are in accordance with the theory underlying the RIASEC model.

Convergent validity. Convergent validity was assessed by comparing the Computerized IP profiles with profiles resulting from the RIASEC Self-Description Questionnaire (SDQ). A moderate relationship was expected between these two methods of assessing RIASEC types.

A cross-classification analysis was first carried out to assess the agreement between the first-letter codes obtained from the Computerized IP profiles and the rank one categories from the RIASEC Self-Description Questionnaire (SDQ). Results of this analysis are presented in Table 12. As can be seen from the table, the diagonal values (indicating an exact match between profiles) are the highest values within any row or any column, suggesting that the profiles resulting from the Computerized IP correspond well with the SDQ profiles. The overall hit rate was moderately high (53%).

Three measures of profile congruence were also computed to determine the degree to which the three-letter profiles resulting from the Computerized and P&P IP administrations corresponded with three-letter profiles resulting from rankings on the RIASEC Self-Description Questionnaire (SDQ). The measures of profile congruence utilized were the Iachan M index (Iachan, 1984a, 1984b), the Brown and Gore C index

(Brown & Gore, 1994), and a revised version of the Brown and Gore C index (hereafter, C-rev). The Iachan M index uses a rational scoring scheme that weights particular match types between two ordered profiles. In standardized form, M can range in value from 0 to 1.0, with larger values of the index indicating a high degree of congruence between the two profiles. For example, two ordered profiles with no elements in common would receive a score of zero on the index. Two profiles with the same elements (but ordered distinctly) would receive a higher index score, and two profiles with all elements in common and in identical order would receive the highest possible value of the index
(i.e., M = 1.0).

The Brown and Gore C index, in contrast, incorporates the concept of circular distances to determine the level of profile congruence and is computed as

$$C = 3x_1 + 2x_2 + x_3 ,$$

where x_i indicates the circular scale score (described previously) between position i in both profiles. When standardized, the value of C ranges from 0 to 1.0, with higher values reflecting greater profile congruence. However, both the C index and the M index have limitations. Specifically, the M index only weights exact code matches, so codes that are similar to one another (e.g., R and I) receive no greater weight than codes that are very dissimilar (e.g., R and S). The C index, in contrast, does account for these varying degrees of proximity between codes. It does not, however, account for the proximity between codes in adjacent positions across profiles (as the M index does)—an issue of importance when code transpositions occur as a result of measurement error. The profiles RSC and SRC, for example, might reasonably be considered more similar than the profiles RSC and AIC (because in the former case, the first two code positions have simply been transposed), yet the former receives a lower C score than the latter. For this reason a third index, a revised version of the C index (C-rev), was computed. The C-rev index is computed in a similar fashion to the C index, but also weights adjacent codes across profiles. This results in a congruence measure that is more relevant for the RIASEC theory. Specifically, this index is computed as

$$\mathrm{C\text{-}rev} = 5x_{11} + 2x_{12} + 2x_{21} + 3x_{22} + x_{23} + x_{32} + x_{33} ,$$

where x_{ij} indicates the circular scale score between position i of the first profile and position j of the second profile. C-rev is then standardized to range from 0.0 to 1.0, with higher values indicating greater profile congruence. When values of the three congruence indices were calculated (see Table 13), moderately high values (.44 to .66) were obtained on all indices when comparing either the Computerized IP or the P&P IP to the SDQ. These results suggest that both versions of the IP matched the SDQ profiles quite well.

Structural validity. Finally, the structural validity of the Computerized IP was investigated and compared to that of the P&P version to evaluate the dimensional stability of the IP across test formats. Structurally similar measures suggest that the underlying constructs measured by the IP are equivalent across forms, thus providing further support for the equivalency of the P&P and Computerized versions.

Correlations among the subscales within each test version are shown in Table 14. Generally, the pattern of within-test scale intercorrelations fit the hypothesized RIASEC structure (i.e., scales close to each other in the RIASEC structure were more strongly correlated than were those further apart from one another). However, the Enterprising scale appeared to be more strongly correlated with the Realistic scale (in both the Computerized and P&P versions) than would be expected given the theoretical structure of the RIASEC scales.

A randomization test of hypothesized order (Rounds, Tracey, & Hubert, 1992) was next used to examine the structural validity of the Computerized and P&P IP versions, assuming the RIASEC model (Holland, 1997). Also, the correspondence index (CI) was calculated to evaluate model-data fit. This index assesses the degree to which predictions derived from the circular model are met by the data ranges. Values of the CI range from -1.00 to +1.00; a value of +1.00 indicates a perfect model-data fit. For the Computerized IP, CI = .33 ($\underline{p} < .10$), and for the P&P IP, CI = .32 ($\underline{p} < .12$). These results were nonsignificant, indicating that a random order hypothesis could not be rejected.

The structural validity of the Computerized IP was further examined with multidimensional scaling (MDS), a statistical procedure that can be used to provide a spatial representation corresponding to the proximity of variables within a data set. MDS analyses were conducted using the matrix of scale score intercorrelations to assess whether the RIASEC circular structure fit the data. First, an MDS of the Computerized IP scores was carried out. The configuration is displayed in Figure 1. A two-dimensional solution fit the data well, explaining 87.9% of the variation. However, the MDS solution did not correspond well with the RIASEC circular model. Specifically, the order of the Artistic and Investigative scales was reversed. In addition, the Enterprising scale was in the center of the plot, reflecting its stronger than expected relation with the Realistic and Artistic scales. There was also a larger than expected distance between the Realistic and Conventional scales.

Figure 2 shows the MDS solution for the P&P IP scores. This MDS analysis yielded a similar pattern of results. Again, a two-dimensional solution fit the data, explaining 87.5% of the variance. When an MDS solution was obtained using both the Computerized IP and P&P IP subscale intercorrelations (see Figure 3), the corresponding RIASEC scales of each measure were identically ordered (R-A-I-S-C-E) and nearly identically situated. This result provides further support for the comparability of the measures.

Two-dimensional MDS analyses were also carried out using the Euclidean distances (an alternate measure of inter-scale proximity) among the RIASEC scales of both the Computerized and P&P IP. In each case, the structure appeared closer to the hypothesized RIASEC circular structure, with the RIASEC scales appearing in the expected order, but with the Enterprising scale somewhat depressed. The results obtained using the Computerized IP scores are shown in Figure 4 (as nearly identical results were obtained with the P&P IP, this MDS configuration is not shown).

Because, as indicated previously, the test-retest sample differed significantly from the comparability sample on several demographic variables, we used this sample to further examine the structural properties of the IP. Randomization tests were carried out to

assess the circularity of the inter-scale correlation matrices for both Time 1 and Time 2. In both cases, the random order hypothesis was rejected ($\underline{p} < .02$ and $\underline{p} < .03$ for Time 1 and Time 2, respectively). The correlation matrices and CI indices are shown in Table 15. The obtained CI indices of .63 and .65 indicate a good fit of the RIASEC model to the correlations. A simultaneous MDS analysis of the Time 1 and Time 2 test-retest sample (see Figure 5) was then carried out, using the inter-scale correlations as input. This produced a configuration much closer to the hypothesized structure. In this solution, the scales were in R-I-A-S-E-C order, with only the Enterprising scale of each IP version appearing in a slightly depressed position. Additionally, corresponding scales from the two IP versions were very nearly overlapping, which suggested that the structure of the data was consistent across test administrations.

Comparability of the Computerized and P&P IP Forms

In addition to the reliability and validity of the IP, a third issue of importance was the comparability or convergence between scores generated by the Computerized and P&P versions of the IP. An analysis was carried out that examined the potential influence of test format on participants' scores—that is, whether an individual would achieve the same profile regardless of the version (Computerized or P&P) administered. M, C, and C-rev index values comparing the P&P IP profiles to the Computerized IP profiles were computed, as were indices comparing the Time 1 with the Time 2 Computerized IP profiles that resulted from the test-retest sample. The test-retest sample was examined separately because these participants differed from the comparability sample on several demographic variables, including educational level, ethnicity, and gender. Consequently, analysis of this group would provide additional insight into the psychometric properties of the Computerized IP.

Means and standard deviations of the M, C, and C-rev values comparing IP profiles are shown in Table 13. Very high values (.76 to .90) were found when comparing the profiles from each IP version, indicating a high degree of profile similarity and high convergent validity. Similarly, very high congruence values (.75 to .88) resulted when Computerized profiles from the test-retest sample were compared across a one-month interval. These test-retest congruence values can be used as a benchmark since the same test format was used. Comparing the test-retest congruence values to the comparability sample values provide further evidence that test format (Computerized or P&P) does not affect IP scores.

In addition, the similarity of results from the reliability and validity analyses of the two forms of the IP provide evidence that the scores generated from Computerized and Paper & Pencil Interest Profiler are comparable. Nevertheless, direct tests are available to evaluate the comparability of the measures. We conducted several of these direct tests.

First, a profile analysis was conducted to observe the degree of parallelism between the Computerized and P&P versions of the IP. A participant's score on each scale of the instrument was the dependent variable, and the measurement instrument (Computerized or P&P IP) and the RIASEC scale categories were the two independent variables. Results indicated that there was no significant interaction between measurement instrument and RIASEC scale ($\underline{p} > .10$). That is, an individual's scale score did not appear to be dependent upon the particular version of the IP (P&P or

Computer) that was taken. Thus, the two versions appear to be comparable. Complete results of this analysis are presented in Table 16, and they are depicted graphically in Figure 6.

Correlations among the RIASEC scales across test versions provide further evidence of the convergent validity of the Computerized and P&P IP forms. These correlations ranged from a low of .93 for the Enterprising scale to a high of .97 for the Realistic scale. Complete results of this analysis are presented in Table 17.

Table 18 illustrates the results of the cross-classification analysis of primary code agreement between the two IP versions. In general, the measures yielded consistent primary code classifications across measures (Cohen's Coefficient Kappa = .75, hit rate = 79.8%). However, only a small number (4.4%) of participants were simultaneously classified as Enterprising by both the Computerized and P&P versions. In addition, it is noteworthy that a large number of participants (23.4%) were classified as Social by both IP versions.

User Feedback

Participants' comfort and satisfaction with the Computerized and P&P versions of the IP were also investigated. The length of time taken to complete the Computerized IP was recorded, and participants were asked to respond to a questionnaire after they had completed both versions of the IP. This questionnaire was designed to elicit feedback from participants regarding their understanding of each IP version, their perception of each instrument, their previous experience with computers, and the process they used to complete the Computerized IP.
Participants completed the Computerized IP quickly. The mean time to complete the Computerized IP was 19.1 minutes. Table 19 provides additional summary statistics for completion time. When asked about their experiences using the Computerized IP, the vast majority (84.1%) of participants indicated that the instructions were very clear. Most (92.1%) reported that they found the computer presentation and graphics to be at least somewhat interesting, and 93.5% reported that the information presented on the computer screen was "easy" or "very easy" to read. In addition, the majority (78.4%) indicated that they preferred the Computerized IP to the P&P version, while 17.5% indicated that they would take either version. Furthermore, 87.8% reported that they would recommend the IP to a friend. Table 20 details these results.

Several cross-classification tables were constructed to assess how participants' previous experience with computers influenced their use of the Computerized IP. As Table 21 indicates, participants who were more familiar with computers were more likely to use the mouse to complete the Computerized IP ($\chi^2 = 22.4$, $\underline{p} < .001$). In addition, and not surprisingly, participants more familiar with computers found the instructions clearer ($\chi^2 = 24.5$, $\underline{p} < .01$; see Table 22), and the screen easier to read ($\chi^2 = 16.3$, $\underline{p} < .06$; see Table 23) than did those who had less computer experience. Participants who were less familiar with computers found the graphics to be more interesting ($\chi^2 = 16.3$, $\underline{p} < .06$; see Table 24). The majority of participants (78.0%) preferred the Computerized IP version (see Table 25) and found the instructions clear, although there was a tendency ($\chi^2 = 25.21$, $\underline{p} < .0001$) for more experienced computer users to prefer the Computerized IP.

Discussion

Computer technology can increase the accessibility and efficiency of vocational testing. However, psychologists have an ethical obligation to ensure the equivalence of computerized and paper-and-pencil versions of assessment instruments (AERA et. al., 1985). In the current study, the psychometric properties of the Computerized IP were evaluated. Results suggest that the Computerized IP yields reliable scores in diverse samples of adults. In addition, the validity of the Computerized IP was supported. The measure demonstrated the expected pattern of relationships with both participants' current job and their self-reported ideal job. Indeed, the correspondence between the high-point code generated by the Computerized IP and respondents' current and ideal jobs was comparable to that found in previous studies using well established interest measures such as the UNIACT-R (ACT, 1995) and the Vocational Preference Inventory (Holland, 1985). Also, ideal occupation was more congruent with the IP-generated primary codes than was current occupation, reflecting (as expected) a disparity between current and ideal occupations for at least some segment of the population.

Additional support for the validity of the Computerized IP profiles was demonstrated by their relationship to participants' scores on the RIASEC Self-Description Questionnaire. Congruence indices suggested that these measures were strongly related. These results indicate that the Computerized IP is as effective as other well-known vocational interest measures in predicting participants' rankings of interest areas (c.f., Slaney, 1978).

Moreover, the comparability of the Computerized and P&P versions of the IP was demonstrated, in accordance with the requirements of the Standards for Educational and Psychological Testing (AERA et al., 1985). Multiple analyses suggest that the Computerized IP and P&P IP can be used interchangeably with confidence. Specifically, the congruence between profiles generated by each version was found to be extremely high, providing strong support for the equivalence of the measures. Additionally, MDS analyses indicated that the structures of the Computerized and P&P versions were virtually identical, providing further evidence of the comparability of the test formats. Overall, these results suggest that respondents receive similar scores on the IP, regardless of the test version taken.

The structural validity of the Computerized IP was also evaluated using correspondence indices (CI) and multidimensional scaling (MDS). MDS analyses and randomization tests using interscale correlations from the comparability sample indicated that the structure of the Computerized IP (and the P&P IP) scores deviated from the RIASEC model. However, a follow-up MDS analysis using the more highly educated, more ethnically homogenous, regionally homogeneous, and predominantly female test-retest sample yielded more promising results. Specifically, a randomization test of the test structure suggested circularity among the IP scales. Additionally, multidimensional scaling analyses indicated that the scales from the Computerized IP displayed R-I-A-S-E-C ordering, with only the Enterprising scale appearing in a slightly depressed position. Similar results were found in an earlier study of the P&P IP (Rounds et. al., 1998). Rounds and his colleagues suggested that the depressed position of the Enterprising scale may be due to the fact that the IP includes items from all prestige and educational categories, thereby introducing more variability (and perhaps less conceptual unity) into

the Enterprising category. In addition, it is notable that in both the comparability sample and test-retest sample of this study, very few participants were classified as Enterprising.

These MDS results are similar to those found in previous studies that have examined the influence of ethnicity, educational level, and socio-economic status (SES) on RIASEC structure. For example, Ryan, Tracey, and Rounds (1996) evaluated the influence of SES and gender in a sample of African-American and White high school students and found that, while there were no ethnic differences in the structure of interests, when ethnicity and SES were considered simultaneously, structural differences were found. In addition, these authors found gender differences in vocational interest structure; specifically, Holland's model provided a better fit for female respondents, regardless of their ethnicity. It is notable that the composition of the test-retest sample in the current study is demographically similar to samples used in previous studies that have found an adequate fit to the RIASEC model (e.g., Day, Rounds, & Swaney, 1998).

With respect to participants' subjective evaluation of the Computerized IP, most viewed the Computerized IP as easy to use, and the vast majority preferred it to the P&P version. They were able to complete the Computerized IP in a reasonable amount of time, found the instructions easy to comprehend and follow, and had little difficulty reading from the computer screen. Most would recommend this version of the IP to friends. These responses suggest that people will be apt to use the instrument and be satisfied with its results. In sum, the Computerized IP appears to be a useful, efficient, interest inventory that should prove helpful to those making career decisions. Future research with the IP should revise the Enterprising scale so that its psychometric properties are consistent with the RIASEC model. In addition, longitudinal studies of the utility of the IP could prove useful in establishing additional evidence of the measure's criterion-related validity.

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Tables

Table 1

Description of Comparability Sample

Characteristic	freq.	%
Gender		
Male	168	38.6
Female	267	61.4
Age		
18 or less	118	27.1
19 to 22	53	12.1
23 to 30	86	19.8
31 to 40	72	16.6
41 to 50	79	18.2
> 50	26	6.0
Education		
Less than high school	113	26.0
High school degree	164	37.7
Some college to BA	145	33.3
> 16 years	12	2.8
Ethnicity		
White Non-Hispanic	173	39.8
African-American	170	39.1
Hispanic/Latino	69	15.9
Asian/Pacific Islander	5	1.1
American Indian/Alaskan Native	4	0.9
Other	14	3.2
Employment Status		
Unemployed	237	54.4
Part-time	88	20.2
Full-time	70	16.1
Military	5	1.1
Not seeking employment	35	8.0
Student status		
Not a student	126	29.0
High school	114	26.3
Junior College/vocational	58	13.4
College Student	59	13.6
Graduate Student	34	7.8
Other	43	9.9
Region		
East (NY)	45	10.3
West (CA)	59	13.6
North (MI)	167	38.4
South (NC)	164	37.7

Note. Column marginal frequencies do not always sum up to total number of participants because of missing data; total $N = 435$.

Table 2

Description of Test-Retest Sample

Characteristic	freq.	%
Gender		
Male	29	23.2
Female	96	76.8
Age		
18 or less	9	7.2
19 to 22	33	26.4
23 to 30	33	26.4
31 to 40	31	24.8
41 to 50	12	9.6
> 50	7	5.6
Education		
Less than high school	12	9.6
High school degree	49	39.2
Some college to BA	58	46.4
> 16 years	5	4.0
Ethnicity		
White Non-Hispanic	85	68.0
African American	32	25.6
Hispanic/Latino	3	2.4
Asian/Pacific Islander	3	2.4
American Indian/Alaskan Native	0	0.0
Other	1	0.8
Employment status		
Unemployed	29	23.2
Part-time	48	38.4
Full-time	35	28.0
Military	0	
Not seeking employment	13	10.4
Student status		
Not a student	8	6.5
High school	3	2.5
Junior College/vocational	48	38.7
College Student	49	39.5
Graduate Student	7	5.6
Other	9	7.3

Notes. Column marginal frequencies do not always sum up to total number of participants (125) because of missing data. All participants in the test-retest sample were from the Southern region (NC).

Table 3

Coefficient Alpha for P&P and Computerized Versions of the IP

Scale	P& P IP	Computerized IP
R	.94	.94
I	.94	.94
A	.95	.95
S	.95	.95
E	.93	.93
C	.96	.96

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

Table 4

Computerized IP Test-Retest Correlations

Scale	*r*
R	.87
I	.82
A	.88
S	.88
E	.82
C	.92

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

Table 5

Scale Means and Standard Deviations for the P&P and Computerized IP

Scale Means:	R	I	A	S	E	C
Paper & Pencil IP	8.46	12.63	14.31	16.28	11.35	13.22
Computerized IP	8.30	12.89	14.40	16.39	11.41	13.13

Scale standard deviations:

	R	I	A	S	E	C
Paper & Pencil IP	7.94	8.97	9.00	9.50	7.85	10.21
Computerized IP	7.93	8.93	9.27	9.45	7.77	10.06

Note. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional; *n* = 435 for each group.

Table 6

Cross-Classification of the RIASEC High-point Codes for

Time 1 and Time 2 Administrations of the Computerized IP

	Time 2						
Time 1	R	I	A	S	E	C	Marg. Freq
R	**2**	**0**	0	0	0	0	2
I	0	**14**	1	1	0	4	20
A	0	3	**21**	0	1	0	25
S	0	4	6	**26**	1	4	41
E	1	0	0	1	**0**	0	2
C	0	1	1	2	0	**31**	35
Marg. Freq.	3	22	29	30	2	39	125

(Continued)

Table 6 (Continued)

Row Percents

	Time 2						
Time 1	R	I	A	S	E	C	Marg. Freq.
R	**100.00**	0.00	0.00	0.00	0.00	0.00	2
I	0.00	**70.00**	5.00	5.00	0.00	20.00	20
A	0.00	12.00	**84.00**	0.00	4.00	0.00	25
S	0.00	9.76	14.63	**63.41**	2.44	9.76	41
E	50.00	0.00	0.00	50.00	**0.00**	0.00	2
C	0.00	2.86	2.86	5.71	0.00	**88.57**	35
Marg. %	2.40	17.60	23.20	24.00	1.60	31.20	
Marg. Freq.	3	22	29	30	2	39	125

(Continued)

Table 6 (Continued)

Column Percents

	Time 2							
Time 1	R	I	A	S	E	C	%	M. Freq.
R	**66.67**	0.00	0.00	0.00	0.00	0.00	1.60	2
I	0.0	**63.46**	3.45	3.33	0.00	10.26	16.00	20
A	0.00	13.64	**72.41**	0.00	50.00	0.00	20.00	25
S	0.00	18.18	20.69	**86.67**	50.00	10.26	32.80	41
E	33.33	0.00	0.00	3.33	**0.00**	0.00	1.60	2
C	0.0	4.55	3.45	6.67	0.00	**79.49**	28.00	35
Marg. Freq.	3	22	29	30	2	39		125

Note. Cohen Coefficient Kappa = 0.67. Hit rate = 75.2%. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 7

Circular Scale Score Distribution Comparing High-point Code of Current Occupation with High-point Code of Computerized IP profile

.

Circular Scale Score	Freq	Percent
0	61	16.5
1	118	31.9
2	102	27.6
3	89	24.1
Total *N*	370	

Table 8

Circular Scale Score Distribution Comparing High-point Code of Ideal Occupation with High-point Code of Computerized IP Profile

Circular Scale Score	Freq	Percent
0	41	10.0
1	114	27.7
2	103	25.0
3	154	37.4
Total *N*	412	

Table 9

Circular Scale Score Distribution Comparing High-point Code of Current Occupation with High-point Code of P&P IP profile

Circular Scale Score	Freq	Percent
0	67	18.1
1	103	27.8
2	111	30.0
3	89	24.1
Total *N*	370	

Table 10

Circular Scale Score Distribution Comparing High-point Code of Ideal Occupation with High-point Code of P&P IP profile

Circular Scale Score	Freq	Percent
0	50	11.5
1	99	24.0
2	100	24.3
3	163	39.6
Total *N*	412	

Table 11

Means and Standard Deviations of Circular Scale Scores

	Current occupation		Ideal occupation	
	M	*SD*	*M*	*SD*
Paper & Pencil IP	1.60	1.04	1.90	1.03
Computerized IP	1.59	1.03	1.90	1.02

Note. n = 435 for current and ideal occupation and n = 362 for SDQ.

Table 12

Cross-Classification of the RIASEC High-point Codes for the Computerized IP and Self-Description Questionnaire

	SDQ						
Comp. IP	R	I	A	S	E	C	Marg. Freq.
R	**18**	2	1	1	0	1	23
I	15	**28**	8	5	3	2	61
A	10	14	**29**	14	2	7	76
S	8	6	4	**75**	5	2	99
E	10	1	3	5	**8**	1	28
C	8	8	4	15	6	**34**	75
Marg. Freq.	69	59	49	114	24	47	362

(Continued)

Table 12 (Continued)

Row Percents

	SDQ						
Comp. IP	R	I	A	S	E	C	Marg. Freq.
R	**78.26**	8.70	4.35	4.35	0.00	4.35	23
I	24.59	**45.90**	13.12	8.20	4.92	3.28	61
A	13.16	18.42	**38.16**	18.42	2.63	9.21	76
S	8.08	6.06	4.04	**74.75**	5.05	2.02	99
E	35.71	3.57	10.71	17.86	**28.57**	3.57	28
C	10.67	10.67	5.33	20.00	8.00	**45.33**	75
Marg. %	19.06	16.30	13.54	31.49	6.63	12.98	
Marg. Freq.	69	59	49	114	24	47	362

(Continued)

Table 12 (Continued)

Column Percents

	SDQ							
Comp. IP	R	I	A	S	E	C	%	M. Freq.
R	**26.09**	3.39	2.04	0.88	0.00	2.13	6.35	23
I	21.74	**47.46**	16.33	4.39	12.5	4.26	16.85	61
A	14.49	23.73	**59.18**	12.28	8.33	14.89	20.99	76
S	11.59	10.17	8.16	**64.91**	20.83	4.26	27.35	99
E	14.49	1.70	6.12	4.39	**33.33**	2.13	7.74	28
C	11.59	13.56	8.16	13.16	25.00	**72.34**	20.72	75
Marg. Freq.	69	59	49	114	24	47		362

Note. Cohen Coefficient Kappa = 0.42. Hit rate = 53.0%. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 13

Means and Standard Deviations of Congruence Indices

Comparison	Iachan M Index		Brown & Gore C Index		Revised Brown & Gore C-rev Index	
	M	*SD*	*M*	*SD*	*M*	*SD*
P&P IP/SDQ	.440	.285	.664	.229	.620	.205
Comp. IP/SDQ	.444	.288	.657	.238	.610	.214
P&P IP/Comp. IP	.900	.158	.824	.222	.757	.170
Time 1/Time 2 Comp. IP	.879	.162	.794	.224	.746	.165

Note. SDQ = Self-Description Questionnaire. Comp = Computerized. Indices have been standardized to range from 0.0 to 1.0.

Table 14

RIASEC Scale Intercorrelations for the Computerized IP (upper triangle) and P&P IP (lower triangle)

	R	I	A	S	E	C
R	--	.30	.25	.09	.38	.15
I	.32	--	.36	.36	.22	.21
A	.27	.36	--	.32	.45	.18
S	.12	.38	.33	--	.35	.37
E	.38	.23	.46	.36	--	.46
C	.15	.22	.19	.34	.43	--

Note. n = 435. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional. Randomization test (Computerized IP): CI = .33, $p \leq .10$; Randomization test (Paper & Pencil IP): CI = .32, $p \leq .12$.

Table 15

RIASEC Scale Intercorrelations for the Time 1 (upper triangle) and Time 2 (lower triangle) Test-Retest Administrations of the P&P IP

	R	I	A	S	E	C
R	--	.39	.18	.12	.24	.13
I	.40	--	.35	.31	.18	-.11
A	.17	.42	--	.33	.30	.22
S	.16	.28	.28	--	.22	.06
E	.33	.19	.26	.28	--	.44
C	.19	-.09	.03	.09	.55	--

Note. n = 125. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional. Randomization test (Time 1): CI = .63, $p \leq .02$; Randomization test (Time 2): CI = .65, $p \leq .03$.

Table 16

Analysis of Variance for Computerized and P&P IP and RIASEC Codes

Source	*df*	*SS*	*MS*	*F*	*p*-value
Scale Version	1	2.58	2.58	0.33	.57*
Error	434	3374.76	7.78		
RIASEC	5	31819.81	6363.96	57.84	.000*
Error	2170	238776.19	110.04		
Scale * RIASEC	5	24.19	4.84	1.73	.12*
Error	2170	6062.47	2.79		

*Geisser-Greenhouse / Huynh-Feldt corrections or Wilk's lambda provide *p*-values of the same magnitude.

Table 17

Intercorrelations between the P&P and Computerized IP RIASEC Scales

Computerized IP	Paper & Pencil IP R	I	A	S	E	C
R	**.97**	.30	.26	.10	.36	.14
I	.31	**.96**	.36	.38	.21	.20
A	.25	.34	**.96**	.31	.40	.15
S	.10	.35	.33	**.96**	.34	.36
E	.38	.22	.47	.35	**.93**	.41
C	.14	.20	.20	.34	.44	**.95**

Note. *n* = 435. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 18

Cross-Classification of RIASEC High-point Codes for the P&P and Computerized IP

Paper & Pencil Interest Profiler	Computerized Interest Profiler						
	R	I	A	S	E	C	Marg. Freq.
R	**21**	3	2	2	2	1	31
I	0	**55**	9	4	0	1	69
A	1	3	**77**	6	2	2	91
S	3	3	1	**102**	6	5	120
E	0	0	5	5	**19**	2	31
C	0	7	3	4	6	**73**	93
Marg. Freq.	25	71	97	123	35	84	435

(Continued)

Table 18 (Continued)

Row Percents

Paper & Pencil Interest Profiler	Computerized Interest Profiler						
	R	I	A	S	E	C	Marg. Freq.
R	**67.74**	9.68	6.45	6.45	6.45	3.23	31
I	0.0	**79.71**	13.04	5.80	0.0	1.45	69
A	1.10	3.30	**84.62**	6.59	2.20	2.20	91
S	2.50	2.50	0.83	**85.00**	5.00	4.17	120
E	0.0	0.0	16.13	16.13	**61.29**	6.45	31
C	0.0	7.53	3.23	4.30	6.45	**78.49**	93
Marg. %	5.75	16.32	22.30	28.28	8.05	19.31	
Marg. Freq.	25	71	97	123	35	84	435

(Continued)

Table 18 (Continued)

Column Percents

Paper & Pencil Interest Profiler	Computerized Interest Profiler							
	R	I	A	S	E	C	%	M. Freq.
R	**84.00**	4.23	2.06	1.63	5.71	1.19	7.13	31
I	0.0	**77.46**	9.28	3.25	0.0	1.19	15.86	69
A	4.00	4.23	**79.38**	4.88	5.71	2.38	20.92	91
S	12.00	4.23	1.03	**82.93**	17.14	5.95	27.59	120
E	0.0	0.0	5.15	4.07	**54.29**	2.38	7.13	31
C	0.0	9.86	3.09	3.25	17.14	**86.90**	21.38	93
Marg. Freq.	25	71	97	123	35	84		435

Note. Cohen Coefficient Kappa = .75. R = realistic, I = investigative, A = artistic, S = social, E = enterprising, C = conventional.

Table 19

Length of Time in Minutes to Complete the Computerized IP

Mean	Median	Minimum	Maximum	*SD*
19.1	17.4	7.3	73.0	8.0

Note. n = 435.

Table 20

Evaluation of Computerized Interest Profiler

How much experience do you have using a computer?

	Freq.	%
None	23	5.3
A few times	92	21.1
Occasionally	188	40.7
Almost every day	143	32.9
Total *N*	435	

What equipment did you use to work through your computerized Interest Profiler?

	Freq.	%
Mostly used keyboard	77	17.7
Mostly used mouse	258	59.3
Used both about equally	100	23.0
Total *N*	435	

Overall, how clear were the Interest Profiler instructions?

	Freq.	%
Very clear	366	84.1
Clear	58	13.3
Somewhat unclear	10	2.3
Not clear at all	1	0.2
Total *N*	435	

(Continued)

Table 20 (Continued)

Evaluation of Computerized Interest Profiler

*What did the directions ask you **NOT** to think about when you were answering the work activity questions?*

	Freq.	%
Whether you had enough education or training	78	18.1
How much money you would make	14	3.2
All of the above	303	70.3
None of the above	36	8.4
Total *N*	431	

What did you think about computer presentation and graphics?

	Freq.	%
Very interesting	130	30.2
Interesting	178	41.3
Somewhat interesting	89	20.6
Boring	27	6.3
Very boring	7	1.6
Total *N*	431	

How difficult was it to read the information presented on the computer screens?

	Freq.	%
Very easy to read	305	70.1
Easy to read	102	23.4
Somewhat easy to read	16	3.7
Difficult to read	7	1.6
Total *N*	430	

(Continued)

Table 20 (Continued)

Evaluation of Computerized Interest Profiler

After the instruments are completed and available to the public, which version of the Interest Profiler would you rather take?

	Freq.	%
Paper & Pencil version	18	4.1
Computerized version	341	78.4
No preference, would take either version	76	17.5
Total *N*	435	

After the Interest Profiler is completed and available to the public, would you recommend it to a friend who needs help in exploring careers?

	Freq.	%
Yes	381	87.8
No	10	2.3
Not sure	43	9.9
Total *N*	434	

Table 21

Cross-Classification of Computer Experience with Equipment Used

Computer experience	Mostly Keyboard	Mostly Mouse	Both about equally	Total
Never	10	10	3	23
Few times	23	48	21	92
Occasionally	21	106	50	177
Almost every day	23	94	26	143
Total	77	258	100	435

Note. Pearson Chi-square = 22.35; $p < .001$

Table 22

Cross-Classification of Computer Experience with Clarity of Instructions

	Clarity of instructions				
Computer experience	Very Clear	Clear	Somewhat clear	Not clear	Total
Never	15	6	2	0	23
Few times	68	19	4	1	92
Occasionally	152	22	3	0	177
Almost every day	131	11	1	0	143
Total	366	58	10	1	435

Note. Pearson Chi-Square = 24.53; $p < .01$; Goodman-Kruskal Gamma = -0.42

Table 23

Cross-Classification of Computer Experience with Ease of Reading Computer Screen

	Ease of reading screen (very easy ⟺ very difficult)					
Computer experience	1	2	3	4	5	Total
Never	10	12	1	0	0	23
Few times	61	26	2	2	0	91
Occasionally	125	40	7	3	0	175
Almost every day	109	24	6	2	0	141
Total	305	102	16	7	0	430

Note. Pearson Chi-square = 16.27; $p < .06$; Goodman-Kruskal Gamma = – 0.20

Table 24

Cross-Classification of Computer Experience with Appeal of Graphics

	Presentation & graphics (very interesting ⟺ very boring)					
Computer experience	1	2	3	4	5	Total
Never	14	6	3	0	0	23
Few times	33	37	16	5	0	91
Occasionally	51	75	33	13	4	176
Almost every day	32	60	37	9	3	141
Total	130	178	89	27	7	431

Note. Pearson Chi-square = 20.34; $p < .06$; Goodman-Kruskal Gamma = -.21

Table 25

Cross-Classification of Computer Experience with IP Version Preference

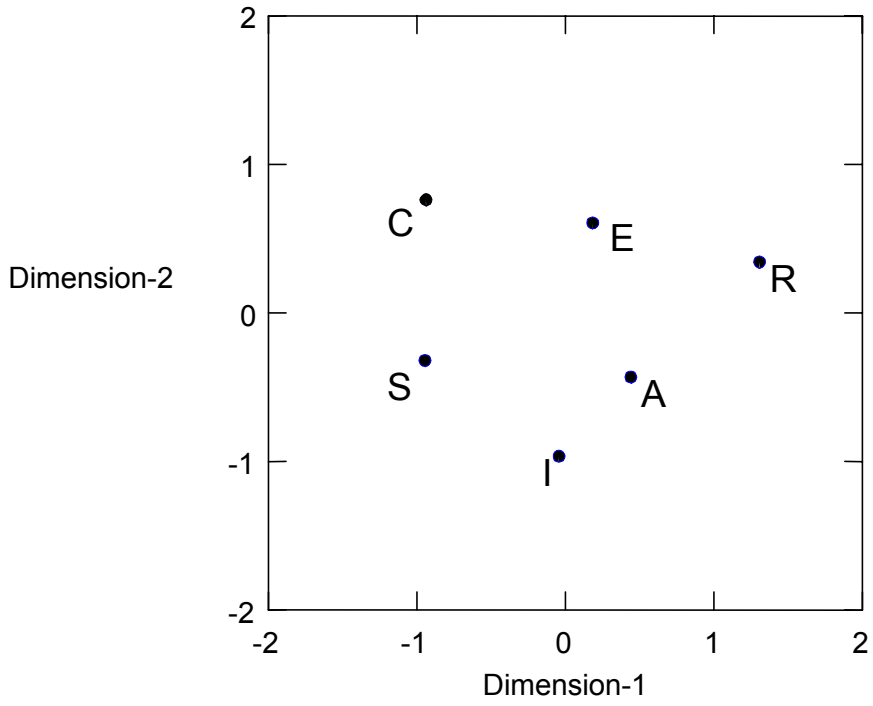
	Preferred Version			
Computer Experience	Paper & Pencil IP	Computerized IP	No Preference	Total
Never	2	15	6	23
Few times	8	57	27	92
Occasionally	6	149	22	177
Almost every day	2	120	21	143
Total	18	341	76	435

Note. Pearson Chi-square = 25.21, $p < .0001$.

Figures

Figure 1

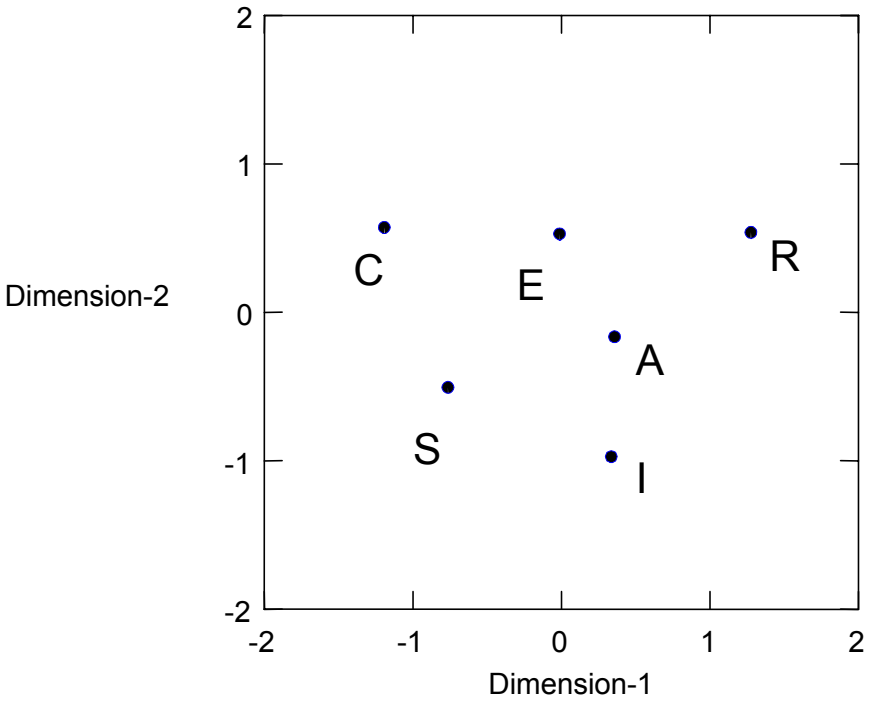
Computerized IP MDS Solution on the Comparability Sample



Note. Stress = .105, VAF = .879, *N* = 435.

Figure 2

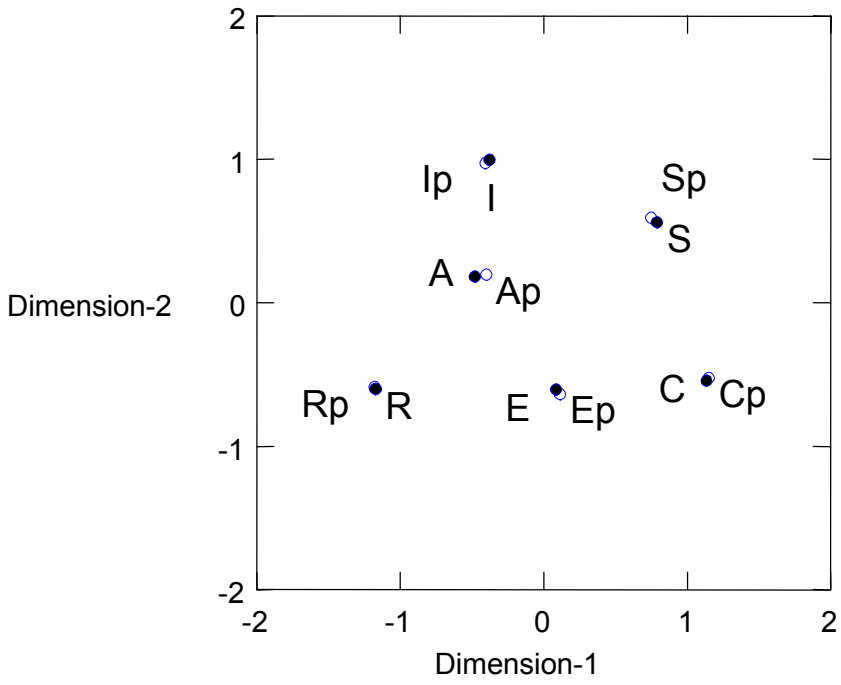
P&P IP MDS Solution on the Comparability Sample



Note. Stress = .114, VAF = .875, *N* = 435.

Figure 3

Computerized and P&P IP MDS Solution



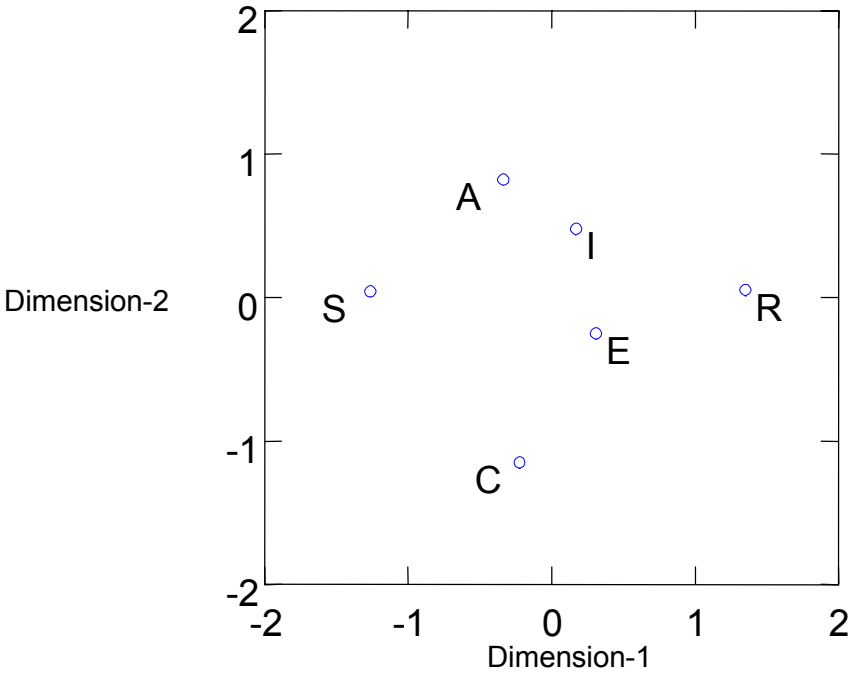
Notes. Stress = .114, VAF = .945, *N* = 435.

R,I,A,S,E, and C indicate scales of the Computerized IP.

Rp, Ip, Ap, Sp, Ep, and Cp indicate scales of the P&P IP.

Figure 4

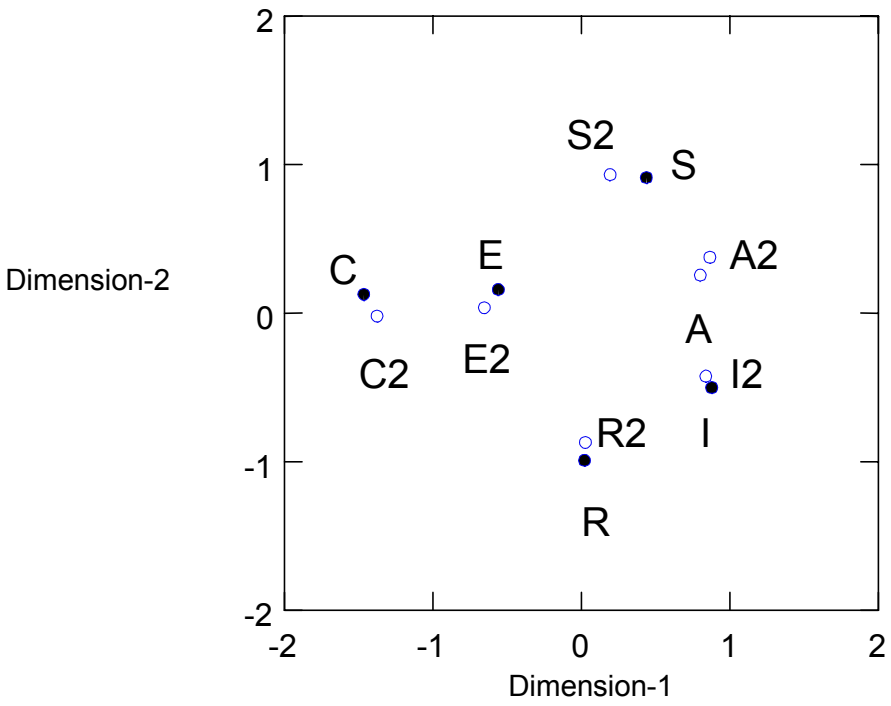
Computerized IP MDS Solution on the Comparability Sample using Euclidean Distances



Note. Stress = .095, VAF = .915, *N* = 435.

Figure 5

Computerized IP MDS Solution on the Test-Retest Sample



Notes. Stress = .093, VAF = .948, *N* = 125

R, I, A, S, E, and C indicate scales for Time 1.

R1, I2, A2, S2, E2, and C2 indicate scales for Time 2.

Figure 6

Estimated Marginal Means of IP Scales