Linking Client Assessment Profiles to O*NET® Occupational Profiles Within the O*NET Interest Profiler Short Form

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Acknowledgments

The information contained in this report is based on sections of the report *Linking Client Assessment Profiles to O*NET™ Occupational Profiles (1999)*, authored by Rodney McCloy and John Campbell of the Human Resources Research Organization (HumRRO), and Phil Lewis and David Rivkin of the National Center for O*NET Development. In order to link individuals' scores to O*NET-SOC occupations within the web-based O*NET Interest Profiler Short Form, the previous linkage methodology has been revised to work effectively with this new tool.

Introduction

The **O*NET® Career Exploration Tools** are a set of assessment tools used for career counseling, exploration, and planning purposes. These tools are designed to help clients learn work-related information about themselves that can be used to focus their career search activities. The **O*NET Career Exploration Tools** assist clients in planning and identifying occupations for which they (a) have (or can learn) the required abilities, (b) have the basic interests that characterize people in those occupations, and/or (c) have a strong need for the work values that the occupations will provide. That is, workers, students, and individuals new to the labor market can use **O*NET Career Exploration Tools** to identify occupations that are linked to their attributes.

To achieve this focused career exploration, clients use the **O*NET Career Exploration Tools** to accurately and reliably identify their abilities, interests, and/or work values. Once clients identify their work-related attributes, they are directed to O*NET-SOC occupations that are linked to the individualized assessment information they provided. The purpose of this report is to describe how client interest assessment profiles are linked to O*NET-SOC occupational profiles by means of the **O*NET Interest Profiler Short Form**, one of the **O*NET Career Exploration Tools**. This Short Form was developed to enable clients to quickly and accurately identify their work-related interests and use them to identify careers for exploration. The Short Form will greatly benefit career counseling settings where there is limited time for interest assessment and discussion and in computer centers where individuals may have a restricted amount of time for computer work.

O*NET Career Exploration Tools

The O*NET program has developed six career exploration tools designed to help clients assess important pieces of personal and career information:

(1) **O*NET Ability Profiler**—measures nine abilities related to job performance. The assessment is group-administered via paper-and-pencil and may be scored electronically or by hand.

(2) **O*NET Interest Profiler**—measures six vocational interests (i.e., Realistic, Investigative, Artistic, Social, Enterprising, and Conventional: R-I-A-S-E-C; cf. Holland, 1985, 1997). The assessment is self-administered via paper-and-pencil and is self-scored.

(3) **O*NET Computerized Interest Profiler**—measures six vocational interests (i.e., R-I-A-S-E-C interests). The assessment is self-administered via computer and uses automated scoring.

(4) **O*NET Interest Profiler Short Form**—measures six vocational interests (i.e., R-I-A-S-E-C interests). The assessment is self-administered via the web and uses automated scoring.

(5) **O*NET Work Importance Locator**—measures six important work values (Achievement, Independence, Recognition, Relationships, Support, and Working Conditions) identified in the Theory of Work Adjustment (cf. Dawis & Lofquist, 1984; Dawis, Lofquist, & Weiss, 1968; Lofquist & Dawis, 1969; Weiss, Dawis, England, & Lofquist, 1964).[1] The assessment is self-administered via paper-and-pencil and is self-scored.

(6) **O*NET Work Importance Profiler**—measures 21 important work needs related to six work values (see above). The assessment is self-administered via computer and uses automated scoring.

Each of the assessment tools described above yields several scores for the client. These scores define the client's score profile. Clients can identify occupations to explore using the score profile generated for them from a single **O*NET Career Exploration Tool** or they can combine score profiles generated from multiple **O*NET Career Exploration Tools** (McCloy, Campbell, Oswald, Lewis, & Rivkin, 1999). This paper solely focuses on linking client assessment profiles to O*NET-SOC occupational profiles using the **O*NET Interest Profiler Short Form** (Rounds, Su, Lewis, & Rivkin, 2010). The linkage methodology described in this report was specifically developed for the **O*NET Interest Profiler Short Form**. It is a modification of the previous linkage methodology used with the other forms of the O*NET Interest Profiler.

O*NET-SOC Occupations

The O*NET-SOC is based on the Standard Occupational Classification [(SOC); Office of Management and Budget, 2000] system. In some cases, the O*NET-SOC describes occupations at a more detailed level than does the SOC to reflect needed occupational specificity. The O*NET-SOC 2009 taxonomy includes 1,102 occupational titles, 965 of which represent O*NET data-level occupations. (National Center for O*NET Development, 2009). Data-level occupations are those occupations for which the O*NET program collects data. Data and occupational information are collected on a wide variety of variables and scales, such as occupational characteristics and worker requirements drawn from the O*NET Content Model (http://www.onetcenter.org/content.html). Data are gathered from job incumbents and occupation experts for domains such as knowledges, work activities, work context, tasks, and educational requirements. Additionally, trained occupational analysts, following standardized procedures, independently conduct an analysis of occupational information provided by job incumbents to develop occupational ability and skills information.

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[1]In the Theory of Work Adjustment, the six work values were labeled Achievement, Autonomy, Status, Altruism, Safety, and Comfort, respectively.

For career exploration purposes, O*NET-SOC occupations are categorized into five Job Zones on the basis of the amount of education, training, and/or experience each occupation requires. Job Zones are ordered according to increasing levels of education, training, and/or experience, such that Job Zone 1 contains occupations requiring the least preparation, and Job Zone 5 contains those occupations requiring the most preparation (National Center for O*NET Development, 2008; Oswald, Campbell, McCloy, Rivkin, & Lewis, 1999).

Each O*NET-SOC occupation has an occupational score profile that enables direct linkage of the occupation with score profiles generated from the **O*NET Career Exploration Tools**. For the web-based Interest Profiler, each occupation has a specific interest score profile that corresponds to interest information measured by the assessment. For a description of the development of this occupational information, see *Linking Client Assessment Profiles to O*NET Occupational Profiles* (McCloy et al., 1999), *Generation and Use of Occupational Ability Profiles for Exploring O*NET Occupational Units, Vols. I-II* (McCloy, Campbell, Oswald, Rivkin, & Lewis, 1999), *Development of Occupational Interest Profiles for O*NET Occupations* (Rounds, Smith, Hubert, Lewis, & Rivkin, 1999), *Procedures for O*NET Job Zone Assignment* (National Center for O*NET Development, 2008), and *Determining the Occupational Reinforcer Patterns for O*NET Occupational Units, Vols. I-II* (McCloy, Waugh, Medsker, Wall, Rivkin, & Lewis, 1999a).

Linking Assessment Results to Occupations

The primary goal of the **O*NET Career Exploration Tools** is to identify the set of O*NET-SOC occupations that best correspond to a client's abilities, interests, and/or work values. To meet this goal, a linking procedure compares a client's assessment results from one or more of the O*NET tools (e.g., **O*NET Ability Profiler**, **O*NET Computerized Interest Profiler**) to O*NET occupational information related to the tool(s) the client elects to use. The O*NET-SOC occupations with score profiles that most closely correspond to the client's score profile qualify as suggested candidates for the client's career exploration. **O*NET Career Exploration Tools** also can be used in conjunction with other available assessment instruments, if needed, to meet program objectives or individual assessment needs. The following sections discuss how client/O*NET-SOC occupational profile correspondence was characterized for the purposes of identifying an algorithm for determining profile similarity using the **O*NET Interest Profiler Short Form**.

O*NET Interest Profiler Short Form

The **O*NET Interest Profiler** is available in three versions: a paper-and-pencil version, a computerized version, and the **O*NET Interest Profiler Short Form** that is taken via the web. All three versions of the Interest Profiler are designed for worker and student career exploration, counseling, and planning, and measure six types of Holland (1997) occupational interests: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C), collectively called RIASEC. The first two versions of the Interest Profiler instruments (i.e., paper-and-pencil and computerized formats) are longer forms than the web-based Short Form instrument and are comprised of 30 items per RIASEC scale, totaling 180 items. The **O*NET Interest Profiler Short Form** was developed to aid in career exploration settings where it is beneficial for interest measures to be completed in short amounts of time (e.g., group counseling sessions, where participants can complete their interest assessments and have time for discussion; computer centers where individuals may have short time frames to work on the computer). Additionally, this web-based version may offer more access to individuals seeking an interest assessment, while also allowing for easier updates and maintenance to be made to the instrument. The Short Form consists of 10 items per RIASEC scale, totaling 60 items (see Rounds et al., 2010).

The **O*NET Interest Profiler Short Form** is self-administered via the web and scored by computer. This allows for an almost unlimited array of mathematical calculations to be performed virtually instantaneously. Participants completing the Short Form indicate their interests on a five-point response scale. The scale is assigned the following weights: 0 = "strongly dislike," 1 = "dislike," 2 = "unsure," 3 = "like," and 4 = "strongly like." Scale responses are summed for each of the six types of Holland occupational interests, with scores ranging from 0 to 40 points.

Research has demonstrated that the Short Form generates reliable and valid profiles of interest information about the client (Rounds et al., 2010). With the **O*NET Interest Profiler**, it is important that the comparison of the client's score profile and the score profiles of each O*NET-SOC occupation be based on the *shape* or *pattern* of the scores, rather than the absolute *level* or *amount* of each score. There is no concern about directing a client to explore occupations that are "under" or "over" the level of interest. Instead, the goal is to direct a client to occupations that tend to have the same high interests, as well as the same low interests (i.e., the same pattern).

When a client generates a score profile from the **O*NET Interest Profiler Short Form**, the correlation coefficient serves as the index of correspondence. The correlation between a client's profile (*X*) and an occupational profile (*Y*) is given mathematically as follows:

$$r_{XY} = \frac{\Sigma(X - \overline{X})(Y - \overline{Y})}{N\sigma_X\sigma_Y}$$

where $\overline{X}$ and $\overline{Y}$ and σ_X and σ_Y are the means and standard deviations of X and Y, respectively, and N is the number of scores to be correlated (i.e., the number of scores constituting the client's profile).[2] The correlation indexes the similarity of the shape (but not the level) between the client and occupation profiles and is the correspondence index most vocational counselors prefer. The correlation can range from -1.0 to +1.0. A correlation of +1.0 indicates that the rank orders of client and O*NET-SOC occupational profile scores are identical, whereas a correlation of -1.0 indicates that the rank order of client scores is opposite the rank order of O*NET-SOC occupational profile scores. A value of 0.0 indicates no correspondence between the client score profile and the O*NET-SOC occupational score profile.

An Example

To demonstrate how the correlation coefficient is used, Figure 1 contains two O*NET-SOC occupation-specific interest profiles and one client interest profile. The client profile correlates perfectly with the profiles of O*NET-SOC occupation 1 and O*NET-SOC occupation 4 (r = 1.0). Therefore, O*NET-SOC occupations 1 and 4 would be targeted as promising areas for career exploration. Figure 2 contains the same client profile, but two different O*NET-SOC occupation profiles. While the level of these O*NET-SOC occupational patterns are similar to the client profile, there is less correspondence between the pattern of client profile and the profiles for O*NET-SOC occupation 2 and O*NET-SOC occupation 3 (r = -1.0 and -.27, respectively). Therefore, these occupations would not be targeted for career exploration.

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[2]Note that σ represents variability of the *sample* at hand and uses a divisor of *N*.

Figure 1. Sample Client and Occupational Profiles for the O*NET Interest Profiler Short Form: High Correlations
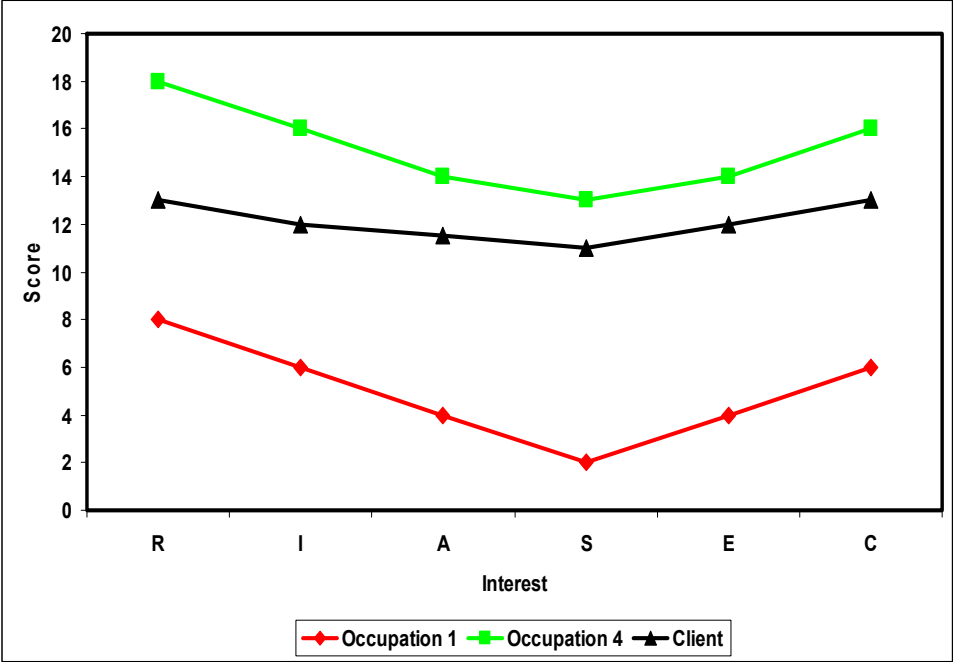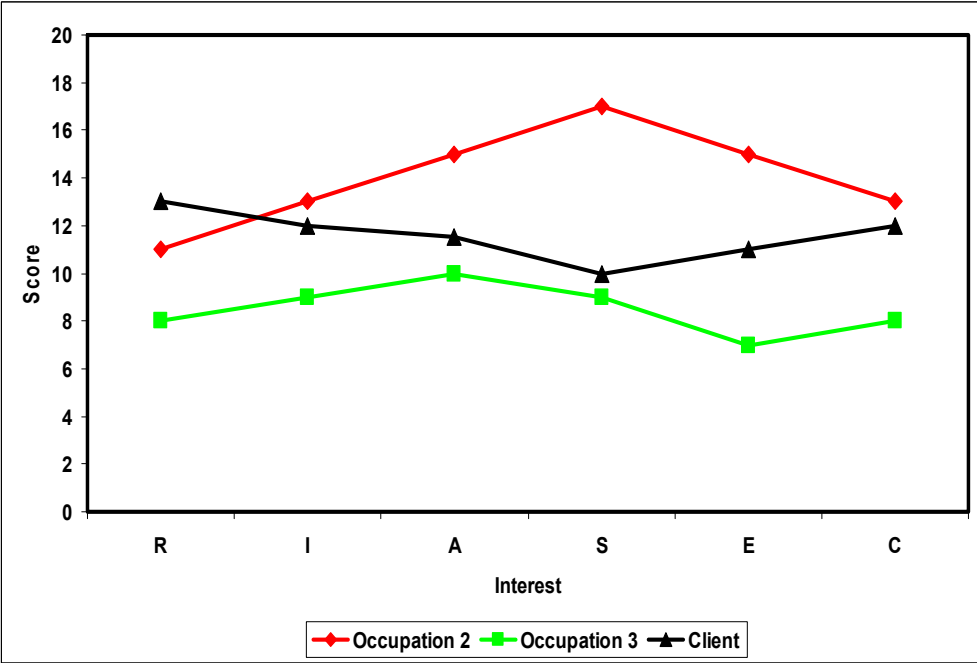

Figure 2. Sample Client and Occupational Profiles for the O*NET Interest Profiler Short Form: Low Correlations

Occupations Listed on the O*NET Interest Profiler Short Form Score Reports

By comparing the client's interest profile to those of O*NET-SOC occupations, the program selects those occupations considered most promising for career exploration. For the **O*NET Interest Profiler Short Form**, the client score profile will contain scores for each of the six interest areas: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. After calculating the correlation coefficient between the client score profile and each O*NET-SOC occupation score profile, the scoring program applies a series of decision rules to the results. O*NET-SOC occupations that satisfy the decision rules appear on the client's score report. These decision rules are described below.

1. Occupations are presented in descending order of the correlation, within Job Zone.

2. The correlation between a client's and an O*NET-SOC occupational profile must be positive for an occupation to appear on the Interest Profiler score report.

3. O*NET-SOC occupations for which the client/O*NET-SOC occupation profile correlation is notably high are identified as "very strong" matches.

4. The "very strong" match cutoff denotes the value for which the statistical significance of the correlation is $p < .05$ as derived from a one-tailed significance test. The "strong" match cutoff represents the value for which the statistical significance of the correlation is $p < .10$, as derived from a one-tailed significance test. See Table 1 below for a description of the "very strong" and "strong" match correlation criteria.

Table 1
*Correlation Values for an O*NET-SOC Occupation to Appear on the Profiler Score Report and to be Labeled "Strong" or "Very Strong" Matches*

Career Exploration Tool	Strong Match Correlation	Very Strong Match Correlation
O*NET Interest Profiler Short Form	.608	.729

5. There are no limits on the number of O*NET-SOC occupations that may be suggested within a Job Zone.

6. The goal of the scoring program is to list a total of 10 "very strong" or "strong" occupations displayed per Job Zone. If there are not 10 "very strong" or "strong" matches to the client's interest profile available, the scoring program displays the occupations with the next highest available positive correlations.

7. No occupations with negative correlations are reported.

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8. There may be some instances where fewer than 10 occupations are displayed per Job Zone, as only a small number of occupations may be linked to the client's interests. If fewer than 7 occupations are presented per Job Zone, the following language is displayed on the score report:

   "Within this Job Zone, a small number of occupations are linked to your interest profile. Click on a different Job Zone above to see more occupations linked to your interest profile."

9. Additionally, there may be occasions where no occupations are linked to a client's interest profile within a Job Zone. If this occurs, the following language is displayed on the score report:

   "Within this Job Zone, there are no occupations that are linked to your interest profile. Click on a different Job Zone above to see occupations linked to your interest profile.

The decision rules used in the scoring algorithm help ensure that users of the web-based **O*NET Interest Profiler Short Form** receive appropriate, meaningful occupations based on their interest results.

Summary

To facilitate client career exploration, a diverse set of **O*NET Career Exploration Tools** have been developed that clients can use to assess their abilities, interests, and work values. Except for the **O*NET Ability Profiler**, the assessment tools are offered in both computerized and paper-and-pencil formats. Clients can score the paper-and-pencil versions, while the computerized assessments have automated scoring. Given a set of scores on one or more of the Profilers, clients are directed to O*NET-SOC occupations that are deemed most promising for career exploration. The occupations are based on the 965 data-level O*NET-SOC occupational titles.

The O*NET-SOC occupations targeted for further exploration are those with a score profile calculated to be most correspondent with the client score profile. This report described the statistical index used to determine profile correspondence within the **O*NET Interest Profiler Short Form**: the correlation coefficient. The correlation provides a numerical index of the similarity of the shapes (but not the levels) of the client and occupation profiles and is the approach most vocational counselors prefer for describing profile correspondence.

The **O*NET Interest Profiler Short Form** helps clients identify their work-related interests and links their interest profile to occupations for career exploration purposes, especially focusing client career exploration on those occupations that are "very strong" and "strong" matches to their interests. By linking clients' interests with occupations that are "very

strong" and "strong matches" to their interests, the Interest Profiler can help workers consider career options, think about career education and training, and transition into new occupations more smoothly. Additionally, the Interest Profiler can help students and individuals new to the labor market explore career areas that relate to their interests. The Short Form of the Interest Profiler is beneficial in counseling and consultation settings, where brief instruments allow time for participants to complete the interest assessment while also allowing time for discussion. The Short Form may also be beneficial in computer centers, where individuals may have limited amounts of time to work on the computers. Finally, the web-based nature of the **O*NET Interest Profiler Short Form** allows greater access to individuals seeking an interest assessment, while also allowing for easier updates and maintenance to be made to the instrument.

The development of the Short Form and the modified and enhanced client/O*NET-SOC occupation linkage procedures just described provide another component to a flexible, dynamic career exploration system that corresponds to today's rapidly changing world of work.

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