

Personality Trait Predictors of Usage of Internet Services

Wee-Kheng Tan¹⁺ and Cheng-Yi Yang²

^{1,2} Dept of Information & Electronic Commerce, Kainan University, Taiwan

Abstract. This study investigated the relationship between personality traits and usage level of Internet services through the multiple regression method. Using 23 Internet services, this study provided a holistic picture of how personality traits affect usage level of Internet services and showed that these traits affect usage level differently. The characteristics of Internet services are a key reason for such an outcome. Usage level of Internet services which are popular, have been in existence for many years, necessary tools for accessing online, and passive leisure tools are likely to be free from the influence of personality traits. Hence, basic Internet applications such as email and search engine are least affected by personality traits of users. While personality may be an enduring feature of individuals, its impact on usage of Internet services may not always be consistent over time. Theoretical and marketing implications are discussed.

Keywords: Big Five, Personality Traits, Internet Services

1. Introduction

Personality is “the enduring emotional, interpersonal, experiential, attitudinal and motivational style that explains individual’s behavior in different situations” [1] (pp. 105). Big Five traits (openness to experience, conscientiousness, extraversion, agreeableness and neuroticism) [2-3] is a well-established and unifying framework to measure and understand personality traits.

Internet services are integrated into many people’s lives and change individual behaviour profoundly. In response, commercial entities have developed and introduced a wide variety of Internet services to capture the attention of Internet users.

Past studies have looked at how user’s personality influences Internet services usage. Very often, studies investigate how personality influences a particular Internet service, such as social networks [4], blogs [5], and fantasy computer role-playing games [6]. Some studies, such as [7-10] consider several Internet services in the same study but they are few in number. There is also a need for more updated study in view of the rapid growth of Internet services. Investigating a battery of Internet services simultaneously can provide a more holistic view of how personality affects Internet service usage. Nowadays, commercial entities do not provide Internet service in isolation but offer them as packages of services. Commercial entities also hope that users will use them as a package. Hence, analyzing many Internet services simultaneously is more relevant to the commercial entities.

This study revised and updated the list of Internet services and considered 23 Internet services in a single study. The purpose of this study is to investigate the extent to which the use of different Internet services is related to individual personality differences.

2. Literature Review

The Big Five traits are five broad personality traits that personality psychologists believe provide a full picture of an individual’s personality [1,3]. A brief description of these traits is:

⁺ Corresponding author. Tel.: + 886-3-341-2500; fax: +886-3-341-2373.
E-mail address: tanwk@mail.knu.edu.tw.

- Openness to Experience refers to individuals' receptivity to novelty and change. Individuals who are high in openness to experience trait tend to be curious and like to try new ideas.
- Conscientiousness refers to individuals who are rule-following, responsible, detail-oriented, like to plan ahead and persistent.
- Extraversion is related with heightened level of sociability. Individuals who are high in extraversion are energetic, bold, warmhearted and outgoing.
- Agreeableness is most concerned with inter-personal relationships. Individuals who are high in this trait tend to be friendly, considerate, accommodating, helpful and forgiving.
- Neuroticism deals with adjustment and emotional resilience when facing stress and pressure. Individuals who are high in neuroticism have higher anxiety level, discontented and emotional.

Personality has an impact on the way people place themselves along the "computing technology continuum of perspective" [11]. Agreeableness is positively associated with perceived usefulness of technology [12]. Big Five traits study has also been applied to individual Internet service. People who are high in neuroticism report lower level of Internet usage [13]. They are also likely to use the Internet to avoid loneliness [14]. Conscientiousness is negatively related to Internet addiction [15]. Extraversion, neuroticism and openness to experience are related to usage of social media [16]. Another study [17] revealed that extraversion and openness to experience are positively related to social media. A study by [18] found that extraversion and openness to experience are not as influential as previous literature would suggest for the case of Facebook usage. Among the Eysenckian personality dimensions, psychoticism is the only dimension related to forming new relationships and having "Internet only" friends; and extroversion is the only dimension related to maintaining long-distance relationships [19]. Neuroticism and conscientiousness can significantly predict provision of online product review [20].

There are some but few studies which look at how personality influences usage of a battery of Internet services. Classifying popular Internet services as social services, information services and leisure services, [8] examined the interaction of Eysenckian personality dimensions and Internet use. They found that for men, extraversion is positively related to leisure services and neuroticism is negatively related to information services. For women, extraversion is negatively related and neuroticism positively related to social services. Study [9] found that only modest associations exist between personality and three groups of computer activities (technical, information exchange and leisure). Grouping 16 Internet services as 4 factors (work, social, use-at-home, and leisure), [10] found that there are few significant associations between patterns of use and personality after controlling gender and age. Classifying Internet as communication, academic and leisure, [7] found that Internet usage is negatively related to agreeableness, conscientiousness, and extraversion.

3. Survey Design and Analysis

The Big Five traits of the participants were measured by the 44-item Big Five Inventory (BFI) instrument developed by [3]. The instrument includes 10 items for openness to experience, 9 for conscientiousness, 8 for extraversion, 9 for agreeableness, and 8 for neuroticism. Participants were asked to use a five-point Likert-type scale (from strongly disagree "1" to strongly agree "5") to describe their personality. BFI is scored by adding the answers to a series of eight to ten appropriate questions and taking the average. Participants were also asked to use six-point Likert-type scale to provide their view on how often they use the 23 Internet services, from never "1" to very frequent "6".

A total of 148 valid returns were received. The sample included 103 (69.6%) men, 134 (90.5%) singles, 120 (81.1%) were 20-30 year old. Participants included 133 (89.9%) who have received or now receiving tertiary education and 108 (73.0%) of them were students. Hence, the respondents are generally male, young and well-educated.

ANOVA test ($F=17.914$, $p=0.000$) showed that there is significant difference across the five personality traits (Table 1), with agreeableness having the highest mean (3.759) and neuroticism having the lowest mean (3.224). All the traits have high reliability with Cronbach's alpha ranging from 0.784 to 0.863.

Table. 1: Big Five Personality Traits.

	Items	Cronbach's Alpha	Mean	S.D.
Agreeableness	9	0.784	3.759	0.476
Openness to Experience	10	0.791	3.520	0.530
Extraversion	8	0.808	3.412	0.570
Conscientiousness	9	0.822	3.507	0.531
Neuroticism	8	0.863	3.224	0.659

Factor analysis was applied to the 23 Internet services. Six factors were extracted but 1 factor containing online games and finding new friends online was dropped because of low Cronbach's value. Factor analysis was re-run with KMO=0.811 and Bartlett Test of Sphericity being significant (1972.878, $p=0.000$). The final 5 factors extracted (loading ranging from 0.614 to 0.886, eigenvalue from 1.301 to 6.874, cumulative variance explained = 71.693%) were named as basic services, entertainment, social networking, transaction and finance (Table 2). Cronbach's alphas were of high reliability (0.700-0.907). ANOVA test ($F=127.587$, $p=0.000$) revealed there is significant difference across the five Internet services categories, with basic services having the highest mean (5.063) and finance having the lowest mean (1.896).

Table. 2: Internet Services.

	Cronbach's Alpha	Mean	S.D.
<u>Basic services</u> Email, search engine, instant messaging	0.700	5.063	0.947
<u>Entertainment</u> Online music, online movie, online radio	0.747	4.077	1.205
<u>Social networking</u> Write blogs, read blogs, write micro-blogs, read micro-blogs, write on social network sites (SNS), read from SNS	0.892	3.595	1.352
<u>Transaction</u> Buy from e-tailer sites, sell in e-tailer sites, auction on e-auction sites, sell in e-auction sites, group purchasing, use e- purchasing/auction service agents	0.907	2.331	1.176
<u>Finance</u> e-banking, e-tax reporting, e-investment	0.841	1.896	1.275

Table 3 presents the multiple-regression estimates of those personality traits which have significant effect on Internet services. Five sets of multiple-regression analyses were run for each category of Internet services as dependent variables and the five personality traits as the common independent variables. No multi-collinearity problem existed since the tolerance rates and VIF values met the requirements specified by [21].

Extraversion significantly affects social networking ($\beta = 0.356$), transaction ($\beta = 0.363$) and finance ($\beta = 0.278$) while neuroticism significantly affects social networking ($\beta = 0.235$) and transaction ($\beta = 0.196$) at the significance level of $p < 0.05$. Extraversion is consistently a stronger predictor than neuroticism in social networking and transaction.

Table. 3: Multiple Regression (Only Significant Results are Displayed).

	Dependable variable				
	Open	Conscientious	Extraversion	Agreeableness	Neuroticism
Basic services	-	-	-	-	-
Entertainment	-	-	-	-	-
Social networking	-	-	$\beta=0.356^*$, $t=3.483$	-	$\beta=0.235^*$, $t=2.912$
Transaction	-	-	$\beta=0.363^*$, $t=3.588$	-	$\beta=0.196^*$, $t=2.453$
Finance	-	-	$\beta=0.278^*$, $t=2.740$	-	-

Note: Open – openness to experience; Conscientious – conscientiousness; β - standardized β ; $*p < 0.05$

4. Discussion

Basic services category use is not affected by any personality traits. The components of basic services category (email, search engine and instant messaging) are also the top three most frequently-used services. Entertainment is the next most frequently-used category and two of its components (online music and online movie) are also highly used, only after email, online search and instant messaging. Hence, it can be deduced that the usage level of Internet services with characteristics of having been with us for a long time, simple, basic services required for surfing the Internet, popular, low-involvement type, low risk and general online leisure activities is not likely to be influenced by the personality of users.

If Internet services do not have the above characteristics, it is probable for personality to affect the usage level. This is observed in the transaction, social networking and finance categories. Their usage level is all lower than the basic services and entertainment categories. Transaction involves risk while some social network sites, such as Facebook serves as “social extension” in the online world. For online finance category, there are also many viable, familiar and though-to-be safer substitute services in the offline world. These characteristics cause these Internet services to have riskier and higher involvement content than the basic services and entertainment categories, allowing user’s personality a role in deciding how often to use these services.

Even though personality traits influence usage frequency of transaction, social networking and finance categories, there is a difference in which personality trait is influential. Neuroticism affects transaction and social networking positively. This result suggests that the online world enables individuals high in neuroticism to search for product information, compare products and find sellers more easily, hence reducing the anxiety of purchasing products online. There are also more potential buyers in the online world than in the offline world, hence reducing sellers’ anxiety. Individuals high in neuroticism can make voicing their experience a conduit to reduce their anxiety or reading other people experience to encourage themselves.

Extraversion trait affects transaction, social networking and finance categories. Extraversion is related to heightened level of sociability. Hence, its impact on social networking is not surprising. Being bold, a facet of extraversion, can explain why individual high in extraversion are more daring to perform financial transaction online. This research generally contradicted [7] which the latter study found that more introverted students engaged in higher levels of Internet usage. A possible explanation is Internet usage is already a daily routine for many individuals, so much so that both extraverted and introverted users use Internet though possibly with different purposes.

Many previous research associates personality with a particular Internet service. This study is one of the few studies which consider many Internet services simultaneously. Given the rapid evolution of Internet services, this study also serves as a timely update. By considering bundles of Internet services, this study is able to fill the literature gap, contributes to the theoretical angle and allows one to draw more holistic results linking personality traits to characteristics of Internet services. Our theoretical contributions are as follows. Firstly, personality does contribute to usage frequency of Internet services. Secondly, Internet services which have been with us for a long time, simple, basic services required for surfing the Internet, popular, low-involvement type, low risk and general online leisure activities are less likely to be influenced by the personality of users. Thirdly, while personality may be an enduring feature of individuals, its impact on Internet services use may not always be consistent over time. One will have to consider how long the Internet services have been with us and to what degree they have penetrated our daily life.

From the marketing perspective, website operators can use the types of Internet services frequently used by the users to deduce their personality. Using this piece of information, the operators can think of better strategies to satisfy their customers. Openness to experience does not have an impact on Internet services. Since this trait involves preference for new ideas, it shows that these Internet services do not attract this group of people. This result should be read in the context that the respondents of this study are mostly students. This group of users are often fairly technologically savvy and has a high level of Internet familiarity [22]. Hence, this study is a reminder to website operators to come up with more innovative rather than copy-cat Internet services to attract this type of users.

This research is limited by the relatively small sample size. The respondents are generally male, young and well-educated. Despite the limitations, the study is still able to provide useful and noteworthy insights. Future study can include a larger and more broader-based sample. This study showed that characteristics of Internet service can determine whether personality has an impact on usage level. Future study can examine the relationship between personality and these characteristics in greater detail. While personality may be an enduring feature of individuals, its impact on usage of Internet services may not be consistent over time. Future study can focus on two or three Internet services and perform a longitudinal study to look at this issue.

5. References

- [1] R.C. Rose et al. Expatriate performance in overseas assignments: The role of Big Five Personality. *Asian Social Science*. 2010, **6**(9): 104-113.
- [2] P.T.J. Costa, R.R. McCrae. Four ways five factors are basic. *Personality and Individual Differences*. 1992, **13**(6): 653-665.
- [3] O.P. John, S. Srivastava. The big five: History, measurement, & development. In: L.A. Pervin, O.P. John (eds.). *Handbook of Personality: Theory & Research*. New York: Guilford Press. 1999, pp. 102-138.
- [4] Y.A. Hamburger, G. Vinitzky. Social network use and personality. *Computers in Human Behavior*. 2010, **26**: 1289-1295.
- [5] R E. Guadagno et al. Who blogs? Personality predictors of blogging. *Computers in Human Behavior*. 2008, **24**: 1993-2004.
- [6] A.E. Park, T.B. Henley. Personality and fantasy game character preferences. *Imagination, Cognition and Personality*. 2007, **27**(1): 37-46.
- [7] R.N. Landers, J.W. Lounsbury. An investigation of Big Five and narrow personality traits in relation to Internet usage. *Computers in Human Behavior*. 2006, **22**: 283-293.
- [8] Y.A. Hamburger, E. Ben-Artzi. The relationship between extraversion & neuroticism & the different uses of the Internet. *Computers in Human Behavior*. 2000, **16**(4): 441-449.
- [9] R.J. Swickert et al. Relationships among Internet use, personality, and social support. *Computers in Human Behavior*. 2002, **18**: 437-451.
- [10] P. Hills, M. Argyle. Uses of the Internet and their relationships with individual differences in personality. *Computers in Human Behavior*. 2003), **19**: 59-70.
- [11] R.D. Johnson et al. Differential social attributions toward computing technology: An empirical investigation. *International Journal of Human-Computer Studies*. 2006. **64**(5): 446-460.
- [12] S. Devaraja et al. How does personality matter? Relating the Five Factor Model to technology acceptance and use. *Information Systems Research*. 2008, **19**(1): 93-105.
- [13] T. Tuten, M. Bosnjak. Understanding differences in web usage: The role of need for cognition and the five factor model of personality. *Social Behavior and Personality*. 2001, **29**: 391-398.
- [14] S. Butt, J. G. Phillips. Personality and self reported mobile phone use. *Computers in Human Behavior*. 2008, **24**(2): 346-360.
- [15] L.L. Yang, M. Liu. The relationship between adolescents' conscientiousness, Internet service preference and Internet addiction. *Psychological Science*. 2006, **29**(4): 947-950.
- [16] J. Zywica, J. Danowski. The faces of Facebookers: Investigating social enhancement & social compensation hypotheses. *Journal of Computer-Mediated Communication*. 2008, **14**(1): 1-34.
- [17] T. Correa et al. Who interacts on the Web? The intersection of users' personality & social media use. *Computers in Human Behavior*. 2010, **26**: 247-253.
- [18] C. Ross et al. Personality & motivations associated with Facebook use. *Computers in Human Behavior*. 2009, **25**(2): 578-586.
- [19] L.P. Tosun, T. Lajunen. Does Internet use reflect your personality? Relationship between Eysenck's personality dimensions and Internet use. *Computers in Human Behavior*. 2010, **26**: 162-167.

- [20] S. Picazo-Vela et al. Why provide an online review? An extended theory of planned behavior & the role of Big-Five personality traits. *Computers in Human Behavior*. 2010, **26**(4): 685-696.
- [21] J.F. Hair et al. *Multivariate Data Analysis* (5th ed.). Prentice Hall, 1998.
- [22] R.J. Nathan et al. Key usability factors of service-oriented web sites for students: An empirical study. *Online Information Review*. 2008, **32**(3): 302-324.