EXPLORING THE RELATIONSHIP BETWEEN CAREER INTERESTS

AND WORK VALUES AS MEASURED BY THE *CHOICES*

CAREER INFORMATION DELIVERY SYSTEM

by

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ABSTRACT

Person by environment fit is the most common approach used to support
career decision making. In short, individuals learn how their personal
characteristics can be "matched" to the occupations that correspond to those
characteristics. Various career assessments have been designed to facilitate
this matching process, including the *O*NET Interest Profiler* (designed to assess
an individual's career interests) and the *O*NET Work Importance Locator*
(designed to assess an individual's work values), both published by the U. S.
Department of Labor. The assumed relationships between career interests and
work values have not been thoroughly researched, especially as measured by
these O*NET instruments. The present study sought to examine the
relationships. In particular, it was hypothesized that each career interest would
significantly correlate with one or possibly two theoretically related work values:
Realistic with Working Condition; Investigative with Achievement; Artistic with
Independence; Social Interest with Relationships; Enterprising with Status; and
Conventional with Support and/or Recognition.

O*NET-based career assessments from a sample of over 52,000
individuals (assumed to be primarily high school students, given the nature of
those usually assessed with such systems) were examined. O*NET career
interest scales were correlated with O*NET work value scales to determine the
relationships between these two related sets of constructs. While a number of

correlations were significant at $p < .01$, no correlation was larger in magnitude than 0.05. Effect sizes (r^2) were calculated, and no effect size exceeded 0.2% of variance explained. The overall conclusion reached was that career interests and work values, as assessed by the O*NET instruments, were substantially unrelated.

Three broad potential explanations for the lack of correlation were suggested: (1) limitations of the assessment instruments; (2) applicability of interest and value constructs to high school students; and (3) career interests and work values are totally nonoverlapping constructs. Evidence consistent with the first explanation was presented. The second and third explanation should be explored in further studies.

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INTRODUCTION

People can't choose what they don't know. Perceptions of the world we live in and the choices we have to make are constrained by the information we have available and our own ability to process that information. In any decision making process, knowing all the potential options is fundamental to a sound decision. In the case of career decision making, knowing the options means having quality information about the world of work, and–equally important– having information about the personal characteristics you bring to the world of work that will make some options good matches for you.

The historical roots of vocational guidance run deep, according to Dumont and Carson (1995). They note that as early as 10,000 B.C.E., there were Egyptian empires organizing along the banks of the Nile River. Precursors of vocational psychology from that era include the division of labor and the use of sociopolitical mechanisms to channel people into fields such as architecture, engineering, seamanship, design and various arts and crafts. Dumont and Carson credit the Greek philosopher Plato with articulating a number of principles underpinning developmental psychology, including the notion that the development of a vocation begins in childhood (p. 373). Peterson and González (2005, p. 121) note the contributions to vocational guidance of a 10th-century Iraqi text. Translated as the *Treatises of the Brothers of Purity,* the text (believed

to have been written by Muslim reformers around 955 C.E.) suggested that an appropriate match between people and their jobs should be based on the behavior and mental abilities required to perform job tasks.

Contemporary literature typically credits Frank Parsons (1909) as the "father of vocational guidance." Parsons believed that the importance of choosing a vocation could not be overemphasized, and he worked diligently to define a scientific method to support the process. In fact, the basic tenets of "Person by Environment (P-E) Fit" used today were put forth by Parsons almost 100 years ago:

> *In the wise choice of a vocation there are three broad factors: (1) a clear understanding of yourself, your aptitudes, abilities, interests, ambitions, resources, limitations, and their causes; (2) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; (3) true reasoning on the relations of these two groups of facts.* (p. 5)

It could be argued that every theory of career guidance since 1909 has grown out of an effort to further develop or define some aspect of Parsons' approach to career decision making. For example, developmental theories (e.g., Ginzberg, 1984) propose facilitating career decision-making through stage appropriate interventions that include reassessing "repeatedly how they can improve the fit between their changing career goals and the realities of the world of work" (p. 180). Donald Super (1974) built on the developmental framework in defining various traits of vocational maturity that included self awareness and occupational knowledge. Roe (1956) proposed that combinations of early parent-child relationships, experiences and genetics all contribute to an individual's

development of a need structure that is supported by either "person-oriented" or "nonperson oriented" work environments. John Holland (1997) described six occupational environments and six matching career personalities. Mitchell and Krumboltz (1990) suggest that career development involves four factors: (1) innate talents and abilities, (2) environmental conditions, (3) learning, and (4) individual skill sets. The cognitive information processing perspective of career development (Peterson, Sampson, and Reardon, 1991) emphasizes the role of self knowledge and knowledge of the world of work in "career problem solving." In an extensive review of the literature, Tinsley (2000, p. 273) concluded that "The accumulated evidence from over 100 investigations indicates that the P-E fit model provides a valid and useful way of thinking about the interaction between the individual and the environment." Dawis (2000) suggested that more sophisticated P-E models might be developed by focusing on the *interaction* between the person (P) and the environment (E). In other words, attention should be paid to how each person impacts his environment, as well as how that environment changes in response to the people in it. However, no matter the specific focus or relative weighting of traits and factors, the underlying premise first articulated by Parsons continues to resonate. Self knowledge and quality information about occupations, used in a logical decision-making process that enables one to match personal characteristics with supportive work environments, will result in the best career decisions.

Recent Developments

       The most recent effort of the U. S. Department of Labor to support career development and decision-making is the Occupational Information Network, most commonly known as O*NET. O*NET grew out of the recommendations detailed by the Advisory Panel for the Dictionary of Occupation Titles (APDOT) in their final report, *The New DOT: A Database of Occupational Titles for the Twenty-first Century* (1993)*.* The APDOT was mandated to: (1) Recommend the type and scope of coverage as well as the level of detail to be collected on occupations; (2) Advise on methodologies of occupational analysis to identify, classify, define and describe jobs in the *Dictionary of Occupational Titles* (DOT); (3) Advise on new or alternative approaches to production, publication and dissemination of the DOT; and (4) Recommend options for implementation of improvements to the DOT. The *Dictionary of Occupational Titles* was considered the primary source of occupational information about occupations from its first publication in the 1930s through the end of the 1990s. The DOT was a large reference book containing about 12,000 occupational titles. The corresponding narrative definitions were short and static, and were accompanied by a code that reflected a few common descriptors (e.g., the code included a rating for the extent to which a worker in the occupation would encounter "data, people and things"). The APDOT spent two years assessing the occupational information needs of various potential consumers including educators and students, as well as employers and workers across existing and emerging businesses and industries in the U. S. The report proposed a number of critical changes for the new DOT

(later known as O*NET): the adoption of a **common language** to facilitate discussion among users from all disciplines; to be **published electronically** in a way that would allow **searching and sorting**, and would **facilitate continuous improvement**; and make possible the **collection and dissemination** of information about the **skills needed** for success in, and especially across, occupations. Whereas the DOT reflected the industrial age economy, O*NET needed to reflect the information age economy, an important component of which was recognized as lifelong career development and decision-making by individuals.

Under a contract awarded by the Utah Department of Employment Security, on behalf of the U. S. Department of Labor, a report–*Development of Prototype Occupational Information Network Content Model, Volume I* (Peterson, et al., 1995) was published. The Content Model laid the foundation for creating an automated replacement for the DOT. The authors grouped the APDOT recommendations into three broad topics; (1) O*NET **content** requirements, (2) the **structure** of O*NET, and (3) **data collection** for O*NET. The O*NET content requirements are of special interest here as they relate closely to the topic of the proposed study.

O*NET Content Requirements

Figure 1 (National Center for O*NET Development) shows the latest iteration of the O*NET Content Model showing the various domains of information as conceived by the authors. Notably, O*NET developers favored
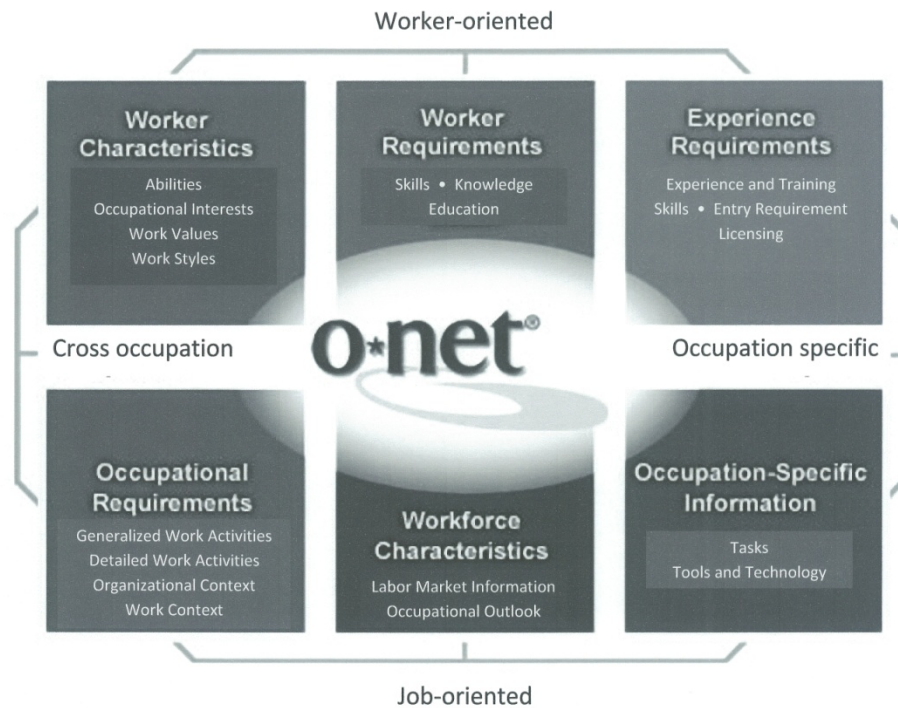
Figure 1. O*NET Content Model

common descriptors over the traditional narratives used in the DOT. This

approach facilitated the combining of related occupational titles from the DOT

into broader "occupational units." This resulted in fewer O*NET occupations

(currently about 1,000 as compared to the DOT's 12,000), but with much more

detailed descriptions. The chart also makes clear that the six domains were

conceived as interrelated and that the characteristics were envisioned along a

continuum described as Job-oriented vs. Worker-oriented. In addition,

characteristics were said to reflect cross occupational information vs.

occupationally specific information. Peterson, et al. (2001) emphasized that

O*NET utilizes a taxonomic approach, and that "Taxonomies are not simply lists,

but can instead be considered a fairly exhaustive delineation of the elements of a given domain, based on research or some other systematic process, with each element conceptually independent of the others" (p. 6). The characteristics within a domain and their interrelationships offered great potential for supporting effective person-job matching. This was a key consideration from the very beginning.

Job-oriented Characteristics

The three domains on the job-oriented side of the spectrum include:

1. Occupational requirements (e.g., work activities, organizational context)–includes information about typical activities required across occupations;

2. Workforce characteristics (e.g., labor market information)–envisioned as a way to link descriptive occupational information to statistical labor market information; and

3. Occupation-specific information (e.g., tasks)–a comprehensive set of variables that apply to a single occupation or narrowly defined job family.

There are many descriptors organized into taxonomies for each of these domains. Developers of the O*NET content model were eager to create a resource that would offer users a much more comprehensive view of job oriented characteristics than had ever been available before. (Some of the information needed for the Job-oriented domains falls outside the immediate scope of the O*NET program's data collection. For example, in order to offer the content

promised by the "Workforce Information" domain, O*NET collaborates with the Bureau of Labor Statistics. The importance of a "common language" to facilitate collaboration is evident.)

Worker-oriented Characteristics

The three domains seen as "Worker-oriented" include:

1. Worker Characteristics (e.g., Occupational Interests, Work Values)– these are the enduring qualities of individuals assumed to have an influence on how they acquire work-relevant knowledge and skills;

2. Worker Requirements (e.g., Skills)–individual attributes related to work performance; and,

3. Experience Requirements (e.g., Licensure)–information about typical experiential backgrounds of workers.

Just as for the Job-oriented domains, characteristics organized within each of the Worker-oriented domains are many, and are organized into taxonomies. Of particular consequence to this study is the Worker Characteristics domain, and the taxonomies developed around Occupational Interests and Work Values. These will be addressed later in greater detail. For now, suffice it to say that these areas, and other areas under the Worker-oriented domains, offer huge amounts of information not available before O*NET.

As per the title of the APDOT Report, O*NET has unquestionably become "*The New DOT: A Database of Occupational Titles for theTwenty-first Century.*" In short, O*NET makes **more occupational information** available, makes that information **vastly more accessible** by a greater diversity of audiences, provides

the **common language** that facilitates cross-discipline discussion about jobs and the world-of-work in general (including person-job matching efforts), and has engendered the collection of higher **quality data on a more frequent basis** – all goals initially defined by the Advisory Panel (1993).

O*NET offers the most comprehensive source of information about occupations in the U. S. economy with over 350 descriptors for every occupation. There are various on-line tools to help users navigate O*NET, but the lay consumer can be easily overwhelmed by both the breadth and depth of the information. To ease the information overload, and to ensure that students and adults in career transition have access to the information most pertinent to career decision making, many states sponsor a "Career Information Delivery System (CIDS)."

Career Information Delivery Systems (CIDS)

In a publication developed by America's Career Resource Network Association, a CIDS is described as the "career information equivalent of a voter information guide" (ACRNA, 2005). That is, a CIDS provides "educational, occupational, industry, financial aid, job search and related information for career development" (Association of Computer-based Systems for Career Information, 2006). As technology has advanced, comprehensive CIDS have enhanced access for students and adults via Internet-based programs. Examples of state-sponsored CIDS include *Oregon CIS*, New York's *Job Zone, Achieve Texas,* and *Florida Choices.* Many state-sponsored CIDS are customized versions of a nationally vended product, such as *IntoCareers* (developed and maintained by an

outreach unit of the University of Oregon) or *Choices* (a system developed by the Bridges Transitions Company, a subsidiary of the Xap Corporation).

Of particular interest to the proposed study is the *Choices* program. *Choices* is a web-based career guidance system that meets the comprehensive system standards of quality in the development, delivery, and utilization of computer-based career information established by the Association of Computer-based Systems for Career Information (2009). The occupational information from O*NET most pertinent to career decision making is embedded in the *Choices* system. Career interest and work values descriptors are included as part of each occupational profile. In addition, *Choices* offers on-line administration and scoring of the O*NET assessment instruments designed to measure career interests (the *Interest Profiler)* and work values (*Work Importance Locator).*

Career Interests

As previously mentioned, the importance of understanding one's interests has long been perceived as a key component of career decision making. Parsons (1909) suggested a line of questioning that would "throw light on the aptitudes and interests of the applicant" (p. 18). The two generally accepted determinants of interests are: (1) nurture, emphasizing the role of socialization and learning; and (2) nature, emphasizing the heritability of interests (Brown & Lent, 2005, p. 281).

Assessment has operationalized the definition of interests as a preference for activities expressed as likes or dislikes. The first formal assessment of interests was published as the "Strong Vocational Interest Blank" in 1927 and

enabled counselors to link individuals' results with occupations. Attempts to design useful measures of interests heightened after World War II when the armed services established educational and vocational planning programs for veterans. Today, vocational interests are the most frequently assessed construct used in career counseling (Brown & Lent, 2005). It was obvious to O*NET developers that a complete description of an occupation needed to include this construct.

Authors of the O*NET content model defined interests as a sub-domain under Worker Characteristics. They noted that job performance and job satisfaction are hypothesized to be (at least partially) a function of the match between a person's interests and the job. In reviewing potential methods of representing interests in O*NET, they concluded that, "(a) Holland's types are prominent in the theoretical and applied vocational and career counseling literature and (b) there is favorable evidence concerning the validity of the Holland taxonomy" (Peterson, et al., 1995, p. 11-7). They recognized that the O*NET occupational descriptions would be enhanced by the inclusion of Holland types. There was some concern expressed about the adaptability of the traditional method for assigning Holland types to every O*NET occupation, given the requirement of assessing large numbers of incumbent workers. The authors anticipated that a less resource-intensive approach would have to be adopted.

Holland Types

Holland's theory uses a classification system applied to both individuals and work environments (Gottfredson & Holland, 1996; Holland, 1997). First

presented in 1959, John Holland's theory has been described as a "major force in applied psychology" by Spokane (1996, p. 35). In their textbook, Osipow and Fitzgerald (1996) argue that, by the 1990s, Holland's theory was "clearly the dominant force in career research" (p. 90). Most other contemporary career counseling textbooks also include a chapter devoted to Holland (e.g., Brown & Lent, 2005; McDaniels & Gysbers, 1992; Peterson & Gonzales, 2005; Peterson, Sampson & Reardon, 1994; Zunker, 1994). Tracey and Rounds (1993) conducted a structural meta-analysis to evaluate Holland's vocational interest model (as compared to Gati's) and asserted that "support for the superiority of Holland's model was provided" by testing predictions on the raw data itself (i.e., correlation matrices) and by using a variety of other types of analyses. Rounds and Tracey (1996) asserted that Holland has had "a vast influence on how psychologists conceptualize and assess vocational interests."

In a recent article, Deng, Armstrong and Rounds (2007) wanted to evaluate how well the Holland's career types represent the structure of the current U. S. labor market. They looked at a set of occupational titles (representing 85% of the workforce) and concluded that, "for individuals whose interests fall within the occupational space represented by the types, current measures may be sufficient."

In a review of "recent notable evidence" Holland himself maintained that his key hypotheses are well supported by research and that the classification system organizes and structures typological and environmental data in a meaningful way (1997, pp. 168-169).

Holland's model presents six **personality types**:

1. Realistic–typified by individuals who prefer to work with machines, tools and things and who value material rewards for their accomplishments.

2. Investigative–typified by individuals who are interested in understanding natural and social phenomena and who value the acquisition of knowledge.

3. Artistic–individuals who enjoy literary, musical or other artistic endeavors and who value the creative expression of ideas and emotions.

4. Social–characterized by individuals who seek to help people by teaching, counseling or otherwise serving through personal interaction and who value fostering the welfare of others.

5. Enterprising–individuals who enjoy persuading, manipulating, or leading others and who value material wealth and social status.

6. Conventional–individuals who prefer orderly routines and who value material or financial accomplishment and power. (p. 3)

These six personality types are paralleled by six **environmental types**:

1. Realistic–work requiring manual and mechanical competencies and environments that accommodate robust and adventurous styles.

2. Investigative–work requiring analytical, technical, scientific and verbal competencies and environments that support acquisition of knowledge through scholarship and investigation.

3. Artistic–work requiring innovation or creative ability and environments that promote unconventional ideas, manners and aesthetic values.

4. Social–work requiring skills in mentoring, treating, or teaching others and environments that encourage a concern for the welfare of others.

5. Enterprising–work requiring skills in persuasion and manipulation of others and environments that accommodate acquisitive or power-oriented styles.

6. Conventional–work requiring clerical skills and defines strict standards of performance and environments typified by orderliness and routines. (p. 4)

Holland ordered the six types around a hexagon (Figure 2) on the basis of their similarities to each other. That is, adjacent types are more similar to each other than are intermediate types, and types that oppose each other on the hexagon are most dissimilar. These relationships between the types help to explain why Holland's model is sometimes known as the "RIASEC" (reflects the first letter of each Holland type).
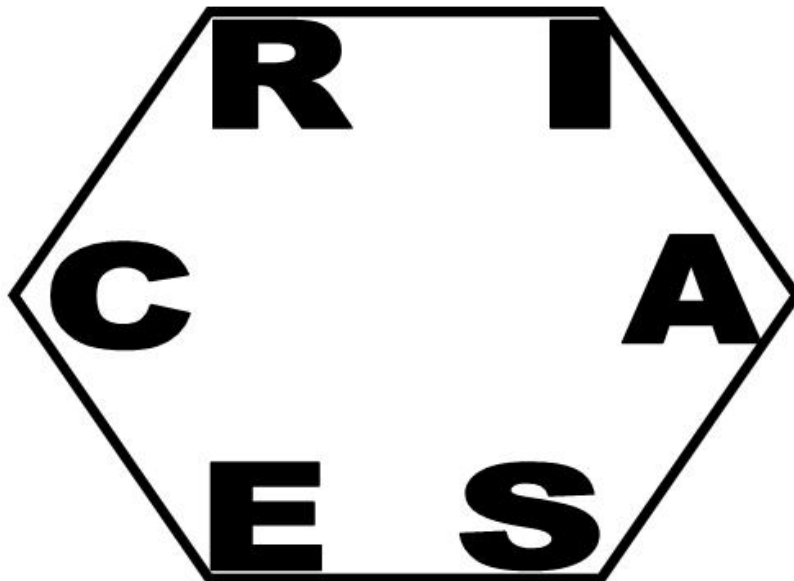

Figure 2. Holland's "RIASEC" Hexagon

The hexagonal representation is important to understanding three key aspects of Holland's theory:

1. Congruence—a measure of the match between a personality type and a work environment. A personality and work environment that are the same are said to be highly congruent. For example, an individual whose primary Holland code is "Artistic" would be best matched to "Artistic" work environments, where their skills would be utilized, their interests expressed, and their values supported. Holland suggested that the greater the congruence, the greater the job satisfaction. Known as the "C Index" (Brown & Gore, 1994) this aspect of Holland's theory has generated a lot of research interest, though Tinsley (2000) argues that "further investigations of the hexagonal structure of the RIASEC dimensions are of little theoretical or practical usefulness." Tinsley's review of the literature revealed that hexagonal congruence was not predictive of a number of vocational outcomes, and urged researchers to re-focus their attention on theoretical elaborations of the generic P–E fit model. In response, Tracey, Darcy, and Kovalski (2000) questioned Tinsley's conclusion that Holland's congruence hypothesis was invalid, though they agreed with Tinsley's recommendations for a shift of focus in future research. They argued that "given the resilience with which we hold onto these PE fit models, it is highly probable that the PE fit is a key aspect of this self-selection" (2000, p. 217). They noted that many of the studies that were considered (they cite Cronbach & Snow, 1981 – in which they looked at the value of aptitude by treatment interaction for college students – as an

example) reflected the results of assessments for individuals who had already made education or career decisions. Another response to Tinsley (Prediger, 2000) references both his own, and John Holland's summary of 30 years of hexagon-based research (Holland, 1997), to support his conclusion that Holland's hexagon has the underlying dimensions and general structure to reflect an *approximation* of reality. Eggerth and Andrew (2006) proposed some modifications to the C Index in order to facilitate its use with the Strong Interest Inventory and O*NET. They argued that some interest profiles may be fully characterized using only one Holland type, whereas others may require two or three code letters to capture all the meaningful information in a profile. They present six possible cases, with associated formulas for modifying the C index for individuals with profiles of unequal length. Gore and Brown (2006) argued for a simpler approach to dealing with the conditions described by Eggerth and Andrew. They suggest a simple "substitution" method that will yield similar results without the computational complexity introduced by Eggerth and Andrew. Gore and Brown go on to argue for the importance of considering congruence in career counseling efforts on the basis of binomial effect size suggested by Rosenthal and Rubin. In short, the binomial effect size is a way of judging the importance of using a specific intervention. Gore and Brown suggest that fully 20% more people will show improved satisfaction if they are helped to choose congruent work environments. They also argue that congruence remains an important construct to be considered in future research.

2. Consistency—people or environments with primary and secondary types that are adjacent on the hexagon (e.g., Artistic-Social), are the most consistent. Those that are described by types that appear opposite each other on the hexagon are the least consistent. Holland (1997, p. 89) summarizes the research on the construct of consistency. He claims that "well-designed studies that closely follow the theory have produced nearly all of the positive evidence" (p. 89). One example he cites is a study by Wiley and Magoon that used a sample of 211 Social types (scored highest on the "Social" scale on the *Self Directed Search*) and grouped by high, medium and low consistency levels to forecast persistence to graduation and cumulative GPA. The highly consistent students persisted at a higher rate and also achieved higher GPAs.

3. Differentiation—this is the degree to which an individual or work environment resembles one Holland type. For example, a person who is best described by the "Conventional" type would be considered highly differentiated. A work environment that consists mostly of Social characteristics would be considered a highly differentiated environment. In his review of the literature, even Holland (1997, p. 148) admits that differentiation is a weak construct.

Holland's theory is the foundation of the majority of the interest assessments used today. Measures such as the Department of Defense "Interest Finder," the "Career Assessment Inventory," the "Harrington-O'Shea Career Decision-Making System," and the "Kuder General Interest Survey" all report individual results in terms of Holland personality types. Typically scores are reflected as a "Holland code" consisting of the first letters of the two or three

areas for which an examinee expresses highest interest. The development of the "O*NET Interest Profiler" was the first attempt to measure Holland types as assigned to the occupations in O*NET.

O*NET Occupational Interest Patterns

In order to assign the Holland environmental types to occupations, there historically have been two general approaches: 1) using a reference sample of incumbent workers for each occupational scale, or 2) examination of the "data, people, things" ratings and other occupational descriptions from the *Dictionary of Occupational Titles.* When O*NET determined that the Holland classification of work environments should be included in their descriptions, they embarked on a project to develop "Occupational Interest Patterns" (OIP) for each O*NET occupation. After an extensive review (that included applying all methods to sample sets of occupations) of the historical methods, plus a third "judgment" method, O*NET developers determined that the judgment method offered the best potential for using OIPs for both counseling and research. In short, the judgment method involves having three trained judges determine ratings for each of the Holland work environments according to a 1-7 scale ('1' being not at all characteristic of the occupation, and '7' being completely characteristic). Rounds, et al. (1999) point to several advantages of the judgment method they developed:

1. Yields OIPs that are expressed in numerical terms that facilitate comparisons with clients' interest profiles.

2. Allows for an adaptable and manageable classification of occupations.

3. Produces more reliable RIASEC profiles than historical methods.

4. Holland's RIASEC hexagon model has a good fit to the judgment

occupational classification data.

5. Classification is based on direct judgment and is easily understandable

and replicable. (pp. 19-20)

In summary, Rounds, et al. claim that,

> *The OIPs are unique in vocational assessment and classification research, being the first effort to create full, numerical profiles, covering all six RIASEC environments. . . . These high-point profiles can be used by counselors and clients to determine which interests are truly descriptive of an occupation's environment.*

Though McDaniel and Snell (1999) question whether the six-

construct numeric OIP (reflecting the degree to which every Holland type

is reflected in the occupations) is superior to the more traditional three

letter codes (wherein the interest profile of an occupation is expressed in

up to three Holland code letters and reflect only the major types for that

occupation), they concede that the numeric code makes it easier to adjust

decisions rules concerning person-occupation fit, and that is of particular

value in computer-based systems of career information.

The O*NET Interest Profiler

With the Holland code descriptors successfully integrated as a component

of their occupational profiles, O*NET resolved to develop a suite of career

exploration tools (i.e., assessments) that could assist users in finding

occupations that were consistent with their abilities, interests and work values.

The *O*NET Interest Profiler*, a paper-and-pencil instrument, was the first such

tool to be made available. The *Interest Profiler* consists of 180 items reflecting activities that are representative of the six Holland interest areas (30 items per area for the total of 180 items). A computer-administered version of the *Interest Profiler* soon followed and subsequently many CIDS incorporated the assessment in their systems. Regardless of the venue in which the Profiler is administered, users' results are expressed in terms of the RIASEC codes. Results reflect an interest level for each of the types, though users are advised to take special note of their highest interest areas. As those same codes define the occupational environments, users have immediate access to a list of matching occupations, either by accessing O*NET directly, or by accessing O*NET interest descriptors of occupations made available in print materials or embedded in CIDS.

Information concerning reliability and validity for the *Interest Profiler* is summarized by Pope (2009) who asserts that it is an instrument that is "up-to-date and supported by substantial research providing good evidence of validity and reliability." Rounds, et al. (1999) describe the processes by which they were able to establish internal consistency which resulted in reliability estimates ranging from .93. to .96. Test-retest reliability estimates ranged from .91 to .97. The construct validity of the *O*NET Interest Profiler* scales was supported, and cross correlations between the Interest Profiler and the Armed Services Vocational Aptitude Battery (ASVAB) Interest Finder ranged from .73 to .84. There were some issues related to the validity of the Interest Profiler reported. Rounds, et al. point out that using another Holland-based instrument (i.e., the

ASVAB Interest Finder) as a benchmark may lead to different conclusions since different score distributions of high- point codes result from different inventories. Attempts to include items on the Interest Profiler that reflected a broad range of occupations (i.e., covering "all prestige and education levels") was unlike the traditional Holland-based assessment instruments and may have affected its validation against the ASVAB Interest Finder. In his review of the *O*NET Interest Profiler,* Pope expresses some concern that the validity is tied to just one instrument, but expects that both the reliability and validity research will grow as use of the assessment continues to grow.

<u>Work Values</u>

A value is "what a person consciously or subconsciously desires, wants, or seeks to attain" (Locke, 1983). Peterson and González (2005) say values "are motivational forces," and "influence the role work plays in people's lives." Dawis (2005) asserts that each person (P) has requirements that need to be met, most through their environments (E). In fact, Dawis claims that "Many of P's needs in adulthood can be met at work." The ones that matter most to P are E's ability to deliver reinforcers (e.g., pay, prestige, working conditions) that satisfy P's needs. Similarly, E has parallel and complementary requirements that can be met by P and make P a satisfactory worker. Thus, understanding work values has a benefit for both individuals (as they look for work environments that support their values), and also for organizations (if they recognize the advantage of employing satisfied workers). In comparison to the ubiquity of Holland's theory of career personality and interests, there has been no one work values theory to emerge

with that same level of near-universal appeal. However, development of the

O*NET content model, and the choice of values constructs to be included, has

certainly renewed interest in both the topic of work values in general, and in the

theory underlying the values specified.

As previously mentioned, one of the major goals of O*NET was to

describe occupations in ways that could support person-job matching. Though

there were a number of assessments that purported to identify **individuals'** work

values – e.g., *The Values Scale, Survey of Personal Values* (Zunker, 1994, p.

152) – O*NET developers searched for an approach that would also result in a

more complete description of **occupations**. The *Minnesota Theory of Work*

Adjustment hit the mark.

The Minnesota Theory of Work Adjustment (TWA)

Described as "one of the most robust and best validated theories in

vocational psychology" (Eggerth, 2008), the TWA is the foundation of both the

Minnesota Job Description Questionaire and the *Minnesota Importance*

Questionnaire. The *Minnesota Job Description Questionaire* (Borgen, et al.,

1968) grew out of work accomplished at the University of Minnesota. Initiated by

Lloyd H. Lofquist in 1959, the "Work Adjustment Project" was a 20-year federally

funded research program that resulted in the development of the "Theory of Work

Adjustment" (Dawis, 2005, p. 3). The original study, conducted in the 1960s and

1970s, was of vocational rehabilitation clients. The theory of work adjustment

was an attempt to provide a framework that could narrow and focus the analysis

of the huge mass of data that was collected. One hypothesis of the theory is that

(worker) satisfaction is a function of the level of correspondence between an individual's needs and the value reinforcers available in the work environment. The TWA acknowledges that this level of correspondence is not static, since both workers and environments can change (and often do, thus making the term "adjustment" all the more descriptive). The TWA defines several work adjustment styles to reflect the degree of tolerance a worker has toward an ill-fitting environment (Osipow & Fitzgerald, 1996).

Researchers became interested in describing occupations in terms of their ability to meet the values (or individual needs) of workers. In an effort to define "occupational reinforcer patterns" (ORPs), they developed the *Minnesota Job Description Questionnaire.* The MJDQ asked job incumbents to rate the extent to which each of 21 statements reflected a reinforcer available to them in their work environment. The resulting ORP is a description of the occupation in terms of its scores on those 21 reinforcers. Keep in mind that on the MJDQ, respondents judged the work **environment**, not their personal needs and values.

The *Minnesota Importance Questionnaire* or "MIQ" (Rounds, et al., 1981) is the companion assessment for defining one's **personal** work values. The same 21 needs statements used to describe work environments in the MJDQ are presented to individuals in the MIQ. However, the MIQ instructs respondents to rate the 21 statements in terms of their relative importance on their "ideal job." That is, rather than considering one's current job and associated environment, the respondent contemplates the kinds of reinforcers that would be consistent with the needs they are looking to satisfy through work. Early forms of the MIQ

included both a pair-comparison section (210 items), and an absolute judgment

section to yield scores on 20 statements. (Two of the earlier 21 needs statements

were combined to reduce the total number of statements to 20.)

The reliability of the 1967 edition of the MIQ was evaluated in three ways

(Gay, et al. 1971). First, the median internal consistency reliability coefficients

ranged from .77 to .81 for nine different subject groups (p. 38). Second, the

range of scale stability coefficients for the test-retest (10-month interval) was

from .46 to .79, with a median of .53 (p. 39). The median stability coefficient (10-

month retest interval) for the MIQ profile was .87, suggesting that profile analysis

is the better foundation for interpretation of results (p. 40). Validity of the 1967

MIQ was examined in a number of ways, but a study conducted by Betz (as cited

in Gay, et al., 1971) of workers who had been employed for at least twelve

months, revealed correlations between individuals' MIQ profiles (and

corresponding Occupational Reinforcement Patterns) and job satisfaction (as

measured by the Minnesota Satisfaction Questionnaire) to be statistically

significant for cashiers and sales clerks, but not for checker markers (p. 55).

However, a number of other studies that demonstrated the ability of the MIQ to

differentiate among groups (e.g., disabled and nondisabled, managers and

skilled white collar workers) were cited, and findings were consistent with

expectations described by the Theory of Work Adjustment. And of special

interest here, research conducted by Thorndike, Weiss and Dawis (cited in Gay,

et al., 1971) that revealed canonical correlations of .78 with the Strong Vocational

Interest Blank (the results of which are expressed as Holland interest codes) for groups of college students was offered as evidence of convergent validity (p. 47).

A later version of the MIQ (Rounds, et al., 1981) reflected a six-dimensional taxonomy of work values under which the needs are organized:

1. Achievement

2. Comfort (in O*NET, "Working Conditions")

3. Status (in O*NET, "Recognition")

4. Altruism (in O*NET, "Relationships")

5. Safety (in O*NET, "Support")

6. Autonomy (in O*NET, "Independence")

Median reliability coefficients for the MIQ scales reported by Rounds, et al. ranged from .77 to .81, calculated for nine groups (1981, p. 9). Median scale test-retest correlations for the 20 needs scales ranged from .89 (immediate retest) to .53 (retesting after 10 months).

Dawis (1991) suggests that when the person and environment are in close *correspondence* in terms of work values – that is, the person is largely meeting the requirements of the work environment, and the work environment satisfies the person's needs – there is mutual satisfaction (1996, p. 81). The TWA differentiates E's satisfaction with P, as "satisfactoriness," and reserves the term "satisfaction" for P's satisfaction with E. Thus, there are four possible states for P: (1) satisfied and satisfactory; (2) satisfied but unsatisfactory; (3) dissatisfied but satisfactory; and (4) dissatisfied and dissatisfactory. TWA expects that the state of mutual satisfaction will maintain P-E interaction, but the other three states will

eventually result in adjustment behavior. This "correspondence" construct mirrors that of "congruence" in Holland's theory, though Brown (1996, p. 338) suggests that the role of values correspondence is more important than interests congruence in determining the source of motivation in career decision making.

O*NET developers determined that work values, manifested as reinforcers available in a work environment, offered a potentially unique contribution to the descriptions of occupations. The fact that there was a corresponding assessment of individual work values added to the appeal of the underlying theory of work adjustment. Peterson, et al. (2001) described the six-dimension taxonomy of work values that was adopted for use in O*NET as representative of "a work environment that encourages accomplishment, is comfortable and not stressful, provides recognition, fosters harmony and service to others, is predictable and stable, and stimulates initiative, respectively." The potential for person-job matching was obvious. As Dawis (1996) points out, a conceptual framework to apply to career choice is an important element in effective career counseling, and certainly TWA offers that framework, "which can be used in any setting, for any level in the occupational hierarchy, and with any population." Authors did acknowledge, however, that less resource-intensive methods would need to be discovered in order to add work values information to describe every occupation in O*NET (Peterson, et al., 1995).

O*NET Occupational Reinforcer Patterns

The National Center for O*NET Development describes the processes by which values information was generated for the occupations based on the theory

of work adjustment, and the MJDQ. According to McCloy, et al. (1999), the

research design for generating occupational reinforcement patterns (ORPs) for

O*NET occupations was a result of obtaining work values score profiles from (a)

estimates based on regression equations, and (b) those derived from expert

judgments of occupational analysts. Ratings scales were developed using the

needs statements from the MJDQ and adding occupations to anchor the scale for

high, medium and low for each of the reinforcers. As a result of further study,

refinements were made in the rater training and materials, but it was determined

that nonincumbent raters were a reasonable choice for generating the ORPs. To

this end, subject matter experts (SMEs; in this case, occupational analysts and

industrial/organizational psychology graduate students) rated the extent to which

each of the work needs was reinforced by each O*NET occupation. (There were

sets of ratings generated by eight judges for each occupation. Mean and median

interrater reliabilities were in the .80s.) Results of the study suggested that,

> *ORPs generated by SMEs evidenced appreciable reliability,*
> *moderate correlation with profiles obtained by job incumbents, and*
> *reasonable patterns of work values scores across [occupations].*
> *(p. 8)*

The authors further concluded that ORPs based on estimates derived

from earlier regression equations would be less descriptive than those ratings of

SMEs who would be better able to keep up with the rapidly changing reinforcers

in today's workplace.

The O*NET Work Importance Locator

       As with interests, work values were seen as a way to enhance the person-job matching capabilities of O*NET. With the reinforcers of the MJDQ firmly embedded in the occupational descriptions, O*NET turned its attention to a corresponding values assessment. The items included on the computer-administered *Work Importance Profiler (WIP)* are based on the *Minnesota Importance Questionaire.* Examinees first rate items on relative importance, then respond to each of the need statements as "important" or "not important" in terms of their ideal job. Of course, the WIP offers two advantages over the MIQ: (1) immediate access to results; and (2) the direct connection to all O*NET occupations (vs. the "benchmark occupations" to which MIQ results could be compared). A second measure, *The Work Importance Locator* (WIL) was developed as a "paper-and-pencil" alternative for assessing work values. The WIL is a card sorting task that defines an individual's work values in terms of the six dimensions described by Dawis and Lofquist (1984). The card sort is described as "well-established as a tool for self-reflections on interests, skills and values" (Butcher, n.d.). The card sort technique – the physical sorting of cards containing descriptive information into categories – was originally promoted as a way to increase the control and engagement of individuals as they estimated their personal levels of interest or other characteristics. In this card sorting task, users organize 20 need statements under 5 levels of importance. The WIL enables the individual to find O*NET occupations best suited to their work values,

either by accessing O*NET directly, or by using O*NET values information made available in print materials or in CIDS.

Similarly, there were reports to document the development of both the computer-administered (McCloy, et al., 1999b) and paper-and-pencil versions of the O*NET work values measures (McCloy, et al., 1999c). Of note here are the reliability and validity data reported for the *O*NET Work Importance Locator* (paper and pencil version of the values assessment) in the User's Guide (U. S. Department of Labor, 2000b). Reliability was reported as "moderate," as evidenced by test-retest results showing that examinees' had the same top value 62% of the time. Low internal consistency was reported (median value of .20), which authors proposed was due in large part to the effects of ipsatization. The validity study reported in the Guide shows the correlation between scores obtained on the MIQ and on the WIL to range between just .30 and .49. The authors speculate that rank order format of the WIL might be a contributing factor, and that the wording modifications that were made to the needs statements may have played a role. In any case, these fairly low correlations lead to a cautionary note included in the Guide: "validation evidence did not support clients' use of their results to determine the entire profile of their work values," though there was some confidence in the ability of the WIL to provide clients with a valid indication of their highest work value. Ciechalski's review (2009) of the WIL acknowledges the careful development and standardization of the assessment, but asserts that a counselor is needed to assist the individual in

administering, scoring, and interpreting results. Ciechalski recommends the WIL

for career exploration, career planning, and career counseling.

Research Specific to O*NET Interests and Values

Much of what has been published about the interests and values used in

O*NET has been generated by the National Center for O*NET Development. For

example, "Development of the O*NET™ Interest Profiler" (Lewis & Rivkin, 1999)

describes the seven initial stages of research conducted in the production of the

Interest Profiler. Additional papers available from the O*NET Consortium include,

"Second Generation Occupational Interest Profiles for the O*NET System:

Summary," (Rounds, et al., 2008a), and "Second Generation Occupational Value

Profiles for the O*NET System: Summary" (Rounds, et al., 2008b). Obviously,

O*NET has a continuing commitment to examining the person-job matching

variables used in the system with a number of forthcoming reports in the works.

The topics of career interests and work values are combined into one

chapter in the O*NET Content Model (Peterson, et al., 1995). As the authors

point out, "The idea is that individuals who are motivated will perform well, and

that interests and values are important parts of motivation" (p. 11-1). They go on:

> *Values and interests differ in that interests tend to refer to
> the like or dislike of activities, while values refer to an evaluation of
> the importance of activities and other characteristics of work
> environments. However, this is not a clear distinction because likes
> and dislikes could be evaluated in terms of importance and
> evaluations of importance could be made relative to likes and
> dislikes* (11-2)*.*

The O*NET Content Model refers to Holland's "six-factor taxonomy of

occupational interests (p. 11-3)," but John Holland typically refers to his theory as

describing six personality types, and related work environments (Holland, 1997).

Indeed, as noted previously, Gottfredson and Holland (1996) go so far as to

include a description of the values consistent with each type of personality and

work environment, the implication being that measuring values separately offers

little unique information that would be useful to people making career decisions.

Colozzi (2003, p. 181) offers the "Depth-Oriented Values Extraction" process for

closely examining Holland-based assessment results as a way of helping clients

better understand their work values.

Because the O*NET assessment tools, and the O*NET system itself, are

relatively recent developments, studies outside those sponsored by the National

Center are in short supply. Eggerth, et al. (2005) looked at the Holland code

classifications used to describe the occupations in O*NET as compared to those

from the Strong Interest Inventory, and from the Dictionary of Holland

Occupational Types. Their finding that disagreements on first code assignments

occur about a third of the time resulted in a call for additional investigations on

this topic. They also make a strong argument for the development of

interpretative guidelines for counselors who use interest information to advise

clients and students.

Smith and Campbell (2006) used exploratory factor analysis, cluster

analysis, and multidimensional scaling to analyze the structure of work values in

O*NET. The authors identified three factors (not six) among the need reinforcers.

They suggest that additional research is needed to discover whether this

simplified framework better reflects the structure of work values in general, or is simply a reflection of the rating methodology used in O*NET.

Smith and Campbell (2009) developed a values characterization of each of the O*NET (i.e., Holland) interest categories. The constructed values profile plots for each interest area, then correspondence analysis and canonical correlation were conducted to assess the relationship between interest and values categories based on the values and interests profiles of the O*NET occupations (O*NET 5.1 data set). The values profile plots for the interest categories reflect similar patterns for:

- Conventional and Realistic, with Support and Working Conditions as the two highest values;

- Investigative and Artistic, with Achievement and Independence as the top two values;

- Social and Enterprising, with a solitary peak for Relationships reflected only for Social and flatter overall profiles for both interest areas.

It is important to note that Smith and Campbell studied the interest and value profiles for *occupations,* not of *individuals.* However, it supports the notion that the reinforcers likely to be available to people working in specific occupations are related to the interests of people likely to work in those occupations.

An additional line of contemporary inquiry is well worth mentioning here. As the "Big Five" model of personality has gained prominence, the overlap with Holland's "Big Six" model of career interests has gained the attention of

researchers. The "Big Five" dimensions include (1) Extraversion, (2)

Agreeableness, (3) Conscientiousness, (4) Neuroticism, and (5) Openness. In a

series of meta-analyses, Larson, Rottinghaus and Borgen (2002) confirmed that

there are several strong relationships between some interests and some

domains of personality. In addition, the relationship of the "Big Five" personality

factors to individuals' work values has been explored (e.g., Furnham, et al., 2005;

Robinson, 2007). Efforts to link career interests and work values with aspects of

personality underscore the notion that they share some common structural

components. In fact, Spokane and Decker (1999, as cited in Larson,

Rottinghaus & Borgen, 2002) suggest that "interests, personality, self-efficacy,

and other variants of personality and vocational self-concept may be facets of a

unified set of complex underlying traits."

Statement of Problem

The development of separate interests and values assessments and

corresponding occupational interest and value patterns in O*NET offers

unprecedented opportunities to explore the relationships between interests and

values. As previously noted, the O*NET Interest Profiler is built on a strong

historical foundation of Holland-based interest assessments, but the foundation

for work values assessments in general (let alone those specifically based on the

values defined by the theory of work adjustment), is less strong. However, by

adopting Holland's theory and the theory of work adjustment as the basis of their

interest and values assessments, O*NET has effectively defined the

corresponding factors for the next generation of career explorers. The popularity

of the O*NET interest and values measures, and the availability of privacy-protected assessment records, compel further study of assumptions about career interests and work values.

Based on the relationships between interests and values as suggested by theory (e.g., Colozzi, 2003; Holland, 1997; Smith & Campbell, 2009) and on personal experience, practicing counselors typically link individuals' interests and values in helping to explore "matching" occupations. For example, if one is working with an individual who scores high on the "Social" interest scale on the O*NET assessment, the assumption is that the person would find satisfaction in work that affords the opportunity to foster the welfare of others (i.e., the "Relationships" value scale in terms of the O*NET Work Importance Locator). Similarly, "Realistic" types are said to value material rewards and comfortable work environments (reflected in "Working Conditions" in O*NET); "Investigative" types value the acquisition of knowledge (the "Achievement" scale in O*NET); "Enterprising" individuals would typically be assumed to value social status ("Recognition"); and "Artistic" people value creative expression ("Independence"). According to Holland's theory, "Conventional" types value financial accomplishment and power. These values are not easily mapped to just one corresponding scale of the O*NET Work Importance Locator. Many of the occupations designated as "Conventional" are clerical or business support occupations in which workers achieve financial security and a level of authority in relationship to some type of corporate hierarchy. At the need level, the expectation would be that "Conventional" types would be reinforced by "pay that

compares well with others" – a component of the "Working Conditions" scale, and being "treated well by the company," and having good supervisors – part of the "Support" scale.

The purpose of this study is to analyze individuals' results on the O*NET interest and value assessments to reveal any correlations that support the relationships between interests and values as described above.

METHOD

<u>Instruments</u>

The instruments to be used to measure career interests and work values are based on tools developed by the U. S. Department of Labor as a part of enhancing occupational information in the Occupational Information Network, also known as "O*NET."

The Department of Labor expressed their willingness to share the O*NET Career Exploration Tools free of charge with product developers, as long as they were willing to be bound by the terms of the *O*NET Developer's Agreement*. The Bridges Transitions Company, among many other product developers, registered with O*NET and moved forward with their own computer-administered versions of the *Interest Profiler* and the *Work Importance Locator* a number of years ago. Thousands of users have completed these assessments via the *Choices* web-based Career Information Delivery System published by Bridges.

The Choices Interest Profiler is the interest assessment embedded in the Choices system. It is a straightforward translation of the paper-and-pencil *O*NET Interest Profiler* for web-based administration, scoring, and subsequent connection to "matching" occupations. The same 180 items are used and presented in the same order as in the *O*NET* version (see Appendix A for a list of the 180 items). Choices users have the same the "Like," "Unsure," and
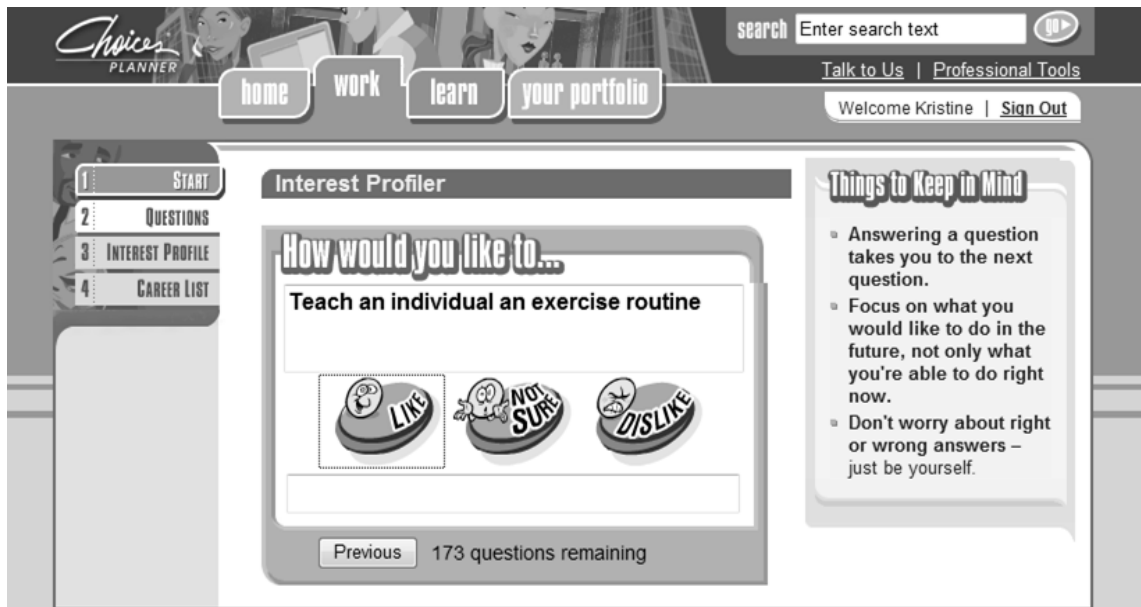
Figure 3. *Interest Profiler* in Choices: Presentation of Sample Item

"Dislike" response options as those used in O*NET (example of item

presentation, Figure 3). Items marked as "Like" are scored as one point, with no

points given for any other responses (the formula for producing the six interest

scales are also presented in Appendix A). Though reliability and validity

information specific to the Choices version is not available, it is reasonable to

assume that internal consistency would be similarly high (internal reliability

estimates for the O*NET *Interest Profiler* range from .93. to .96) to the O*NET

version. Results are presented in bar graph format, with additional narrative

descriptions of the individual's top two interest areas.

The Choices Work Values Sorter is the work values assessment embedded in the Choices system and is an adaptation of the paper-and-pencil O*NET Work Importance Locator (WIL). The WIL is a card sorting activity consisting of 20 cards, each containing a "need statement" related to one of six work values, and a Work Value Card Sorting Sheet. The card sorting sheet has columns labeled for five levels of importance (1="most important," 5="least important"), with space for four statements under each. In Choices, the 20 statements are presented on virtual cards that can be picked up and placed on a sorting grid with the click of a computer mouse (Figure 4).
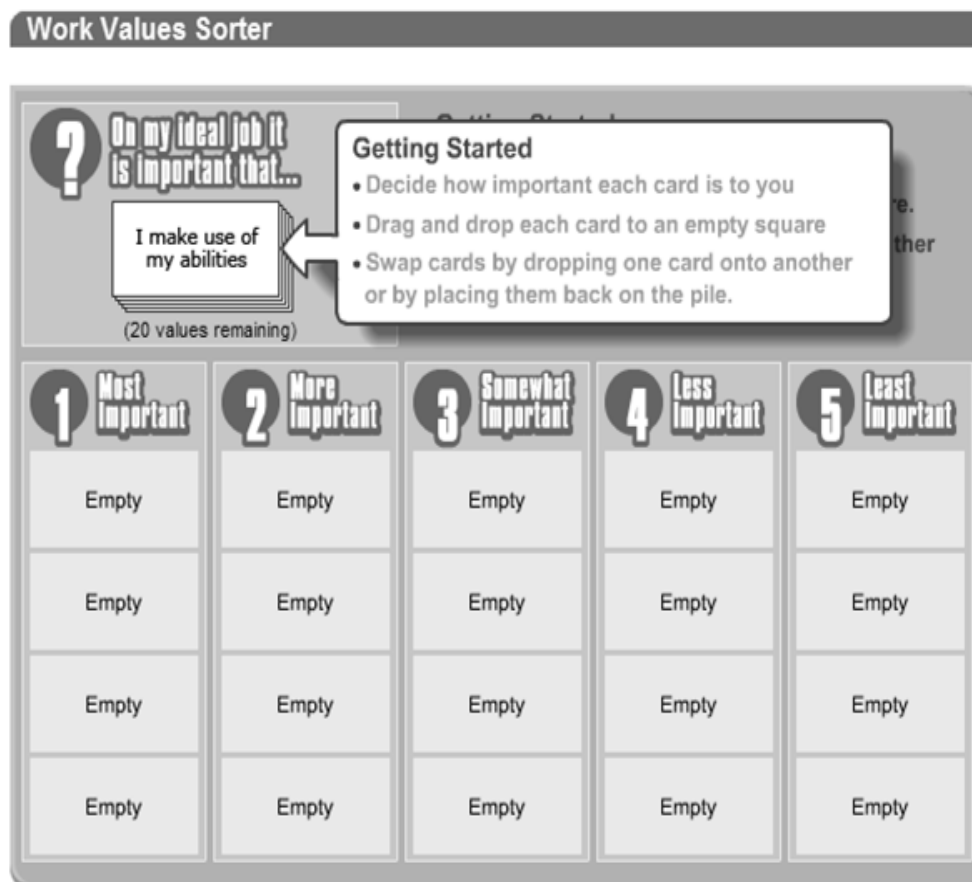

Figure 4: Work Values Sorter in Choices

Results are scored as follows: 1) The statements placed in the "Most Important" column get five points; "More Important" = four points; "Somewhat Important = three points; "Less Important" = 2 points; and "Least Important" = 1 point. 2) Point values for the statements are then organized under the six work values with which they are associated. 3) Points for each work value are a result of addition and multiplication as defined (Figure 5). Final results are presented in bar graph format, with additional narrative descriptions of the individual's top two values. As with the interest matching approach, Choices users can connect directly to occupations that have matching interest codes without having to indicate their preference for a training/education level.

Participants

Participants were 57,032 individuals who completed career assessments using the Choices Career Information Delivery System. This dataset was provided, without participant identifiers, by Bridges Transitions Company. Because the dataset was de-individuated, demographics were not available. However, the vast majority of individuals completing the Choices instruments in any given year are high school students. According to a study released in 2008 by the National Center for Education Statistics, the U. S. high school class of 2004 was 49.9% male, 50.1% female. Race/ethnicity is described for this group as 4.5% Asian, 13.3% Black, 15% Hispanic, 62.3% White, and 3.9% "more than one race."

**Need Statements Associated With Each Work Value
And SCORING**

*Each statement completes the sentence, "On my **ideal** job it is important that . . ."*

ACHIEVEMENT
   X 3*
...I make use of
my abilities.

...the work could
give me a feeling of
accomplishment.

INDEPENDENCE
   X 2*
...I could try out
my own ideas.

...I could make
decisions on my own.

...I could plan my work
with little supervision.

RECOGNITION
   X 2*
...the job would provide
an opportunity for
advancement.

...I could give
directions and
instructions to others.

...I could receive
recognition for
the work I do.

RELATIONSHIPS
   X 2*
...my co-workers would
be easy to
get along with.

...I would never be
pressured to do things
that go against my sense
of right and wrong.

...I could do things
for other people.

SUPPORT
   X 2*
...I would be treated
fairly by the company.

...I have supervisors
who would back up
their workers with
management.

...I have supervisors
who train
their workers well.

WORKING CONDITIONS
   X 1*
...I could be busy
all the time.

...my pay would
compare well with
that of other workers.

...I could work alone.

...the job would provide
for steady employment.

...I could do
something different
every day.

...the job would
have good
working conditions.

**Total of points for statements (dependent on placement in
columns) is multiplied as indicated to give total score for that work
value.*

Figure 5: Work Value Scoring

Design

The design is a correlational study, correlating individuals' scores on the six interest categories (i.e., Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) of the *Choices Interest Profiler* with their scores on the six values categories (Achievement, Working Conditions, Recognition, Relationships, Support, and Independence) of the *Choices Work Values Sorter*.

Hypotheses

It is predicted that:

1. Scores on the Realistic interest scale will correlate significantly in a positive direction with scores on the Working Conditions value scale.

2. Scores on the Investigative interest scale will correlate significantly in a positive direction with scores on the Achievement value scale.

3. Scores on the Artistic interest scale will correlate significantly in a positive direction with scores on the Independence value scale.

4. Scores on the Social interest scale will correlate significantly in a positive direction with scores on the Relationships value scale.

5. Scores on the Enterprising interest scale will correlate significantly in a positive direction with scores on the Recognition value scale.

6. Scores on the Conventional interest scale will correlate significantly in a positive direction with scores on the Support value scale and/or the Recognition value scale.

7. Other scores on interests scales will not correlate significantly with other scores on value scales.

RESULTS

Dataset

The initial dataset consisted of the responses of 57,032 participants to the Choices Interest Profiler and the Choices Values Sorter. However, these data contained individuals who did not respond to all items of both instruments. When individuals with missing data were removed, the dataset consisted of 52,253 participants. It is this reduced dataset, with no missing responses, that was analyzed.

Power Considerations

Given that results of interest are correlation coefficients, it is reasonable to ask how much power exists to tests the hypotheses of this dissertation. According to Cohen (1988), with 1000 cases there would be power of 80% to detect a correlation in the population at the 0.10 level. Thus, with the over 52,000 cases, there should be sufficient power to detect even small correlational effects. In addition to correlations, effect size (r^2) will be presented, as this may be the more appropriate measure given the extremely large size of the dataset.

Correlations

Table 1 presents the Pearson product moment correlations between all interest and value scales. The full correlation matrix (including interests with interests and values with values) is presented in Appendix B.

Table 1. Interest/Value Correlations Matrix

Interest/Value Correlations Matrix
N = 52253

		INT Realistic	INT Investig	INT Artistic	INT Social	INT Enterpris	INT Convent
WV Ach	Pearson	-.028**	-.012**	.005	-.002	-.030**	-.041**
	Sig.	.000	.005	.273	.620	.000	.000
WV Ind	Pearson	.009	-.010	-.001	-.003	.019**	.020**
	Sig.	.035	.028	.908	.471	.000	.000
WV Rec	Pearson	.017**	.022**	-.007	.020**	.024**	.036**
	Sig.	.000	.000	.112	.000	.000	.000
WV Rel	Pearson	.015**	.010	.006	.001	.012**	.004
	Sig.	.001	.027	.174	.796	.004	.392
WV Sup	Pearson	-.013**	-.016**	-.009	-.007	-.031**	-.031**
	Sig.	.003	.000	.040	.110	.000	.000
WV WkC	Pearson	.002	.006	.006	-.007	.008	.013**
	Sig.	.664	.171	.195	.095	.082	.004

** Correlation is significant at the 0.01 level (2-tailed).

These correlations will serve to test the hypotheses presented earlier.

Hypothesis 1: Scores on the Realistic interest scale will correlate significantly in a positive direction with scores on the Working Conditions value scale. The correlation between the Realistic interest scale and the Working Conditions values scale was $r = 0.002$, $p > .01$. Hypothesis 1 was not supported.

Hypothesis 2: Scores on the Investigative interest scale will correlate significantly in a positive direction with scores on the Achievement value scale. . The correlation between the Investigative interest scale and the Achievement values scale was $r = -0.012$, $p < .01$. Hypothesis 2 was not supported.

Hypothesis 3: Scores on the Artistic interest scale will correlate significantly in a positive direction with scores on the Independence value scale. The correlation between the Artistic interest scale and the Independence value scale was $r = -0.001$, $p > .01$. Hypothesis 3 was not supported.

Hypothesis 4: Scores on the Social interest scale will correlate significantly in a positive direction with scores on the Relationships value scale. The correlation between the Social interest scale and the Relationships value scale was $r = 0.001$, $p > .01$. Hypothesis 4 was not supported.

Hypothesis 5: Scores on the Enterprising interest scale will correlate significantly in a positive direction with scores on the Recognition value scale. The correlation between the Enterprising interest scale and the Recognition value scale was 0.024, $p < .01$. Hypothesis 5 was supported.

Hypothesis 6: Scores on the Conventional interest scale will correlate significantly in a positive direction with scores on the Support value scale and/or the Recognition value scale. The correlation between the Conventional interest scale and the Support values scale was $-.0310$, $p < .01$, and the correlation between the Conventional interest scale and the Recognition scale was 0.036, $p < .01$. Hypothesis 6 was partially supported.

Hypothesis 7: Other scores on interest scales will not correlate significantly with other scores on value scales. Of the remaining 29 correlations between interest scales and value scales, 14 were significantly correlated ($p < .01$). Hypothesis 7 was not supported.

One difficulty in testing the hypotheses by assessing the significance of the correlations involves the extremely large size of the dataset. Another way of considering the hypotheses is to look at effect sizes. In essence, effect size is the proportion of variance in a given interest/value scale that can be explained by

another interest/value scale. Table 2 presents the same matrix as Table 1, but

with effect sizes (r^2) rather than correlations.

      An examination of Table 2 shows that there is no relationship that explains

as much as 0.2% of the variance in any interest scale on the basis on any value

scale. Considered in this way, Hypotheses 1 through 6 would fail to be

supported, and Hypothesis 7 would be supported. Given the extremely large

sample size involved, this seems to be the more reasonable way to assess the

hypotheses of the current study.

Internal Consistency Reliabilities of the Scales

      The small relationships between work interests and work values might be

explained by small internal consistency reliabilities of the scales. To assess this

possibility, coefficient alpha was calculated for each of the interest and value

scales. For interests, the coefficient alphas were: (1) Realistic, $\alpha = 0.953$; (2)

Investigative, $\alpha = 0.950$; (3) Artistic, $\alpha = 0.950$, (4) Social, $\alpha = 0.951$, (5)

Table 2. Interest/Value Effect Size

Interest/Value Effect Size (r^2)
N = 52253

	INT Realistic	INT Investig	INT Artistic	INT Social	INT Enterpris	INT Convent
WV Ach	0.000784	0.000144	0.000025	0.000004	0.000900	0.001681
WV Ind	0.000081	0.000100	0.000001	0.000009	0.000361	0.000400
WV Rec	0.000289	0.000484	0.000490	0.000400	0.000576	0.001296
WV Rel	0.000225	0.000100	0.000036	0.000001	0.000144	0.000016
WV Sup	0.000169	0.000256	0.000081	0.000049	0.000961	0.000961
WV WkC	0.000004	0.000036	0.000036	0.000049	0.000064	0.000169

Enterprising, α = 0.930, (6) Conventional, α = 0.957. For values, the coefficient

alphas were: (1) Achievement, α = 0.437; (2) Independence, α = -0.167, (3)

Recognition, α = -0.234; (4) Relationships, α = -0.680, (5) Support, α = -0.197;

(6) Working Conditions, α = -0.604. An inspection of the alphas shows very high

internal reliability for the six interest scales. However, the six value scales show

little internal reliability, with five of the six alphas being negative. According to

McCloy, et al. (1999b, p. 36),

> The ipsative scoring of the WIL-P&P attenuates internal
> consistency values because most of the inter-item correlations are
> necessarily negative. Scales with more items encounter greater
> attenuation because there is more competition among the items
> within the scale.

McCloy asserts that "the low internal consistency reliability estimates and

low correlations with other measures are a function of the scoring procedure –

they do not speak to the psychometric strength or operation utility of the WIL." In

other words, the way in which values are measured by the WIL severely restricts

the degree to which they can correlate with any other measure.

DISCUSSION

There were no meaningful correlations found between interest and value scales using assessments essentially analogous to the O*NET *Interest Profiler* and the *Work Importance Locator.* There are a number of possible explanations, which fall into three basic categories: (1) problems with the assessment tools; (2) applicability of the interest and value constructs to high school students; and (3) the possibility that career interests and work values may be totally non-overlapping constructs.

<u>Assessment Tools</u>

As evidenced by the large dataset, both the *O*NET Interest Profiler* and the *O*NET Work Importance Locator* are used extensively with both students and adults across the United States. However, the evaluation studies of both O*NET assessments were based largely on vocational/technical and community college students and clients of workforce service centers. The *O*NET Interest Profiler* was the result of an eight-phase development process that resulted in a highly valid and reliable instrument. O*NET reported test-retest reliability ranging from .81 to .92, and internal reliabilities in the .93 to .96 range, similar to those reported for the current dataset.

In contrast, though the *O*NET Work Importance Locator* was developed in a similarly rigorous manner, the rank order response format most likely limits its

ability to achieve high internal consistency values due to a degree of inherent ipsatization. Once four need statements are rated "most important," the next need statement can be ranked no higher than "more important." Basically, the card sorting technique yields ratings for the statements that are not completely independent of each other. In an effort to correct for this ipsatization, O*NET applied a technique to reduce the adverse effects, yielding an average increase of .38 per scale. However, even with this statistical correction, internal consistency was only "moderate."

A second problem with the assessment of values using the *O*NET Work Importance Locator* is the small number of items per scale. Individuals' values scores are based on just two to six items per scale. Even if items did consist of totally independent ratings, such small numbers of items per scale (as compared to the 30 items per scale for the *O*NET Interest Profiler*) would lead to relatively low scale reliabilities. Both the WIL and its computer-administered counterpart, the *Work Importance Profiler* were based on the MIQ, but the *Work Importance Profiler* maintained the two-part design of the MIQ. In the first part participants compare and rank all 21 need statements against one another. Because the needs are presented just five at a time in this phase, participants will see each need statement several times (21 screens, 5 needs ranked on each). In the second part, all 21 need statements a presented on a single screen for participants to specify which are important to them ("Yes") and which are not ("No"). The alphas reported for the Work Importance Profiler ranged from .50 to .86 for Time 1 and .46 to .84 for Time 2. The median alpha of .76 is somewhat

lower than those ranging from .77 to .81 reported in the manual for the MIQ (Gay, et al., 1971), but are certainly better than those of the WIL.

Unfortunately, it appears that various compromises were made in the development of the WIL to achieve consistency with O*NET terminology and to deliver a user-friendly and easy to score instrument. Ironically, the compromises made in the interest of reducing errors in self-scoring are totally unnecessary when the WIL is embedded in a CIDS where scoring is accomplished electronically. It also seems likely that electronic delivery would mitigate the need to so severely limit the number of items. Clearly, an assessment of values based upon a larger number of items yields value scales with better psychometric properties.

The low (and in most cases, negative) internal consistency reliabilities for the work values scales in the current study make it unlikely that they could significantly correlate with any other variable, no matter how theoretically related it may be. This could certainly be one reason for the lack of significant relationships between interests and values found in the current study.

One final point: O*NET suggests that validity evidence supports the disclosure of only an individual's highest work value, rather than a complete values profile. In practice, however, the full profile of values – based on the rank ordering of just 20 needs statements – and the full profile of interests (based on the "like" responses given to 180 items) are presented to individuals. In most cases – and especially as embedded in a larger career information delivery system – individuals are prompted to use their results to guide further career

exploration. This current practice seems questionable at best, given the suggestion from O*NET to use only the highest work value as measured by the WIL, as well as the psychometric shortcomings on the *O*NET Work Importance Locator*.

<u>Applicability of Interests and Values Constructs</u>
<u>to High School Students</u>

Students' interests and the relationship of those interests to occupational "matches" enjoy a long history in school counseling and guidance practice. Holland's theory, in particular, is the basis of numerous approaches to helping students understand how their current life and school experiences can help inform a meaningful career exploration process. Furthermore, an individual's interests appear to be fairly stable over time as evidenced by the pursuit of occupations within the same or similar fields across a lifetime. On the other hand, work values took shape as a part of work adjustment theory. Researchers wanted to know what role work values played in the job satisfaction of current workers, largely to inform the process of rehabilitation for those in career transition. Applying work values assessment and matching techniques to the career guidance process came later, and never enjoyed the ubiquity achieved by Holland-based interests (though certainly the inclusion of work values in the O*NET Content Model was a huge step toward increasing the consideration of work values, specifically as defined by the theory of work adjustment, as a part of career counseling). For a number of reasons, it is less evident that an individual's work values endure over time – the difference between a "trait" and a

"state" (variables that fluctuate over time). It seems likely that what a person identifies as "important" in an ideal job at age 16 might change as a result of experience, circumstances or just increased maturity (e.g., Cotton, Bynum, & Madhere, 1997; Johnson & Elder, 2002; Kapes & Strickler, 1975). Perhaps alternative values assessments should be developed with items (and more of them) couched in terms of a student's current experiences rather than the less-understood "ideal job" of the future. Further research specific to high school guidance practice is needed to better define the role of interests and work values in suggesting "matching" occupations. Could we examine students' tentative occupational goals to discover whether they are more consistent with their interests or values? Such information could help define a more valid and useful approach for suggesting occupations or programs of study to students. In addition, ensuring that students meaningfully engage in career assessments of all kinds would assure better results. This can be especially challenging when measures are essentially computer-administered. In any case, the lack of information about the applicability of work values to high school students is a second possible explanation of the fact that no meaningful relationships between values and interests were discovered in this study.

Career Interests and Work Values Are Separate and Distinct

The lack of meaningful correlations between career interests and work values as measured by the O*NET-based assessments in this study compel the consideration of a final possible explanation. That is, career interests and work values are totally separate and distinct constructs. This explanation implies that

there is so little shared variability that the results of interest and values measures can best be considered separately as potential contributors to suggesting good occupational choices.

To test this hypothesis, one would need some "gold standard" with regard to occupational choice (perhaps a measure of occupational satisfaction or some other proximal behavior) five years after career interests and work values had been assessed. It would then be possible to use multiple regression to predict occupational satisfaction based upon career interest, work values, and possibly other variables, to determine the relative importance of each predictor variable. Unfortunately, in this study no "gold standard" measure of future career satisfaction was available. Thus, this remains an area for future research.

Future Directions

The current study does not allow us to conclude with certainty which of the three explanations posited above is the correct one, or, indeed, whether more than one of these explanations is correct. It is also possible that there are other explanations for the current findings. However, one should consider what current career guidance practice is: students and adults are assessed with instruments that are either identical to or very similar to those used in the current study, and then prompted to use this information (including interest and value measures) to help them find a good "match" among available occupational options. At the very least, the current study casts some doubt on the potential utility of value scales as they are currently measured and interpreted.

Future research should take advantage of the large amount of data that has been generated by O*NET-based career guidance systems in discovering which pieces of information generated are most efficacious in terms of yielding appropriate career choices. This research will most likely have to involve a longitudinal component, comparing interest, values, abilities, and work force information at one time with career contentment measures at some later point in time. It will also have to consider issues of development, as adolescent career choices may be based upon factors and implicit decision rules that differ from the career choices of adults. Finally, the psychometric properties of the instruments used in career guidance need to be considered, as only sound instruments can yield good information upon which to make career decisions.

Happiness in one's work is an essential component of life satisfaction. It is also important to a productive economy and profitable businesses. Thus, we owe it to current and future workers to discover the tools that will allow them to find the best "person by environment" fit that is possible.

APPENDIX A

INTEREST PROFILER ITEMS AND SCORING

1. Build kitchen cabinets.
2. Guard money in an armored car.
3. Study space travel.
4. Make a map of the bottom of an ocean.
5. Conduct a symphony orchestra.
6. Write stories or articles for magazines.
7. Teach an individual an exercise routine.
8. Perform nursing duties in a hospital.
9. Buy and sell stocks and bonds.
10. Manage a retail store.
11. Develop a spreadsheet using computer software.
12. Proofread records or forms.
13. Operate a dairy farm.
14. Lay brick or tile.
15. Study the history of past civilizations.
16. Study animal behavior.
17. Direct a play.
18. Create dance routines for a show.
19. Give CPR to someone who has stopped breathing.
20. Help people with personal or emotional problems.
21. Sell telephone and other communication equipment.
22. Operate a beauty salon or barber shop.
23. Use a computer program to generate customer bills.
24. Schedule conferences for an organization.
25. Monitor a machine on an assembly line.
26. Repair household appliances.
27. Develop a new medicine.
28. Plan a research study.
29. Write books or plays.
30. Play a musical instrument.
31. Teach children how to read.
32. Work with mentally disabled children.
33. Sell merchandise over the telephone.
34. Run a stand that sells newspapers and magazines.
35. Keep accounts payable/receivable for an office.
36. Load computer software into a large computer network.
37. Drive a taxi cab.

38. Install flooring in houses.
39. Study ways to reduce water pollution.
40. Develop a new medical treatment or procedure.
41. Perform comedy routines in front of an audience.
42. Perform as an extra in movies, plays, or television shows.
43. Teach an elementary school class.
44. Give career guidance to people.
45. Give a presentation about a product you are selling.
46. Buy and sell land.
47. Transfer funds between banks using a computer.
48. Organize and schedule office meetings.
49. Raise fish in a fish hatchery.
50. Build a brick walkway.
51. Determine the infection rate of a new disease.
52. Study rocks and minerals.
53. Write reviews of books or plays.
54. Compose or arrange music.
55. Supervise the activities of children at a camp.
56. Help people with family-related problems.
57. Sell compact disks and tapes at a music store.
58. Run a toy store.
59. Use a word processor to edit and format documents.
60. Operate a calculator5.
61. Assemble electronic parts.
62. Drive a truck to deliver packages to offices and homes.
63. Diagnose and treat sick animals.
64. Study the personalities of world leaders.
65. Act in a movie.
66. Dance in a Broadway show.
67. Perform rehabilitation therapy.
68. Do volunteer work at a non-profit organization.
69. Manage the operations of a hotel.
70. Sell houses.
71. Direct or transfer phone calls for a large organization.
72. Perform office filing tasks.
73. Paint houses.
74. Enforce fish and game laws.
75. Conduct chemical experiments.
76. Conduct biological research.
77. Draw pictures.
78. Sing professionally.
79. Help elderly people with their daily activities.
80. Teach children how to play sports.
81. Sell candy and popcorn at sports events.
82. Manage a supermarket.
83. Compute and record statistical and other numerical data.

84. Generate the monthly payroll checks for an office.
85. Operate a grinding machine in a factory.
86. Work on an offshore oil-drilling rig.
87. Study the population growth of a city.
88. Study whales and other types of marine life.
89. Perform stunts for a movie or television show.
90. Create special effects for movies.
91. Help disabled people improve their daily living skills.
92. Teach sign language to people with hearing disabilities.
93. Manage a department within a large company.
94. Sell a soft drink product line to stores and restaurants.
95. Take notes during a meeting.
96. Keep shipping and receiving records.
97. Perform lawn care services.
98. Assemble products in a factory.
99. Investigate crimes.
100. Study the movement of planets.
101. Conduct a musical choir.
102. Act in a play.
103. Help people who have problems with drugs or alcohol.
104. Help conduct a group therapy session.
105. Sell refreshments at a movie theater.
106. Sell hair-care products to stores and salons.
107. Calculate the wages of employees.
108. Assist senior level accountants in performing bookkeeping tasks.
109. Catch fish as a member of a fishing crew.
110. Refinish furniture.
111. Examine blood samples using a microscope.
112. Investigate the cause of a fire.
113. Paint sets for plays.
114 Audition singers and musicians for a musical show.
115. Help families care for ill relatives.
116. Provide massage therapy to people.
117. Start your own business.
118. Negotiate business contracts.
119. Type labels for envelopes and packages.
120. Inventory supplies using a hand-held computer.
121. Fix a broken faucet.
122. Do cleaning or maintenance work.
123. Study the structure of the human body.
124. Develop psychological profiles of criminals.
125. Design sets for plays.
126. Announce a radio show.
127. Plan exercises for disabled patients.
128. Counsel people who have a life-threatening illness.
129 Represent a client in a lawsuit.

130 Negotiate contracts for professional athletes.
131. Develop an office filing system.
132. Keep records of financial transactions for an organization.
133. Maintain the grounds of a park.
134. Operate a machine on a production line.
135. Develop a way to better predict the weather.
136. Work in a biology lab.
137. Write scripts for movies or television shows.
138. Write a song.
139. Teach disabled people work and living skills.
140. Organize activities at a recreational facility.
141. Be responsible for the operation of a company.
142. Market a new line of clothing.
143. Record information from customers applying for charge accounts.
144. Photocopy letters and reports.
145. Spray trees to prevent the spread of harmful insects.
146. Test the quality of parts before shipment.
147. Invent a replacement for sugar.
148. Study genetics.
149. Perform jazz or tap dance.
150. Direct a movie.
151. Take care of children at a day-care center.
152. Organize field trips for disabled people.
153. Sell newspaper advertisements.
154. Sell merchandise at a department store.
155. Record rent payments.
156. Enter information into a database.
157. Operate a motorboat to carry passengers.
158. Repair and install locks.
159. Study the governments of different countries.
160. Do research on plants or animals.
161. Sing in a band.
162. Design artwork for magazines.
163. Assist doctors in treating patients.
164. Work with juveniles on probation.
165. Sell automobiles.
166. Manage a clothing store.
167. Keep inventory records.
168. Maintain employee records.
169. Set up and operate machines to make products.
170. Put out forest fires.
171. Do laboratory tests to identify diseases.
172. Study weather conditions.
173. Edit movies.
174. Pose for a photographer.
175. Provide physical therapy to people recovering from an injury.

176. Teach a high-school class.
177. Sell restaurant franchises to individuals.
178. Sell computer equipment in a store.
179. Stamp, sort,and distribute mail for an organization.
180. Handle customers' bank transactions.

REALISTIC score = total of points (1 for each "like" response) for items:
1, 2, 13, 14, 25, 26, 37, 38, 49, 50, 61, 62, 73, 74, 85, 86, 97, 98, 109, 110, 121,
122, 133, 134, 145, 146, 157, 158, 169, 170

INVESTIGATIVE score = total of points (1 for each "like" response) for items:
3, 4, 15, 16, 27, 28, 39, 40, 51, 52, 63, 64, 75, 76, 87, 88, 99, 100, 111, 112, 123,
124, 135, 136, 147, 148, 159, 160, 171, 172

ARTISTIC score = total of points (1 for each "like" response) for items:
5, 6, 17, 18, 29, 30, 41, 42, 53, 54, 65, 66, 77, 78, 89, 90, 101, 102, 113, 114,
125, 126, 137, 138, 149, 150, 161, 162, 173, 174

SOCIAL score = total of points (1 for each "like" response) for items:
7, 8, 19, 20, 31, 32, 43, 44, 55, 56, 67, 68, 79, 80, 91, 92, 103, 104, 115, 116,
127, 128, 139, 140, 151, 152, 163, 164, 175, 176

ENTERPRISING score = total of points (1 for each "like" response) for items:
9, 10, 21, 22, 33, 34, 45, 46, 57, 58, 69, 70, 81, 82, 93, 94, 105, 106, 117, 118,
129, 130, 141, 142, 153, 154, 165, 166, 177, 178

CONVENTIONAL score = total of points (1 for each "like" response) for items:
11, 12, 23, 24, 35, 36, 47, 48, 59, 60, 71, 71, 83, 84, 95, 96, 107, 018, 119, 120,
131, 132, 143, 144, 155, 156, 167, 168, 179, 180

APPENDIX B

Interests/Values Correlations Matrix

	WV Ach	WV Ind	WV Rec	WV Rel	WV Sup	WV WrkC	IN R	IN I	IN A	IN S	IN E	IN C
WV Ach	1	-.355**	-.089**	-.027**	-.060	-.414**	-.028**	-.012**	.005	-.002	-.030**	-.041**
WV Ind	-.355**	1	-.202**	-.141**	-.251**	.003	.009*	-.010*	-.001	-.003	.019**	.020**
WV Rec	-.089**	-.202**	1	-.267**	-.288	-.174**	.017**	.022**	-.007	.020**	.024**	.036**
WV Rel	-.027**	-.141**	-.267**	1	-.075**	-.314**	.015**	.010*	.006	.001	.012**	.004
WV Sup	-.060**	-.251**	-.288**	-.075**	1	-.313**	-.013**	-.016**	-.009*	-.007	-.031**	-.031**
WV WrkC	-.414**	.003	-.174**	-.314**	-.313**	1	.002	.006	.006	-.007	.008	.013**
IN R	-.028**	.009*	.017**	.015**	-.013**	.002	1	.488**	.265**	.239**	.595**	.492**
IN I	-.012**	-.010*	.022**	.010*	-.016**	.006	.488**	1	.432**	.481**	.461**	.451**
IN A	.005	-.001	-.007	.006	-.009*	.006	.265**	.432**	1	.487**	.503**	.284**
IN S	-.002	-.003	.020**	.001	-.007	-.007	.239**	.481**	.487**	1	.501**	.430**
IN E	-.030**	.019**	.024**	.012**	-.031**	.008	.595**	.461**	.503**	.501**	1	.707**
IN C	-.041**	.020**	.036**	.004	-.031**	.013**	.492**	.451**	.284**	.430**	.707**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

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