An investigation of Big Five and narrow personality traits in relation to Internet usage

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Abstract

The relationship between Internet usage and the Big Five as well as three narrow personality traits was examined using 117 undergraduates as study participants. Results indicated that total Internet usage was negatively related to three of the Big Five traits – Agreeableness, Conscientiousness, and Extraversion as well as two narrow traits – Optimism and Work Drive, and positively related to Tough-Mindedness. The results of a hierarchical regression analysis indicated that Work Drive added significantly to Extraversion and Conscientious in the prediction of total Internet usage, producing a multiple correlation of 0.349 ($p < 0.01$). Results were discussed individually by trait, in terms of broad versus narrow personality traits, and regarding suggestions for future research.

Keywords: Big five; Broad and narrow traits; Internet usage; Work drive; Optimism; Tough-mindedness

1. Introduction

In recent years, there has emerged a limited, but growing, research literature on personality traits in relation to Internet usage (e.g., Hamburger & Ben-Artzi, 2000;
Leung, 2002; Scealy, Phillips, & Stevenson, 2002). There are several important reasons why this area of research merits attention. Personality traits represent relatively enduring characteristics of individuals that show consistencies over their lifespans and across a wide range of situations (Pervin & John, 1997; Shaffer, 2000). Moreover, personality traits have been found to be related to a broad spectrum of human activities and types of behavior, including school attendance (McShane, Walter, & Rey, 2001), gambling behavior (Blaszczynski, Walker, Sagris, & Dickerson, 1999), parent–infant bed sharing (Kelmanson, 1999), confessing to crimes in police interrogations (Watanabe & Yokota, 1999), blood donations (Paunonen & Nicol, 2001), housing behavior (Sweeney, Pittman, & Montgomery, 1984), music listening preferences (Rentfrow & Gosling, 2003), leadership behavior (Judge & Bono, 2000), behavioral aggression (Wu & Clark, 2003), television-viewing (Persegani et al., 2002), drug use (Sussman, McCuller, & Dent, 2003), sexual behavior (Kalichman, Chain, Zweben, & Swain, 2003), job performance (Barrick & Mount, 1991), and participation in sports (Freixanet, 1999; O'Sullivan, Zuckerman, & Kraft, 1998). As usage of the Internet is regularly engaged in by many individuals in all walks of life, (NTIA Release, 2000), it is a logical area to investigate from a personality perspective, particularly since level of usage is often discretionary rather than mandated, and thus more likely to reflect personal motives, needs, values, preferences and other personality attributes.

In addition, from the perspective of individual development, personality precedes many of the other variables that can and have been studied in relation to the Internet, including attitudes toward the Internet (Lavin, Marvin, McLarney, Nola, & Scott, 1999), computer expertise (Blair, O'Neil, & Price, 1999), computer training (Rozell & Gardner, 1999), time management (Brenner, 1997), social support (Shaw & Gant, 2002), lifestyle characteristics (Ho & Lee, 2001), advertising beliefs (Korgaonkar, Silverblatt, & O'Leary, 2001), tutoring systems (Wheeler & Regian, 1999), information support (Scull, 1999), collaborative knowledge (Chung, O'Neil, & Herl, 1999), innovation adoption factors (Shelley, 1998), and computer anxiety (Chua, Chen, & Wong, 1999) and other computer-related affective states (Coffin & MacIntyre, 1999). From the standpoint of creating a meaningful knowledge base in this area, it is important to establish first whether personality traits account for variation in Internet usage, and which traits are relatively more important. It will then be important to assess which variables explain additional variance in Internet usage above and beyond that accounted for by personality traits.

The present study addresses the relationship between personality traits and Internet usage. It is important to consider first the issue of what personality traits to investigate in relation to Internet usage, since there are so many different traits to choose from in the broader psychological literature. Fortunately, there is a general consensus regarding the Big Five model as a unified, parsimonious conceptual framework for personality (Digman, 1990, 1997; Wiggins & Trapnell, 1997). Empirical studies have verified the overall factor structure and integrity of the Big Five constructs of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism in many different settings and areas of inquiry (Costa & McCrae, 1994;
De Raad, 2000). We therefore chose to examine the Big Five traits in relation to Internet usage.

There is, however, a growing debate about whether validity relationships can be enhanced by considering narrow personality traits in addition to the broad, Big Five constructs (e.g. Ashton, 1998; Ones & Viswesvaran, 2001; Paunonen, Rothstein, & Jackson, 1999; Schneider, Hough, & Dunnette, 1996). For the present study, we used two criteria to select narrow traits likely to add variance beyond the Big Five: (1) trait definition and meaning not readily subsumed by accepted Big Five taxonomies (e.g. De Raad, 2000; Digman, 1990); and, since our study involves college students, (2) established, empirical relationships with academic performance. Based on prior research by the second author (Lounsbury et al., 2003; Lounsbury, Loveland, & Gibson, 2002), we selected three narrow traits for inclusion in the present study – Optimism, Tough-Mindedness, and Work Drive. These traits can briefly be summarized as: Optimism – a generalized predisposition toward positive expectations, Tough-Mindedness – appraising information and making decisions based on logic and facts rather than feelings and intuition, and Work Drive – disposition to work long hours and expend extra time and effort to meet achievement-related goals (for more detailed definitions, see Lounsbury & Gibson, 2002; Lounsbury et al., 2002).

Before turning to the specific objectives of the present study, we consider the extant research on personality traits and Internet usage. Scealy et al. (2002) found that shyness was related to specific types of Internet usage. Leung (2002) found that loneliness was not significantly correlated with usage of the online instant messaging program, ICQ (“I seek you,”), but was related to amount of self-disclosure. Armstrong, Phillips, and Saling (2000) found that low self-esteem was related to heavy Internet usage. Hamburger and Ben-Artzi (2000) found that extraversion and neuroticism were related to different types of Internet usage.

Research Questions

We addressed three research questions:

1. Are the Big Five personality traits related to Internet usage (including overall usage and usage by category)?
2. Are the narrow personality traits of Optimism, Tough-Mindedness, and Work Drive related to overall Internet usage?
3. Do the narrow traits add incremental validity beyond the Big Five traits in accounting for overall Internet usage?

2. Methods

2.1. Participants

The research setting for this study was a large state university in Tennessee, with 117 undergraduates in a lower-division psychology course serving as participants, with 41% male, 59% female; 24% aged 18 years, 44% 19 years, 15% 20 years, 8%
21 years, and 9% 22 years or more; 82% Caucasian, 9% African–American, 1% Hispanic, 4% Asian–American, and 4% “Other.”

2.2. Measures

2.2.1. Personality

The measure of personality, the Adolescent Personal Style Inventory or APSI (Lounsbury et al., 2003) is applicable for adolescents through college age and incorporates measures of the Big Five traits of Openness, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability as well as the narrow traits of Optimism, Tough-Mindedness, and Work Drive (for further details, see Lounsbury et al., 2003).

Variables for the personality traits consisted of summed scores based on individual items set on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) with a midpoint of 3 (neutral/undecided).

2.2.2. Internet usage

In view of the ease of usage and validity of self-reported Internet usage (Deane, Podd, & Henderson, 1998), we measured usage of the Internet as a self-report item on an eight-point scale with response choices as follows: (1) less than 1 h per week, (2) less than 5 h per week, (3) less than 1 h per day, (4) at least 1 h per day, (5) between 1 and 3 h per day, (6) between 3 and 5 h per day, (7) between 5 and 10 h per day, and (8) more than 10 h per day.

Following previous research which broadly categorizes types of Internet usage (Hamburger & Ben-Artzi, 2000; O’Dell, Korgen, Schumacher, & Delucchi, 2000), we asked respondents to indicate the percent of time they typically spent each week on the Internet that was devoted to: Communication (including E-mail and Chat), Leisure (including music, role-playing, shopping), and Academic (research, course participation on-line).

2.3. Procedure

Approval to conduct this research was secured from the university Institutional Review Board. Participants were recruited by posting a signup on a bulletin board in the campus Psychology building. Students were offered extra credit for their participation. Students met with an experimenter in various buildings across campus, where informed consent forms and the questionnaires were distributed. After signing the informed consent forms, participants took the questionnaire.

3. Results

Table 1 displays the coefficient alphas for the eight personality variables along with their intercorrelations and correlations with overall Internet usage. Five person-
Ality traits were significantly negatively related to total Internet usage: Agreeableness ($r = -0.23$, $p < 0.05$), Conscientiousness ($r = -0.21$, $p < 0.05$), Extraversion ($r = -0.21$, $p < 0.05$), Optimism ($r = -0.22$, $p < 0.05$), and Work Drive ($r = -0.26$, $p < 0.01$). Also, Tough-Mindedness was positively correlated with Internet usage ($r = 0.20$, $p < 0.05$).

To examine the question of incremental validity of the narrow personality traits in relation to the Big Five in predicting Internet usage, we performed a hierarchical regression analysis in which the Big Five measures were allowed to enter stepwise in a set, followed by the three narrow traits measures which were allowed to enter stepwise in the second set. As can be seen in Table 2, the results of this analysis revealed that Extraversion and Conscientiousness significantly entered the equation to predict Internet usage with a multiple correlation of $R = 0.285$ ($p < 0.01$). In the second step, Work Drive significantly entered the equation producing a multiple correlation of $R = 0.349$ ($p < 0.01$). The two Big Five traits of Extraversion and Conscientiousness together accounted for 8% of the variance in Internet usage, with Work Drive adding an additional 4% of the variance in Internet usage.

Table 3 displays the correlations between the eight personality variables and the percent of time spent in the three categories of Internet usage – Social, Leisure, and Academic. Conscientiousness and Work Drive were both significantly and negatively

<table>
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<tr>
<th>Table 1</th>
<th>Coefficient alpha’s and intercorrelations of study variables</th>
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<tbody>
<tr>
<td>(1) Agreeableness (0.70)</td>
<td>(2) Conscientiousness (0.84)</td>
</tr>
<tr>
<td>Agreeableness (1)</td>
<td>0.24**</td>
</tr>
<tr>
<td>Conscientiousness (2)</td>
<td>0.02</td>
</tr>
<tr>
<td>Emotional stability (3)</td>
<td>0.24**</td>
</tr>
<tr>
<td>Extraversion (4)</td>
<td>0.27**</td>
</tr>
<tr>
<td>Openness (5)</td>
<td>0.15</td>
</tr>
<tr>
<td>Optimism (6)</td>
<td>-0.09</td>
</tr>
<tr>
<td>Tough-mindedness (7)</td>
<td>0.35**</td>
</tr>
<tr>
<td>Work drive (8)</td>
<td>(0.80)</td>
</tr>
<tr>
<td>Internet usage (9)</td>
<td>_</td>
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</tbody>
</table>

*n = 117. Values in the diagonal represent Cronbach’s coefficient alpha reliability coefficient.

* $p < 0.05.$  
** $p < 0.01.$

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Results of multiple regression analysis with Big Five and Narrow Traits predicting Internet usage</th>
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<tbody>
<tr>
<td>Step</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Big Five traits (Extraversion, Conscientiousness)</td>
</tr>
<tr>
<td>2</td>
<td>Work Drive</td>
</tr>
</tbody>
</table>

*n = 117.  
* $p < 0.05.$  
** $p < 0.01.$
related to percent of Internet time spent on Leisure \( (r = -0.18, p < 0.05 \) and \( r = -0.24, p < 0.01 \), respectively), whereas Conscientiousness was significantly, positively related to percent usage for Academic purposes \( (r = 0.18, p < 0.05) \).

4. Discussion

The present results showed that three of the Big Five personality traits – Agreeableness, Conscientiousness, and Extraversion – were inversely related to Internet usage. In other words, more introverted, less agreeable, and less conscientious students engaged in higher levels of Internet usage. In view of the conceptual specification of the construct of Introversion–Extraversion, there are several possible explanations for this result: More extraverted students may be spending their discretionary time in more social activities that do not involve computer or Internet usage. Conversely, introverted students may have more free time to engage in Internet usage or they may be more attracted to Internet usage because it is an activity where they can focus their attention and quietly immerse themselves in what is essentially solitary behavior. Further explanation of this finding is a topic that could be addressed by future research.

The negative relationship between Agreeableness and Internet usage may reflect students who do not get along well with other students choosing to spend more time on the Internet rather than in interpersonal settings, or they may be less frequently sought out for group activities by other students and, thus, have more time available for Internet usage compared to students scoring higher on Agreeableness. Also, unlike face-to-face interpersonal settings, there are relatively few demands for agreeable behavior on the Internet, even in E-mail exchanges and chat rooms, which would make this environment more fitting for less agreeable students.

The negative relationship between Conscientiousness and Internet usage is interesting and raises several questions. Let us first consider what this finding means:

### Table 3

<table>
<thead>
<tr>
<th>Percent time spent on</th>
<th>Communication</th>
<th>Leisure</th>
<th>Academic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreeableness</td>
<td>0.01</td>
<td>-0.06</td>
<td>-0.02</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.01</td>
<td>-0.18*</td>
<td>0.19*</td>
</tr>
<tr>
<td>Emotional stability</td>
<td>-0.10</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.07</td>
<td>-0.12</td>
<td>0.10</td>
</tr>
<tr>
<td>Openness</td>
<td>-0.02</td>
<td>-0.17</td>
<td>0.10</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.02</td>
<td>-0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td>Tough-mindedness</td>
<td>-0.09</td>
<td>0.12</td>
<td>-0.10</td>
</tr>
<tr>
<td>Work drive</td>
<td>0.06</td>
<td>-0.24**</td>
<td>0.10</td>
</tr>
</tbody>
</table>

\( n = 117 \).

\* \( p < 0.05 \).

\** \( p < 0.01 \).
Based on commonly accepted conceptualizations of the Conscientiousness construct (e.g., De Raad, 2000), we interpret this result as indicating that students who are more rule-following, organized, reliable, and structured report lower levels of Internet usage than less conscientious students. Why might this be? One possible explanation is the wide-open, unstructured environment of the Internet with its absence of rules and policies (Kiesler, Siegal, & McGuire, 1984; King, 1999) may appeal more to less conscientious students. In this regard, the Internet may be a better fit with their personality. Or, it may be that more conscientious students are more engaged in structured activities like participation in clubs and organizations, studying for classes, writing papers, etc. In support of this idea, we note that Conscientiousness was positively related to relative Internet usage for Academic purposes, but negatively related to relative usage for Leisure functions. It should be noted that many student activities reflecting Conscientiousness, such as writing papers and storing class notes, may involve computer usage but not Internet usage. One topic for future research would be to examine whether a similar relationship to Conscientiousness holds for computer usage as distinct from Internet usage. A broader topic of interest would be to investigate personality-Internet usage in terms of person–environment fit, where perceptions of the Internet are related to personality attributes.

Consistent with other areas of personality research (e.g., Moberg, 1998; Paunonen & Ashton, 2001; Paunonen & Nicol, 2001; Schneider et al., 1996), the present results show that narrow personality traits are also related to Internet usage and, in the case of Work Drive, add significantly to the prediction of Internet usage above and beyond the Big Five traits. More specifically, we can interpret the narrow-trait relationships as indicating that students who are more pessimistic, tender-minded, and disinclined to work hard academically used the Internet more frequently. Although many possible explanations for each of these findings might be advanced, we offer the following: First, more pessimistic students might be attracted to Internet usage to confirm their negative expectations or to share perceptions and beliefs with like-minded pessimists. In this vein, at least one observer has noted that Internet supporters have a pessimistic disposition (Godrich, 2003). Second, students who are more tough-minded may be more likely to engage in Internet usage because it is an arena where feelings and sentiments do not come much into play and one can base one’s actions on logic, facts, and critical thinking. Third, the negative relationship between Work Drive and Internet usage may simply reflect that students who spend a lot of time on the Internet do so at the expense of time that could be spent studying hard and exerting extra effort to make good grades. Indeed, the significant negative correlation between Work Drive and percent Internet time classified as Leisure supports the notion that Internet usage is motivated by non-work (i.e., leisure) pursuits. Also, frequent Internet usage may not be functional for more hard-working students. Along these lines, employees who engage in non-essential Internet usage on the job have been considered as having a lower work ethic (Ritterskamp, 2003).

Overall, the results of the present investigation have demonstrated the relationship of selected Big Five personality traits as well as narrow personality traits to Internet usage. At present, researchers in this area may well choose to study all
of the Big Five traits, because different results may emerge in different research contexts and because use of the Big Five affords researchers a common vocabulary and metric for understanding personality dynamics across a wide range of settings (c.f. Mershon & Gorsuch, 1988). On the other hand, the present findings also indicate that researchers who want to maximize validity relationships should include narrow personality traits in addition to the broad Big Five factors. We recommend that researchers in this area consider using “multidimensional composites” (Pau- nonen & Nicol, 2001), comprised of both broad traits such as the Big Five and narrow personality measures. Future research on individual dispositions related to Internet usage can potentially explore a variety of narrow personality traits, too numerous to catalog here. In addition, the use of personality dimensions contextualized to computer as well as Internet usage may prove useful in elaborating validity relationships in this area of inquiry (see, e.g., Schmit, Ryan, Stierwalt, & Powell, 1995).

There are several limitations of the present study. First, the study was limited to psychology undergraduate students at a single university. Also, the sample size was modest and did not permit disaggregated analyses by other demographic/personal factors such as sex, year in school, and intellectual ability. Third, we did not measure the actual amount of time spent in different areas of Internet usage, which could reveal different patterns of relationship to personality traits than percent of total time spent on the Internet. For example, 10% of time spent on the Internet for academic purposes may reflect very different psychological dynamics for someone who spends a few minutes a day on the Internet versus someone who spends several hours every day. Additionally, the participants were students seeking extra credit for completing the inventory, and we do not know if the findings are generalizable to students not receiving extra credit or to students who do not volunteer to participate. Finally, we were unable to ascertain if our measure of Internet usage was range-restricted in our particular sample, which could have lowered the magnitude of the observed correlations.

Further research is needed to verify, clarify, and extend the present results. In particular, it will be important to know if the relationships we observed can be replicated in both similar and different settings. Also, future research in this area may identify other narrow personality traits related to Internet usage, though we would recommend that such efforts include an examination of incremental validity beyond the Big Five. Finally, it will be interesting to see if the effects of other constructs and factors on Internet usage can be assessed after taking into account effects attributable to personality variables.

References


