Individual Differences In Internet Usage Motives

Tel Amiel

Thesis submitted to the Faculty of the Virginia Polytechnic
Institute and State University in partial fulfillment of
the requirements for the degree of

Masters of Arts
In
English

Stephanie Lee Sargent, Chair
James B. Weaver III
James M. Dubinsky

June 13, 2002
Blacksburg, Virginia

Keywords: Individual Differences, Personality, Internet,
Usage Motives, Usability

Individual Differences In Internet Usage Motives

Tel Amiel

Abstract

The relationship between the psychobiological model of
personality types (psychoticism, extraversion, and
neuroticism) devised by Eysenck & Eysenck (1985) and
Internet use and usage motives was examined. A sample of
210 undergraduate students were asked to report on their
motives for using the Internet and how often they engaged
in a variety of Internet and web-based activities. The
findings demonstrate distinctive patterns of Internet use
and usage motives for those of different personality types.
Specifically, those scoring high in neuroticism reported
using the Internet to feel a sense of "belonging" and to be
informed. Extraverts rejected the communal aspects of the
Internet, and made more instrumental and goal-oriented use
of Internet services. Finally, those scoring high in
psychoticism demonstrated an interest in more deviant,
defiant, and sophisticated Internet applications. The role
of personality in audience segmentation research is
discussed along with implications of the findings in
usability and interface design. Suggestions for future
research are included.

Table of Contents

Introduction

Audience Segmentation

In the past decade, the growth of the Internet, has been undeniable, affecting the way people communicate, interact, and gather information. According to 2002 estimates, more than 400 million people use the Internet (Nielsen//Netratings, 2002), testifying to the swiftness with which this network of computers has changed the way we live and will continue to live. During the past two decades the Internet has risen from a governmental and educational system to a medium supporting high-speed video, audio, and text communication between ordinary people around the world, changing our social life and the way we communicate (cf. Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay & Scherlis, 1998).

Communication researchers have recognized the importance of studying the Internet as a communication medium (Newhagen & Rafaeli, 1996), but the study of motivations and behaviors associated with Internet use is limited (Bourdeau, Chebat & Couturier, 2002). As a communication medium, the Internet is particularly complex and intricate, allowing both mass and mediated interpersonal communication (Morris & Ogan, 1996). It can function as a mass medium much like television and radio, streaming endless quantities and qualities of audio and video to an individual user or a larger audience. It allows users to

converse with others within a group, or individually, using any combination of text, audio, and video channels.

As with any other medium, such as over-the-air television, radio, and new media (particularly, those involving the Internet, multi-media, and interactive environments; see Webster & Phalen, 1997; Vorderer, 2000), researchers and marketing groups have a vested interest in understanding and categorizing users and their interactions with the medium and its content. As Webster (1989) described: "it seems likely that the assessment of exposure will be pivotal in determining their (new media) economic survival and gauging their social significance" (p. 3).

Traditional audience measurements such as demographic and psychographic segmentation can be applied to new media, but "such transplanted methods are not always successful" (Webster, 1989, p. 3; see also, Webster & Phalen, 1997). Psychographics and demographics have also been criticized for their often poor predictive qualities and seeming difficulty in interpreting results (Beville, 1988; Eastman, 1989).

The use of personality types as predictors of media exposure has arisen as viable alternatives to traditional audience segmentation constructs (Weaver, 2000). As stable constructs (McCrae & Costa, 2000), personality traits and types should, not only provide a reliable segmentation scheme, but also provide increased predictive validity. Recent research has

shown that personality, as a measure of individual differences, has been strongly connected to television viewing motives (Weaver, 2001). Since media analysts use traditional audience measurements to identify and segment not only the television audience, but the Internet audience as well, it is expected that personality dimensions can extend our understanding of the Internet audience beyond the limitations of current methodologies.

The question addressed by this study becomes: do personality types serve as discriminators of Internet use? More specifically, do patterns or profiles of uses and gratifications expected from the Internet differ significantly as a function of personality?

Theoretical Considerations

Uses and Gratifications

Communication researchers have advanced the framework of "uses and gratifications" as a robust and comprehensive paradigm of the interaction between the audience (or user) and media.

According to Katz, Blumer, and Gurevitch (1974), uses and gratifications research is "concerned with (1) the social and psychological origins of (2) needs, which generate (3) expectations of (4) mass media or other sources, which lead to (5) differential patterns of media exposure (or engagement in other activities, results in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones" (p. 20). Central to the paradigm is the postulation that the audience is mostly active in their exposure to media, in other words, *choosing to attend* to a particular channel or program because of a certain need or motivation, and not simply by happenstance. Though this postulation has received considerable criticism (Elliot, 1974), research has provided support to the principle that media exposure is at least partially purposive (Levy & Windall, 1984).

Considering that social and psychological needs are at the defining factors of purposive media exposure, an examination of these factors should prove useful in determining patterns of media exposure and prediction of media use. Of particular

interest, is the role of psychological and social factors in exposure to the Internet, its content, and the many tools used to navigate and exchange information within this medium.

Segmentation Schemes

The most traditional method used to analyze the audience to a particular medium is that derived from demographic data, such as age, sex, and gender. Media analysts such as Nielsen, Simmons, and Arbitron publish the results of their demographic segmentation schemes, which are used by media institutions and marketing agencies to define programming and advertising targeted at a particular age group, gender, or income level. Demographic segmentation was considered adequate when a small number of media outlets dominated programming (e.g. the 3 big networks for television). But as mass media expanded and produced diverse programming, many "foundations, academics, media critics, and many in public television believe that the quantitative services used in commercial TV are seriously deficient in defining audience reactions" (Beville, 1988, p. 132; see also Hustad & Pessemier, 1974). Demographic separation has traditionally depended on binary differentiation, identifying whether an individual of a particular age or sex is attending to the media, or not. Attention is an important audience measurement, but is limited in its elucidation of

motivations leading to media use, and the consequences associated with media exposure. Furthermore, demographic segmentation leads to the concept of an "ideal audience" (Eastman, 1989, p. 136), a targeting of programs to those in a particular age group, or of a particular gender, who are more prone to purchasing products pitched through advertisements. In other words, networks have a vested interest in those belonging to demographic segments with more purchasing power. This in turn leads to rather limited content, targeted only at the high consumer, while tending to ignore other viewers.

Though demographic data has shown descriptive value, "research using traditional socio-demographic background variables has proved singularly unrevealing when applied to the consumption of the mass media and especially television" (Elliot, 1974, p.250). Since the Internet allows for the creation of virtually unlimited media outlets (individual or corporate), the suitability of demographic segmentation should only decrease (Webster, 1989).

Because of the limitations of demographic research, qualitative measures of media use were introduced. Though a specific definition of what "qualitative" measures represent is not clear, qualitative queries focus on user *reactions and reasons* rather than *attention* to different media, using measures such as: overall opinion of a newspaper (good, average, poor)

and how or why the newspaper is read (advertising is useful) (Simmons Report, 1994). Moreover, qualitative inquiry enhances our understanding of the qualities and intricacies of the *user.*

Qualitative measures can also tap into audiences' likes, dislikes, and attitudes, focusing on psychological rather than physical/social distinctions. These measures, termed *psychographic*, do not categorize the user according to age or origin, but instead, attempts to divide the population according to particular beliefs, values, and interests. Psychographic categorizations, such as those based on lifestyles and values have suffered from the lack of a consistent operationalization. A variety of instruments to measure values and lifestyles are available, such as the Values and Lifestyles Scales (VALS; Mitchell, 1981), Rockeach Value Scale (RVS; Rockeach, 1973), and List of Values (LOV; Kahle, L. R., Beatty, S. E., & Homer, P. 1986). Still, many researchers have created their own instruments and measures of lifestyles and values, adding to the uncertainty associated with this construct and limiting the generalizability and usefulness of the results.

Following the uses and gratifications framework, Frank & Greenberg (1980) developed an audience segmentation scheme based on audiences' interests and needs, developed from an exploratory and exhaustive measure of all possible media interests and leisure activities, such as sports and drama. As the authors

readily disclose though, "one can make an argument for including virtually any interest or need" (p. 39) in a categorization such as this.

Similarly, Hornik and Schlinger (1981) examined the role of psychographics and lifestyles as predictors of media time use (MTU). The researchers rejected any previous operationalization of lifestyles as "based on unrepresentative respondent samples and a relatively small number of lifestyles dimensions" (p. 344). Even though the authors cite Frank and Greenberg's segmentation as an exception, a new categorization of lifestyles defined by a "broad battery of items" (p. 344) was used instead.

Lifestyles have also been used as a segmentation tool in marketing and purchasing research. Wasnik & Park (2000) used lifestyle categories to differentiate between heavy and light consumers using descriptors such as *outdoorsy*, *pet lover*, and *active lifestyle*.

Others have attempted to correlate personal values using terms such as "security" and "freedom" to segment media users. Values are construed as fairly stable individual characteristics and, as such, could help predict future behavior and patterns of media exposure (Kamamura & Mazzon, 1991).

In their study of the influence of values and demographics in media exposure and selection, McCarty & Shrum (1993), using the RVS, suggest that individual values play an important role

in mediating television viewing but conclude that "segmentation on values data alone may be problematic. Given that the interrelationships among demographics, values, and behavior are quite complex, segmentation schemes that employ both demographics and values may be the most fruitful" (p. 11). Though RVS has been widely used in marketing and segmentation research, it has received criticism for its limitations in "aggregate analysis and comparisons between individuals" (Kamamura & Mazzon, 1991, p. 209).

The predicament of psychographic segmentation can be partially blamed at the method by which categories originate. Demby (1974) suggest three methods to create psychographic categories: the researcher's imagination, group session and in-depth interviews, and a review of the literature. While these suggestions can be constructive, if psychographic measures are to be exhaustive and inclusive, researchers must turn to more systematic and wide-ranging inspection methods.

Psychographic measures have divided the audience into categories by differentiating lifestyles and values containing measures which are chosen rather haphazardly, in an attempt to "exhaust" all possible classification categories, limiting the generalizability of results. Moreover, most psychographic categories do no more than extend demographic taxonomies to include personal preference or attitudinal measures that are in

turn, associated back to assorted demographic categories, showing a continued reliance on the limited predictive value of demographic measures.

It comes as no surprise then, that psychographic research has received little industry support because of high costs, limited predictive values, and seeming difficulty in interpreting results (Beville, 1988; Eastman, 1989). Indeed, as Frank & Greenberg (1980) conclude of research in audience segmentation: "coefficients of determination for almost any aspect of individual behavior using variables such as demographics or other general interest measures as predictors are typically quite low" (p. 219), attesting to the limited success of traditional psychographic segmentation research.

Nevertheless, a combination of psychographic and demographic classification, though limited in its explanatory value, is more successful as a predictive measure than the latter alone (Frank & Greenberg, 1980; Hornick & Schlinger, 1981).

Wind & Green (1974) criticized psychographic research, concluding that lifestyle segmentation projects could end up "as a rather *ad hoc* and isolated exercise, requiring repetition each time a new problem arises" (p. 102). Still, the authors highlight that a "hierarchy of predictor variables – e.g. physiological, mental, demographic, values, interests,

activities, benefits sought – sounds like it might be worth
exploring" (p. 102).

Personality and Individual Differences

Given the limitations of traditional psychographic
research, the use of personality variables has been seen as a
more functional and efficient approach to looking at the
audience. The role of personality as a mediator and predictor of
media use has been investigated in a number of media studies,
including music videos (Robinson, Weaver, & Zillmann, 1996),
movies (Weaver, Brosius, & Mundorf, 1993), television, movies,
and music (Weaver, 1991), television remote control use (Weaver,
Walker, McCord, & Bellamy, 1996), and media violence (Zillmann &
Weaver, 1997), suggesting that personality traits should,
indeed, be an essential part of media gratifications research
(Wober, 1986; Weaver, 1991). A recent review of personality
research in mass media studies shows increasing data suggesting
a connection between individual characteristics and consumption
of media fare (Weaver, 2000).

A significant part of the study in the psychology of media
use has been focused on the role of personality and individual
differences. Rosengren (1974) identified individual differences
as a principal component of any paradigm for media uses and
gratifications research, concluding that incorporating

personality variables into such research seemed almost "self-evident" (p. 273). Indeed, individual differences and their psychological characteristics have been consistently placed within an integrated media gratifications model (Rosengren, 1974; Palmgreen, Wenner, & Rosengren, 1985). Early ventures into the study of personality as a factor affecting media exposure suffered from the lack of reliable operationalizations of personality variables (see Weaver, 2000), leading to inconsistent results (see Wober, 1986). In order to serve as useful predictors of media selection and perception, personality traits, much like demographic characteristics, must be organized into a finite number of categories; therefore, a reliable operationalization of personality traits is needed.

Of the many traits taxonomies used in personality research, the psychobiological model developed by Eysenck & Eysenck (1985) has been most prominently used in mass media personality research, and has shown consistent results across a variety of cultures and samples (Eysenck & Eysenck, 1985; Barrett, Petrides, Eysenck, & Eysenck, 1998). Eysenck's model is based on the hierarchical organization of *traits* (such as sociability, anxiety, and creativity), which point to "more-or-less consistent and recurrent patterns of acting and reacting that simultaneously characterize individuals and differentiate them from others" (McCrae & Costa, 2000). Different individuals are

better represented by some traits then others, which is not to say that every individual action or reaction can be predicted based on personal traits. In other words: "traits are essentially dispositional factors that regularly and persistently determine our conduct in many different types and situations" (Eysenck & Eysenck, 1985, p. 17), as opposed to *states* which define temporary or "singular occurrences" (p. 17). For example, an individual described as cheerful will not be cheerful all the time; the descriptor points to the *predisposition* to be cheerful and the likelihood to act in a cheerful manner.

The correlation or clustering of traits leads to a personality type. Eysenck identified three personality types labeled neuroticism (N) as opposed to stability, extraversion (E) as opposed to introversion, and psychoticism (P) in opposition to impulse control (Eysenck & Eysenck, 1985). These three types have been connected to neurobiological factors such as the difference in cortical arousal in introverts and extroverts (Bartusek, Beeker, Diedrich, Naumann, & Meier, 1996; Eysenck & Eysenck, 1985) and psychopathologies, where extreme scores can represent psychopathy, dysthymia, hysteria, and other dysfunctions (Eysenck & Eysenck, 1985).

Extraversion relates to an individuals' "ability to engage the environment" (Clark & Watson, 1998, p. 403). Extraverts

display high levels of sociability, participation, and positive self-esteem (Weaver, 1998) and are characterized as sociable, lively, active, assertive, carefree, dominant, surgent, venturesome and sensation-seeking (Eysenck & Eysenck, 1985, p. 15). The extrovert is preoccupied with external appearance and how others perceive their actions.

Neuroticism identifies the degree to which an individual "perceives the world as threatening, problematic, and distressing" (Clark & Watson, 1998, p. 403). Those scoring high in the neuroticism dimension tend to display high anxiety and a negative self-image (Weaver, 1998). The neurotic type is composed of the first-order traits: anxious, depressed, guilt feelings, low self-esteem, tense, irrational, shy, moody, and emotional (Eysenck & Eysenck, 1985, p. 15). The neurotic values the comfort of their environment and dislikes the prospect of engaging in a setting beyond his or her control.

Both neuroticism and extraversion types are present within a variety of other trait taxonomies, and have shown a remarkable level of consistency with other personality measures, including those originating from a lexical rather than pathological or questionnaire-based construction, suggesting the validity and reliability of their measures (Zuckerman, 1988; Draycott & Klein, 1994; Avia, Sanz, Sánchez-Bernardos, Martínez-Arias, Silva, & Graña, 1995; Saggino, 2000).

Particular to Eysenck's model is the psychoticism factor, a third dimension to the trait taxonomy. Psychoticism points to an individual's level of egocentricity, autonomy, social deviance, and impulsivity (Weaver, 1998), and is characterized as aggressive, cold, egocentric, impersonal, impulsive, antisocial, unempathetic, creative, and tough-minded (Eysenck & Eysenck, 1995, p. 14). Individuals scoring high on the psychoticism scale show a disregard for authority and society's rules and regulations, exhibiting a need to be on the edge. Psychotics are unlikely to feel guilt, empathy, or sensitivity to the feelings of others (Eysenck & Eysenck, 1985; Richendoller & Weaver, 1999). In disagreement with Freud, Eysenck postulates the psychotic disorders are not merely quantitatively superior to neurotic conditions. Instead, psychoticism measures a completely different set of conditions, such as manic-depressive and schizoid disorders (Eysenck and Eysenck, 1985; Eysenck, 1998). Though present only on Eysenck's typology, Zuckerman (1988) has demonstrated supported for the anti-social and impulsive nature of the psychotic, showing high correlations between psychoticism and boredom susceptibility, autonomy, and risk taking (see also, Zuckerman, 1993).

A well-structured, high-ordered hierarchy of personality types can offer a more robust exploration of values and lifestyles as segmentation schemes. As Rockeach (1973) explains,

traits can be seen as reflections of values. For example, a person described as authoritarian, might consider obedience, cleanliness, and politeness as important values. Further examination of the connection of values and traits is limited, but Wiseman & Bogner (in press) have suggested that *attitudes* equate to traits (lower hierarchy), and *values* are associated with *types* (such as P, E, and N).

Researchers have also pointed to the correlation between a variety of lifestyle factors and personality types. Using a three-factor model (N/NE, E/PE, DvC; neuroticism/negative emotionality, extraversion/positive emotionality, disinhibition versus constraint), based on Eysenck's P, E, and N, Clark and Watson (1998) reported a striking disparity of substance abuse among college students of different personality types. Specifically, the authors found a higher positive relationship between marijuana, cigarette, psychedelic drug, and caffeine pill use by DvC college students ($\underline{r}$ = 0.23 to 0.33), as compared to their N/NE and E/PE counterparts ($\underline{r}$ < |0.10|). The authors also reported substantially higher correlations between alcohol use and DvC college students ($\underline{r}$ = 0.44), as compared to high N/NE ($\underline{r}$ = -0.04) and E/PE ($\underline{r}$ = 0.05) scorers.

It is clear then, that an intrinsic connection exists between the concepts of lifestyles, values, and personality types. Instead of "doing away" with other typologies, the

examination of personality dimensions as a segmentation scheme can also advance our understanding of psychographics, particularly when examining the connections between personality dimensions, values, and lifestyles.

Personality and Media Use

Because of their stable qualities and rich construction, personality traits (and consequently, personality *types*) have been examined as a more reliable segmentation measure by media researchers.

For example, Weaver (1991) studied 119 male students' television, movie, and music preferences according to popular and accessible media content. Those scoring high on neuroticism expressed strong interest in information/news television, and "downbeat" music (e.g. *If you leave me now – Chicago, It's too late – Carol King*), while tending to avoid "lighthearted comedy and action/adventure fare" (p. 1298). Those scoring high on psychoticism, who are characterized by socially deviant behavior, showed a stronger preference for graphically violent horror movies (e.g. *Alien* and *Nightmare on Elm Street*) and less interest in typical television content such as situation-comedy (e.g. *Cosby Show*), and both romance (e.g. *Dirty Dancing*) and comedy movies (e.g. *Crocodile Dundee*).

In a similar fashion, analysis of rock music preferences by Robinson, Weaver, and Zillmann (1996) showed that those scoring high on the psychoticism scale enjoyed defiant rock-music videotapes ("Paradise City" - *Guns and Roses*, "I Hate Myself for Loving You" – *Joan Jett & the Black Hearts*) more than those scoring lower on the same scale. Moreover, those scoring high in psychoticism enjoyed nondefiant rock-music videos ("You're the Inspiration" – *Chicago*, "Lost in Your Eyes" – *Debbie Gibson*) less than those scoring lower in the same scale.

Similar interactions between media fare and psychoticism were evidenced by Weaver, Brosius, & Mundorf (1993) in their study of movie preferences in both American and German audiences. Subjects were shown vignettes promising a variety of media content (e.g. comedy, horror, drama, etc.). Vignettes promising violent media fare proved to be of high appeal to those scoring high on psychoticism in both cultures. Moreover, high-psychoticism Americans showed "significantly stronger preferences for sexual-comedy than did their low psychoticism counterparts" (p. 312). Those scoring high on extraversion, in both cultures, tended to prefer vignettes associated with sexual-comedy.

Similarly, in examining the role of personality and television viewing motives, Weaver (2001) found that those scoring high in psychoticism and extraversion tended to reject

"traditional" motives for television use, such as to pass time

for companionship, to relax, to find information, and/or to seek

stimulation. Also notable, is the strong difference between the

neurotic, and the extrovert and psychotic groups. Those scoring

high on neuroticism, a trait characterized by anxiety and low

self esteem, scored higher on traditional television motives and

were consistently different from the psychoticism and

extraversion groups.

Similar results were found in an analysis of television

remote control uses and gratifications. Weaver, Walker, McCord,

& Bellamy (1996) showed that those scoring high in neuroticism

used the remote control to avoid objectionable content,

differing from the psychoticism group, a finding similar to that

of Weaver (2001). Moreover, viewers scoring high on psychoticism

tended to use the remote control device to "control others – or

more precisely, to annoy and tease co-viewers" (p. 487), while

those scoring high on extraversion reject the notion of

controlling others through remote control use, a finding which

is consistent with the definitions of these two personality

types.

Though research in the area of personality and media

preferences has been limited, studies such as these have pointed

to the relationship between personality and content preference

in traditional media from the framework of Eysenck's personality

trait taxonomy. These encouraging results in the study of traditional media prompt the overarching question to be addressed in this study: Do individual differences effectively discriminate users according to content and media preferences within the Internet?

Personality and the Internet

As Weaver (2000) highlighted, the desirability of new communication tools and media, such as those available through the Internet can present substantially different appeal to those of different personality types.

In their study of Internet uses and gratifications, Papacharissi and Rubin (2000) found that those more satisfied with their outward, social life preferred to use the Internet for more instrumental purposes (e.g. information seeking). On the other hand, those less satisfied with life and felt less valued in face-to-face interactions used the Internet as a substitute for social interactions and to pass time. Though personality types were not examined as predictors of Internet use, the results provided by this study suggest a connection between extraversion and purposive Internet use (instead of pass time), and a possible connection between neuroticism to pass time and interpersonal use.

Similar interactions were found in a study of the substitute value of computer-mediated-communication and face-to-face interaction. Flahery, Pearce, & Rubin (1998) found that externally oriented people (who believe their environment controls them, feel powerless) used the Internet for inclusion more than internally oriented people. These findings suggest a connection between neuroticism, a type characterized by anxiety and perceiving "the world as threatening, problematic, and distressing" (Clark & Watson, 1998, p. 403), and use of the Internet for social inclusion.

Of particular interest to the current study is Hamburger & Ben-Artzi's (2000) research into the relationship between personality types and Internet motives. The researchers found that those scoring high on extraversion tended to prefer leisure services (sex websites, random surfing), and that those scoring high on neuroticism had a negative association with information services (work-related information, studies-related information). More specifically, for male subjects, extraversion was positively associated with leisure services, and neuroticism was negatively associated with information services. For female subjects, extraversion was positively associated and neuroticism negatively associated with social services (chat, discussion groups, people-address seeking). Weaver (2001) found similar sex-motives interactions in his study of television use: males

were motivated to watch television for information and stimulation, while females rather watch television for companionship and to pass time.

The results provided by the Hamburger & Ben-Artzi (2000) study are an important first step, but suffer many shortcomings. First, it is limited to the inspection of two of Eysenck's personality types (E and N) using the EPI (an older version of the Eysenck Personality Questionnaire), even though psychoticism has been shown to be an important predictor in other media studies (cf. Robinson, Weaver, & Zillmann, 1996, Zillmann & Weaver, 1997). Secondly, the number and distribution of subjects is rather limited (n = 73). Finally, categories of Internet use were originated from a survey of the subjects, which limits responses to a small number of Internet use motives.

A five-factor exploration of personality and Internet use (Swickert, Hitner, Harris, & Herring, in press) demonstrated a negative correlation ($\underline{r}$ = -0.14, p < 0.04) between a leisure services factor (instant messaging and games) and neuroticism. Though the authors did not inspect the role of sex as a potential discriminator, the findings seem to contradict those exposed by Hamburger & Ben-Artzi (2000). It must be highlighted though, that the three Internet usage factors extracted by Swickert et. al. (technical, information exchange, and leisure), seem to lack conceptual validity. A factor termed "technical"

contained the elements of bulletin board use, chat room visitation, web page creation, and multi user dungeon visitation. While factor analytical procedures can help us distill a large number of factors into more manageable concepts, it is important not to abuse this statistical method in an attempt to uncover an underlying factor that is not conceptually sound, grouping factors that have little to do with each other (Eysenck, 1952).

A similar investigation using the five-factor model (Tuten & Bosnjak, 2001) found a weak relationship between neuroticism and two world wide web application categories: "gathering product and brand information" (r = -0.11), and "learning, reference, and education" (r = -0.11).

Though current research in the realm of personality and Internet use is limited, personality can be a "highly relevant factor in determining behavior on the Internet" (Amichai-Hamburger, 2002), and therefore, deserves careful examination.

Usability and Individual Differences

Personality research reaches beyond the scope of marketing, or advertising. Personality and individual differences can also play a role in the design of tools and software used to navigate the Internet. The growth of the personal computer has opened the door to a plethora of users of different backgrounds, expertise,

knowledge, and mental models detailing how computer systems should work. In turn, computer software has become more and more complex, in an attempt to satisfy the diversity of users and their goals (Redish, 1998). Shneiderman (1998, 2000) suggests that in order to make these systems as approachable and usable as possible, achieving what he terms "universal usability," designers must be able to accommodate the intricacies of computer users, including their culture, expertise, and personality, among others.

Customizable interfaces, which allow users to define the placement of icons, the appearance of menus, and other aspects of the interface, are limited in their adaptation to user's needs. It comes as no surprise that Jacob Nielsen, a usability expert, claims that over ninety percent of websites have "miserable usability" (Anderson, 2000). Designers have been slow to adapt their websites and interfaces to match a variety of users, mostly because of cost and time constraints. Still, operating systems (such as Windows) and large websites (such as My Yahoo, and other portals) provide some support for individual differences. The ability to change the screen color and contrast, font sizes, and the positioning of elements on the screen, allows for customization and some level of adaptability.

Interface designers have also recognized the importance of adapting user interfaces to different cultural needs and nuances. As Ito & Nakakoji (1996) explain, though:

"Although tempting, it is misleading to simply generalize such differences as "cultural differences." Cultural differences often stem from much deeper and more complex background social context, not just "preference of speed versus friendliness." On the other hand, there are differences among different groups of people. What is important for user interface design is to have mechanism to understand such differences and accommodate them when identified. Such mechanisms, then, will, level out differences whether they are cultural or individual." (p. 107)

As the researchers conclude, customization is a step forward. But an investigation of patterns of individual differences can help us design systems that account for the collective cultural diversity of users, as well as their individual needs.

Previous research has investigated the personality of computer programmers (Lee & Shneiderman, 1978; Curtis, 1984), but few systematic studies of interface design accounting for the personality of software users have been made. One notable exception is an experiment by Vostok & Fukuda (2001) that adapted the design of a Tetris game to a variety of personality types. Specifically, users were asked to play two games: a straightforward version of the block-building Tetris game, and one that displayed different "faces" (happy, sad, accepting, cute) in the background depending on the users' ability, taking

into account their personality type, measured by using the
Keirsey temperament sorter (available at
http://www.keirsey.com). Researchers found that users preferred
the latter, personality-adapted mode, more than the generic
version of the game.

If individuals of different personality types use Internet
tools for differently, then those who design Internet based
content and interfaces should account for this divergence in the
design of their products. For example, if the neurotic does
indeed make more use of community-oriented Internet programs,
preferring virtual rather than face-to-face contact and
interaction, designers should attempt to add features that
promote the sense of belonging that the neurotic is searching
for. If, as postulated, psychotics are interested in more
advanced, novel, and complex computer applications, and the
extravert, makes less use of the Internet for interpersonal
interaction, designers of chat systems should allow users to
choose menu structures and functions that adapt (e.g. more or
less functions, exploratory options) objectives, experience, and
comfort level. By examining the links between personality types
and the motivation behind using Internet-based programs and
tools, software designers could better appeal to and satisfy the
need and characteristics of those who constitute the primary
user-base of their particular system.

If, as previous research has demonstrated, different personality types make use of the media (and the Internet) for different reasons, then designers should attempt to include at least a user of each personality type in their usability studies, in order to get a more comprehensive inspection of design flaws and usability problems.

Research Expectations

Considering the encouraging results of previous traditional and new media studies reported here, and the limitations of previous research into personality and Internet use, the current study addresses the following question: Do Eysenck's personality types serve as useful discriminators of Internet use?

Because of their high sociability and external orientation, it is expected that extraverts will be more likely to view the Internet as an extension rather than substitute for social interaction (Flaherty, Pearce, & Rubin, 1998).

Neuroticism, characterized by anxiety and rejection of social interaction is expected to be associated with a need to use the Internet for social activities, such as chat, e-mail, and other interpersonal communication tools.

It is also expected that neurotics would have less interest in using the Internet as a service tool, and as an informational service (Hamburger & Ben-Artzi, 2000).

Psychotics, who are characterized by breaking societies'

mores and rules, are expected to reject traditional media use

motives (Weaver, 2001) and use the Internet for

anonymity/identity control and stimulation. The stimulation

factor here can differ considerably from its traditional

conception, in that the Internet allows for significantly more

defiant, provocative, and rebellious action than traditional

media (i.e. hacking, posting to non-mainstream newsgroups,

developing defiant websites).

Method

Project Participants

Participants were college students enrolled in two
introductory-level communication studies courses at a large
Southeastern university, where approximately 60% of
undergraduates are male, and roughly 75% are Caucasian. One
class is a requirement for all communication studies majors,
while the other is composed mainly of engineering and business
students. Respondents received extra credit in their respective
classes for assisting with this project. A total of 211 subjects
participated in this study, resulting in 210 usable
questionnaires (101 females and 109 males), since a participant
failed to identify his or her sex.

Questionnaire

Participants were greeted by a male investigator and
instructed to read and sign an informed consent form. Once all
assigned subjects arrived, the investigator announced that they
would be participating in three different studies. Subjects were
then given three questionnaires and one opscan sheet to mark
their answers. In order to give participants plenty of time,
each session was allotted one hour, but participants rarely took
longer than thirty minutes to complete all questionnaires.

Computer and Internet Sophistication

Since all participants were required to own a computer, and the university provides free and easy access to the Internet, participants were asked four questions aimed at measuring overall experience with the Internet and computers.

When asked how they would rate their computer expertise, 1.9% of the students identified themselves as having "none," 1.0% as "novices," 27.6% as "somewhat familiar," 45.7% as "familiar," and 23.8% as "very familiar."

Most participants had been using the Internet for a considerable amount of time, specifically, 0.5% had been using the Internet for less than one year, 2.9% for more than one year but less than two, 22.4% for more than two but less than three, 24.8% for more than three but no more than four, 12.9% for more than four but not more than five, and 36.7% for more than five years.

The university computer requirement and the ease by which anyone can access the Internet might help account for the high level of computer and Internet experience. Moreover, these factors might attenuate gender differences in engaging with computer technology, particularly the Internet (Teo & Lim, 2000).

Considering that e-mail is one of the most popular Internet applications, a measure of participant's use of this application

was called for. Other studies (cf. Swickert et. al, in press) measured e-mail use by asking *how many minutes* a participant spent using e-mail, which is a troublesome measure: would a respondent be able to accurately report the amount of time spent on e-mail? A better measure of dependency on e-mail can be calculated by asking how many times a day a person typically checks her or his e-mail. While this might not be as specific as a time measure, participants might be able to more accurately report their level of e-mail use.

Again, reported usage was high, demonstrating a level of dependency on e-mail: 0.5% reported checking e-mail less than once a day, 2.9% once a day, 22.4% two to three times a day, 24.8% four to five times a day, 12.9% six to seven times a day, and 36.2% more than seven times a day.

Since the university provides free hosting for student web pages, respondents were asked for how long they had a personal web page (if at all), as a final measure of Internet sophistication. A majority of respondents (64.8%) reported not having a personal web page, 12.9% reported having one for less than one year, 7.1% for more than one but less than two years, 4.3% for more than two but less than three years, 6.7% for more than three but less than four years, 0.5% for more than four but less then five years, and 3.8% for more than five years.

Internet Use

Participants were also asked to identify specific Internet (Appendix B) and World Wide Web (Appendix C) applications that they used most. Answers were recorded on a nine point Likert-type scale ranging from "never" (1), to "sometimes" (5), to "very often" (9).

Students reported making frequent use of e-mail (M = 8.59, SD = 1.10), music sharing services (M = 7.44, SD = 2.13), web browsers (M = 7.92, SD = 1.81), and stand-alone (non web-based) text messaging programs such as ICQ and Instant Messenger (M = 8.13, SD = 1.96). Among applications and services that can be accessed using a web browser (web applications), search engines were reported as the most popular (M = 7.98, SD = 1.40).

Personality Measures

In order to assess personality type, subjects were asked to complete a short version of the Eysenck Personality Questionnaire (EPQ-R) containing slight changes in language, adapted to an American sample, using a likert-type response scale. The EPQ-R consists of 36 self-report items, with 12 measures for each personality type (P, E, N). Subjects were asked to report how well each item described themselves on a nine point scale ranging from "strongly disagree" (1), to "neutral (5), to "strongly agree" (9).

Consistent with Eysenck et. al (1985), responses were grouped and added to form interval level scales, identified as Extraversion (E; alpha = 0.90), Neuroticism (N; alpha = .83), and Psychoticism (P; alpha = 0.66). Pearson correlation coefficients computed between the three variables revealed a significant, but weak correlation between extraversion and neuroticism (r = -0.20, p < .005).

Internet Motives Questionnaire

An Internet Motives Questionnaire (IMQ; Appendix A) was designed to examine motivations for Internet use. The IMQ consisted of 45 questions compiled and adapted from previous studies (Paparachissi & Rubin, 2000; D'Ambra & Rice, 2001; Weaver, 2001; Bourdeau, Chebat, & Couturier, 2002), designed to measure a wide variety of motivations associated with interpersonal and mass media use. Questions were conceptually divided into four categories: interpersonal/communication utility, entertainment utility, information utility, and convenience. Participants were asked to report which items motivated them to use the Internet based on a nine point Likert-type scale ranging from "strongly disagree" (1), to "neutral" (5), to "strongly agree" (9).

Results

Personality and Internet Use

In order to explore the links between personality and Internet usage motives, stepwise regression analyses were conducted between each personality type and the 45-items in the IMQ (Appendix A), the 14 measures of Internet use (Appendix B), the 16 categories of World Wide Web use (Appendix C), and the four aforementioned measures of Internet sophistication. Sex was forced into the regression model to investigate the possibility of sex differences among each personality type. A dummy variable was created to measure the sex of participants. A negative value indicates females, and a positive value indicates males.

The regression analysis was stopped once any of the included variables (other than sex, which was forced into the model), failed to meet the set level of significance ($p < 0.05$). The results of these analyses, presented on Tables 1, 2, and 3, demonstrate differing Internet usage motives for each personality type. Negative parameter estimates convey a reversal of the questionnaire item. For example, a negative value for the "belong to a group" item indicates that respondents rejected this item as a reason to use the Internet. Similarly, a negative value for "text messaging" suggests that participants made less use of programs such as ICQ (I Seek You) and Instant Messenger.

Extraversion

Seven variables loaded into the regression model for extraversion (Table 1), explaining approximately 20% of the variance ($F(7,210)$ = 7.14; p < 0.0001; R^2 = 0.20). The results indicate that sex was not a significant discriminator among extraverts, failing to reach the set level of significance ($\underline{p}$ < 0.05). The model draws attention to the negative association between extraversion, and "to belong to a group" (beta = -1.21) and "because I feel more comfortable talking to people online" (beta = -1.28) demonstrating the extraverts' rejection of the Internet as a substitute for personal interaction. Instead, those scoring high on extraversion prefer to voice their opinion ("to let people know what I think," beta = 1.31). Moreover, extraverts tend to use the Internet to do research (beta = 1.06) and to share music with others (beta = 1.29).

Neuroticism

The regression model for neuroticism (Table 2) resulted in eight regressor variables, accounting for approximately 24% of the variance (R^2 = 0.24, $F(8,210)$ = 7.88, p < 0.0001). The negative sex value demonstrates a larger number of female neurotic participants (beta = -3.12).

In contrast with the extravert, those scoring high on neuroticism show particular interest in communal activities on

the Internet. This is indicated by their desire to escape

loneliness (beta = 0.98), and to "belong to a group" (beta =

1.55). Paradoxically, neurotics reject "text messaging" (beta =

-1.40), a popular one-on-one and group communication tool, and

show little interest in engaging in online discussions ("to

participate in discussions," beta = -1.24). Finally, those

scoring high on N demonstrate an interest in alternative news

(beta = 1.55) and a need to learn about potential threats ("so

that I can learn about what could happen to me," beta = 1.16).

Table 1

Extraversion and Internet Usage Motives: Linear Equation Following Stepwise Regression

Item	Parameter estimate	Standard error	Model R^2	F
SEX	-1.21	1.01	0.05	1.45
Because I feel more comfortable talking to people online	-1.28	0.42	0.09	9.41*
Music-sharing services	1.29	0.46	0.13	8.01*
Research	1.06	0.41	0.15	6.80*
Mainstream news	-0.84	0.38	0.17	4.79*
To let people know what I think	1.31	0.50	0.18	6.81*
To belong to a group	-1.21	0.58	0.20	4.39*
Intercept	61.95	5.60		112.32**

Note. Sex was coded as a dummy variable (-1 female, and -1 male).
*p<0.05 **p<0.001.

Table 2

Neuroticism and Internet Usage Motives: Linear Equation Following Stepwise Regression

Item	Parameter estimate	Standard error	Model R^2	F
SEX	−3.12	0.93	0.01	11.19**
To belong to a group	1.55	0.52	0.08	8.81*
Alternative news	1.55	0.45	0.13	11.89**
Text messaging	−1.40	0.46	0.16	9.25*
To participate in discussions	−1.24	0.40	0.18	9.48*
So that I can learn about what could happen to me	1.16	0.42	0.20	7.54*
Because it is cheaper	−0.79	0.36	0.22	4.83*
Because it makes me feel less lonely	0.98	0.46	0.24	4.66*
Intercept	59.32	4.72		158.18**

Note. Sex was coded as a dummy variable (-1 female, and −1 male).
*p<0.05 **p<0.001.

Psychoticism

Table 3 shows the results of the regression analysis for psychoticism. Nine variables accounted for 38% of the variance (R^2 = 0.38, $F(9,210)$ = 12.43, $p < 0.0001$). Unlike the extravert and the neurotic, the psychotic showed a general disinterest in interpersonal/communication utility motives for using the Internet. The only interpersonal/communication measure associated with those scoring high on psychoticism was a disregard for Internet as a medium to "leave messages" (beta = -1.12).

Those scoring high on P reported more diverse usage motives, including pass time ("to pass time away," beta = 1.08), nudity and pornography web sites (beta = 0.79), and file-sharing services (beta = 0.50). Psychotics disregard using the Internet for fun (beta - -1.83), using it to look for information (beta = -1.10), and to participate in multi-user domains (beta = -0.83).

Finally, the model demonstrates the psychotic's interest in learning about what could happen to him/herself ("so I can learn about what could happen to me," beta = 0.81), but a disinterest as to what could happen to others ("so I can learn about what is happening in the world," beta = -0.75).

Unlike neuroticism, no sex effect was evident for high P scorers.

Table 3

Psychoticism and Internet Usage Motives: Linear Equation Following Stepwise Regression

Item	Parameter estimate	Standard error	Model R^2	F
Sex	1.06	0.71	0.09	2.24
To leave messages	-1.12	0.34	0.16	11.15**
Because it passes time away	1.08	0.28	0.22	14.3***
Because it's fun	-1.83	0.43	0.27	17.92**
To look for information	-1.10	0.46	0.29	5.68*
Nudity/Pornography	0.79	0.26	0.32	9.57*
So I can learn about what can happen to me	0.81	0.28	0.34	8.20*
Multi-user domains	-0.83	0.32	0.35	6.96*
File-sharing services	0.50	0.20	0.37	6.39*
So I can learn about what is happening the world	-0.75	0.36	0.38	4.27*
Intercept	62.47	4.43		198.59**

Note. Sex was coded as a dummy variable (-1 female, and -1 male).
*p<0.05 **p<0.001.

Discussion

Personality and Internet Use

    In accordance to their outgoing and sociable qualities, and research expectations, extraverts seemed to reject the Internet as a substitute for human contact. High E scorers did not see the Internet as a "comfortable" medium to communicate and socialize with other. When using the Internet as a mediated interpersonal communication medium, the extravert reported a desire to voice an opinion, rather than to seek support or escape loneliness. Moreover, those scoring high on extraversion seem to use the Internet for instrumental purposes, such as research and music downloads, while using more common Internet tools, such as the web browser. Interestingly, extraverts reject using the Internet to view mainstream news (no association between extraverts and interactive or alternative news is evident). This is consistent with Weaver (2001), in that extraverts rejected the most traditional motives associated with television viewing, including *information*.

    These findings conflict, in part, with those reported by Hamburger & Ben-Artzi (2000), in that here, extraverts did not report a strong interest in "random surfing" or "sex web sites." These characteristics seem to be more closely related to those scoring high in the psychoticism scale. It must be acknowledged

that in their exploratory study, Hamburger & Ben-Artzi made use of an older inventory (EPI; Eysenck Personality Inventory) that does not measure the psychoticism scale.

The data shows that those scoring high on the psychoticism scale could be described as using the Internet for more alternative or deviant purposes, rejecting the idea of using it for "fun." High P scorers show a preference for web sites displaying pornography and nudity, while making use of file-sharing, as opposed to music-sharing services. This is an important distinction for a number of reasons. First, music-sharing has become a popular service for college students, who are benefited by large-bandwidth connections, exploring free and fast access to a variety of music files (e.g. MP3). While sharing music has become almost mainstream, file-sharing is most commonly connected with the distribution of pirated software, videos, images, and other illegally-distributed, copyrighted material. Secondly, file-sharing services listed as examples in the questionnaire (e.g. Gnutella network) point to more sophisticated applications than those under the music-sharing label (Appendix B). The preference for defiant, or non-mainstream content, was also evidenced in other media studies (Weaver, 1991; Weaver, Brosius, & Mundorf, 1993; Robinson, Weaver, & Zillmann, 1996; Weaver, 2001).

Unlike Weaver (2001), who studied television use, the present study finds that those scoring high on psychoticism use the Internet as a medium to pass time. While this finding might seem contradictory at first, psychotics could clearly find in the Internet a much more challenging and satisfying pass time medium than television.

Interactions between psychoticism and interpersonal/communication needs were limited to a rejection of the Internet as a medium to "leave messages." Though high P scorers reported using the Internet "to learn about what could happen to me," they also rejected the need to look for information or to learn about what is happening in the world. Though this inherent disinterest in society and rebellious attitude is a characteristic of the psychotic (Eysenck & Eysenck, 1985; Zuckerman et al., 1988), a need to learn about potential threats could be closely related to the deviant, and perhaps, illegal activities the psychotic might engage in. The Internet allows for far more "policing" of activity than other media, such as television. By looking at computer logs and activity reports, one could "trace" a user's action online. Perhaps the high P scorer, in an attempt to learn about "what could happen," is performing an act of self-preservation, more than worrying about the consequences of their actions.

Unlike those scoring high on psychoticism, high N scorers demonstrated a need for information and belonging. Neurotics showed a preference for alternative news, as opposed to "mainstream" or "interactive" news, perhaps evidencing the need to seek novel, uncommon information, beyond that to be found in mainstream news. Taken together with their need to be informed "about what could happen to me," the need for information could be understood as an attempt to balance the anxiety and insecurity that the neurotics experience. These findings partially conflict with those presented by Tuten & Bosnjak (2001). The authors found a weak but significant correlation between neuroticism and "learning, reference, and education" websites. A direct contrast of these findings is troublesome, in that the category measured by the authors concatenate a variety of web site categories (learning, reference, and education) into on measure. Unlike here, the authors found no association between "current events and news" websites and neuroticism.

These results agree with findings on television research by Weaver (1991), but disagree with those reported by Hamburger & Ben-Artzi (2000). Nevertheless, it must be considered that the "information services" factor utilized by the authors of the latter study was comprised of "work" and "study related information," rather than "news" which is most likely unrelated to work or study information seeking.

It was hypothesized that neurotics would report using the Internet for communication and interpersonal motives. The results suggest a paradox: neurotics turn to the Internet when they are lonely, and in order to belong to a group, but do not make use of text messaging tools (interpersonal/group communication), or to engage in discussions (the negative association between neuroticism and instant messaging agrees with findings by Swickert et. al [in press]). While these findings might appear contradictory at first, an examination of the neurotics' perception of the Internet as a communication medium through the lens of *social presence* and *media richness* theories might prove particularly insightful.

Social presence theory stipulates that communication media differ in respect to their ability to convey both verbal and non-verbal cues in a communicative exchange in order to convey the closeness (presence) of individuals engaging in communication (Short, et al., 1976). Social presence is measured by the inherent qualities of the medium (what it affords) and an individual's perception of the communicative act when the medium is used (situational factors). Social presence is typically marked by scales such as "unsociable-sociable, insensitive-sensitive, cold-warm, and impersonal-personal" (Short et al., 1976, p.66). The theory suggests then, that individuals will choose to communicate through a medium that permits the desired

level of social presence, depending on the chosen task (i.e. informational exchange, argumentation).

Media richness theory suggests that media differ based on their ability to transfer information content. A brochure, or a paper memo would be considered a lean medium, suited for the delivery of unequivocal messages (where the procedure is known but limited information is available), but less effective as a medium to treat equivocal tasks (resolve personal conflicts). A richer medium (i.e. face to face) would be more suitable for such problem solving interactions since it permits a variety of visual, verbal, and non-verbal cues to be exchanged. Essentially, media richness theory suggests that information will best be transmitted by a medium that matches the communicative requirements (Trevino, Lengel & Daft, 1987; Savolainen, 1999).

No consistent scale of media richness or social presence exist, though generally, face-to-face is recognized as having higher social presence and richness, followed by video and audio media (telephone, television, video conferencing), text-based electronic communication (*instant messaging, text chat*, e-mail) and paper-based media (Short et al, 1976; Trevino, Lengel, & Daft, 1987; Rice, 1992; Suh, 1999). Much of this classification is due to two constructs: immediacy of feedback, and symbol variety. Therefore, face-to-face communication, which allows for

rapid feedback and a variety of verbal and non-verbal cues, scored highest. Computer based communication, such as e-mail, has been rated both higher and lower than paper-based media in different studies (for a review, see Rice, 1992). The ambiguity in ranking of different media is evident in other studies, which have also reported inconsistent results (Rice, 1984; Suh, 1999; Dennis and Valalich, 1999).

It would seem rather intuitive to hypothesize that the neurotic would prefer to communicate through a medium of less social presence and media richness, that could offer a safe-haven from the pressures of face-to-face communication (demand for rapid response, personal exposure, etc.). The findings of this study suggest that perhaps, the inconsistent rankings and results offered by research into media richness and social presence could be due to the neurotic's avoidance of various media for communicative purposes (not only those with high social presence/media richness), particularly because it is not only a safe haven for the receiver, but also for the sender. In other words, because people might feel more comfortable speaking in an online environment, they might also be more prone (feel more at ease) to starting arguments, showing disdain, or openly offending others, without the restraint that would take place in face-to-face contact. Studies have demonstrated an increased level of uninhibited behavior in a computer-mediated

communication environment, including a decrease in conformity, and an increase in personal attacks/flaming (for a review, see Connell, Mendelsohn, Robins, & Canny, 2001).

The anxiety and apprehension that characterize high N scorers might translate into an avoidance of all communication. As Weaver (1998) describes, neurotics might perceive themselves as easily falling into a "spiral of miscommunication" (p. 113), because they judge themselves inadequate communicators (cf. Coupland, Giles, & Wiemann, 1991, p. 13) Therefore, neurotics might attempt to avoid discussions or interactions that could lead to confrontation, arguments, or other "negative" outcomes.

Usability and Personality

The results suggest that a difference exists in the pattern of Internet usage among individuals of different personality types. The data demonstrates that those scoring high in extraversion have less computer experience, and makes use of more common Internet tools, such as the World Wide Web and music-sharing. Software designed for the extravert user should emphasize a goal oriented use of the Internet, perhaps designed to contain a smaller set of tools and options, not necessarily contained under a "novice" mode, but rather, one that emphasizes more instrumental, and less exploratory use.

Neurotics, who turn to the Internet for communicative and communal purposes, do not seem to make use of current instant messaging programs. While we can only conjecture as to why this is so, an examination of the roots of this inconsistency is called for. The negative relationship and text messaging programs could reside in the design of popular instant messaging programs, which include too many features and gadgets, deviated from simple text-based communication (phone, groups, chat, shopping, web exposure). This "creeping featurism" could strike a negative chord with the neurotic's anxiety and avoidance of complexity.

Contrasting with both the neurotic and extravert, those scoring high on psychoticism seem to have a taste for more deviant and advanced applications, also using the Internet to simply pass time. A more feature-rich application allowing for exploration and unusual or unique environments might appeal to the high P scorer.

Though the application and investigation of such findings is beyond the scope of this paper, this analysis suggests that usability researchers can benefit from investigating user's personality types in order to create customized interfaces (Kostov & Fukuda, 2001). The exploratory nature of this study limits the ability to make sweeping generalizations as to the exact programs and features used by those of different

personality types. Nevertheless, the data pattern suggests that a comprehensive model of Internet usage can be attained by further research into specific application areas (e.g. design of web pages, menu structure preferences).

The knowledge that users of a specific personality type prefer one type of Internet application over another, and use the Internet for different reasons, should encourage designers to expand the concept of usability to include the complexities of human personality. For example, Nielsen (2000) asserts that a usability study with five users (identified as anyone who will make use of the system) can detect most usability shortcomings in a system. He further suggests that when a system has several distinct groups of users (such as children and parents, males and females), there will still be "great similarities between the observations from the two groups." The data from this study suggests that inspecting demographic differences (such as age and sex) are not sufficient to fully understand the user experience. While a great number usability oversights might be uncovered by inspecting five *actual users*, one must expand this definition to include individual differences, such as personality types (see Shneiderman, 2000).

We can no longer limit ourselves to chose a *random* selection of users during tests. This does not necessarily mean that *more* participants should be investigated in a usability

test. What is suggested instead is that the software designer should attempt to include a user of each personality type in usability testing. This could be a first step in directing us toward universal usability (Shneiderman, 2000).

Conclusion

Taken together, the results clearly suggest a pattern of differences between each personality type and Internet usage and usage motives. Alas, some caveats must be acknowledged. While an extensive list of web and Internet applications was used (Appendix B, Appendix B), the ever-expanding nature of the Internet allows for an even greater list of items to be included. While other measures could have been included here, only the most salient and prevalent were incorporated, for the sake of questionnaire completion time.

Also, this study relied on self-reported measures of usage and "perceptions" of usage motives, which might not reflect actual behavior and usage patterns. A more reliable measure of Internet program preference might be investigated experimentally, allowing users to select an application from a list of available programs (e.g. Instant messaging, web browser, online games, e-mail), and analyzing patterns of program preference according to different personality types. Another alternative could include diaries, given to pre-selected P, E, and N participants, used to record daily Internet use (for a criticism of this method see Ang, 1991).

As highlighted previously, other trait typologies exist, and merit investigation. A five-factor model of personality has been suggested as an alternative taxonomy of personality types.

Specifically, the five-factor model includes E and N, but identifies three other dimensions: openness, agreeableness, and conscientiousness (John, 1990; McCrae & Costa, 2001). An investigation of the relationship between these five factors and Internet use could prove instructive, especially when weighed against the results presented above.

Finally, its must be highlighted that participants in this study demonstrate substantial experience with the Internet and computers, partially due to a university-wide requirement for personal computers, and widely available Internet connections. Further studies should investigate a wider Internet user base, such as newcomers and different age groups, in order to verify the replicability of these results.

References

Anderson, R. (2000). Coversations with Clement Mok, and Jakob

    Nielsen, and with Bill Buxton, and Clifford Nass

    [Electronic version]. *ACM Interactions, 7,* 46-80.

Ang, I. (1991). *Desperately seeking the audience*. New York, NY:

    Routledge.

Avia, M. D., Sanz, J., Sánchez-Bernardos, M. L., Martínez-Arias,

    M. R., Silva, F., Graña, J. L. (1995). The five-factor

    model-II [Electronic version]. Relations of the neo-pi with

    other personality variables. *Personality and Individual*

    Differences, 19, 81-97.

Barrett, P. T., Petrides, K. V., Eysenck, S. B. G., & Eysenck,

    H. J. (1998). The eysenck personality questionnaire: An

    examination of the factorial similarity of p, e, n, and l

    across 34 countries [Electronic version]. *Personality and*

    Individual Differences, 25, 805-819.

Beville, H. M. (1988). *Audience ratings: Radio, television, and cable.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Bourdeau, L., Chebat, J., Couturier, C. (2002). Internet consumer value of university students: E-mail-vs.-web users [Electronic version]. *Journal of Retailing and Consumer Services, 9,* 61-69.

Clark, L. A., & Watson, D. (1999). Temperament: A new paradigm for trait psychology. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality Theory and Research* (pp. 399-423). New York, NY: Guilford Press.

Connell, J. B., Mendelsohn, G. A., Robins, R. W., & Canny, J. (2001). Effects of communication medium on interpersonal perceptions: Don't hang up the telephone yet! [Electronic version]. *Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work, Boulder, United States,* 117-124.

Coupland, N., Giles, H., Wiemann, J. M. (1991). *"Miscommunication" and problematic talk.* Newbury Park, CA: Sage.

Curtis, B. (1984). Fifteen years of psychology in software

    engineering: Individual differences and cognitive science

    [Electronic version]. *Proceedings of the 7th International*

    Conference on Software Engineering, Orlando, Unites States,

    97-106.

D'Ambra, J. & Rice, R. E. (2001). Emerging factors in user

    evaluation of the world wide web [Electronic version].

    Information & Management, 38, 373-384.

Demby, E. (1974). Psychographics and from whence it came. In W.

    D. Wells (Ed.), *Lifestyle and psychographics.* (pp. 9-31).

    American Marketing Association.

Draycott, S. G. & Klein, P. (1995). The big three or the big

    five – the EPQ-R vs the NEO-PI: A research note,

    replication and elaboration [Electronic version].

    Personality and Individual Differences, 6, 801-804.

Eastman, S. T. (1989). *Broadcast/cable programming: strategies*

    and practices. Belmont, CA: Wadsworth Publishing Company.

Eysenck, H. J. & Eysenck, S. B. G. (1975). *Manual of the Eysenck*

    Personality Questionnaire. London: Hodder & Stoughton.

Eysenck, S. G. B., Eysenck, H. J., & Barrett P. (1985). A

    revised version of the psychoticism scale. *Personality and*

    Individual Differences, 6, 21-29.

Eysenck, H. J. & Eysenck, M. W. (1985). *Personality and*

    individual differences: A natural science approach. New

    York: Plenum Press.

Flaherty, L. M., Pearce, K. J., & Rubin, R. B. (1998). Internet

    and face-to-face communication: not functional alternatives

    [Electronic version]. *Communication Quarterly, 46,* 250-266.

Hamburger, Y. A. & Ben-Artzi, E. (2000). The relationship

    between extraversion and neuroticism and the different uses

    of the internet. *Computers in Human Behavior, 16,* 441-449.

Hamburger, Y. (2002). Internet and personality [Electronic

    version]. *Computers in Human Behavior, 18,* 1-10.

Hornik, J. & Schlinger, M. J. (1981). Allocation of time to the

    mass media [Electronic version]. *Journal of Consumer*

    Research, 7, 343-335.

Hustad, T. P. & Pessemier, E. A. (1974). The development and
    application of psychographic life style and associated
    activity and attitude measures. In W. D. Wells (Ed.),
    Lifestyle and psychographics. (pp. 31-70). American
    Marketing Association.

John, O. P. (1990). The "big five" factor taxonomy: Dimensions
    of personality in the natural language and in
    questionnaires. In Pervin, L.A. (Ed.), *Handbook of
    personality theory and research* (pp. 66-97). New York, NY:
    The Guilford Press.

Kamamura, W. A. & Mazzon, J. A. (1991). Value segmentation: A
    model for the measurement of values and value systems
    [Electronic version]. *Journal of Consumer Research, 18,*
    208-218.

Katz, E., Blumer, J. G., & Gurevitch, M. (1974). Utilization of
    mass communication by the individual. In J. G. Blumer & E.
    Katz (Eds.), *The uses of mass communications: Current
    perspectives on gratifications research.* (pp. 19-34).
    Beverly Hills, CA: Sage.

Kostov, V. & Fukuda, S. (2001). Development of man-machine
    interfaces based on users preferences [Electronic version].
    Proceedings of the 2001 IEEE International Conference,
    Mexico, 1124-1128.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S.,
    Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A
    social technology that reduces social involvement and
    psychological well-being? *American Psychologist, 53,* 1071-
    1031.

Ito, M. & Nakakoji, K. (1996). Impact of culture in user
    interface design. In J. Nielsen & E. M. del Galdo (Eds.),
    International user interfaces. (pp. 105-126). New York, NY:
    John Wiley & Sons.

Lee, J. M. & Shneiderman, B. (1978). Personality and
    programming: Time-sharing vs. batch preference [Electronic
    version]. *Proceedings of the 1978 Annual CSC-ER Conference,*
    561-569.

McCrae, R. R. & Costa, P. T. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality Theory and Research* (pp. 139-153). New York, NY: Guilford Press.

Moris, M. & Ogan, C. (1996). The Internet as a mass medium. *Journal of Communication, 46,* 39-50.

Newhagen, J. E. & Rafaeli, S. (1996). Why communications researchers should study the internet: A dialogue. *Journal of Communication, 46,* 4-13.

Nielsen, J. (2000). *Why you only need to test with 5 users.* Retrieved March 29, 2002: http://www.useit.com/alertbox/20000319.html

Nielsen//NetRatings (2002, March). *Hot off the next.* Retreived May 10, 2002, from: http://www.nielsen-netratings.com/ hot_off_the_net_i.jsp

Palmgreen, P., Wenner, L. A., & Rosengren, K. E. (1985). Uses
and gratifications research: The past ten years. In K. E.
Rosengren, L. A. Wener, & P. Palmgreen (Eds.). *Media
gratifications research: Current perspectives.* (pp. 11-40).
Beverly Hills, CA: Sage.

Papacharissi, Z. & Rubin, A. M. (2000). Predictors of internet
use [Electronic version]. *Journal of Broadcasting and
Electronic Media, 44,* 175-196.

Redish, J. (1998). Minimalism in technical communication: Some
issues to consider. In J. M. Carroll (Ed.), *Minimalism
beyond the nurnberg funnel.* (pp. 219-243). Cambridge, MA:
MIT Press.

Rice, R. E. & Williams, F. (1984). Theories old and new: The
study of new media. In Rice and Associates, *The new media*.
(pp. 55-80). Beverly Hills, CA: Sage.

Rice, R. E. (1992). Task analyzability, use of new media, and
effectiveness: A multi-site exploration of media richness.
Organizational Science, 3, 475-500.

Richendoller, N. R., & Weaver, J. B. (1994). Exploring the links between personality and empathic response style. *Personality and Individual Differences, 17,* 303-311.

Rosengren, K. E. (1974). Uses and gratifications: A paradigm outlined. In J. G. Blumer & E. Katz (Eds.), *The uses of mass communications: Current perspectives on gratifications research.* (pp. 269-286). Beverly Hills, CA: Sage.

Saggino, A. (2000). The big three or the big five? A replication Study [Electronic version]. *Personality and Individual Differences, 28,* 879-886.

Savolainen, R. (1999). The role of the internet in information seeking. Putting the network services in context. *Information Processing and Management, 35,* 765-782.

Shneiderman, B. (1998). *Designing the user interface: strategies for effective human-computer interaction.* Reading, MA: Addison-Wesley.

Shneiderman, B. (2000). Universal usability [Electronic version]. *Communications of the ACM, 43,* 84-91.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications.* London: John Wiley & Sons.

Suh, K. S. (1999). Impact of communication medium on task performance and satisfaction: An examination of media-richness theory [Electronic version]. *Information & Management, 35,* 295-312.

Swickert, R. J., Hittner, J. B., Harris, J. L., Herring, J. A. (in press). Relationship between internet use, personality and social support [Electronic version]. Computers in Human Behavior.

Teo, T. S. H., & Lim, V. K. G. (2000). Gender differences in internet usage and task preferences [Electronic version]. *Behaviour & Information Technology, 19,* 283-295.

Tuten, T. L., & Bosnjak, M. (2001). Understanding differences in web usage: the role of need for cognition and the five factor model of personality. *Social Behavior and Personality, 29,* 291-398.

Vorderer, P. (2000). Interactive entertainment and beyond. In D.

   Zillman, & P. Vorderer (Eds.), *Media entertainment: the*

   psychology of its appeal (pp. 21-36). Mahwah, NJ:

   Lawrence Erlbaum.

Weaver, J. B. (1991). Exploring the links between personality

   and media preferences. *Personality and Individual*

   Differences, 12, 1293-1299.

Weaver, J. B. (1998). Personality and self-perceptions about

   communication. In J. C. McCroskey, J. A. Daly, & M.M.

   Martin (Eds.), *Communication and personality: trait*

   perspectives (pp. 95-117). Cresskill, NJ: Hampton Press.

Weaver, J. B. (2000). Personality and entertainment preferences.

   In D. Zillmann & P. Vorderer (Eds.), *Media entertainment:*

   the psychology of its appeal (pp. 235-247). Mahwah, NJ:

   Lawrence Erlbaum.

Weaver, J. B. (2001). *Individual Differences in Television*

   Viewing Motives. Paper presented at the meeting of the

   International Communication Association, Washington, DC.

Webster, J. G. (1989). Assessing exposure to the new media. In
  Salvaggio, J. L. & Bryant, J. (Eds.), *Media use in the
  information age: Emerging patterns of adoption and consumer
  use*. (pp. 3-19). Hillsdale, NJ: Lawrence Erlbaum.

Webster, J. G. & Phalen, P. F. (1997). *The mass audience:
  Rediscovering the dominant model*. Mahwah, NJ: Lawrence
  Elrbaum.

Wiseman, M. & Bogner, F. X. (in press). A higher-order model of
  ecological values and its relationship to personality
  [Electronic version]. *Personality and Individual
  Differences.*

Wober, J. M. (1986). The lenses of television and the prism of
  personality. In J. Bryant & D. Zillmann (Eds.),
  Perspectives on media effects. (pp. 205-228). Hillsdale,
  NJ: Lawrence Erlbaum Associates.

Zillman, D. & Weaver, J. B. (1997). Psychoticism in the effect
  of prolonged exposure to gratuitous media violence on the
  acceptance of violence as a preferred means of conflict
  resolution [Electronic version]. *Personality and Individual
  Differences, 22,* 613-527.

Zuckerman, M., Kuhlman, D. M., Camac, C. (1988). What lies

    beyond E and N? Factors analyses of scales believed to

    measure basic dimensions of personality [Electronic

    version]. *Journal of Personality and Social Psychology, 54,*

    96-107.

Zuckerman, M., Kuhlman, D. M., Joireman, J., Teta, P., & Kraft,

    M. (1993). A comparison of the three structural models for

    personality: The big three, the big five, and the

    alternative five. *Journal of Personality and Social*

    Psychology, 4, 757-768.

Appendix A

Table A1

Internet Motives Questionnaire

Statement	M	SD
Interpersonal/Communication Utility		
Because I can avoid meeting/talking to people	2.77	1.89
To belong to a group	3.11	1.96
To express myself freely	4.76	2.26
To let people know what I think	5.14	2.14
To meet new people	3.41	2.35
To participate in discussions	4.26	2.50
Because it makes me feel less lonely	3.38	2.21
To read about what other users have to say	5.88	2.30
Because I feel more comfortable talking to people online	4.07	2.46
Because sometimes it's easier to talk online than to tell people	5.39	2.54
Because people don't have to be there to receive a message	6.80	2.05
To communicate with friends and family	7.95	1.48
To leave messages	7.21	1.86
When I need to have a short conversation	6.24	2.14
Because my friends use it	6.11	2.42
Because I can say things online I wouldn't normally say	4.40	2.63

Statement	M	SD
Entertainment Utility		
Because it gives me something to do	6.19	2.20
Because it passes the time away	6.01	2.31
When I have nothing better to do	6.94	1.94
When I just want to get away from everything	4.14	2.41
When I'm bored	6.89	1.97
Because it relaxes me	4.35	2.37
Because it calms me down	3.30	2.21
Because it excites me	4.19	2.26
Because it's thrilling	3.67	2.24
It's entertaining	6.82	1.80
Because I just like to use it	6.68	2.05
Because it is fun	7.12	1.54
Because it is enjoyable	6.83	1.73
Information Utility		
To look for information	7.86	1.37
To see what is out there	6.64	1.96
To get information for free	8.05	1.36
Because it's a new way to do research	7.81	1.40

Statement	M	SD
Information Utility		
So that I can learn about what could happen to me	4.92	2.29
So that I can lean how to do things I haven't done before	6.31	2.02
To find information I can't find elsewhere	7.85	1.39
So I can learn about what is happening in the world	6.66	1.89
Because it's easy to find things online	7.15	1.65
Convenience		
Because I can remain anonymous	3.80	2.26
Because I do things online I wouldn't do in person	4.24	2.63
Because it's a comfortable environment	5.34	2.20
Because it's cheaper	5.39	2.54
Because I can always find a computer connected to the Internet	5.21	2.30
To purchase products or services	6.12	2.44
Because it allows me to do things without leaving my home	6.85	1.99

Appendix B

Table B1

Usage of Internet-based programs and services

Statement	M	SD
E-mail	8.61	1.08
Newsgroups	3.15	2.25
Multi-user domains (MUD/MOO)	2.46	1.91
Internet graphic games	4.11	2.48
Music sharing services (for example: Audiogalaxy, Napster)	7.45	2.09
File sharing services (for example: Gnutella, BearShare, Morpheus)	5.47	3.14
FTP programs	3.70	2.62
Web browser	7.92	1.81
Group chat (for example: IRC)	3.37	2.71
Text messaging (for example: Instant Messenger, ICQ)	8.12	1.99
Video chat	2.11	2.07
Voice/audio chat (Internet phone)	2.54	2.20
Internet radio	3.11	2.53
Internet television	2.06	1.82

Note. Participants indicated their responses on 9-point scales (1=never, 5=sometimes, 9= always).

Appendix C

Table C1

Usage of Web based programs and services

Statement	M	SD
Mainstream news	4.66	2.52
Alternative news	2.51	2.08
Interactive news	2.00	1.52
Hacking/cracking sites	1.90	1.82
Governmental sites	3.32	2.17
Shopping	5.40	2.43
Web-based chat	3.26	2.49
Comedy	4.12	2.39
Dating services	1.60	1.47
Others' personal web pages	4.72	2.52
Nudity/pornography	3.36	2.79
Music downloads	6.45	2.67
Industry	4.37	2.62
File downloads	4.70	2.76
Search engines	7.98	1.40
Research	5.90	2.39

Note. Participants indicated their responses on 9-point scales (1=never, 5=sometimes, 9= always).

TEL AMIEL
tel@vt.edu

EDUCATION	**PhD Instructional Technology (expected May 2006)** University of Georgia (Athens, Georgia) **M.A. English, Option in Communication Studies** Virginia Tech (Blacksburg, Virginia) Overall GPA – 3.70/4.00 **Certificate in Human-Computer Interaction, Computer Science** **B.A. Communication Studies (August 1996-December 1999)** **Concentration – Computer Science** Virginia Tech (Blacksburg, Virginia) Overall GPA – 3.26/4.00 (In Major – 3.5/4.0)
EMPLOYMENT	**Online Course Development – Public Speaking Basic Course Initiative** **Director (Spring 2002-Summer 2002)** ▪ Initiate the development and design of the on-line component to the university's public speaking course **Public Speaking Teacher** **Department of Communications Studies, Virginia Tech** Assistant (Fall 2000-Present) ▪ Lecture three classes of twenty students each, meeting twice a week Instructor (summer I & II 2001, summer I 2002) ▪ Teach three classes of approximately twenty students each, meeting daily **Webmaster (September 1999-May 2000)** Department of Communications Studies, Virginia Tech ▪ Re-design of the departmental web system; web server manager **Computer Laboratory Manager (September 1997-May 2000)** Corporate Research Center, Blacksburg, VA ▪ Assist students with technical problems in various software (PC/MAC)
TECHNOLOGY	Adobe Photoshop, Pagemaker, Acrobat Macromedia Dreamweaver, Coldfusion, Freehand, Authorware, Illustrator HTML, Clipper, COBOL, XHTML Internet, word processing, spreadsheets, presentation software PC, Macintosh, UNIX Workstations
GRANTS	**Cabell Brand Center for International Poverty and Resource Studies** [www.CBCenter.org] Virginia Museum of Natural History - $500 (Spring 2001) ▪ Multimedia presentation Seek Education, Explore, Discover (SEEDS) - $500 (Fall 2001) ▪ Online community and computer-mediated-communication

HONORS	**Ed Ewing Service Award (2000)** ▪ Department of Communication Studies **Academic Dean's List** ▪ Fall 1998, Spring 1999, Fall 1999 **The Order of the Gavel (1998-1999)** ▪ Campus-wide leadership honor society
AFFILIATIONS	**National Communication Association (Fall 2001-Present)** **Laboratory for the Study of Human Thought and Action (LSHTA)** **[http://lshta.vt.edu]** Research Assistant (January 2000-Present) ▪ Research projects in communication and human computer interaction **Communication Studies Graduate Student Council (CSGSC)** Founding President (Fall 2000-Present) ▪ Representative to communication studies graduate students at Virginia Tech **Council of International Student Organizations (CISO)** President (August 1998-1999) ▪ Serve as the representative for the international community on campus ▪ Coordinate major campus events, including International Week Public Relations Officer (August 1997-1998) ▪ Publicity for major campus events
SERVICE-LEARNING	**Cranwell International Center – Virginia Tech (Fall 2001)** [http://www.uusa.vt.edu/cranwell] ▪ Website re-design and development of online guide for international students **Seek Education, Explore, Discover (SEEDS) (Spring 1999)** [http://www.seedsguys.org] ▪ Publicity design for SEEDS Kenya Immersion Program
VOLUNTEER WORK	**Layout Designer (Fall 1999/Fall 2001)** ▪ Occasional Word – Communication Studies Alumni Newsletter **Orientation Leader (Fall 1997-Present)** ▪ Help incoming international students
LANGUAGES	**Portuguese**: Native **English**: Fluent **Spanish**: Conversational **Chinese**: Basic
REFERENCES	Available Upon Request