Internet Use and Happiness:
A Longitudinal Analysis

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Abstract. This is an extension of a previous study, which explored the relationship between happiness and Internet use [1]. An Internet Use Scale (IUS), developed in the previous study, was administered to college students along with the Flourishing Scale [2] and the Satisfaction with Life Scale [3]; and three new open-ended questions. We compared changes in the relationship between these measures, and their mean values, across the two samples, and carried out qualitative analyses of the open-ended questions. Results indicated that those who reported spending less time on the internet, less time expressing emotions, and more time checking facts, scored higher on measures of happiness. Further, participants found negative affective expression on the Internet particularly aversive. Finally, those with lower happiness scores were more likely to report playing on-line games; and those with higher happiness scores were more likely to identify Internet disinformation as aversive.

Keywords: Happiness · Internet

1 Why Study Happiness and the Internet?

Following the dawn of the new millennium, research on happiness increased dramatically, largely spurred on by the fact that people increasingly rate happiness as a major life goal. For example, recent surveys have indicated that the strong majority of people across many countries rate happiness as more important than income [2]. Lyubomirsky [3] sums this research up, "…in almost every culture examined by researchers, people rank the pursuit of happiness as one of their most cherished goals in life" (p. 239).

In addition, there is a large body of evidence that suggests situational factors, in particular wealth, play a surprisingly small role in determining happiness. Some suggest that this may be the result of society moving into a post-materialistic phase, where basic needs have been largely met for many in industrialized countries, so pursuit of self fulfillment becomes more important [3].

Finally, there are number of studies that indicate that happy people, in general, have a positive effect on society. For example, there is evidence that happier people are more successful and socially engaged [4].

2 What Is Happiness?

For the most part, researchers agree that happiness is inherently subjective, In fact, the term is often used interchangeably with "subjective well-being" (SWB) [5]. David Myers [6], one of the leading researchers in the area, stated that happiness is "… whatever people mean when describing their lives as happy." (p. 57). Despite the potential for ambiguity with such a definition, there is considerable agreement, at least across Western culture, as to what happiness means [7]. Most people equate happiness with experiences of joy, contentment, and positive well being; as well as a feeling that life is good, meaningful, and worthwhile [8].

As a consequence, self-report measures have served as the primary measure of happiness. Examples include the Satisfaction with Life Scale (SLS), the Subjective Happiness Scale (SHS), and the Steen Happiness Index (SHI). Psychometric studies of these self-report measures indicate that they are, by and large, reliable over time, despite changing circumstances; they correlate strongly with friends and family ratings of happiness; and they are statistically reliable. Sonja Lyubomirsky [8] sums this up, "A great deal of research has shown that the majority of these measures have adequate to excellent psychometric properties and that the association between happiness and other variables usually cannot be accounted for by transient mood" (p. 239). These psychometric studies illustrate the general agreement among people as to what constitutes happiness.

One other interesting point, regarding the definition of happiness and its measurement, is that mean happiness is consistently above a mid-line point in most populations sampled [5]. For example, three in ten Americans say they are "very happy", only 1 in ten report that they are "not too happy", and 6 in 10 say they are "pretty happy" [6]. Therefore, there appears to be a positive set point, where most people appear to be moderately happy, and this is independent of age and gender [7].

3 Individual Difference and Happiness

Happiness is surprisingly stable over time [8] even with major changes in life circumstances [9], and there appears to be no time in life that is most satisfying [10]. These findings are consistent with research that indicates some individual difference traits are predictive of happiness. Further, happiness may also be strongly tied to genetic predisposition. We now turn to a discussion of this research.

Twin studies indicate that there is a strong genetic component in happiness [11, 12]. For example, Lykken and Tellegen [12] assessed the well being of twins at ages 20 and 30. They correlated the happiness scores between monozygotic twins at stage 1 with the score for their twin at stage 2 (cross time/cross twin) and found a correlation of .4, while the test-retest correlation where each twin's score was correlated with himself/herself was only .5. Further the cross twin/cross time correlation for dizygotic twins was only .07. Therefore, heritability appears to account for a large part of the stability in happiness.

As mentioned, some other individual difference measures have been found to consistently correlate with happiness, in particular extroversion. For example, in a

cross-cultural study Lucas and colleagues found that extraversion correlated with positive affect in virtually all 40 nations they examine [14]. Extroversion, as a predictor of happiness, is strongly related to the literature to be discussed, which relates social interaction with happiness, in that there is a clear relationship between the number and quality of social relationships and happiness. One would expect that an extrovert would be more likely to seek out and form these types of relationships.

Religiosity is another variable that has been found to consistently predict happiness [6]. In addition, those who report higher levels of religiosity tend to recover greater happiness after suffering from negative life events [14]. This finding has been found for peoples' self reports of their degree of religiosity, and for behavioral measures such as Church attendance [6]. As with extroversion, the impact of religiosity may be, at least partly, explained by the importance of social interaction in determining happiness, in that those who attend Church regularly, and interact with others in a positive social environment, are more likely to be happy [16]. Further, people often derive meaning and purpose from religious practices, which is another important correlate of happiness [6].

In addition to behavioral tendencies, with respect to individual differences, the research of Lyubomirsky and colleagues provides substantial evidence that there are consistent differences between happy and unhappy people in the ways they process ("construe") information. For example, studies from Lyubomirsky's laboratory have found that happy people are less sensitive to social comparisons [17], tended to feel more positive about decisions after they were made [18], construed events more positively [18], and are less inclined to self-reflect and dwell on themselves [17]. This difference in information processing dispositions in happy vs. unhappy people is presumably one reason why the effects of circumstantial factors are relatively minimal.

Another individual difference factor, which has been identified as important in predicting happiness, is the autotelic personality, which refers to people who tend to regularly experience "flow" [19]. Flow refers to a kind of experience that is engrossing and enjoyable to such a degree that it becomes "autoletic" – worth doing for its own sake [19]. The autotelic personality and the flow concept are consistent with the views of happiness researchers who have suggested that engagement is a fundamental component of a happy life [20].

4 Happiness and the Internet

Studies that have examined the relationship between the Internet and happiness have been conducted at least since the relatively early days of the World Wide Web. Most of these have focused on communication/collaborative activities and the Internet. As we mentioned, these types of activities have been found in non-internet studies to be strongly related to happiness.

4.1 The Internet Paradox

In 1998 Kraut and colleagues reported the results of a reasonably extensive study of early World Wide Web users where they followed the activity of mostly first time

Internet users over a period of years. Researchers administered periodic questionnaires and server logs indicating participant activity on the web. (Participants were provided with free computers and internet connections) [21].

Over all, the results showed that the Internet had a largely negative impact on social activity, in that those who used the Internet more communicated with family and friends less. They also reported higher levels of loneliness. Interestingly, they also found that email, a communication activity, constituted the participants main use of the Internet. The researchers coined the term "internet paradox" to describe this situation in which a social technology reduced social involvement.

These researchers speculated that this negative social effect was due to a type of displacement, in which their time spent online displaced face-to-face social involvement. Although they note that users spent a great deal of time using email, they suggest that this constitutes a low quality social activity and this is why they did not see positive effects on well being [21]. They find further support for this supposition in a study reported in 2002, where they found that business professionals who used email found it less effective than face-to-face communication or the telephone in sustaining close social relationships [22].

Since the time that this Internet paradox was identified, a number of studies over the next twelve years have found, fairly consistently, results that contradict the Kraut et al. results. More recent studies have indicated the potential positive social effects of the Internet and their relationship to well being. Further, the effect appears to be getting stronger as the Internet and the users mature.

In fact, one of the first challenges to this Internet paradox was provided by Kraut himself when he published follow up results for participants in the original Internet-paradox study, including data for additional participants. In this paper, "Internet Paradox Revisited," researchers report that the negative social impact on the original sample had dissipated over time and, for those in their new sample, the Internet had positive effects on communication, social involvement, and well being [23]. Therefore, it appears that the results of the original Kraut et al. study were largely due to the participants' inexperience with the Internet. Within just a few years, American society's experience with the Internet had increased exponentially. Further, the Kraut studies concentrated on email, whereas there are many other social communication tools available on the modern web.

4.2   Displacement Versus Stimulation Hypothesis

More recently, researchers have examined the relationship between on-line communication and users' over all social networks, explicitly addressing the question of whether or not on-line communication "displaces" higher quality communication, or "stimulates" it. Presumably, the former would negatively affect well being, while the latter would enhance it [24].

In one large scale study, over 1000 Dutch teenagers were surveyed regarding the nature of their on line communication activities, the number and quality of friendships, and their well being.

They found strong support for the stimulation hypothesis. More specifically, these researchers developed a causal model, which indicated that instant messaging lead to more contact with friends, which lead to more meaningful social relationships, which, in turn, predicted well being. Interestingly, they did not find this same effect for chat in a public chat room. They attributed this finding to the fact that participants reported that they interacted more with strangers in the chat room as compared to their interaction with friends with instant messaging [24].

4.3   The Internet and Social Connectedness

Despite studies, such as the one just mentioned, which have found a relationship between internet use and positive outcomes, there is still a great deal of press suggesting that the internet can effect users negatively, causing social isolation, and shrinking of social networks. This is purported to be especially true for adolescents [25].

Researchers with the Pew Internet and Daily Life Project set out to examine this concern directly in one of the most comprehensive studies of the effect of the Internet on social interaction, reported in 2009 [25]. Contrary to fears, they found that:

- A variety of Internet activities were associated with larger and more diverse core discussion networks.
- Those who participated most actively with social media were more likely to interact with those from diverse backgrounds, including race and political view.
- Internet users are just as likely as others to visit a neighbor in person, and they are more likely to belong to a local voluntary organization.
- Internet use is often associated with local activity in community spaces such as parks and restaurants, and Internet connections are more and more common in such venues.

Although these outcomes did not explicitly include happiness, they do support the contention that Internet activities can enhance the amount and quality of social relationships, which has been implicated in a number of studies as a strong and consistent predictor of happiness.

5   Research Overview

This study is a replication and extension of one conducted in 2016 [1] which also explored the relationship between internet activities and happiness. An internet-use-scale (IUS) was developed and subjected to initial psychometric analyses, and modified accordingly, resulting in a 13 item scale, representing three categories of internet use: Affective expression, Information Gathering, and Total Time (spent on the internet). Results indicated that both happiness measures were negatively related to the Time category, and one happiness measure was positively related to the information gathering factor. The current research extends this through the administration of the revised IUS and the same two happiness measures: Flourishing Scale [2] and the

Satisfaction with Life [3] scale, with a larger sample. Further we collected responses to three new open-ended questions, which we analyzed quantitatively, by breaking student's comments into individual Internet activities and classifying these into use categories. Finally, we explored differences in these comments/categories as a function of students' scores on the happiness measures.

6 Questions

6.1 Internet Use and Happiness

What is the relationship between internet use and happiness?

6.2 Internet Use and Happiness Over Time

How does the relationship between happiness and internet use, and the mean happiness and use scores differ between the 2016 and 2017 sample?

6.3 Internet Activities

Based on open-ended self report: (1) What are the prime types of activities people engage in on the internet; (2) What activities do they enjoy; (3) What activities are aversive; and (4) How do these differ as a function of happiness scores.

7 Research Method

7.1 Participants

Thirty-four students enrolled in an undergraduate course in digital media at a small Midwestern technological research University in the spring of 2017 served as the participants in this study.

7.2 Measures

The Internet use scale (IUS) [1] was administered to assess internet use. The 13 item scale represents three internet use categories: Affective Expression, Information Gathering, and Time Spent on the Internet. The Flourishing Scale (FS) [2], and the Satisfaction with Life Scale (SWLS) [3] were administered to represent happiness. In addition, participants were required to respond to three open-ended questions: "Describe the ways in which you most commonly interact with the Internet."; "Describe the activities that you enjoy most when interacting with the internet.; and "Describe the activities that you enjoy least when interacting with the internet."

7.3   Procedure

Participants completed the survey on-line, which consisted of the measures delineated above.

8   Results

8.1   Relationship Between Internet Usage and Happiness

In order to assess the relationship between happiness and internet use measures, and to compare the two samples (2016 & 2017), a series of zero-order correlations were computed among the happiness and internet use measures. These results appear in Table 1.

Table 1. Correlation between internet use and happiness as a function of year

Happiness	Factor					
	Affective expression		Info gathering		Time	
	2016	2017	2016	2017	2016	2017
Flourishing	−.087	−.35*	.46*	.53**	−.54**	−.54**
SWLS	−.312	−.15	−.18	.18	−.58**	−.30(*)

(*)p < .10; *p < .05; **p < .01

8.2   Internet Use, and Happiness as a Function of Time

In order to compare the two samples on their internet use and happiness, a series of one-way analyses were computed with the three internet usage factors, and two happiness scores as the dependent measures and time (2016 vs 2017) as the independent variable. Note that these scores were computed as means of the items such that the internet usage scores could range from −7 to +7 with higher scores representing more affective expression, information gathering, and time spent on the internet. Scores on both happiness scales ranged from 1–7 with greater scores representing higher levels of happiness. These results are presented in Table 2.

Table 2. Internet usage and happiness as a function of sample year

Measure	2016	2017
Affective expression*	.36	−.50
Info gathering	5.64	5.67
Time*	.26	−.431
Flourishing	5.31	5.57
SWLS*	4.33	4.90

*p < .05

8.3   Qualitative Analyses

All student responses to the three open-ended items were first broken into individual statements, such that each statement referred to one Internet activity. These were then classified into categories. These statements/categories were then further broken down into two groups: High Happiness (those scoring above the median on the mean of the two happiness scales); and Low Happiness (those scoring below the median).

With respect to the first question: "Describe the ways in which you most commonly interact with the Internet." four categories emerged. These categories were "Passive Uses", including reading and watching; "Communication", including things like social media and email; "Gaming", including on-line gaming; and "Work" which consisted of school work and general fact checking. These categories were consistent across the high- and low-happiness groups, with the exception that those in the Low happiness group were more than twice as likely to mention on-line gaming as a primary activity.

For the second question: "Describe the activities that you enjoy most when interacting with the Internet." The categories remained the same, with the exception that the "work" category disappeared and, again, those in the low-happiness group mentioned on-line gaming as an enjoyable activity twice as much as those in the high-happiness group.

For the third question: "Describe the activities that you enjoy least when interacting with the internet", the categories changed significantly, and was not as consistent across the two happiness groups. "Negative Affective Expression" was clearly the main category for both groups. Some representative comments: "I dislike negativity on the Internet, whether it's people arguing or complaining about something or someone."; "… seeing others hate on one another"; and "… when people are jerks." A second category that emerged for both groups was, not surprisingly, "work", including homework, research, etc.

For those in the high-happiness group there was a clear third category that immerged regarding dis-information with comments such as "Fake News Reports", "I worry about the accuracy of information …"; and "… reading posts on social media that have no factual backing". On the other hand, those in the low-happiness group did not mention this as an aversive Internet phenomenon. Interestingly, there were also some in the high-happiness group who mentioned on-line gaming as a negative experience, contrasting markedly with the low-happiness group, where on-line gaming was a primary category representing enjoyment of the internet.

9   Conclusions

Taken together, the results paint a picture of the happy versus unhappy Internet user. First, those who spend more time on the Internet are less happy. This was demonstrated in the 2016 sample [1] and replicated in the 2017 sample. Further, the qualitative analysis indicated that those who scored lower in happiness were much more likely to report spending time playing and enjoying video games, while there were some in the high-happiness who even reported this as a negative experience. This may very likely be related to the time-on-the-internet finding, since, an often sited negative

consequence of on-line video gaming is the amount of time it takes away from other important life activities [26].

Second, when interacting with the Internet, those who report spending more time gathering information and carrying out research score higher on happiness measures. There was a strong relationship between this usage factor and the flourishing scale in both the 2016 and 2017 sample. Note that this usage factor refers to the degree to which someone is likely to spend time checking facts on the internet, but also the degree to which one is aware of the potential inaccuracy of information. One item scored positively on this sub-scale is "I'm skeptical of the accuracy of information I find on the internet". This was further supported by the qualitative analysis where a number of those in the high-happiness group reported that they found factual inaccuracy on the Internet as a major negative; while those in the low-happiness group did not mention it. As one of those in the high-happiness group described this, "I worry about the accuracy of information I find and often check several different websites for information."

Third, those who use the Internet as a method for negative affective expression are less happy. Although this relationship was statistically significant with only one happiness measure in the 2017 sample; it's certainly true that people are in general agreement that those who participate in negative affective expression are causing unhappiness for others. By far, the most common theme that emerged with respect to the open-ended question on what people like least about the Internet, was the aversion people have for negative-affective expression. Across both happiness groups users found it aversive when "people are jerks", as on participant put it.

Finally, we carried out some analyses to compare changes in the participants' views between the 2016 and 2017 sample, with respect to their happiness and Internet usage scores. The good news, in terms of what we've learned about the Internet and happiness, is that those in the 2017 sample report spending significantly less time online than the 2016 sample; when online are significantly less likely to participate in affective expression; and, perhaps consequently, scored significantly higher on the satisfaction with life scores.

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