Chapter XXX
Holland’s Vocational Theory and Personality Traits of Information Technology Professionals

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ABSTRACT

Drawing on Holland’s (1985, 1996) vocational theory and based on a sample of 9,011 IT professionals, two research questions were investigated. On what personality traits do IT professionals differ from other occupations and which of these are also related to their career satisfaction? Five traits met both these criteria—Emotional Resilience, Openness, Tough-Mindedness, and Customer Service—for which IT professionals had higher scores, and conscientiousness, for which they had lower scores. IT career satisfaction was also positively related to Extraversion, Agreeableness/Teamwork, Assertiveness, Optimism, Tough-Mindedness, Work Drive, and Visionary Style. Results are discussed in terms of the fit of these traits with IT work and the value of these insights for personnel-management functions like selection, training, professional development, and career planning.
The purpose of this chapter is to apply Holland’s (1985; 1996) vocational theory to the occupational field of Information Technology (IT) using a large, empirical sample of IT professionals. Original findings are presented on key personality traits of IT professionals and implications of these results are discussed.

John L. Holland is, arguably, one of the most eminent and influential vocational theorists of our time. He is famous for his psychological theory of careers, including career choice, vocational preference, and a taxonomy of personality types for occupations. Holland’s vocational theory has several main premises. First, people can be characterized by their resemblance to basic personality attributes. In his view, the key personality attributes are what he terms “types” which have historically been assessed as vocational interests (Holland, 1985). However, as will be explained below, accumulating evidence convincingly shows that personality traits may be effectively substituted for vocational interests in explications of the main tenets of Holland’s theory.

The six main vocational interest themes in Holland’s model are: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (The Career Key, 2008). Another major premise of Holland’s vocational theory is that jobs, occupations, and work environments can also be viewed in terms of their resemblance to these basic personality types. The final major premise of Holland’s theory is that the correspondence or fit between persons and work environments on these personality types leads to important vocational outcomes, including satisfaction, tenure, and performance. Holland summarized the essence of his vocational theory as follows:

Studies show that people flourish in their work environment when there is a good fit between their personality type and the characteristics of the environment. Lack of congruence between personality and environment leads to dissatisfaction, unstable career paths, and lowered performance. (Holland, 1996, p. 397).

There are two logical corollaries of Holland’s fit model which have been generally verified by subsequent research and are germane to the present study. 1) There are differences in average scores on personality characteristics associated with occupations which help determine fit; and 2) higher scores on these personality characteristics are related to higher levels of satisfaction. Thus, for example, under the Holland model artists tend to have higher mean scores on the Artistic vocational interest scale and higher artistic scores are associated with greater job satisfaction of artists (Holland, 1985; 1996). Making a similar extension of Holland’s taxonomy to the IT professions, computer programmers and IT workers have typically (e.g., O*NET, 2008) been considered as exemplifying three of the Holland dimensions—Investigative, Realistic, and Conventional—reflecting, respectively, the profession’s scientific-research orientation, its emphasis on practical concerns including working with machinery and equipment, and its penchant for working in a structured, office setting.

Although research has been conducted on a variety of topics related to psychological characteristics and the functioning of IT workers—including work values (Prasad, Enns, & Ferratt, 2007), best management practices (Major, Davis, Germano, Fletcher, Sanchez-Hucles, & Mann, 2007), precursors of voluntary turnover (Rouse, 2001), self-efficacy and well-being (Beas & Salanova, 2006), anomie (Shankar, 2007), burnout (Hetland, Sandal, & Johnsen, 2007), and work-nonwork conflict (Messersmith, 2007)—research on the vocational interests of IT workers is much more limited. The few extant studies in this literature mainly focus
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on topics like programmer gender differences (Rosenbloom, Ash, Dupont, & Coder, 2008), IT vocational interests and job satisfaction (Perry, 1967), and the distinctive vocational interests of IT workers compared to other occupations (Perry & Cannon, 1968). For instance, using a sample of 1378 computer programmers, Perry and Cannon (1968) showed that, compared with other occupations, male programmers had greater interest in problem solving, mathematics, and mechanical pursuits and less interest in people.

An alternative approach to the study of careers and occupations involves the use of personality traits (which are relatively enduring characteristics of individuals that are relatively consistent over time and across situations). In recent years a broad-based consensus has emerged that all normal personality traits can be parsimoniously described by five traits, termed the Big Five model of personality (Agreeableness, Conscientiousness, Emotional Stability, Extraversion, and Openness) (De Raad, 2000). The Big Five personality traits have been replicated across a wide range of settings (e.g., De Raad, 2000), and they have been validated against many different criteria, including job performance (Salgado, 1997), job satisfaction (Judge, Heller, & Mount, 2002), career success (Judge, Higgins, Thoresen, & Barrick, 1999), life satisfaction (DeNeve & Cooper, 1998), and academic performance (Lounsbury, Sundstrom, Loveland, & Gibson, 2003).

More recently, some researchers have argued that the Big Five taxonomy is too broad and that more narrow-scope personality constructs may augment their ability to predict behavior. These arguments have received verification in work and academic domains (e.g., Lounsbury, Sundstrom et al., 2003; Paunonen & Ashton, 2001). As a case in point, Lounsbury, Loveland, Sundstrom, Gibson, Drost, and Hamrick (2003), found that six narrow traits (Assertiveness, Customer Service Orientation, Optimism, Image Management, Intrinsic Motivation, and Work Drive) were positively related to career satisfaction for individuals in various occupational fields.

There has been some work attempting to logically map personality traits onto various occupational classes (see, for example, O*NET, 2008), but an empirically-validated personality trait profile for IT professionals has not, as yet, been developed. Using judgments provided by subject matter experts, O*NET links the following personality traits to computer programmers: attention to detail, dependability, initiative, achievement, flexibility, independence, integrity, persistence, and cooperation. However, there is currently no empirical evidence showing that any of these traits reliably differentiate IT professionals from members of other occupational groups, nor is there evidence that possession of these traits by IT professionals results in enhanced career satisfaction.

Returning to the goals of the present study, the following research questions were examined:

**RQ1: On which personality traits do IT professionals differ from other occupations?** This research question is based directly on Holland’s vocational theory: Scores on traits important for an occupation should differ in magnitude from scores on the same traits obtained from other occupations. The personality traits assessed were the Big Five personality traits and a set of narrow-scope traits studied previously by Lounsbury, Loveland et al. (2003).

**RQ2: Which personality traits are related to career satisfaction for IT professionals?** This question is also derived from Holland’s vocational theory, which indicates that salient traits for an occupation will be related to satisfaction with that occupation.

Under Holland’s vocational theory, personality traits that differentiate IT professionals from other occupational groups and relate to career satisfaction provide a theoretical perspective for
understanding the psychological makeup of IT professionals. This knowledge may also assist organizational decision makers performing such functions as career planning, selection, counseling, and succession planning for IT professionals. It may also help to inform interventions designed to optimize person-environment fit for IT professionals.

The following sections describe the methodology and results of this study, followed by a discussion of the meaning of the results, both in terms of theoretical and practical implications.

Method

Overview

Data for this study were extracted from an archival database generated by eCareerfit.com, an organization which offers online, personality-based career assessments to companies for transition services, outplacement, career development, succession planning, coaching, mentoring, and leadership development. Data were collected over the period March of 2003 to January of 2008.

Participants

The sample was comprised of a total of 9011 IT professionals employed in a large number of different jobs with many different companies in the United States. Respondents provided their job titles which resulted in the following breakdown:

- Analyst—4%
- Application Developer—2%
- Computer Programmer—7%
- Computer Analyst—6%
- Computer Engineer—5%
- Database Administrator—3%
- Developer—2%
- IT—7%
- IT Consultant—1%
- IT project manager—2%
- IT manager 3%
- LAN Administrator—1%
- Network Administrator—1%
- Network Engineer—1%
- Oracle DBA—1%
- Programmer—3%
- Programmer Analyst—6%
- Project Manager—5%
- SAP Consultant—1%
- Senior Analyst—2%
- Software Analyst—1%
- Software Engineer—5%
- Solutions Consultant—1%
- Systems Administrator—4%
- Systems Analyst—4%
- Tech. Support—2%
- Test Engineer—1%
- UNIX System Administrator—1%
- and Web Developer—2%

All told, the database included over 2,000 unique job titles. Of the total sample, 69% were male and 31% were female. Participation rates by age group were as follows:
- under 30—8%
- 30-39—31%
- 40-49—36%
- 50 and over—25%

Race/ethnic data were not available. Respondents came from many different industries and organizational sectors, including technology services (33%), financial services (11%), telecommunications (11%), manufacturing (7%), professional services (5%), printing (3%), communications (3%), retail (3%), health care (2%), consumer products (2%), science and technology (1%), non-profit organizations and charities (1%), entertainment (1%), automotive (1%), airlines (1%), education (1%), and “other” (14%).

Personality Factors

The personality instrument used in the current study was the Resource Associates’ Personal Style Inventory (PSI), a work-based personality measure comprising the Big Five as well as narrow personality traits. The PSI has been used in a variety of organizational settings, mainly for career development and pre-employment screening purposes, for which there is extensive evidence of criterion-related and construct validity (Lounsbury, Gibson, & Hamrick, 2004; Lounsbury, Gibson, Sundstrom, Wilburn, & Loveland, 2003; Lounsbury, Loveland, et al., 2003; Lounsbury, Park, Sundstrom, Williamson, & Pemberton, 2004; Williamson, Pemberton, & Lounsbury, 2005). All of the PSI items had five-point response scales with bipolar verbal anchors. Following is a sample item from the Optimism scale.

A brief description of each of the personality and managerial style measures used in the present study are presented below along with the number of items in each scale and the coefficient alpha for
the total sample. For each scale, an average score was obtained by taking the mean of the scores on the individual items, so that the minimum possible score in each case was 1.0 and the maximum possible score was 5.0.

**Big Five Personality Traits**

- **Agreeableness/Teamwork**—propensity for working as part of a team and functioning cooperatively on work group efforts (6 items; coefficient alpha = .82).
- **Conscientiousness**—dependability, reliability, trustworthiness, and inclination to adhere to company norms, rules, and values (8 items; coefficient alpha = .75).
- **Emotional Resilience**—overall level of adjustment and emotional resilience in the face of job stress and pressure (6 items; Coefficient alpha = .85).
- **Extraversion**—tendency to be sociable, outgoing, gregarious, expressive, warm-hearted, and talkative (7 items; coefficient alpha = .84).
- **Openness**—receptivity/openness to change, innovation, novel experience, and new learning (9 items; coefficient alpha = .79).

**Narrow Personality Traits**

- **Assertiveness**—a person’s disposition to speak up on matters of importance, expressing ideas and opinions confidently, defending personal beliefs, seizing the initiative, and exerting influence in a forthright, but not aggressive, manner (8 items; coefficient alpha = .81).
- **Customer Service Orientation**—striving to provide highly responsive, personalized, quality service to (internal and external) customers; putting the customer first; and trying to make the customer satisfied, even if it means going above and beyond the normal job description or policy (7 items; coefficient alpha = .71).
- **Intrinsic Motivation**—a disposition to be motivated by intrinsic work factors, such as challenge, meaning, autonomy, variety and significance (6 items; coefficient alpha = .84).
- **Image Management**—reflects a person’s disposition to monitor, observe, regulate, and control the self-presentation and image s/he projects during interactions with other people (6 items; coefficient alpha = .80).
- **Optimism**—having an upbeat, hopeful outlook concerning situations, people, prospects, and the future, even in the face of difficulty and adversity; a tendency to minimize problems and persist in the face of setbacks (8 items; coefficient alpha = .88).
- **Tough-Mindedness**—appraising information, drawing conclusions, and making decisions based on logic, facts, and data rather than feelings, values and intuition; disposition to be analytical, realistic, objective, and unsentimental (7 items; coefficient alpha = .79).
- **Visionary Style**—focusing on long-term planning, strategy, and envisioning future possibilities and contingencies (8 items; coefficient alpha = .84).
- **Work Drive**—disposition to work for long hours (including overtime) and an irregular schedule; investing high levels of time and energy into job and career, and being motivated to extend oneself, if necessary, to finish projects, meet deadlines, be productive, and achieve job success (8 items; coefficient alpha = .82).
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Career Satisfaction

A five-item scale was used to measure career satisfaction (Lounsbury, Moffitt, Gibson, Drost, & Stevenson, 2007), with items tapping satisfaction with career progress and trajectory, career advancement, future career prospects, and career as a whole. Career satisfaction items were framed on a five-point response scale with verbally opposing anchors at each end (e.g., “I am very satisfied with the way my career has progressed so far” versus “I am very dissatisfied with the way my career has progressed so far”). Coefficient alpha for the career satisfaction scale = .82. The career satisfaction measure was added three years ago to the inventory on which the database was derived; thus, the sample size for statistics involving career satisfaction was smaller (n = 1059) than the sample size for the personality traits.

RESULTS

Our first research question focused on personality factor differences between IT professionals and individuals in other occupations. For these analyses we used a one-sample t test to compare the mean scores of IT professionals against normative statistics derived from over 200,000 individuals representing all non-IT occupations in the database collected over the course of an eight year period. The mean scores for the IT professionals are presented in Table 1 grouped by whether they were found to be significantly higher, lower, or undifferentiated from the normative mean scores.

Compared to all other occupations, IT professionals had significantly higher mean scores on five personality traits—Customer Service Orientation, Tough-Mindedness, Intrinsic Motivation, Openness, and Emotional Resilience. The mean scores were below norm for three traits—Conscientiousness, Visionary Style, and Image Management. The mean scores for IT professionals were not significantly different from the norm group on five traits—Optimism, Agreeableness/Teamwork, Assertiveness, Extraversion, and Work Drive.

The second research question examined the relationships between career satisfaction and the personality traits of IT professionals. Pearson correlation coefficients were computed to examine relationships between career satisfaction and the study’s personality measures. Results are displayed in Table 2. Career satisfaction was positively and significantly related to all of the Big Five traits—with correlations ranging from $r = .46$ ($p < .01$) for Emotional Resilience to $r = .12$ ($p < .01$) for Conscientiousness. Career satisfaction was significantly related to all but two (Image Management and Intrinsic Motivation) of eight narrow-scope traits, with correlations ranging from $r = .38$ ($p < .01$) for Optimism to $r = .05$ ($p > .05$) for Visionary Style.

DISCUSSION

Using Holland’s (1985, 1996) theory of vocational choice as a conceptual point-of-departure, we attempted to determine whether scores on Big Five and narrow-scope personality traits could differentiate IT professionals from other occupational groups. We also assessed whether these traits were related to the career satisfaction of IT professionals. Based on the results of over 9,000 IT employees in a wide variety of job titles from a broad range of organizations, five traits met both of these criteria. Specifically, IT workers had above-norm average scores on four traits which were also positively related to career satisfaction—Emotional Resilience, Tough-Mindedness, Openness, and Customer Service Orientation. They had below-norm scores on Conscientiousness, which was also positively related to career satisfaction.

Considering each of these traits individually, we consider first those traits which met two criteria drawn from Holland’s vocational theory: (1) mean
Table 1. Mean scores on personality traits for IT professionals grouped by comparisons to all other occupations

<table>
<thead>
<tr>
<th>Dimensions on which IT professionals have higher mean scores than the norm for all occupations</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Service</td>
<td>4.65</td>
</tr>
<tr>
<td>Tough-Mindedness</td>
<td>3.73</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>3.61</td>
</tr>
<tr>
<td>Openness</td>
<td>3.57</td>
</tr>
<tr>
<td>Emotional Resilience</td>
<td>3.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions on which IT professionals have similar mean scores than the norm for all occupations</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimism</td>
<td>3.23</td>
</tr>
<tr>
<td>Agreeableness/Teamwork</td>
<td>3.22</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>3.12</td>
</tr>
<tr>
<td>Extraversion</td>
<td>3.09</td>
</tr>
<tr>
<td>Work Drive</td>
<td>2.98</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions on which IT Professionals Have Lower Mean Scores than the Norm for all Occupations</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscientiousness</td>
<td>2.77</td>
</tr>
<tr>
<td>Visionary Style</td>
<td>2.36</td>
</tr>
<tr>
<td>Image Management</td>
<td>2.26</td>
</tr>
</tbody>
</table>

Note: For IT Professionals n = 9,011.

scores which were significantly different (either higher or lower) from the norm for all occupations and (2) significant correlations with career satisfaction. First, Emotional Resilience was higher among IT professionals than other occupations and was the trait most highly correlated with career satisfaction in our sample. One possible explanation for the importance of Emotional Resilience is that high levels of stress are inherent in many IT jobs (Jepson, 2004). Individuals who work in IT often face schedule pressure, demands from multiple constituencies in their employing organizations, and, typically, an “impossible workload” (Savvas, 2004). Similarly, as noted by Major, Davis, Germano, Fletcher, Sanchez-Hucles, and Mann (2007), IT workers experience numerous sources of stress that are universal across occupations and work environments. As consumer electronics continue to exponentially mature, non-IT employees are pressuring IT employees to improve enterprise services at a similar rate. Meanwhile information assurance and computer security place IT staff in the situation of having to limit the use of consumer technology. These two countervailing forces (consumer electronics and enterprise security) often place IT staff in the difficult situation of having to limit the desired pace of change in the non-IT lines of business. IT professionals with higher levels of Emotional Resilience are better able to handle the chronic
stress associated with their work. As Weinberg (1972) concludes in his landmark book on The Psychology of Computer Programming “…we can probably say with assurance that someone without the ability to tolerate stressful situations for a period of a week or more is not good programmer material-given the realities of programming work today.” The importance of Emotional Resilience is likely to increase in the future for IT professionals given current trends toward consumer electronics, greater outsourcing of work, limitations caused by enterprise IT security, increased competition from programmers in other countries, and continual technological innovation (for a review of extrajob factors influencing the career environment, see Storey, 2000).

Openness was also higher for IT professionals in our sample, and it was positively correlated with career satisfaction. Higher levels of Openness enable individuals to adapt to change and facilitate personal discovery, new learning, and professional development. The field of IT is continually changing due to new technology and innovations in software, information systems, and arrangements for integrating IT with other organizational units and functions. IT staff need to be nimble and flexible. Technology launches in the last 2-3 years have doubled the complexity when compared against all prior technology combined. IT staff that enjoy openly learning and sharing information flourish in this type of environment. IT staff often drive the business adoption of collaboration technologies such as instant messenger and virtual web meetings. Most enterprises are constantly assessing the need to retrain or replace the IT workforce. The IT workers that openly stay abreast of new technologies and openly share them with their peers tend to flourish. In fact, the Association of Information Technology Professionals (AITP) lists the following conduct standards for all members:

Table 2. Correlations of personality traits with career satisfaction

<table>
<thead>
<tr>
<th>Big Five-Related Traits</th>
<th>Correlations With Career Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscientiousness</td>
<td>.12**</td>
</tr>
<tr>
<td>Emotional Resilience</td>
<td>.46**</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.27**</td>
</tr>
<tr>
<td>Openness</td>
<td>.26**</td>
</tr>
<tr>
<td>Agreeableness/Teamwork</td>
<td>.21**</td>
</tr>
<tr>
<td>Narrow Traits</td>
<td></td>
</tr>
<tr>
<td>Assertiveness</td>
<td>.31**</td>
</tr>
<tr>
<td>Customer Service Orientation</td>
<td>.22**</td>
</tr>
<tr>
<td>Image Management</td>
<td>-.01</td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>.04</td>
</tr>
<tr>
<td>Optimism</td>
<td>.38*</td>
</tr>
<tr>
<td>Tough-Mindedness</td>
<td>.18**</td>
</tr>
<tr>
<td>Work Drive</td>
<td>.29**</td>
</tr>
<tr>
<td>Visionary Style</td>
<td>.05</td>
</tr>
</tbody>
</table>

n = 1059
*p < .05; **p < .01
In recognition of my obligation to management
I shall: keep my personal knowledge up-to-date
and insure that proper expertise is available when
needed. (AITP, 2006, para. 2).

In recognition of my obligation to my employer
I shall: make every effort to ensure that I have
the most current knowledge and that the proper
expertise is available when needed. (AITP, 2006,
para. 5).

The IT field should continue to expand and
become more differentiated with respect to areas
of specialization and expertise. Thus, Openness
will continue to be critical to the success and
psychological well-being of IT professionals. In
fact, it is difficult to imagine an IT employee who
is closed to new ideas and resists change being
effective in any IT job or deriving satisfaction
from this work.

Two other traits were also of higher magnitude
and were positively correlated with career satis-
faction for IT professionals—Tough-Mindedness
and Customer Service Orientation. Qualities
like tough-mindedness have often been seen as
an important qualification for working in the IT
profession. For example, Exforsys (2008) states
that “the first trait which computer program-
ners should possess is an analytical mind” and
CareerOverview.Com (2008) avers that “the most
qualified applicants for programming jobs will
have analytical and logical thinking skills...”.
Also, the Myers-Briggs Thinking dimension
(which involves using a logical thinking style
and basing decisions on facts and data rather than
feelings) has been described as characteristic of
computer programmers, systems analysts and
computer specialists (BSM Consulting, 2008). In
addition, “being logical and factual” has been as-
associated with computer programmers (careerpath.
com, 2008). Given the relatively limitless options
in technology and the rapid pace of change, IT
staff need to be willing to make a decision and
stick with it. Their decisions need to be grounded
in a rigorous analysis of integration with other
information systems, but reviews must be done
quickly. IT staff need to be tough-minded enough
to stick with a grounded decision.

The results for Customer Service Orientation
are consistent with studies showing a positive
relationship between the career satisfaction of IT
employees and the IT service orientation (Jiang,
Klein, & Ballou, 2001). Most IT departments in
organizations have service level agreements to
provide timely, quality service to internal custom-
ers. Then, too, more effective IT performance
has been found to have a positive impact on the
satisfaction of external customers within the
company (Karimi, Somers, & Gupta, 2001). The
importance of customer service for IT workers
is at the cornerstone of their drive to expand ser-
vices to additional internal customer groups (e.g.
marketing and sales departments) and integrate IT
with other organizational functions (Lee, Trauth,
& Farwell, 1995). This customer service drive
to standardize IT services often results in cost
savings as services become consistent across the
enterprise. If the IT organization can align with
external facing lines of business (sales, market-
ing, etc), the IT staff’s alignment with Customer
Service Orientation can be used to directly benefit
the business by supporting technologies such as
new marketing and service activities increases,
such as personalized marketing, self-service sales,
podcasts, instant product presentation, real-time
customer intelligence. (Gogan, 1998).

One personality trait which was positively
related to career satisfaction but for which IT
professionals had, on average, below-norm scores
was Conscientiousness. The latter result is not
surprising given the generally unstructured na-
ture of IT work and the freedom and discretion
IT professionals have in how they solve problems
and perform their work (see O*NET, 2008). The
current findings of below-norm Conscientiousness
for IT professionals are consistent with results
from a recent investigation by Ash, Rosenbloom,
Coder, and Dupont (2008). They found that non-IT
professionals had higher Conscientiousness scores than IT professionals. Similarly, a study by Mastor and Ismael (2004) observed slightly below-norm Conscientiousness scores for IT majors. Interestingly, however, Witt and Burke (2008) found that Conscientiousness is positively related to the job performance of IT professionals.

Considered as a whole, the above findings for Conscientiousness and IT work are complex and do not lend themselves to simple interpretations. While higher levels of Conscientiousness may be desirable from the standpoint of career satisfaction and the job performance of IT professionals, IT professionals generally score lower on Conscientiousness than individuals in other occupations. This may be due to a self-selection bias in that individuals lower on Conscientiousness gravitate toward IT work for any number of reasons. Like all of the Big Five traits, Conscientiousness is a broadband construct. It subsumes personal qualities like attention to detail and quality consciousness in the same way that it embraces qualities like conformity and rule-boundedness. The conformity and rule-boundedness aspects of Conscientiousness may be incongruent with the nonconformist, unconventional personalities often attracted to IT work. Such individuals prefer more informal and less structured work environments, relaxed dress codes and personal appearance requirements, greater discretion and less standardization in how the work is accomplished; and, in some cases, more schedule freedom. From the organization’s standpoint, based on the above results, it would be desirable to recruit and hire IT candidates with higher levels of Conscientiousness and to emphasize Conscientiousness-enhancing training and development programs (such as time management, safety and security issues, and organizational citizenship).

Two other traits on which IT professionals had below-norm scores, but which were not significantly related to career satisfaction were Visionary Style and Image Management. The former finding is understandable given that IT work, with its emphasis on details and many small, interlocking steps in task completion, typically involves the opposite of visionary thinking style. As summarized by Walling (2008):

*I have never, ever, ever seen a great software developer who does not have amazing attention to detail.*

As for a relative under-emphasis on Image Management, very little IT work requires careful monitoring of one’s own image and trying to project a smooth, polished, self-presentation in interpersonal settings. As an anonymous blogger put it, “in my experience, computer programmers don’t care that much about being popular or good looking—they are skilled craftsmen with a solid work ethic” (Half Sigma, 2008).

Although each was positively related to career satisfaction, there were no significant differences in mean scores between IT and other occupations on five traits: Assertiveness, Extraversion, Optimism, Agreeableness/Teamwork, and Work Drive. Regarding the importance of Assertiveness, while it might not be listed in most inventories of key attributes of IT employees, Schneider (2002) lists it as one of the key personality attributes for IT consultants, noting that “you need to be assertive...You need to make sure people don’t walk over you. You also need to be able to stick up for yourself without coming across as too aggressive.” Similarly, Weinberg (1972) contends that a critical personality trait for programmers is “...assertiveness, or force of character. A programmer’s job is to get things done, and getting things done sometimes requires moving around obstacles, jumping over them, or simply knocking them down.” The field of Information Technology changes at such an incredible rate that staff who find themselves without the ability to drive a solution quickly find themselves lacking current skills and unable to perform effectively.

Optimism is another trait which is unlikely to appear in any IT job description. However, it
is the second most highly correlated trait with career satisfaction for IT professionals. This is similar to Lounsbury, Loveland, et al.’s (2003) finding that Optimism was one of the top two correlates of Career Satisfaction for occupations in general. The importance of Optimism for IT work may be due to the benefits for problem-solving associated with having a positive mindset and persisting toward solutions despite setbacks, and the attendant satisfaction that comes from successful task completion. Nearly all important IT work is fraught with difficulties and challenges for which an optimistic frame of mind would be an advantage (cf. Seligman, 1990). Perhaps that is why Walling (2008) concludes that in the case of software development, “…all great developers are optimistic…”. In many cases software programmers must embark on programming efforts without a complete understanding of how the programming will be done. For Optimistic IT staff, this can be an exciting time that contributes to career satisfaction.

As for the importance of Work Drive, having a strong work ethic is frequently listed as a requisite factor for success in computer programming or other types of IT work (e.g., Liberty, 1999). Given the multiple, continual demands placed on IT workers and the often high-stakes nature of successful IT project completion, it makes sense to argue that those with high levels of Work Drive may be better suited for such work. They would also be more likely than their less hard-working peers to receive the organizational rewards and recognition that, over the long term, leads to higher levels of career satisfaction. The field of information technology changes so frequently that most IT staff have a healthy sense of “Retool”, “Retrain” or “Replace”. Those with a consistent Work Drive tend to provide value to the organization by constantly retraining themselves with little effort from management.

IT work is widely regarded as being mainly the domain of introverts with two-thirds of computer professionals estimated as being introverted, (e.g., Institute for Management Excellence, 2006). However, in the present study there were no significant differences between our sample of IT professionals and other occupations as a whole on this dimension. Moreover, the average IT-worker score represented about an equal emphasis on Introversion and Extraversion. Also, Extraversion was positively correlated with IT career satisfaction in the present study. How can such observations be reconciled? The answer may be that Extraversion leads to more satisfying experiences over the course of a career, perhaps because it results in more acquaintanceships and friendships, greater personal communication with coworkers and bosses, or even a more positive reception by others at work. Such dynamics would produce a positive correlation between Extraversion and career satisfaction. Regardless, the present results should be considered by those individuals engaged in career planning, vocational development, job counseling, and others who help individuals choose an occupation and might be inclined to not recommend IT for extraverts. From the standpoint of career satisfaction, one would encourage more extraverted individuals to go into IT work. On the other hand, the current findings are consistent with recommendations that interpersonal skills and communication should be emphasized in IT professional training and development (Lee et al., 1995). In addition, since Extraversion is related to higher levels of career satisfaction, organizations may want to consider offering IT employees more opportunities to socialize, fraternize, and interact with other employees through, for example, company-sponsored luncheons, picnics, recreation programs, outings, and other activities that promote extraversion-related behaviors.

Regarding teamwork, in the present sample IT professionals did not differ from other occupations, which is in variance with the traditional view of IT employees working independently (cf. U. S. Dept. of Labor, 1991). Teamwork was, however, positively correlated with career satisfaction in the current study. One reason for this is that IT
departments usually have to coordinate and collaborate with other organizational units to achieve successful information systems. IT professionals are increasingly involved in cross-organizational teaming, and internal IT teaming has become more the norm with the advent of team-based or agile programming (Beck 1999). As noted by Schneider (2002) in his research on factors contributing to the success of IT projects, “…teambuilding and motivation are more important than technical competence or formal training.” Additionally, Major et al. (2007) list as best practices for managing IT employees using teams for general problem-solving, knowledge-sharing, and peer learning. In terms of practical implications, based on the present results, individuals who are more teamwork-oriented would be more likely to enjoy careers in IT. However, the Occupational Information Network (O*NET) , which is one of the premiere sources of occupational planning information, lists the opposite of Teamwork—Independence—as a key Work Style and Work Value for IT occupations (O*NET, 2008). Further research is needed to clarify which of these attributes is more important for successful and satisfying IT careers.

As previously noted, an empirically-based personality profile of IT professionals has yet to be developed. The current study is an important first step in that direction. Holland’s theoretical framework characterizes IT professionals as having mainly investigative, realistic, and conventional interests. While consistent with Holland’s vocational theory, the current study goes beyond such interest-based depictions by showing that, compared to other occupations, IT professionals are more: tough-minded and analytic, more open to new experiences and learning, emotionally resilient, customer-oriented, and intrinsically motivated. They are also less: conscientious, concerned with image management, and less visionary in their thinking style. Moreover, we found higher magnitude and positive correlations with career satisfaction for the traits of Emotional Resilience, Optimism, Assertiveness, Work Drive, Extraversion, and Openness. In summary, the Holland vocational theory is very germane for the field of IT and there appear to be multiple personality pathways to career satisfaction for IT professionals.

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**KEY TERMS AND DEFINITIONS**

**Big Five Model:** An extensively researched, conceptual model of normal personality proposing five basic traits—Openness, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability—that characterize individual differences in personality. Also known as the Five-Factor Model.

**Career Choice:** Process of choosing a career path which can involve choices regarding education and training for a given career.

**Career Satisfaction:** Overall feelings of accomplishment and fulfillment a person has regarding his or her career as a whole, which can represent 80,000-100,000 hours of work for the typical American.

**Holland's Vocational Theory:** John L. Holland’s basic vocational theory contends that people flourish in jobs and careers in which there is a good fit between their personality and characteristics of the work environment. Better fit leads to higher levels of satisfaction, productivity, and longevity.

**Information Systems Careers:** Careers in the information systems or information technology professions

**Personal Style Inventory (PSI):** A normal personality inventory developed by Resource Associates that measures broad and narrow traits which have been contextualized for work as well as academic settings.

**Personality Traits—Broad and Narrow:** Broad personality traits, such as Extraversion and Conscientiousness, are global constructs representing relatively enduring characteristics of individuals consistent over time and across situations. Narrow personality traits, such as Optimism or Tough-mindedness, are more conceptually specific constructs, often components of broad traits, that are consistent over time and across situations.

**Person-Environment Fit:** Degree of correspondence between a person and his or her environment, usually viewed as the alignment between the personality of the individual and the demands of an environment, as in person-job fit.

**Vocational Choice-Information Systems:** Process of choosing information systems as a career.

**Vocational Interests:** Characteristic likes or dislikes a person has regarding different occupations or types of work, usually conceptualized as a small set of basic dimensions, such as Holland’s six-fold taxonomy of Realistic, Investigative, Artistic, Social, Enterprising, and Conventional vocational interests.