

Social inhibition and its correlation with the uses and gratifications of internet use

A study about the predictors of excessive Internet Use

Nina Conrady (s0157082)

BSc Psychology, University of Twente, Enschede

Faculty of Behavioural Science, Psychology

1st Supervisor: Dr. Marcel Pieterse

2nd Supervisor: Dr. Henk Boer

Enschede, 03-07-2009

Abstract (EN)

The present study examined Internet use of Dutch university students and gaming-site visitors. On the ground of existing literature about the antecedents of excessive Internet use and the uses and gratification approach, social inhibition and socio-affected regulation (SAR) mechanisms were chosen to form an integrative model of excessive Internet use. A sample of 90 Dutch Internet users was investigated by using Denollet's DS14, Meerkerk's Compulsive Internet Use Scale and a newly designed questionnaire of uses and gratifications on Internet to assess correlations between the three constructs. It was hypothesized that the more socially inhibited a person is, the more likely it becomes that SAR-driven variables will be used to explore the Internet which in turn leads to excessive Internet use. Hierarchic regression showed that social inhibition, SAR-driven variables and frequency of using the Internet explained 50.3 % of the variance of excessive Internet use. A relationship of compulsive Internet use and socio-affected regulation mechanisms was found, which indicated a mediation of social inhibition by SAR-driven mechanisms and behavior.

Abstract (NL)

Deze studie had het doel het internet gebruik van Nederlandse studenten en 'gaming-site' bezoekers te onderzoeken. Op basis van bestaande literatuur van de voorspellers van excessief internet gebruik en de 'uses and gratifications' benadering zijn sociale inhibitie en socio-affectieve regulatie (SAR) mechanismen gekozen om een integrerend model van excessief internet gebruik te vormen. Een steekproef van 90 Nederlandse internetgebruikers werd onderzocht op sociale inhibitie, excessief internet gebruik en relevante constructen van de 'uses and gratifications' benadering. Denollet's DS14, Meerkerk's Compulsive Internet Use Scale en een nieuw ontworpen vragenlijst voor de 'uses' en de 'gratifications' van internet gebruik zijn toegepast om de correlaties tussen de drie constructen te meten.

Hierarchische regressie heeft laten zien dat sociale inhibitie en de SAR-benadering van internet gebruik 50.3% van de variatie verklaren. Er werd een relatie tussen compulsief internet gebruik, socio-affectieve regulatie mechanismen gevonden, die een mediatie van SAR-mechanismen en Internetgedrag op sociale inhibitie impliceert.

Introduction

In the last few years Internet use and gaming have gained popularity throughout the whole world. From the 90's of the last century on there has also been a rapid increase of internet-usage all over the world. The internet became very popular in society due to its use for commercial just as for scholarly purposes. In 2009 internet usage throughout the whole world was estimated at 1,596 million with 393 million users (48.9% penetration rate) in Europe alone. Statistics pose that there has been a growth in users between 2000 and 2009 of about 342% worldwide (Miniwatts Marketing Group, 2009). Figures for the Netherlands on Internet use are hard to find, but surveys at the beginning of the new millennium showed a penetration rate of 45, 82% which increased to approximately 62% in 2003. This indicates the growth potential of the Internet during the last few years.

With the development of the first MUD's, which were characterized by game-playing of multiple users in a ceaseless world, the rise of massively multi-users online role-play game (MMORPG) had its starting point in the late 70's. The online environment allowed thousands of users to interact and play with each other in a persistent and graphical virtual world at the same time in different places (Yee, 2006). In 2003 gaming was performed by 430 million people worldwide, a quarter of which was played online (Kraut & Fleming Seay, 2007). Of those users 8% spent more than 40 hours on gaming and 70% spent at least 10 hours a week on massively multi-user Online Role-Playing Games. This demonstrates the enormous amount of invested time in gaming (Yee, 2006). During the rise of the internet in the last two decades the gaming activity (especially online-gaming) grew even more rapidly due to the uncountable possibilities of interconnections the internet offers the game-community (Yee, 2006).

These developments gave discussions about the emergence of the so-called internet-addiction. Psychologists disagree about whether it really is a pathological addiction. What kind of evidence is there to claim that something like internet addiction really does exist?

Positive and negative consequences of Internet use

Unlike dependencies on chemical substances, the internet does not only have negative but also positive impacts on society. Among these are the possibilities of conducting research, performing business transactions, assessing libraries or communicating with colleagues (Young, 2004). Furthermore, it offers direct benefits, such as the interconnections between families and friends, and participation in online forums regardless of time, distance and personal circumstances. In a longitudinal study by Kraut et al. it was found that respondents generally experienced positive effects of the Internet on communication, social involvement and well-being. Nevertheless, these effects were in general more applicable to extroverts than introverts. Kraut et al. suggested that a so-called 'rich-get-richer' model characterizes effects of internet use, i.e. using the internet predicted better outcomes for extraverts and those with more social support but worse outcomes for introverts and those with less support (Kraut, Kiesler, Boneva, Cummings, Helgeson, & Crawford, 2002).

On the other hand there are indicative findings that the Internet indeed may have addictive potential. Young (1996) was one of the first researchers who examined the existence of and the correlations with excessive internet use. Over-users reported that they would be unable to cut down their excessive internet use even if they tried really hard to do so. They could not restrict their usage to a normal amount of internet activity. Participants mentioned that their internet use resulted in personal, family and occupational problems that had also been found in other addictive disorders (Lesieur & Blume, 1993).

Findings from a survey by Vault.com (an online analyst firm) among 1,439 employees indicated that a great amount of time at work is spent by surfing the Internet. 37% of those employees admitted surfing constantly, while 32% stated that they were online a few times a day (Adschiew, 2000). Although these data only refer to people who work in an internet-related environment, they still give a good indication of the amount of loss in working time. Furthermore, in a survey of an electronic monitoring firm, it was found that 30% of 224 corporations indicated that they had terminated and 64% had disciplined employees for inappropriate use of the Internet (i.e. pornography, chatting, gaming etc.). This work-related internet abuse translates into a great amount of lost dollars for employers. Vault.com estimated the costs at up to 54 billion dollars annually due to lost productivity and negative publicity (Websense, 2000).

Furthermore, studies about the negative impact the internet has on students' performance indicated that their internet abuse led to consequences in academic accomplishment. Morahan-Martin & Schumacher (2000) found that in a sample of 227 undergraduate Internet users, 27.2% reported no symptoms whereas 64.7% reported one to three symptoms and 8.1% reported four or more symptoms of pathological Internet use. In a study by Young (1998) 58% of those students who in fact had made excessive use of the Internet suffered from poor study habits, poor grades or failed school.

Beside work-related and academic problems, marriages and intimate relationships are most disrupted by excessive internet use. Cyber affairs (i.e. romantic or sexual relationships that are maintained mainly through electronic communication) caused long-term and stable marriages to be destroyed due to declining investment in the relationship, personality changes and repeated lying by the dependent partner. Studies also showed that among internet addicts 53% were having serious relationship problems which were eventually ending in marital discord, separation or divorce (Young, 2004).

Compared to other addictions physical consequences were not as significant notable. Yet, overuse can cause disrupted sleep patterns which leads to impairment in academic or occupational functioning. Furthermore, computer use can result in a sedentary lifestyle and an increased risk for carpal tunnel syndrome, back strain and eyestrain (Young, 1996).

Still, assumptions of the cause of excessive Internet use face the problem of a potentially bidirectional relationship. Researchers are uncertain about whether socially inhibited individuals use the internet because they are lonely and socially inhibited in the first place or whether they became lonely and social inhibited because they engaged in compulsive use of the Internet. Those in favor of the first statement argue that Internet use interferes with interaction with the outside world, which in turn leads to feelings of social anxiety and loneliness. The more the user spends time online, the more he engages in superficial relationships in the virtual world at the costs of lesser real-life relationships (Morahan-Martin & Schumacher, 2003). On the contrary, others assume that perceived loneliness and social anxiety may be the cause of excessive Internet use because of the possibilities the internet provides: it creates a world where anonymity, absence of status, prestige, class and attractiveness play a major role in disinhibited behavior of people. On the subject of gaming the internet provides the "fun and challenge of video games with the social rewards of an online community", which in turn facilitates meeting new people, sharing information or stay in touch with old friends (Kraut & Fleming Seay, 2007). Therefore the internet might provide the desired emotional support and activities socially inhibited individuals are unable to find in the real world. Thus, the question whether Internet addiction really can be classified as an addiction in the tradition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) stays unanswered. Nevertheless,

this does not pose a problem with respect to this study because of the aforementioned implications of excessive Internet use.

Risk factors

Since the manifestation of the internet in the late 90's there have been a variety of studies about the potential factors that play a part in the emergence of excessive internet use. The different results raised the question about which factors of Internet use are indeed responsible for a higher sensitivity to dependent Internet behavior.

Demographics: Studies repeatedly showed that boys are in greater danger of spending more time on the Internet than girls (Lin & Tsai, 2002). In a norwegian study, demographic risk factors of problematic internet use were identified as being of young age, male gender, living in a city, being single, having a higher education level and being in an unsatisfactory financial situation (Bakken, Wenzel, Götestam, Johansson, & Oren, 2009).

Personality traits: Research of excessive Internet use has shown that high novelty seeking, harm avoidance and low reward dependence (i.e. the tendency to respond intensely to signals of reward) appear to be significant predictors of internet addiction (Ko, Yen, Chen, Chen, Wu, & Yen, 2006). Furthermore, according to Caplan (2002), people who are shy and low in self-esteem are drawn to the Internet due to the social benefits it might provide. Most notably however is the factor of social inhibition, being a predictor of excessive Internet use. Studies found that excessive Internet users showed a higher level of social isolation (Modayil, Thompson, Varnhagen, & Wilson, 2003). In addition to that, loneliness, which is associated with social inhibition and anxiety, higher self-consciousness (Solano & Koester, 1989) and sensitivity to rejection (Russel, 1996), also predicts a great amount of internet usage.

Lifestyle: The lifestyle of a person can contribute to a higher susceptibility of the development of addictive behaviors. Young (2004) noted that counselors had argued that students are at greater risk of developing an addiction because of the features the student life entails. When pupils become students a variety of changes take place: They are guaranteed free and unlimited access to the Internet by their universities. Faculties encourage students to make use of the Internet for academically purposes. Furthermore, students have vast amounts of unstructured times accompanied by the new experience of not having to justify themselves, i.e. experiencing freedom from parental control. Freshmen may have a hard time getting to know people in their new social situation which might lead to social alienation or intimidation. Additionally, there is no monitoring or censoring of the activities they engage in on the Internet.

Pathology: Shotton (1991) was one of the first researchers that observed the tendency of computer-dependents to lead a rather schizoid lifestyle and feeling comfortable with prolonged periods of social isolation. This also corresponds with findings about correlations between excessive internet use and loneliness and depression: As noted earlier, loneliness is associated with social inhibition, social anxiety and self-consciousness (Solano & Koester, 1989) and repeatedly mentioned in the context of social disintegration triggered by low self-esteem, sensitivity to rejection, anxiety, self-consciousness and poor social skills (Young, Rodgers, 1998; Morahan-Martin, Schumacher, 2003).

Internet applications: Findings indicated that apart from personality variables there are also situational variables of the Internet itself that might trigger excessive use. As Young (1996) stated: "Specific applications appeared to play a significant role in the development of pathological internet use as dependents were less likely to control their use of highly interactive features than other on-line applications" (p. 241). This describes the addictive nature of those applications that are interactive in service (in social contexts), such as live chats (IRC)

and multi-user domains (MUDs). The more interactive an application is utilized the greater its addictive potential might be. In a study about the potential explanations of pathological Internet use dependents indicated that they were most likely to use chat rooms and MUDs when being online, followed by news groups and emails. The least utilized were informational protocols and Web pages (Young, 1997).

But which factors influence a person's uses of the Internet? To understand differences in Internet use behavior one has to take a look at the most prominent approach in media research history, the uses and gratification approach, which is described in the following.

Uses and gratifications approach on the Internet

The uses and gratification approach was first presented by Katz, Blumler & Gurevitch in 1974. This approach has widely been applied to a variety of media (Palmgreen, Wenner & Rosengren, 1985), as well as to the Internet (Eighmey & McCord, 1998; LaRose, Mastro & Eastin, 2001; Stafford & Stafford, 2004). The uses and gratification approach is an audience-centered one, concerned not only with what media do to people but also what people do with media. It assumes that people actively seek out media in a goal-directed, conscious way to fulfill a wide variety of needs (LaRose, Mastro, & Eastin, 2001). Furthermore, it pays attention to the recipient being the central figure of the communication process, as well as the degree of the users' satisfaction obtained from using the media. Katz, Blumler & Gurevitch (1974) stated that the starting points of the approach are concerned with "(1) the social and psychological origins of (2) needs which generate (3) expectations of (4) the mass media or other sources which lead to (5) differential patterns of media exposure, resulting in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones" (p. 510). In other words, psychological variables and social situations may alter the motives one has to use the media, which in turn may motivate certain expectations of that media. For example, the audience might watch news programs in order to fulfill the need for getting information about a certain topic or watch celebrity-shows to get entertained.

In spite of its initial critique, the concept of an active audience is gaining credibility within newer research on media consumption, particularly on the Internet as the user is provided with a wider range of source selection and channels of information. In a study conducted by LaRose, Mastro & Eastin (2001), where uses and gratifications were combined with the features of the social-cognitive theory (i.e. negative or positive outcome expectations), 60% of the variance in internet usage could be explained. As Ruggiero (2000) stated: "the U&G approach might well play a major role in answering initial Web-use questions of prurience, curiosity, profit seeking, and sociability" (p.23).

Effects of socio-affective regulation (SAR) on Internet use

It is repeatedly mentioned that there is no simple main effect of Internet use in general, but instead personality factors (such as social inhibition) might be mediated by cognitive variables (McKenna & Bargh, 2000). Researchers have found factors of escapism, pleasure, affection, inclusion, relaxation and control (Papacharissi & Rubin, 2000) even as interactive control, socialization, identification and economic motivation to be differential when it comes to the amount of internet usage. In addition to a social integration component the internet satisfies the need for information (Larose, Mastro, & Eastin, 2001).

In a study within the uses and gratification research about the functions of the Internet Weiser (2001) claimed that it is important to first determine which functions the Internet serves before answering which social and psychological consequences the Internet might have. He introduced the division between two empirically robust dimensions. The first one was labeled as Socio-Affected Regulation (SAR), which summons the different social

and affiliative purposes of internet use. These include email- and chat programs, discussion forums, social networks (e.g. facebook) and gaming. The second dimension, the Goods-and-Information Acquisition (GIA), indicated a practical or utilitarian use of the internet, which comprises functions such as obtaining information at home or in work-related settings (Weiser, 2001). These two constructs are closely linked to media use in terms of immediate (entertainment) and delayed (informational) gratification-patterns, first described by Schramm et al. in studies about television usage (Schramm, Lyle, & Parker, 1961).

Weiser found out that an SAR-motivated approach would lead to a significant negative influence, whereas the latter would have a positive influence on psychological well-being and social integration of the individual. To understand the reasons of this phenomenon one has to take a look at the correlations of personal and cognitive variables: Physical appearance and visual cues are not influential on the internet. People who exchange information in bulletin boards do this on the basis of their similar interests rather than on their physical appearance. Thus, socially inhibited individuals do not face the problem of being judged or disapproved by others upon their appearance. According to Denollet (2005) the construct of social inhibition has to be defined as “the tendency to inhibit the expression of emotions/behaviors in social interactions to avoid disapproval by others” (p. 89). They may therefore feel inhibited, tense, and insecure when in company of others and thus prefer keeping other people at a distance in social contact situations (Asendorpf, 1993). As McKenna and Bargh (2000) stated, “the assurance of anonymity gives one far greater play in identity construction than is conceivable in face-to-face encounters” (p.62). The concept of anonymity liberates socially inhibited individuals to search for emotional support online that they would not have gotten in the offline world. Communication in the online-world facilitates all kinds of social behavior, such as self-disclosure, intimacy, enhancement of self-presentation and, most of all, development of social skills (Morahan-Martin, Schumacher, 2003). These findings suggest that socially inhibited individuals are able to construct or redefine their identity on the Internet, which they probably would not do because of their limited expressions of emotions and behaviors in the outside-world. Furthermore, McKenna and Bargh (2000) proposed that physical distance, time, physical appearance and anonymity are moderating variables in communication and interaction on the Internet. Especially with respect to social inhibition, these four constructs have to be evaluated differently on the Internet: First of all, whereas time and physical distance put restrictions on communication in real life, the Internet offers the opportunity to talk to people no matter where they are or at which time. Even more important are the latter two constructs, physical appearance and anonymity.

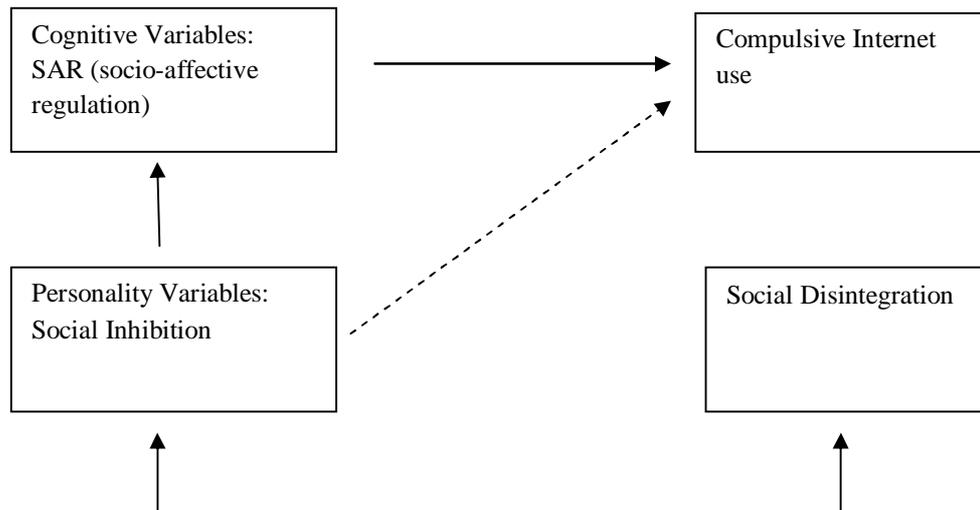
In the context of the ‘rich-get-richer’ model by Kraut et al. (2002) and in concordance with findings of Wellman & Wortley (1990) who proposed that stronger social ties generally lead to better social outcomes than do weaker ties, the SAR-motivated approach has to be interpreted as increasing social disintegration only when excessively used by socially inhibited individuals. Supporting this hypothesis are findings from Papacharissi & Rubin (2000) which indicated that people who feel more comfortable in face to face communication in the offline world tend to use more informational services whereas those who feel less comfortable tend to use more social interaction services. These features of the Internet might explain why socially inhibited individuals are drawn to an SAR-driven approach of Internet use and therefore might develop tendencies of dependent behavior.

Study purposes

This study is designed to examine the relation between personality factors and internet-applications, i.e. whether social inhibition accompanied by socio-affective applications in fact plays a major role in developing a pattern of

excessive internet use. It is hypothesized that social inhibition is mediated in its effect on internet behavior by socio-affective regulation (SAR) applications. In combination they will lead to excessive internet use. Thus, people who score significantly higher on social inhibition scales and make use of the SAR-approach will show a greater tendency of an excessive internet usage pattern.

Figure 1
Model of Predictors of Compulsive Internet Use



Methods

Participants and procedure

The sample consisted of 90 people from the University of Twente and people that have been recruited from different web pages of online-game communities. All participants were Dutch-speaking and completed the online questionnaire in their own time. The questionnaires were first distributed among the university students by means of personal networks and the snow ball method. Two weeks later a link to the questionnaire was published in different Dutch-speaking internet-gaming forums. Participants were informed that participation was entirely voluntary and anonymous.

Of these participants 70% were male and 30% were female. The average age was 23.4 years, ranging from 11 to 48 years. The sample included 81.1 % students, 17.8% employees and one person who indicated that he or she was unemployed.

Measures

The questionnaire included sections assessing demographics, internet and game usage and behaviors, a Dutch version of the social inhibition-scale by Denollet, the compulsive Internet use scale (CIUS) by Meerkerk and a newly designed questionnaire based on the uses-and-gratification approach.

Demographics: The demographic section of the questionnaire included questions about participants' gender, age and educational background.

Internet usage and gaming behavior: Participants were asked how often they used the internet per week, per session and which applications they used while being online. The same questions were asked for their game

behavior. Furthermore, they were asked about the games they played and whether this happens on- or offline. The questions about on- or offline game-playing were excluded from the analysis due to their missing informational value for this research: Game-playing people were reached through Internet forums, which require Internet access. Thus, the fact that respondents were presumably online-game players made it unnecessary to distinguish on- and offline game-playing behavior.

Compulsive Internet Use Scale (CIUS): Influence of the internet on the individual was assessed through the Compulsive Internet Use Scale by Meerkerk, which consists of 14 likert-type questions. The scale includes questions on a five-point scale, with 1=never and 5=always. In the validation study of Meerkerk (2009) this instrument has a good fit (RSMEA = 0.05) with an internal consistency (Cronbach's alpha) of .90. Except for convergent validity, which was good, other validities (s.a. predictive and concurrent validity) still have to be evaluated for this instrument (Meerkerk, Van den Einden, Vermulst, & Garretsen, 2009).

Social inhibition scale (SIS): Social inhibition was assessed by using social-inhibition-items of the DS-14 by Denollet. This scale was based on a five-point likert-scale, with 1 = not true and 5 = true. The items for social inhibition are an indication of discomfort in social interactions, reticence and social poise. In Denollet's study (2005) Cronbach's alpha (.86) and item-total correlations (.52 – .75) for the subscale of social inhibition displayed high levels of internal consistency. In addition to that, results for construct validity showed that social inhibition correlated negatively with extraversion ($r = -.59$), indicating 35% of shared variance.

Uses and gratifications (GIA & SAR): In this last section respondents were asked to define their motivations for their internet usage on a five-point-likert scale, with 1 = never and 5 = always. The scale consisted of 7 subscales which were composed by a choice of earlier mentioned factors of Internet use: Information, identification, integration, arousal, social disinhibition, escape and social disintegration. Those scales included propositions such as 'I use the internet to get information' (information), 'The internet gives me the possibility to identify myself with others' (identification), 'I make new friends on the internet' (integration), 'I like the internet because it gives me emotional arousal' (arousal), 'I feel happier in the virtual world than in real life' (social disinhibition), 'I like being another person in the virtual world (escape), 'I spent less time with my family and friends due to my internet usage' (social disintegration).

Data-analysis

First, reliability analyses were done to assess the reliability of the nine scales of the questionnaire. These showed an overall high Cronbach's alpha (see table 1). Then age and educational level were organized into three subcategories of young, middle and old age, and low, middle and high educational level. Descriptive statistics of age, gender, educational level, occupation, frequency of use and type of games/websites were calculated. In various variance analyses the dependent variables of frequency of use and compulsive Internet use were examined on possible differences in various dichotomous variables (e.g. age, gender, educational level, game genres). After running a correlation analysis, four of the six behavioral variables of Internet use were arranged to form a construct of frequency of use. Regression analysis was used to determine the amount of explained variance of compulsive Internet Use. Those variables that indicated significant correlations in the bivariate analysis were included in the regression analysis. The operationalised variables of the uses and gratifications approach were split into GIA-related (Information) and SAR-related constructs (Identification, Integration, Escapism, Arousal, Social Disinhibition, and Social Disintegration). In the analysis social disintegration was included to the sub-construct of the SAR-variable, due to its high correlations with the other SAR-variables and

the insignificant correlation with social inhibition. The SAR-construct was chosen for further analysis to assess the relations between the different variables of the model described in figure 1.

Table 1
Reliability Analysis for SAR, GIA, SIS, CIUS (N = 76)

Construct	Number items	Cronbach's alpha
Information (GIA)	5	.81
Identification (SAR)	4	.80
Integration (SAR)	7	.80
Escapism (SAR)	6	.78
Arousal (SAR)	4	.82
Social Disinhibition (SAR)	5	.84
Social Disintegration (SAR)	5	.93
Social inhibition scale (SIS)	7	.88
Compulsive Internet Use Scale (CIUS)	14	.90

Results

Descriptive statistics

Participants of this study used the internet for an average of 30.7 hours (20.29) per week. 79.8% of the respondents were online every day, opposed to only a small percentage of 2.4% who said that they would use the Internet less than one day a week. 83.5% used the Internet often or always in the evening.

The average amount of gaming was 10.2 hours (14.48) per week. Nearly half of the sample (46.7%) said that they would spent less than one day a week with gaming, whereas 33,3% indicated that they were playing 5 days or even more often. Furthermore, 50.6% of the respondents played games often or always. Differences in demographical variables and frequency of Internet and gaming are shown in table 2.

Respondents were asked to indicate their amount of gaming and Internet use (see table 2). There was no significant relation between age and frequency of Internet use. Furthermore, students did not play or use the Internet any longer than employees. In opposition to the correlation with Internet use frequency where no association was found, gender was significantly correlated with the amount of game playing ($F(1, 88) = 15,76, p < .00$). Present educational level showed significant differences in gaming frequency ($F(2, 87) = 19,46, p > .00$). Lower and higher educated respondents spent notably less time on gaming than did average educated respondents. Concerning the achieved educational level it was found that low educated respondents played longer than average or high educated people did ($F(2,87) = 12,3, p < .00$).

An analysis of type of game and type of websites did show a significant correlation between frequency of use and browser games ($r = .45, p < .01$), strategy games ($r = .24, p < .05$), second life ($r = .23, p < .05$) and chat ($r = .30, p < .01$). Furthermore, descriptive analysis revealed that 50% of the sample had to be categorized as socially inhibited persons (range: 0-28; cut-off score >10).

Table 2

Descriptive Statistics of Main Characteristics and Frequency of Internet and Gaming Behavior

Characteristics		N	%	Frequency of Internet use per	Frequency of gaming per week
				week in hours	in hours
				M (SD)	M (SD)
Gender	Male	27	30%	29,14 (18,11)	13,48(16,06)
	Female	63	70%	34,19 (24,52)	2,53 (4,05)
Age	11-20	21	23%	24,47 (20,92)	20,71 (22,34)
	21-30	59	66%	32,75 (20,21)	5,03 (8,27)
	> 31	10	11%	31,11 (14,79)	18,5 (12,30)
Occupation	Student	73	81%	31,08 (21,30)	8,95 (14,66)
	Employee	16	18%	28,85 (15,29)	15,88 (13,09)
Present education level	Low	3	3%	6,0 (1,41)	9,33 (9,71)
	Average	17	19%	28,75 (22,34)	26,06 (21,61)
	High	70	78%	31,92 (19,73)	6,38 (9,10)
Achieved education level	Low	16	18%	24,00 (22,99)	21,06 (23,14)
	Average	15	17%	25,14 (13,58)	15,67 (13,05)
	High	59	66%	33,95 (20,50)	5,85 (9,10)
Social inhibition	Yes	41	50%	35,45 (22,62)	13,02 (17,44)
	No	41	50%	27,54 (16,90)	7,57 (10,94)

Compulsive Internet Use

The output showed no significant relations between gender, occupation, present education and compulsive Internet use. Yet, there were significant correlations found between age ($r = .23, p < .05$), achieved education ($r = -.26, p < .05$) and compulsive Internet use suggesting that younger and lower educated Internet users are more likely to develop an excessive internet use pattern.

Furthermore, the type of game, i.e. browser ($r = .35, p < .01$) and shooter games ($r = .27, p < .01$) showed significant correlations with compulsive internet use. There is also indication for a relation between Internet use in the evening ($t = 2.76, p < .00$), at night ($t = 2.51, p < .02$) and high scores on the Compulsive Internet Use Scale (CIUS).

Frequency of game playing and Internet Use per week were also positively associated with scoring higher on the CIUS ($r = .39, p < .00$; $r = .40, p < .00$). Besides, it was found that compulsive Internet Use significantly correlated with the need for identification, integration, escape, arousal, social disintegration and social disinhibition on the Internet. The higher respondents scored on compulsiveness of Internet Use, the higher they scored on all socio-affective regulation variables. As expected, only the need for information did not show significant correlations with compulsive Internet Use (see table 3). Additionally, there was a moderate but significant positive correlation between the scores one has on the social inhibition scale and the scores on the compulsive Internet Use Scale ($r = .30, p < .01$).

Table 3

Pearson Correlations between SAR, Psychological and Behavioral Variables

SAR-variables	Social inhibition	Compulsive Internet	Frequency of Use
Information	.09	.17	-.13
Identification	.14	.42**	.15
Escapism	.74**	.37**	.46**
Arousal	.54**	.27*	.32**
Social Disinhibition	.34**	.60**	.21
Social Disintegration	.18	.50**	.48**
Integration	.06	.42**	.43**

** Significant at the .01 level

* Significant at the .05 level

Regression analysis.

The results of the regression analysis are shown in table 4. In the first model only the personality variable of social inhibition (SIS) was included in the analysis. Social inhibition seemed to contribute significantly to the development of excessive Internet use ($\beta = 0.34$, $p < .01$).

Table 4

Regression analysis with Dependent Variable Score on The Compulsive Internet Use Scale (N=76)

	Model 1	Model 2	Model 3
Variable	β	β	β
Social Inhibition	.342**	.184*	.151
SAR		.600**	.501**
Frequency of Use			.251**
R2	.117	.452	.503
F (df)	9,778(1)	30,109(2)	24,245(3)
P	.003	.000	.000
R2-change		.335	.051
F-change		44,671	7,310
P-change		.000	.009

** Significant at the .01 level

* Significant at the .05 level

In the second model, the cognitive variable, that is the construct of socio-affective regulation of Internet behavior, was integrated. It showed that a combination of the two variables played a significant role in excessive Internet Use. Social inhibition still could be seen as an independent variable that had significant effect on compulsive Internet use ($\beta = .184$, $p < .05$), but the SAR-construct was identifiable as the most important predictor of compulsive Internet use ($\beta = 0.600$, $p < .01$). The output indicated a partial mediation by SAR-variables on social inhibition in its effect on the dependent variable.

In the third model the behavioral variable 'frequency of use' was included into the model. Social inhibition did not show any significant effect on compulsive Internet use ($\beta = .151, p < .08$), whereas the effect of the SAR-construct was further confirmed ($\beta = .501, p < .01$). Furthermore, frequency of use contributed significantly to the development of compulsive Internet use ($\beta = .251, p < .01$). These results imply a mediation of social inhibition by SAR-driven variables and frequency of use.

Discussion

At first, the more adjacent findings will be discussed: gender showed significant correlations with respect to frequency of playing and being on the Internet, which was not to be found in the context of compulsive Internet use. This might suggest that boys in fact are more often on the Internet, but this higher frequency does not necessarily lead to compulsive behavior. This is especially interesting when taking into account that studies have found that men rather employ the Internet for entertainment and leisure activities (i.e. SAR), whereas women use the internet primarily for interpersonal communication and educational assistance (i.e. GIA). Thus, although men are more drawn to SAR-related motives of Internet use they do not show higher rates of compulsiveness than women (Weiser, 2000). This issue should be further examined in future research projects.

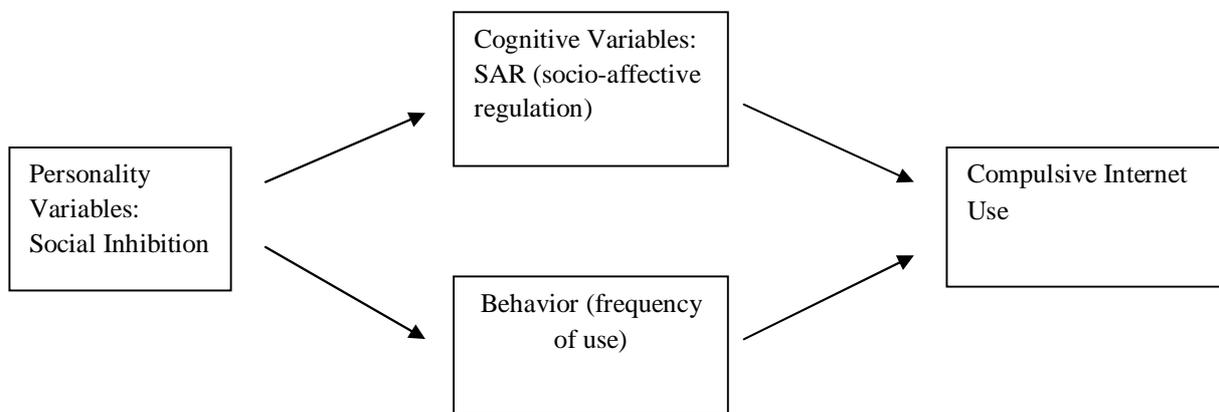
Additionally, students did not play any longer than did working people, which opposes the assumption that students' lifestyle might trigger excessive Internet use. Also, higher educated students engaged notably less in games than did lower educated students. These findings might be due to a selection bias of the sample. Most of the higher educated respondents were reached through a social network which mainly consisted of psychology students. This type of student might not be drawn to the Internet as much as other study fields, such as informatics or mathematics students. Furthermore, concerning the frequency of gaming achieved educational level seemed to differ from present educational level. In general, low educated people seem to be more drawn to gaming than average or high educated people. Still, when looking at the present educational level, students that are averagely educated play more than the other two groups. This might be due to the fact that students who stated that they would pursue an average education are in most parts teenagers who have great amounts of time in the afternoon or evening to play games. When those students grow older they either become higher educated students or get a job which both might constrain their amount of free time or their interest in gaming.

The most important finding however was the relation between personality factors and internet-applications. The basic assumption was confirmed: Social inhibition and SAR-variables are positively correlated with excessive Internet use. It was found that there is a partial mediation of social inhibition by SAR-variables. This implies that socially inhibited individuals are only slightly more drawn to the Internet than non-inhibited individuals, but as soon as they start to use the Internet for socio-affective regulation they run a much greater chance at developing compulsive Internet use. In other words, the minimal effect of the personality factor intensifies when using SAR-driven Internet features, such as MMORPGs or live-chats. When adding a third predictor in the model, i.e. frequency of use, one can see that the effect of social inhibition on compulsive Internet use diminishes, which indicates a complete mediating effect on social inhibition by as well SAR-variables as behavioral variables (see figure 2). The outcome gives reason to believe that social inhibition along with SAR-related variables and frequency of Internet Use might trigger compulsive Internet use. This also supports earlier mentioned assumptions by Young (1996) and Weiser (2001), that excessive Internet use might be the result of a mediation between psychological (i.e. social inhibition) and cognitive (i.e. SAR) variables.

With respect to the earlier designed model of predictors of compulsive Internet use these results suggest a revision of the predicting variables. Due to operationalisation-processes and the fact that social disintegration did not correlate with social inhibition, this variable was excluded from the model. Hierarchical regression showed that social inhibition did have effects on compulsive Internet use via SAR as well as behavior so that it can be concluded that its effect on compulsive Internet use is in fact mediated by those two. All three predictors do contribute to compulsive Internet use. Thus, a socially inhibited individual who makes use of socio-affective regulation and puts a great amount of time into surfing the Internet is much more vulnerable in developing compulsive patterns of Internet use.

Figure 2

Revised Model of Predictors of Compulsive Internet Use



Limitations

This study presented some interesting findings about the cause of compulsive Internet use. Still, there are some limitations that have to be addressed. First of all, due to its cross-sectional design the study faces the problem of not being able to address the causal relations between the variables. It is not clear whether socio-affective regulation (SAR) mechanisms lead to excessive Internet use or whether excessive Internet use leads to using SAR-motivated variables. Also, whether this leads to more negative, i.e. social disintegration from the real world or positive outcomes, i.e. social integration in the virtual world for socially inhibited individuals is still an open question in this research field. To find a definite answer longitudinal studies have to be carried out.

Furthermore, it can be questioned whether the sample of this study satisfies the demands of representativeness. One part of the respondents was reached by a personal network which consisted mainly of young, highly educated university students. The other half was obtained on different gaming sites. These specific groups of the population might be different in their Internet use than older people or blue-collar workers. Still, it has to be recalled that these findings are in accordance with what several other studies have found in the last years, which suggests that the representativeness suffices the goal of this research.

Another possible shortcoming of this research might be the fact that the construct of ‘Goods and Information’-Acquisition (GIA) is underrepresented in the item pool. Only one construct (that is ‘Information’) refers to GIA. This makes it hard to find (negative) correlations between this construct and other variables which

might have further confirmed the obtained results. It is also likely that associations between GIA and other variables may have been overlooked. Thus, the relation between the GIA-construct and excessive Internet use needs to be further studied.

Bibliography

- Adschiew, B. (24 June 2000). *A web of workers*. New York: NBC Nightly News (Television broadcast).
- Bakken, I. J., Wenzel, H. G., Göttestam, K. G., Johansson, A., & Oren, A. (2009). Internet addiction among norwegian adults: A stratified probability sample study. *Scandinavian Journal of Psychology*, 121-127.
- Brian, D. N., & Wiemer-Hastings, P. (2005). Addiction to the internet and online gaming. *Cyberpsychology & Behaviour* 8, No. 2, 110-113.
- Caplan, S. E. (2002). Problematic internet use and psychosocial well-being: development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior* 18, 553-575.
- Denollet, J. (2005). DS14: Standard assessment of negative affectivity, social inhibition and type D personality. *Psychosomatic Medicine* 67, 89-97.
- Eighmey, J., & McCord, L. (1998). Adding value in the information age: uses and gratifications of Sites on the world wide web. *Journal of Business Research* 41, 187-194.
- Group, M. M. (2009, May 4). *Internet World Stats: Usage and Population Statistics*. Retrieved May 4, 2009, from Internet Usage Statistics: <http://www.internetworldstats.com/stats.htm>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1974). Uses and gratification research. *The Public Opinion Quarterly*, Vol. 37, No.4, 509-523.
- Ko, C.-H., Yen, J.-J., Chen, C.-C., Chen, S.-H., Wu, K., & Yen, C.-F. (2006). Tridimensional personality of adolescents with internet addiction and substance use experience. *Can J Psychiatry*, 51, No. 14, 887-894.
- Kraut, R. E., & Fleming Seay, A. (2007). Project Massive: Self-regulation and problematic use of online gaming. *CHI 2007 Proceeding Games*, 829-837.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues* 58, No. 1, 49-74.
- Lesieur, H. R., & Blume, S. B. (1993). Pathological gambling, eating disorders, and the psychoactive substance use disorders. *Journal of addictive Diseases*, 12 No.3, 89-102.
- Lin, S. S., & Tsai, C.-C. (2002). Sensation seeking and internet dependence of Taiwanese high school adolescents. *Computers in Humand Behaviour* 18, 411-426.
- Mastro, D., Eastin, M. S., & La Rose, R. (2001). Understanding internet usage: a social-cognitive approach to uses and gratifications. *Social Science Computer Review*, 19 No. 4, 395-413.
- McKenna, K. Y., & Bargh, J. A. (2000). Plan 9 from cyberspace: the implications of the internet for personality and social psychology. *Personality and Social Psychology Review* 4, No. 1, 57-75.
- Meerkerk, G. J., Van den Einden, R. J., Vermulst, A. A., & Garretsen, H. F. (2009). The compulsive internet use scale (CIUS): some psychometric properties. *Cyberpsychology & Behavior* 12, No.1, 1-6.

- Modayil, M. V., Thompson, A. H., Varnhagen, S., & Wilson, D. R. (2003). Internet users' prior psychological and social difficulties. *CyberPsychology & Behavior* 6, No. 6, 585-590.
- Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological internet use among college students. *Computers in Human Behavior* 16, 13-29.
- Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social cues of the internet. *Computers in Human Behaviour* 19, 659-671.
- O'Reilly, M. (1996). Internet addiction: a new disorder enters the medical lexicon. *Canadian Medical Association Journal* 154, 188-189.
- Papacharissi, Z., & Rubin, A. M. (2000). Predictors of internet use. *Journal of Broadcasting & Electronic Media* 44, No. 2, 175-196.
- Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Communication & Society* 3, No. 1, 3-37.
- Russel, D. (1996). The UCLA loneliness scale (Version 3): reliability, validity, and factor structure. *Journal of Personality Assessment* 66, 20-40.
- Schramm, W. J., Lyle, J., & Parker, E. B. (1961). *Television in the lives of our children*. Stanford, CA: Stanford University Press.
- Shotten, M. (1991). The costs and benefits of computer addiction. *Behavior and Information Technology*, 219-230.
- Solano, C., & Koester, N. (1989). Loneliness and communications problems: subjective anxiety or objective skills? *Personality and Social Bulletin* 15, 126-133.
- Stafford, T. F., & Stafford, M. R. (2004). Determining uses and gratifications for the internet. *Decision Sciences* 35, No. 2, 259-288.
- Weiser, E. B. (2000). Gender differences in internet use patterns and internet applications preferences: a two-sample comparison. *Cyberpsychology & Behavior* 3, No. 2, 167-178.
- Weiser, E. B. (2001). The functions of internet use and their social and psychological consequences. *CyberPsychology* 4, No. 6, 723-741.
- Yee, N. (2006). The psychology of MMORPG's: emotional investment, motivations, relationship formation, and problematic usage. In R. Schroeder, & A. Axelsson, *Avatars at Work and Play: Collaboration and Interaction in Shared Virtual Environments* (pp. 187-207). London: Springer-Verlag.
- Young, K. S. (2004). Internet addiction: a new clinical phenomenon and its consequences. *American Behavioral Scientist* 48, No.4, 402-415.
- Young, K. S. (1998). Internet addiction: the emergence of a clinical disorder. *CyberPsychology and Behaviour* 1, No.3, 237-244.
- Young, K. S. (1996). Psychology of computer use: XL. addictive use of the internet: a case that breaks the stereotype. *Psychological Reports* 79, 899-902.

Young, K. S. (n.d.). *What makes the internet addictive: potential explanations for pathological internet use*. Retrieved June 2, 2009, from Center for On-Line Addictions:
<http://www.netaddiction.com/articles/habitforming>

Young, K. S., & Rodgers, R. C. (1998). The relationship between depression and internet addiction. *CyberPsychology and Behaviour* 1, No. 1, 25-28.