

## Intensity and Effects of Internet Use on the User's Daily Life

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**Submissão: 14/02/2024**

**Aceitação: 12/06/2024**

Os autores declaram que este trabalho tem por base uma dissertação de Mestrado apresentada à Escola Superior de Comunicação Social, no âmbito do mestrado em Audiovisual e Multimédia, pelo primeiro autor, com orientação e acompanhamento dos coautores, e não foi submetido a nenhum outro periódico.

# **Intensidade e Efeitos da Utilização da Internet no dia-a-dia do Utilizador**

**Resumo** (PT): O uso problemático da Internet, embora menos grave do que a dependência da Internet, é mais comum entre os utilizadores. Independentemente da atividade em que estão envolvidos, os indivíduos sentem a necessidade de estar constantemente online e disponíveis. Mesmo quando tentam escapar à rotina online, acabam por regressar frequentemente aos antigos hábitos. Foi realizado um inquérito para avaliar a intensidade e o impacto da utilização da Internet, com uma amostra de 433 indivíduos, com idades entre os 17 e os 33 anos, predominantemente do sexo feminino. Os resultados indicam um nível moderado de utilização da Internet, em linha com as referências identificadas na revisão da literatura. Curiosamente, apesar de utilizarem o smartphone diariamente durante várias horas, os participantes não demonstram sinais relevantes de uso problemático da internet. Em vez disso, dão prioridade às interações pessoais, com amigos e familiares.

*Palavras-chave: Utilização da Internet; Permanentemente online e Permanentemente conectado; Sentimento de pertença; Uso problemático da Internet.*

## **Intensity and Effects of Internet Use on the User's Daily Life**

**Abstract** (EN): Problematic internet use, while less severe than internet addiction, is more prevalent among users. Regardless of the activity they engage in, individuals feel compelled to remain constantly connected online. Even when attempting to break from this routine, they often find themselves reverting to old habits. A survey was conducted to gauge the intensity and impact of internet usage, sampling 433 individuals aged between 17 and 33, predominantly female. The findings indicate a moderate level of internet usage, consistent with existing references outlined in the analysis and discussion. Interestingly, despite spending several hours daily on smartphones, participants do not exhibit signs of excessive internet use. Instead, they prioritize in-person interactions with friends and family.

*Keywords: Internet use; Permanently online and Permanently connected; Sense of belonging; Problematic Internet use.*

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## **Introduction**

The Internet is widely recognized as a powerful information tool, facilitating activities such as reading news, booking trips, and communicating with family, friends, and even strangers. However, its integration into our daily lives only began in the 1990s. In 1991, the World Wide Web was developed from the invention of HTML 1.0 by British scientist Tim Berners-Lee. Initially, Berners-Lee aimed to create a unified information system by combining evolving computer technologies, data networks and hypertext, to address the need for easier information access and sharing among scientists at universities and research centers (CERN, 2020).

Since the year 2000, there has been an exponential evolution, enabling widespread Internet access irrespective of time and location (WeAreSocial & Hootsuite, 2022). This expansion has been fueled by the proliferation of wireless networks, leading to the increased importance of devices like smartphones, laptops and tablets for staying connected. However, smartphones are often deemed more distracting than laptops due to their portability and constant availability (Throuvala et al., 2021) (Petrucco & Agostini, 2023).

Technology, beyond its informational utility, serves as an escape from reality for many individuals, offering moments of abstraction from life's challenges. Internet usage has intensified, with individuals feeling compelled to check their smartphones for online updates within mere minutes or seconds, often unaware of their actions.

As the fastest means of information exchange, the Internet has become the most widely utilized network, continuously evolving with increasing user engagement. Consequently, the selected topic for investigation is the intensity and effects of Internet use on daily life.

## **Theoretical background and hypotheses**

### **1. Permanently Online/Permanently Connected**

Nowadays, it is almost impossible to leave home without a smartphone, as the population has developed a routine where they are connected online almost permanently, and the process of communication triggers even more reasons to be connected (Vorderer, Hefner, Heinecke & Klimmt, 2018; Freytag et al., 2021).

Thus, users live in a world that is permanently online (PO) and permanently connected (PC). Although both concepts are related to Internet use, PO corresponds to the prolonged use of online content and PC corresponds to online social interaction with other users, while doing other activities simultaneously. The feeling of being PO gives individuals the opportunity to do several activities at the same time, with prolonged use, without having to decide which activities they will do first (Vorderer et al., 2018; Freytag et al., 2021).

Even if users try to stay away from the Internet, they eventually return to their previous habits of being online and communicating, so giving up this practice would give them a sense of exclusion (Vorderer & Kohring, 2013). Although this behavior is more noticeable in young people, even more adults and seniors are beginning to join and share their lives online. Email and Skype are among the most popular resources, as they provide the social interaction with family that users need (Vorderer & Kohring, 2013).

According to Lopez-Fernandez (2019), social media, emails, and games are the activities that contribute most to increase feelings of addiction and can lead to excessive use of the Internet. The number of people who cannot stay disconnected from the Internet has been increasing, both in a public and private space and the (few) moments of inactivity are increasingly scarce. There is a need to regularly check whether they have received any notifications, in which most of the smartphone use is dedicated to this type of "checking behavior" (Vorderer, Krömer & Schneider, 2016). This happens since individuals are afraid of feeling excluded from their groups of friends and of missing important events and information (Vorderer & Kohring, 2013).

A study by Vorderer, Krömer, and Schneider (2016) shows that students are more willing to be permanently connected than permanently online, since they frequently prefer to interact with others online rather than in person. Thus, when they do not have access to the Internet, they feel empty and as if something is missing. Some students also reported feeling angry or in panic. The negative feelings shown are related to PC and not to PO, but on the other hand, after getting used to being without online access, some feel more relaxed and less stressed. Also, the days seem longer, and they can enjoy them better; and they also realized they could have more time for family and friends and felt more productive and freer. Thus, the following hypotheses were considered:

**H1: When students don't have Internet access, they feel empty, as if something is missing, irritated or in panic.**

**H1a: After getting used to being without access, students feel more relaxed, less stressed, more productive and freer, and the days seem longer, with more time for family and friends.**

## **2. State of Permanent Communicational Vigilance**

Communicational surveillance corresponds to a constant connection to online content resulting from the daily use of the Internet and can affect several individuals. This is quite inclusive regarding the habits created by the media - surveillance is stimulated through situations that will trigger an automatic behavior in the individual (Reinecke et al., 2018). The fact that the individual wants to have a persistent attachment with online content can alter his well-being, depending on the information he is exposed to, and can also increase the social pressure to be always connected. However, according to a study conducted by Reinecke et al. (2018), this depends on the intensity of individuals' Internet use, and the perception of social pressure is related to age: the higher the age, the lower the social pressure.

Users who receive a greater number of messages may develop a mindset where they respond more frequently and more immediately, prioritizing activities in which the smartphone is involved, rather than offline activities, which may lead to increased stress (Vorderer et al., 2016). Murdock (2013) found that the greater the number of messages received and sent, the greater the stress caused, as well the appearance of sleep disturbances and emotional well-being. This happens since the act of writing and sending messages activates a psychological state that causes body tension (Murdock, 2013), meaning that this is not a healthy activity when done excessively, and can lead to a negative emotional state and anxiety. The following hypothesis was created:

**H2: The greater the number of messages received and sent, the greater the stress caused, as well as the appearance of sleep disturbances and emotional well-being.**

### **3. Problematic Internet Use**

The term Problematic Internet Use (PIU) was proposed by Beard and Wolf (2001, p. 378) and defined as "Internet use that creates psychological, social, academic, and professional difficulties in a person's life", and anyone, regardless of age, can exhibit it (Beard & Wolf, 2001). Through this definition, PIU is not described as a disease, as other authors define it, but rather as a more common and less severe problem than Internet addiction (Pontes, Caplan & Griffiths, 2016).

Regarding PIU, concerns began with the fear that people might become so involved that they would begin to neglect their offline relationships and prefer online interactions (Caplan, 2018). PIU refers to difficulties in impulse control that the user feels and that can origin negative outcomes of Internet use (Caplan, 2003). Compulsive use corresponds to the difficulty in controlling impulses to be online and excessive use refers to the amount of time the individual is online beyond what is considered normal (Caplan, 2003). This happens because when individuals prefer online interaction to face-to-face interaction, they find it more difficult to control their Internet use. Thus, "excessive use is one of the weakest indicators of negative outcomes, while preference for online social interaction, compulsive use, and withdrawal (another cognitive indicator) are among the strongest" (Caplan, 2003, pp. 637–638).

An interesting fact is that Internet use differs between the male and female gender due to differences in behavior and attitudes, and according to Lopez-Fernandez (2019), the female gender prefers to listen to music and use social media, while the male gender prefers to visit gambling websites. Thus, problematic use may be more pronounced in the female gender due to the greater use of social media and the fact that they can communicate and maintain relationships through it, meaning that women get more involved than men (Lopez-Fernandez, 2019). Thus, we considered the following hypotheses:

**H3: Young females use their smartphones daily to send messages and go to social media.**

**H3a: The female gender prefers listening to music and using social media.**

**H3b: The male gender prefers to visit gambling websites.**

Each time users go online, they are more likely to develop tolerance to it, which leads to a more active and prolonged use. Constant and uncontrollable use is worrying, as it can lead to mood swings, decreased productivity, or even decreased performance of basic activities (Breslau, Aharoni, Pedersen & Miller, 2015). Davis suggests distinguishing between general and specific problematic use, where the general includes excessive and multidimensional use of the Internet without a goal in mind (Davis, 2001), which can cause negative outcomes in the individual's work, school, and social life (Tras, Öztemel & Baltaci, 2019). Regarding specific problematic use, the user enjoys the Internet for a particular purpose, such as overuse of certain online activities (playing games or watching videos) (Davis, 2001).

Davis describes PIU, in his discussion of his cognitive-behavioral model, as "a vicious cycle of cognitive and reinforcement distortions that lead to behaviors that give rise to problematic effects associated with spending too much time online" (Davis, 2001, p. 194). There is a combination of cognitive and behavioral cues related to PIU that result in negative aspects due to Internet use, such as cognitive preoccupation (Davis, 2001). This preoccupation involves obsessive thoughts where the individual has difficulty thinking about anything other than what they may be missing online or what they will do when they log back on (Caplan, 2003). This model shows that individuals suffering from psychosocial problems may develop negative perceptions about their social skills, and that they have preference for online interactions (Davis, 2001). Thus, there is a Preference for Online Social Interaction (POSI) which is characterized by someone who believes that this interaction is safer and more comfortable compared to face-to-face interactions (Caplan, 2003). This preference applies to isolated individuals who lack social skills, as they feel more confident in creating interpersonal relationships online rather than in person. The trust created will cause them to be more friendly and feel more like themselves and consequently share experiences and secrets that they probably would not do in person (Caplan, 2003). Thus, the following hypotheses were created:

**H4: The factor solution to analyze Problematic Internet Use confirms the preference for the following factors: Online Social Interaction, Mood Regulation, Negative Outcomes, and Deficient Self-Regulation.**

**H5: Three classes of Problematic Internet Use risk are expected: low (47%); medium (40%) and high (12% to 13%).**



#### **4. Sense of belonging**

The sense of belonging consists of being accepted in a group and creating important and lasting relationships with others, and its absence may contribute to create stress and cause negative impacts on health and well-being. This may occur at any age or culture (Baumeister & Leary, 1995). Human beings aim to build and maintain a small amount of positive and meaningful interpersonal relationships, and to do so, there must be frequent and affective interactions with other people, as well as stable and lasting ones, where there is affective concern between the two sides. The lack of a sense of belonging can be harmful to the individual, both cognitively, affectively, and behaviorally, and can lead to biological responses similar to physical pain (Baumeister & Leary, 1995).

Young adults, being more permanently online, must relate to others until they reach a minimum level of social contact (Reich & Vorderer, 2013). However, the way people view the feeling of belonging differs between men and women, as men prefer to have more relationships but with less connection, while women prefer to have fewer relationships, but to be closer and more intimate (Baumeister & Leary, 1995). The common point between genders is that when an existing relationship ends, it can be replaced by another one, although the need for social contact varies from person to person (Reich & Vorderer, 2013). In this way, the need for belonging is seen as a major need, so the individual values a secure and regular relationship.

#### **5. Effects of Internet Use on the Young Adult**

The young adult age group corresponds to ages between 18 and 25, and is part of Generation Z, since it covers births between 1995 and 2004 (Parker & Igielnik, 2020). On the other hand, Levinson (1977) defends that young adults correspond to ages between 17 and 33, and it is at this stage that they find their place in society (Levinson, 1977). For the same author, it is around 28 years old that the Thirty Years Transition takes place, in which the individual begins to structure his life for the next phase, and it is until age 33 that this transition can take place (Levinson, 1977). This is a generation described as digital native, since it grew up with smartphones and Internet, and does not feel guilty when using them (Patrão & Sampaio, 2016). This generation is in favor of human rights and same-sex marriage, just as they are more in favor of gender equality. They are also

more ethnically and socially inclusive, hardworking, and optimistic about the future. For these reasons, they are less likely to drop out of high school and more likely to enroll in college (Parker & Igielnik, 2020).

Compared to previous generations, the priorities of Generation Z have changed, and it can be said that buying a house and starting a family are not at the top of their ambitions. Traditional work values are important, because young adults want something that is challenging and brings them contentment and a balance between work and personal life (Sánchez-Hernández, González-López, Buenadicha-Mateos & Tato-Jiménez, 2019). In a study conducted by Howard, Rainie, and Jones (2001), it is possible to state that education is a very important aspect with regard to the type of activity an individual will do on the Internet. Those with a higher level of education and income are more likely to use email, to search for information about products or services, and to organize trips online, compared to those with a lower income and level of education (Madden, 2003). Therefore, the following hypothesis was considered:

**H6: Those with a higher level of education are more likely to use email, to research information about products or services, and to organize trips online.**

In the case of students, those who still live with their parents are less likely to use social media, since they still live in a familiar city and environment, and their sense of belonging may still be filled by their parents and close friends (Hargittai, 2007). On the other hand, students who move away from home to study will usually end up by eroding the previously established social networks, resulting in a lack of a sense of belonging. In this case, the Internet is a tool that can also help satisfy the need to belong (Reich & Vorderer, 2013), as young adults seek to satisfy this feeling by building new and long-lasting relationships (online and offline), since they prefer to have more direct communication and have close friends rather than acquaintances (Baumeister & Leary, 1995). Following this argument, we adopted the hypothesis:

**H7: Students who live with their relatives have lower usage of social media.**

The evolution of ICT may make young adults more vulnerable to various addictions, as this is the group that is most likely to engage in the online world (Hargittai, 2007) and thus are the most connected (Hargittai & Hinnant, 2008). Although different age groups have different behaviors towards Internet use, it is the young adult who is more likely to reveal problematic behaviors regarding this (Lopez-Fernandez et al., 2017). Personal

dependence, the individual's demand for achievement, and their availability to work, study, and social media are the main causes for the high use of smartphones by young adults (Thomé, Härenstam & Hagberg, 2011), existing a preference for smartphones over computers (Lopez-Fernandez, 2019). Therefore, one last hypothesis was considered:

**H8: High intensity of Internet use is problematic for the user.**

## Method

As far as the present research is concerned, its objective is to analyze how the intensity of Internet use affects individuals in their day-to-day lives, and a quantitative methodology was used, with data collection and hypothesis building.

Thus, for a better comparison and discussion of results, a research article, by Pontes, Caplan, and Griffiths (2016), was chosen, which aims to validate a Portuguese version of the Generalized Problematic Internet Use Scale 2 (EUGPI2) and to provide a taxonomy of the potential risk of Problematic Internet Use (PIU) among participants, using the model presented in Table 1. The authors designed an online survey with questions about participants' sociodemographic characteristics and Internet use patterns and a Confirmatory Factor Analysis (CFA) was performed.

Table 1. The Generalized Problematic Internet Use Model

Constructs/Factors	Description
Preference for Online Social Interaction (POSI)	A cognitive symptom of generalized PIU characterized by beliefs that one is safer, more efficacious, more confident, and more comfortable with online interpersonal interactions and relationships than with traditional face-to-face social activities.
Mood Regulation (MR)	A cognitive symptom of generalized PIU reflecting individuals' motivation to use the Internet in order to enhance their mood states.
Deficient Self-Regulation (DSR)	Refers to the failure experienced by individuals when they attempt to adequately monitor and judge their Internet usage when trying to adjust their pattern of Internet use.
Negative Outcomes (NO)	Represents the negative consequences or outcomes resulting from unhealthy Internet use, such as problems or difficulties in daily life.

Source: Pontes, Caplan, and Griffiths (2016) (adapted).

An online survey was developed for the analysis to be as close as possible to the mentioned research article, together with the EUGPI2 instrument (Appendix A). IBM

SPSS Statistics 27 software was used to test the hypotheses, and IBM SPSS Amos Graphics 26 software was used to perform the Confirmatory Factor Analysis. To improve the quality of the model, the modification indices were analyzed, in which Pontes, Caplan, and Griffiths (2016) suggested the covariation of three error terms of items belonging to the same factor.

A survey was used, divided into four sections, the first of which is composed only of one question concerning age, to filter the intended sample. The next section aims to find out about Internet use habits, such as the number of hours the respondent usually spends daily on the Internet, as well as the number of messages sent and received, frequency of use and feelings about it. The third section concerns the characterization of Internet use, in which the EUGPI2 instrument, referring to the comparison article, was introduced. Finally, the last section includes questions about demographic factors, in order to characterize gender, education level and occupation of respondents.

Several types of questions were used in the survey: open-ended paragraphs; multiple choice answers; and 7-point Likert scales of agreement (1=strongly disagree to 7=strongly agree), as well as 5-point Likert scales (1=never to 5=daily [including the weekend]).

## **Results**

### **1. Characterization of the Sample**

Regarding the number of daily hours spent online, 15.01% of the respondents use the Internet for 5 hours and 13.39% use it for 8 hours (mean=7.48; SD=3.721). Outliers and extremes were analyzed; however, it was decided not to remove extreme cases due to the very nature of the variables, since the values correspond to a possible pattern of behavior. The highest number of messages that respondents send and receive daily is 100 (16.9%), corresponding to a moderate level of messages (Murdock, 2013), but almost half of the sample falls within the low level (up to 50 messages daily). The distribution of the number messages received registers a significant dispersion, with answers ranging from 0 to 5000 messages (mean=164; SD=375). For this reason, outliers were also analyzed and, similarly to the previous question, no cases were removed.

As for the frequency of smartphone use, the majority send messages (82.7%), go to social media (85.2%), listen to music (52.9%), and go to email (55.7%) daily, including on weekends. Regarding the physical and emotional consequences of high Internet use, the existence of "physical problems/body aches" is one of the categories that stands out the most (39.7%), with examples of headaches, sleep disorders and bad posture, followed by "mental health problems" (39.7%).

Almost half of the sample has never been without Internet access (48%) and of those who have, they were not used to it and felt anxious (28.9%). Many disagree about being in panic (48.5%), irritated (30.9%) and feeling empty (29.3%). On the other hand, some respondents somewhat agree that it feels like something is missing (31.2%). Also, neither agree nor disagree that they feel relaxed (23.3%) – but 22.2% somewhat agree, showing that the distribution of opinions is balanced. The same goes for the feeling of being less stressed, where 21.5% neither agree nor disagree and 20.6% agree a little, 26.6% agree that the days seem longer, and 24.9% agree that they have more time for family and friends. Similarly, some agree on feeling free (22.9%), but there is some neutrality about feeling productive (20.8%).

## **2. Overview of hypotheses**

For H1 (When students don't have Internet connection, they feel empty, as if something is missing, feel irritated or in panic), more than half of the students do not feel an emptiness when they do not have Internet access (66.7%). On the other hand, 59.4% agree that they feel like something is missing. Regarding feeling irritated and in panic, 62.1% and 83.1%, respectively, disagree. Thus, the hypothesis is only correct about the feeling that something is missing, and although more than half of the students feel this way, they do not feel empty, angry or in panic. Vorderer, Krömer, and Schneider (2016) report that online behavior or its absence can cause both stress and relaxation. In this case, most students feel relaxed, less stressed, and more productive.

For H1a (After getting used to being without Internet, students feel more relaxed, less stressed, free and more productive, and the days seem longer, with more time for family and friends), regarding the variable "Did you get used to it easily or not when you were without Internet access for more than 2 days?", an open-ended question was used and subsequently the following categories were created, based on content analysis performed through manual codification: 1-Never been without access; 2-Not used to it; 3-More or

less; 4-Not used to it and felt anxious; 5-It was complicated, but got used to it; 6-Have gotten used to it easily; 7-Have gotten used to it and felt freer. Thus, almost half of the students say they feel more relaxed after getting used to being without Internet (48%), as well as most agree that the days seem longer (80%), they have more time for family and friends (68%), feel freer (56%) and more productive (52%). On the other hand, 40% disagree that they feel less stress, but 44% agree with this statement, the opinions being close. Thus, the hypothesis is confirmed.

Regarding H2 (The greater the number of messages received and sent, the greater the stress caused, as well as the appearance of sleep disturbances and emotional well-being), 196 respondents feel more stress when the number of messages sent and received increases (mean=201 messages), being the highest value observed. On the other hand, 211 respondents disagree that they have more sleep disturbances (mean=149 messages), however, 18% agree on the same statement, showing very close opinions on this aspect. Most disagree that it leads to more emotional well-being problems (n=241; mean=140 messages). Even though more people agree that there is more stress, it does not appear that there are problems of emotional well-being, and they are not related to each other, so the hypothesis is only confirmed in relation to the level of stress. For Murdock (2013), messaging can increase interpersonal stress, just as the interpretation of messages can be misunderstood, and it is the high combination of stress and texting that is problematic. Regarding the sleep disturbances, although this was not found to occur, Lund, Reider, Whiting, and Prichard (2010) argue that nighttime smartphone use can cause lack of sleep, due to light exposure.

For H3 (A large part of young females use their smartphones daily to send messages and go to social media), it is the female gender that uses the smartphone the most to send messages (81.3%). However the chi-square test reveals that the variable "how often do you use your smartphone to send messages?" does not depend on gender (Chi-square: p-value= 0.604>0.05). A large portion of the young females also go on social media, daily (86.1%) and the chi-square test reveals that the variable based on the answers to the question "how often do you use your smartphone to go on social media?" does not depend on gender (Chi-square: p-value=0.561>0.05). Although a large percentage of women use their smartphones to send messages, there is not enough evidence to conclude that significant differences exist between men and women in this regard.

Regarding H3a (The female gender prefers listening to music and using social media), the female gender goes to social media, daily (86.1%), and it is the male gender that most prefers to listen to music, daily (58.1%). Through the expected count, it is confirmed that the data was within the expected value and the chi-square test reveals that the variable "how often do you use your smartphone to listen to music?" does not depend on gender (Chi-Square:  $p\text{-value}=0.106>0.05$ ). Therefore, the hypothesis is not confirmed.

For H3b (The male gender prefers to visit gambling websites), when comparing genders, a higher percentage of men (3.1%) prefer to visit gambling websites on a daily basis. However, there is a large percentage that never visits (76.3%). And the chi-square test shows that the variable "how often do you use your smartphone to visit gambling websites?" depends on gender (Chi-Square:  $p\text{-value}=0<0.05$ ). Since there is a difference between genders, the hypothesis is maintained.

Regarding H4 (The factor solution to analyze EUGPI2 confirms Preference for Online Social Interaction, Mood Regulation, Negative Outcomes, and Deficient Self-Regulation), a CFA (Figure A) was performed on the 15 items of the EUGPI2 across the entire sample ( $N=433$ ) to test the two main competing models (Model A vs. Model B) of the EUGPI2 (Table 2).

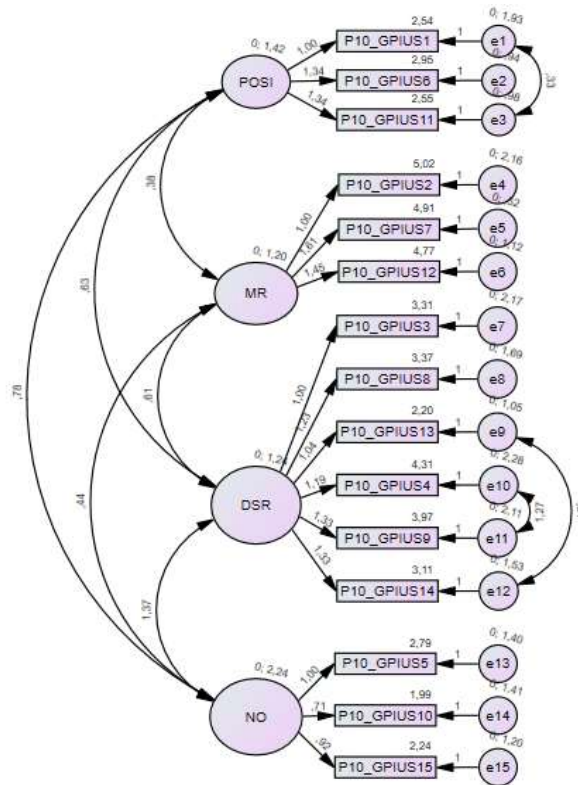


Fig A. H4 Confirmatory Factor Analysis (CFA) of the Generalized Problematic Internet Use Scale 2 (EUGPI2) (Modified Model B). **Abbreviations:** **POSI:** Preference for Online Social Interaction; **MR:** Mood Regulation; **NO:** Negative Outcomes; **DSR:** Deficient Self-Regulation.

Source: elaborated by the authors, following Pontes, Caplan, and Griffiths (2016).

Table 2. H4 Tested Models

	Qui square (x2)	Qui square/degree of freedom (x2/gl)	Root Mean Square Error of Approximation (RMSEA [CI])	P-close	Comparative Fit Index (CFI)	Tucker-Lewis Fit Index (TLI)
<b>Model A</b>	62,7	2,6	0.059 [90% CI: 0.042-0.077]	0,18	0,98	0,96
<b>Model A (research article)</b>	374,2	4,6	0.076 [90% CI: 0.068-0.084]	<0,001	0,89	0,86
<b>Model B</b>	489,5	5,8	0.102 [90% CI: 0.094-0.111]	0	0,88	0,83
<b>Model B (research article)</b>	377,7	4,5	0.075 [90% CI: 0.067-0.083]	<0,001	0,89	0,86
<b>Modified Model B</b>	314,4	3,9	0.079 [90% CI: 0.070-0.088]	0	0,93	0,90
<b>Modified Model B</b>	242,9	2,9	0.057 [90% CI: 0.049-0.065]	0,09	0,94	0,93



(research article)						
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Source: elaborated by the authors, following Pontes, Caplan, and Griffiths (2016).

The results obtained when testing the original Model A did not reveal the best quality of fit:  $\chi^2=62.7$ ;  $\chi^2/df=2.6$ ; RMSEA=0.059 [90% CI: 0.042-0.077], p-close=0.18; CFI=0.98; TLI=0.96. In the case of Model B, the results showed a poor overall fit ( $\chi^2=489.5$ ;  $\chi^2/df=5.8$ ; RMSEA=0.102 [90% CI: 0.094-0.111], p-close=0; CFI=0.88; TLI=0.83). However, to improve the quality of the model, we proceeded to analyze the modification indices, which suggested covariation of three error terms of items belonging to the same factor (i.e., 13 and 14, 4 and 9, and 11 and 1). This may be the result of relatively similar wording and underlying latent construct being assessed by these indicators. After adding these limitations, a third model was tested (Modified Model B) (Table 2) and showed quite satisfactory quality ( $\chi^2=314.4$ ;  $\chi^2/df=3.9$ ; RMSEA=0.079 [90% CI: 0.070-0.088], p-close=0; CFI=0.93; TLI=0.90). Compared to the Modified Model B corresponding to the research article, there is a significant difference in the P-close value (0.09), in which the null hypothesis is not rejected, i.e., the variables are independent, however the remaining values show an acceptable quality. Thus, it is through the Modified Model B that it is confirmed that the dimensions and questions chosen are correct.

The values for kurtosis and skewness are all within the predicted range, showing that the values are normal. To detect univariate outliers, the z-score was calculated, and no values were outside the range of  $\pm 3.29$  standard deviations, so they are all within the stipulated range and no cases were excluded. This means that all 15 indicators can be used.

Finally, for the Cronbach's alpha values, the overall reliability level is very good in all the dimensions ( $>0.80$ ), except for the Negative Outcomes dimension, attaining good reliability (Table 3). Overall, they present similarities with the previous research. Regarding the values of composite reliability, they are all close to those obtained by before; and the value of Average Variance Extracted (AVE) is  $\geq 0.50$ , so all the variables meet the condition, and the values are close to each other. Only the correlation value between Negative Outcomes and Deficient Self-Regulation (0.82) is higher than the square root of AVE, so the dimensions are different from each other. The remaining are within the predicted range.

Table 3. H4 Reliability, convergence, and discriminant validity of the Generalized Problematic Internet Use Scale 2 (EUGPI2)

Variable	Cronbach's Alpha	Composite Reliability	AVE	Correlation Matrix			
				POSI	MR	NO	DSR
<b>POSI</b>	0,85	0,83	0,63	<b>0,79</b>			
<b>MR</b>	0,82	0,84	0,64	0,29	<b>0,80</b>		
<b>NO</b>	0,79	0,79	0,56	0,44	0,27	<b>0,75</b>	
<b>DSR</b>	0,87	0,85	0,50	0,47	0,50	0,82	<b>0,70</b>

**Abbreviations:** AVE: Average Variance Extracted; **POSI:** Preference for Online Social Interaction; **MR:** Mood Regulation; **NO:** Negative Outcomes; **DSR:** Deficient Self-Regulation. **Note:** The Cronbach's alfa obtained for all 15 items was 0,89. The coefficients in bold on the diagonal of the table represents the square root of the Average Variance Extracted for each latent construct.

Source: elaborated by the authors, following Pontes, Caplan, and Griffiths (2016).

As for H5 (There are three classes of EUGPI2 risk (low 47%, medium 40% and high 12% to 13%)) it was not possible to analyze this hypothesis due to lack of existing resources, although an effort was made.

For H6 (Those with a higher level of education are more likely to use email, to research information about products or services, and to organize trips online), 58.1% of those with a college degree use email daily and this number raises to 69%, in those with a level of education higher than a college degree. The chi-square test shows that the variable "how often do you use your smartphone to go to the email?" depends on the educational level (Chi-Square: p-value=0.002<0.05). On the other hand, those with high school education or less are the most likely to search for information about services and products daily (36.6%). The chi-square test reveals that the variable "how often do you use your smartphone to search for information about products or services?" does not depend on the educational level (Chi-square: p-value=0.268>0.05). Regarding organizing trips online, those with an education level higher than a degree do it more often (6.2%). The variable "how often do you use your smartphone to organize trips online?" does not depend on the educational level (Chi-square: p-value=0.064>0.05). The hypothesis is maintained, except in the dimension related with the search for information about products or services, although the values are very close to each other. Madden (2003) mentions that, regarding this variable, the male gender has more need to do so, compared to the female gender. Considering that our sample is mostly female, this may be a reason for not having confirmed the hypothesis in its entirety.

Regarding H7 (Students who live with their relatives have lower usage of social media), 84.3% of students who live with their relatives use social media daily, against 67.6% of students who do not live with their relatives. The chi-square test revealed that the variable "how often do you use your smartphone to go on social media?" depends on the variable "do you reside with your relatives?" (Chi-square:  $p\text{-value}=0,021 < 0,05$ ). Although there are differences, the hypothesis is not confirmed. Hargittai (2007) states that students who live at home with their parents use social media less compared to those who live with roommates or alone, saying that the context of use and the surrounding environment are related to Internet use. In this case, the result was the opposite, i.e., most students who live with their relatives go to social media daily.

For the last hypothesis H8 (High intensity of Internet use is problematic for the user), the variable corresponding to the question "Do you feel that high Internet use can bring physical and emotional consequences? If yes, give some examples." is an open-ended question, so categories were created, being: 1-Yes; 2-No; 3- Physical problems/body aches; 4- Mental health problems; 5- Emotional problems; 6-Addiction; 7- Trust problems; 8-Personal negligence; 9-Other. Therefore, through the descriptive analysis, we verified that both physical and mental health problems are the most mentioned by respondents (mean=7 and 8 hours a day, respectively). On the other hand, only 17 respondents say they experience personal neglect problems (mean=9 hours daily). This shows that, although not the absolute majority agree with this consequence, there is a greater number of hours of use, confirming the respective hypothesis.

## **Findings and limitations**

Our sample ranges in age from 17 to 33 and is mostly female. Most of them are students, have a degree and live with their relatives. They use the Internet on average for 5 hours every day and send and receive 100 messages daily. This is a group that agrees they feel more stress and more sleep disturbances when the number of sent and received messages increases, but on the other hand, they also feel more social and appreciate having people who care about them. Almost half of the sample says that they have never been without Internet access and messaging and going on social media are the most frequent activities among them, although this brings mental health problems and some physical problems/body aches. They agree that when there is no Internet access, they feel like

something is missing, but they never feel angry or in panic. Almost half of the sample say they prefer face-to-face communication to online interaction, and more than half have never missed an appointment due to Internet use. This is a sample that, despite using the smartphone daily, is not significantly influenced by the excessive use of the Internet.

During the research, some limitations were found. First, the sample is mostly female (273 individuals compared to 160 males), demonstrating some gender imbalance. For example, in the sixth hypothesis (Those with a higher level of education are more likely to use email, to research information about products or services, and to organize trips online), Madden (2003) states that regarding the search for information about products or services, males are more likely to do so, compared to females. In this case, if the sample was more balanced, we must consider the possibility that it might have shown different results. Another important aspect to mention is that, although it was found that females tend to use social media more intensely, because they can communicate and maintain relationships through them. It would also be interesting to understand what this implies in terms of stress levels and textual behavior, compared to male users.

Another limitation may be that our study only includes young adults between the ages of 17 and 33. Despite being a sample with a high level of education, it could be beneficial to include more age groups, due to the difference in values and habits that they may demonstrate. Like so, it would be possible to verify how different or similar the results between generations could be regarding the intensity of Internet use.

The last difficulty encountered throughout the analysis was that it was not possible to analyse the fifth hypothesis, due to lack of resources and capacity to do so. The hypothesis, despite having been elaborated with the intention of verifying whether it was confirmed or not, was left unanalyzed, with no possibility of comparing results and conclusions about it.

Although we have found that when the individual prioritizes daily Internet use, it causes physical and mental health problems, it would be interesting to see if there is a correlation between how long ago the individual started using the Internet and the effects of the current use intensity. Whether it is at a younger age or someone who has been on the Internet longer, the probability of loneliness and social engagement also increases, compared to those who are less time online (Caplan & High, 2006). Someone who has used the Internet longer may experience more stress, mental health problems, or

loneliness. While some people turn to the Internet as a tool to improve mood, others, by preferring online interaction, may experience negative outcomes due to this compulsive use.

Finally, it would be interesting to see how different generations relate to the advance of technology, because it is natural that individuals also develop new behavioral forms. Thus, the patterns of smartphone use and behavior, regarding sending and receiving messages, are major factors prone to change, regardless of the individual's age.

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## Appendix A

Escala do Uso Generalizado Problemático da Internet 2 (EUGPI2)<sup>1,2,3</sup>

Items	
Item 1	Prefiro a interação social online em relação à comunicação face-a-face.
Item 2	Usei a Internet para falar com outras pessoas quando me senti sozinho(a).
Item 3	Quando não estou online por algum tempo, começo a preocupar-me com a ideia de me conectar.
Item 4	Tenho dificuldade em controlar a quantidade de tempo que passo online.
Item 5	Tenho dificuldades em gerir a minha vida por causa da Internet.
Item 6	Sinto-me mais confortável com a interação social online do que a interação face-à-face.
Item 7	Usei a Internet para me sentir melhor quando estava em baixo.
Item 8	Sentir-me-ia perdido(a) se não me pudesse conectar à Internet.
Item 9	Sinto que é difícil controlar o meu uso da Internet.
Item 10	Perdi compromissos ou actividades sociais por causa do meu uso da Internet.
Item 11	Prefiro comunicar-me com as pessoas online em vez de face-à-face.
Item 12	Usei a Internet para me sentir melhor quando estava chateado(a).
Item 13	Penso obsessivamente em estar online quando não estou na Internet.
Item 14	Quando não estou na Internet, é difícil resistir ao impulso de me conectar.
Item 15	O meu uso da Internet criou problemas na minha vida.

<sup>1</sup> **Instruções:** Tendo em conta a seguinte escala, avalie em que medida concorda ou discorda com cada uma das seguintes afirmações relativamente ao uso da Internet não profissional ou académico. Isto é, **apenas considere o uso por lazer** tanto no computador como em qualquer outro tipo dispositivo com acesso à Internet.

<sup>2</sup> Escala de 7-pontos: 1: Discordo totalmente; 2: Discordo; 3: Discordo um pouco; 4: Neutro; 5: Concordo um pouco; 6: Concordo; 7: Concordo totalmente.

<sup>3</sup> Dimensões: preferência pela interação social online (1, 6 e 11); regulação do humor (2, 7 e 12); auto-regulação deficiente (3, 8, 13, 4, 9 e 14); consequências negativas (5, 10 e 15).

Source: Pontes, Caplan, and Griffiths (2016).