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Role of Temperament in Internet Usage among Ethiopian Students

Sukhminder Kaur
Assistant Professor,
Deptt. of Psychology,
Punjabi University,
Patiala, Punjab, India

Abstract

The study was aimed to investigate the relationship between Internet Usage and Temperamental traits: Negative Affect, Surgency/Extraversion, Effortful Control and Orienting Sensitivity. It was hypothesized that Internet Usage would be positively related to Negative Affect, Surgency/Extraversion, and Orienting Sensitivity, and negatively related to Effortful Control. In addition, Negative Affect, Surgency/Extraversion, Effortful Control and Orienting Sensitivity were hypothesized to contribute significantly to the variance in Internet Usage. A total of 500 undergraduates in the age range of 18 to 27 years (M = 21. 59, SD = 1.69) were selected from two Ethiopian Public Universities through multi-stage sampling procedure. Internet Usage Scale (Monetti et al, 2011) and Adult Temperament Questionnaire-Short Form (Evans & Rothbart, 2007) were administered in group settings and obtained scores were analyzed using correlation and standard multiple regression statistical techniques. The results of correlation analysis showed Internet Usage is positively correlated with Negative Affect, Surgency/Extraversion and Orienting Sensitivity, whereas significant negative correlation was observed between Internet Usage and Effortful Control. The results of standard multiple regression analysis revealed that Negative Affect, Surgency/Extraversion, Effortful Control and Orienting Sensitivity jointly explained the students' Internet Usage. However, Surgency/extraversion was the only temperamental trait that significantly explained Internet Usage.

Keywords: Internet Usage, Negative Affect, Surgency/Extraversion, Effortful Control, Orienting Sensitivity.

Introduction

Internet usage has been the subject of intense scientific discourse since the inception of the technology. It is more prevalent among the young population across the world, and University students are included in this population cohort (Bashir et al., 2008; Deniz & Geyik, 2015). The internet is an integral part of university studentship in the form of information exchange with their friends and relatives through social media and email, information exploration for academic and non-academic purposes, and for future job markets (Remondino & Chen, 2002; Su & Lee, 2010; Deniz & Geyik, 2015; Dinesh & Chalawadi, 2016; Rushing, 2016). Literature consistently revealed that the internet has improved the living patterns and time management of its users. For instance, the study by Manzoor (2014) revealed such positive impacts as ease of work and time saving among university students.

Even though the positive impacts of the internet are paramount, concerns have been raised around the negative impacts, especially in individuals with psychological and emotional vulnerabilities. Students in higher institutions frequently use the internet for purposes other than school works, such as communication in terms of chatting and information gathering, and entertainment through social websites (Monetti et al., 2011; Batane, 2013; Almarabeh et al., 2016). To the extreme are the conditions under which the internet usage affects the essential life tasks of college students, such as their grades, health and social lives. Related with these are also potential detrimental effects of excessive internet usage leading to problems in distraction (Horres, 2010), pornography, security and privacy, stress, depression, and internet addiction (Sharahia et al., 2014). In addition to the above-mentioned pros and cons of internet usage, the researcher's personal observation shows that the Ethiopian public higher institutions provide students with unlimited access to the internet; i.e. information, communication, and entertainment. Computer resource centers are found at every academic unit and open for each student to use

Thomas Ayana
Research Scholar,
Deptt. of Psychology,
Punjabi University,
Patiala, Punjab, India

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for unlimited time. In addition, almost all students use smart phones that are used to easily excess internet services every where. It seems that almost every student is busy engaging with internet resoures, which might predispose them to over use the internet and subject to internet-related negative conditions. Eventhough the internet seems ubiquitous and the students seem skillful to use the internet resources, some of them seem lacking adequate social skills or self-monitoring skills to systematically deal with the internet. The above practical and empirical information shade a light on the pros and cons of internet usage among students in higher educational institutions, which may partly relate to individual variation among the students themselves. One of such individual difference variables and the early appearing trait of personality is temperament. Even though studies on the internet seem ubiquitous, most of the related literature assessed its link with limited aspects of temperament. The relationships between Internet Usage and the four dimensions of temperament have not been exhaustively addressed. Hence, the present study is planned to fill this gap and produce comprehensive picture about the relationship.

Review of Literature

The term temperament has been described differently by different scholars. Gordon Allport (1961) defined temperament as *"the characteristic phenomena of an individual's emotional nature, including his susceptibility to emotional stimulation, his customary strength and speed of response, the quality of his prevailing mood, these phenomena being regarded as dependent upon constitutional makeup and, therefore, largely hereditary in origin" (p. 34).* On the other hand, Thomas and Chess (1977) broadly defined the construct as *"individual difference in attention and activity level"* (Rothbart & Bates, 2006, pp. 100). Eventually, Rothbart and Derryberry (1981) have given a more comprehensive definition of temperament as *"constitutionally based individual differences in reactivity and self-regulation, and influenced over time by genes, maturation and experience"* (Rothbart, 2012, pp. 9). This term is explained with reference to negative affect, surgency/extraversion, effortful control and orienting sensitivity (Evans & Rothbart, 2007).

Negative Affect is expressed in terms of *sadness, discomfort, anger/frustration and fear* and negatively loaded on the temperamental sub-scale of *soothability* (Rothbar et al., 2000; Zentner & Bates, 2008). Literature links negative affect to varieties of maladjustments and vulnerabilities ranging from mild behavioral problems to severe pyschological conditions (Steptoe, 1998; Johnson & Johnson, 1998; Kemeny, 2007; Diamond & Fagundes, 2008). Furthermore, studies consistently reported its positve relationship with internet usage, and negative affect significantly predicted maladaptive internet usage (Romano et al, 2013; Vidyachathoth et al., 2014; Zou et al., 2015; Telef, 2016). People with negative affect tend to use the Internet to reduce the probable fear, sadness and anger with real life interpersonal relationships, and tend to become comfortable through internet-based communications. Because they are more predisposed to such negative experiences as fear and anger, they usually resort to communicate and engage with their interpersonal relationships by means of the internet.

Surgency/Extraversion is the second reactive dimension of temperament (Evans & Rothbart, 2007). Basically, individuals with surgency/extraversion temperament are intensely stimulated, and satisfied by more interactions, and influenced by relative novelty of experiences. Hence, they are likely drawn to be influenced by the appealing features of the internet and the relative freedom that they might enjoy being online. Literature also links this temperamental contstruct to internet usage in general and problematic Internet usage in particular, and mixed results have been reported. For instance, Smetaniuk (2014) and Coco et al. (2018) reported strong positive associations between surgency/extraversion and face book usage. In contrast, Oztürk et al (2015) found that extraverts are at low risk of internet addiction, and the trait did not adequately contribute to the variance in internet addiction (Cohen et al., 2018). However, limited empirical studies have been reported regarding the relationships between surgency/extraversion and internet usage that might filled with the present study.

The third temperamental trait, effortful control refers to the motivational, affective and attentional regulation counterpart of Bandura's self-regulation. It covers such sub-ordinate traits as *Activational Control*, *Effortful Attention*, and *Inhibitory Control* (Evans and Rothbart, 2007, pp. 884). Effortful Control has consistently been positively associated with healthy human functioning and well-being (Zhang et al., 2014; Snyder, et al., 2015). Studies reported that it contributes to the development of conscience, meta-cognition, and positive interpersonal relationships. Reported evidences have shown that effortful control played a moderating role between internet addiction, online motivation and maladaptive cognitions (Wang et al., 2016). According to Wang et al (2016), it protects against the development of internet addiction and maladaptive cognition in spite of heightened online-motivation. This implies that people with well-developed effortful control are capable of monitoring and controlling their behavior in general and their internet usage in particular. They can make use of the internet for its inherent purposes than are affected by any new or extraordinary features of the internet, because those with well-developed effortful control are capable of prioritizing the purposes of their internet usage and effectively plan to use the internet for its inherent purposes. But the available literature did not adequately explain the direct link between effortful control and internet usage.

Orienting Sensitivity, another component of temperament broadly measures the ability to be conscious of a neutral or emotional stimulation of low intensity from the surroundings, or a spontaneous idea not directly related to an association with the surrounding environment (Wiltink et al., 2006). Individuals with such temperament are characterized by sensing stimuli of minimal intensity level both from the environement and their internal world (Evans &

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Rothbart, 2007). This hiegthened sensitivity might predispose them to be more attracted to the internet as they are capable of detecting all the features of the internet that are virtually appealing and attractive. The relationship between internet usage and orienting sensitivity has not been fully established yet; the available studies only imply the indirect relationship. For example, Poole (2018) reported the importance of orienting sensitivity in protecting such interpersonal qualitites of emphaty and communal interpersonal values among Massively Multiplayer online gamers. Those high in orienting sensitivity were not affected with their interpersonal qualities of empathy and communal interpersonal values while playing massively multiplayer online gaming. This indicates that, though individuals with orienting sensitivity are more sensitive to the internet and its features, their temperamental disposition might help them resist against the maladaptive experiences caused by the On-line Gaming. This indirect findings show the need for further exploration in to the relationship between orienting sensitivity and internet usage in a broader manner.

With reference to the Ethiopian context, research in internet usage is sparse and at an infant stage. Hence, the present study would draw attention from both the national and international scientific community to embark on this new area of research. Globally, the study is also aimed to contribute to the effort to model consistent relationship between global internet usage and temperament and help in the interventions to harness maladaptive internet usage among the students in the Ethiopian Public Universities.

Hypotheses

On the basis of the review of literature, the following hypotheses were formulated:

H_1

Negative affect would be positively correlated with internet usage.

H_2

Surgency/Extraversion would be positively correlated with internet usage

H_3

Effortful Control would be negatively correlated with internet usage

H_4

Orienting Sensitivity would be positively correlated with internet Usage

H_5

Negative Affect, Surgency/Extraversion, Effortful Control and Orienting Sensitivity conjointly contribute significantly to Internet Usage.

METHOD

Sample

A total of 500 undergraduates were selected from two Public Universities in Ethiopia. Out of these, 151 (30.2%) were female, and 349 (69.8%) were male. Their age range was between 18 to 27 years; where mean and standard deviation are 21.59 and 1.69 respectively.

Measures

The following tools were adopted to be used in the study:

Internet Usage Scale (IUS)

It is a 12-items scale developed by Monetti et al (2011) to measure participants' perceptions about the effect of internet usage on their behavior. The instrument is a two dimensional scale containing Self-detachment and Usage, where Self detachment includes items 1, 3, 5, 6, 7 and 11, and Usage composed of items 2, 4, 8, 9, 10 and 12. Self-detachment measures the attitude of participants regarding the social/affective orientation towards the internet as opposed to the traditional face-to-face contacts with family, friends, and activity), and includes items such as *How often do you feel lonely or sad when you are not on-line?.* On the other hand, Usage is used to measure the preference of the participants toward how and when they are likely to use the internet. It includes items such as "*How often do you use the Internet?"* The Internet Usage is composed of a total of 12 items with scale anchors ranging between 0 (Not at all) to 3 (A lot). High score on the composite score of Internet Usage indicates that the individual perceives that internet usage significantly affected his behavior, and low score implies that the Internet Usage has no significant effect. In addition, high score on Self-Detachment shows that the individual perceived that he/she tended to use the internet for interactions with family, friends and activities than face-to-face interactions, and low score indicates a balance between Internet-based communication and face-to-face interactions. High score on Usage scale implies that the individual perceived that he/she preferred how and when he/she is likely to use the internet, and low score indicates that the individual did not show preference for the internet over other real life resources. Monetti et al (2011) reported that internal consistency between the two factor solutions was reported to be 0.74, and coefficient alpha (α) for Self-detachment and usage were 0.70 and 0.67 respectively. In the present study, the coefficient alpha reliability for the whole scale, Self-detachment and usage are 0.73, 0.69 and 0.53 respectively. In addition, the correlation among the total scale and the sub-scales are within acceptable range (see Table 1).

Adult Temperament Questionnaire-Short Form (ATQ-SF)

Adult Temperament Questionnaire-Short Form is a Self-report questionnaire developed by Evans and Rothbart (2007). It is composed of a total of 77 items, with scale anchors ranging between 1 (extremely untrue of you) and 7 (extremely true of you). The total scale items are distributed among Negative Affect (26 items), Surgency/Extraversion (17 items), Effortful Control (19 items), and Orienting Sensitivity (15 items). Out of the 77 items, 29 items were reverse-scored before further analysis. High score on each of the four scales indicate that the individual is fully characterized by the specific trait. On the other hand, low score implies that the specific temperamental trait is not salient or is of low level with the individual. Adequate Cronbach's alpha reliability (α) of Factor scales were reported in (Evans & Rothbart, 2007) ranging from 0.75 to 0.85. In the

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present study, the internal consistencies of the factor scales ranged between 0.68 and 0.75.

Procedure

A total of 500 university undergraduates were randomly selected from two Ethiopian Public Universities. Multi-stage sampling technique was employed to recruit participants from the selected universities. After the universities were identified, information about the available academic units (Faculties/Institutes/Colleges/Schools), departments and their relative batches was obtained from the respective registrar office of each of the universities with consent from the top officials. Given the strata of academic units, departments and batches, simple random sampling procedure was used to select the students from each of the randomly selected batches under each department. After the lists of participants were identified from each batch through lottery method, data collection was conducted in group setting. During the data collection sessions, volunteer subject teachers and Head of Departments were collaborating with the researcher and assisted in introducing the researcher to the participants and making clarifications about ambiguities while filling the questionnaires. The participants were ensured that the information would be kept confidential and only used for the intended purpose of the research. Then the questionnaires containing a total of 96 items (i.e. 7 items for demographic information; 12 items for Internet Usage, and 77 items for Temperament) were distributed among the randomly selected participants during the data collection session arranged for each batch. The participants were given instruction: there are two types of information that you are cordially required to fill: *"(1) Fill in the blank spaces regarding the demographic information, and (2) put tick marks under the scale that best represents your Internet Usage and temperament"*. Accordingly, they were guided while reading through items under each instruction with adequate support from the data collectors. The obtained scores were subjected to statistical analysis using SPSS version 24.

Results and Discussion

The study was aimed to examine the relationships between Internet Usage and the four temperament domains, i.e. Negative Affect, Surgency/extraversion, effortful Control and Orienting Sensitivity. Tables 1 and 2 show the results of correlation and regression analyses.

Table 1: Correlation among the variables (N = 500)

No	Variables	NA	S/E	EC	OS	IU	SD	U
1	Negative Affect (NA)	-	-	-	-	-	-	-
2	Surgency/ Extraversion (S/E)	.623**	-	-	-	-	-	-
3	Effortful Control (EC)	-.709**	-.697**	-	-	-	-	-
4	Orienting Sensitivity (OS)	.721**	.663**	-.655**	-	-	-	-
5	Internet Usage (IU)	.238**	.357**	-.261**	.185**	-	-	-
6	Self Detachment (SD)	.198**	.301**	-.190**	.122**	.874**	-	-
7	Usage (U)	.228**	.322**	-.274**	.218**	.820**	.438**	-

**. Correlation is significant at the 0.01 level.

Table 1 shows that correlations were statistically significant and the findings supported the hypothesized relationships between Internet Usage and the four temperamental variables.

Negative Affect was positively correlated with Internet Usage (r = .24, p < 0.01), Self-Detachment (r = .20, p < 0.01) and Usage (r = .23, p < 0.01); implying that those with negative affect perceived that their internet usage affected their behavior. They perceived that they are socially and emotionally oriented towards the internet for interactions with family, friends and activities as opposed to face-to-face interactions, and preferred towards how and when they are likely to use the internet. Negative affect was described by Rothbart and colleagues as one of the reactive super-dimensions of temperament (Rothbart et al., 2000; Rothbart & Bates, 2006; Zentner & Bates, 2008), that covers the specific traits of sadness, discomfort, anger/frustration and fear, and low soothability. The present study reveals that the reason why those in negative affect tended to use the internet might be attributed to the fact that the specific temperamental traits of sadness, discomfort, anger and fear might have affected their formal interpersonal interaction and engagement with their activities, which consequently predisposed them to favor virtual interactions to reduce interpersonal problems related to fear, anger/frustration and sadness. A number of studies have revealed similar relationship between internet usage and negative affect. For instance, Romano et al (2013), Vidyachathoth et al (2014) and Telef (2016) reported significant relationships between different Internet usage patterns and negative affect.

Significant positive correlations were observed between surgency/extraversion and Internet

Usage (r = .36, p < 0.01), Self-Detachment(r = .30, p < 0.01) and Usage (r = .32, p < 0.01). Those with surgency/extraversion perceived that their internet usage has affected their behavior; they were more socially and emotionally lenient to communicate through the internet than face-to-face interactions, and anticipated towards how and when they are likely to use the internet. This can be examined from the standpoint of the Rothbart temperament model, which characterizes individuals with surgency/extraversion in terms of high intensity pleasure, sociability, and positive affect (Evans & Rothbart, 2007; Rothbart, 2011). They might have been influenced more by the internet because the internet provides a fascinating platform to gain maximum pleasure, exercise adequate social interactions and emotional excitement with its hypermedia. Studies on problematic cell phone use (Coco et al., 2018) and

internet addiction (Cohen et al., 2018) reported similar relationship between the specific construct of temperament and patterns of internet usage. The studies revealed that people with surgency/extraversion were more prone to problematic cell phone use and internet addiction.

The findings of present study revealed significant negative correlation between effortful control and Internet Usage (r = -.26, p < 0.01), Self-Detachment (r = -.20, p < 0.01) and Usage (r = -.27, p < 0.01); those with effortful control perceived that their internet usage did not affect their behavior. They were not socially and emotionally oriented towards internet-based interaction, and did not anticipate when and how they are likely to use the internet. Effortful Control is described as the ability to inhibit dominant response in order to perform a sub-dominant response, to detect errors and to engage in planning (Rothbart & Bates, 2006; Evans & Rothbart, 2007). Accordingly, the result of the present study revealed that those with effortful control were protected against an imbalance between online and face-to-face interactions, and also protected against excessively anticipating the internet usage over other real life counter parts. The present study is consistent with previous studies linking effortful control to aspects of Internet Usage (Zhang et al., 2014).

Significant positive correlation was found between orienting sensitivity and internet usage (r = .18, p < 0.01), Self-Detachment (r = .12, p < 0.01) and Usage (r = .22, p < 0.01); those high on orienting sensitivity perceived that their internet usage affected their behavior. They socially and emotionally oriented towards the internet-based communication over the face-to-face interactions, and preferred how and when they were likely to use the internet. Orienting Sensitivity was described by Evans and Rothbart (2007) as the temperamental trait that shares features of attentional sensitivity, affective-perceptual sensitivity, associative sensitivity and general perceptual sensitivity. The implication is that students with orienting sensitivity were more sensitive about the appealing features of the internet, and more emotionally and socially oriented towards internet-based communication than face-to-face interactions. As a result, they anticipated when and how they are likely to use the internet. This might be attributed to their increased sensitivity to the virtual environment and its appealing backgrounds. However, no adequate literature was sought either to support or refute the finding of the present study. For instance, orienting sensitivity was implied in Online Gaming where it played protective role against the development of behavior problems, such as interpersonal problems, poorer empathy, poorer interpersonal values, and poorer emotional intelligence in Massively Multiplayer Online Gamers (Poole, 2018). Further explorations are needed to clearly delineate the role of orienting sensitivity in internet usage.

To find the degree to which the four temperamental traits predict the students' Internet Usage, regression analysis was used and the result was depicted in the following table (see Table 2).

Table 2: Standard Regression Results

Model	Un-standardized Coefficient (B)	Std. Error	Standardized Coefficient (β)	T	Sig.
(Constant)	14.018	3.595			
Negative Affect	.024	.026	.065	.929	.354
Surgency/Extraversion	.196	.040	.324	4.880	.000
Effortful control	-.048	.042	-.079	-1.138	.256
Orienting Sensitivity	-.069	.037	-.128	-1.872	.062

Note

The dependent variable was Internet Usage. R^2 and the Adjusted R^2 are 0.122 and 0.114 respectively.

The regression model was statistically significant, $F(4, 457) = 12.20$, $p < 0.001$, and accounted to 12.20% of the variance in Internet Usage (see Table 2). This implies that temperament with its four dimensions: negative affect, surgency/extraversion, effortful control and orienting sensitivity contributed 12.20% in the internet usage among the students in the Ethiopian Public universities. However, surgency/extraversion (β =0.32, p < 0.001) is the only temperamental trait that significantly explained Internet Usage. For every additional standard unit change in surgency/extraversion, Internet Usage will increase by 0.32 units when other variables held constant. On the other hand, negative affect (β =.065, p = 0.345), effortful control (β = -.079, p = 0.256) and orienting sensitivity (β = -.128, p = .062) were non-significant in the prediction model. This means that, the contributions of negative affect, effortful control and orienting sensitivity to the students' internet usage are non-significant. The result of the regression analysis can be explained in the framework of the Rothbart's Psychobiological Model of Temperament, that conceives human temperament as an enduring disposition that encompasses negative affect, surgency/extraversion, effortful control and orienting sensitivity. And the model aslo argues that temperament influences human behavior across domains of functioning (Evans & Rothbart, 2007). Hence, the result of the present study implies that temperament plays significant role in the students' Internet Usage. However, the relative contribution of surgency/extraversion over the other three dimensions of temperament might be attributed to the fact that it represents the strong appetitive tendency and the most salient feature of temperament, which might be influenced more by the appealing nature of the internet (Evans & Rothbart, 2008). Similar finding was reported by Oztürk et al (2015), implying that surgency/extraversion significantly predicted cell phone usage.

The present study could be a useful base for future comprehensive inquiries regarding the relationship between temperament and Internet Usage both at global and local levels. It could also have practical contributions to device interventions promoting healthy internet usage among students in the Ethiopian Public Universities. However, some limitations are worth mentioning to help potential readers cautiously use the result of the study. To begin with, the study was conducted using self-report measures. This might pose limitations against generalization about the complex relationships between Internet Usage and temperament. Secondly, though temperament was measured using a well-stablished scale, Internet Usage was measured using limited number of items that might have only adressed the issue in general senses. The Internet Usage Scale (Monetti et al, 2011) was used because of the absence of standardized measures to adequately measure generalized Internet usage behavior; almost all of the available tools measure specific aspects of Internet Usage or maladaptive conditions related to Internet Usage: Internet Addiction, Pathological Gambling, Problematic Internet Usage etc. Thirdly, the reported results of correlational analyses indicate low to modest relationships between Internet Usage and the four temperamental dimensions; hence, the findings of the present study should be interpreted and used cautiously. Forthly, temperament is partly influenced by cultural experiences which requires careful application of the result to other cultures.

Having the above-mentioned inherent limitations with the study, it could be concluded that Internet Usage is significantly related to temperament with respect to students in the Ethiopian Public Universities. However, further explorations are recommended to come up with consistent relationship between Internet Usage and each of the temperamental dimensions. Accordingly, the link between Internet Usage and each of the temperamental dimensions among the students in the Ethiopian Public Universities need adequate exploration for the purpose of modeling the role of temperament in Internet Usage and device systematic interventions. Apart from this, the findings of the present study imply the need for practical interventions. Hence, the Ethiopian Public Universsties are adviced to organize discussion forums involving stakeholders: teachers, parents and students to enhance their awareness regarding the role of temperament in internet usage. In addition, the Ethiopian Public Universities are adviced to incorporate temperament-related interventions in their Student-support system in the form of awareness creation and practical guidance to improve the students' self-monitoring and self-control pertinent to Internet Usage in order to modulate the outward orientations and cravings for high intensity pleasure inherent in temperamental trait of extraversion.

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