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Title: Cross-cultural study of problematic Internet use in nine European countries

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Abstract: The main objective of the present study was to investigate the relationships between Problematic Internet Use (PIU) and time spent online, online activities and psychopathology, by taking cross-cultural and gender differences into account. The second objective was to provide the prevalence estimate of PIU among European Internet users. Our total sample consisted of 5593 Internet users (2129 men and 3464 women) of nine European countries, aged between 18 and 87 years old ($M = 25.81$; $SD = 8.61$). Recruited online, they completed several scales about their Internet use and psychopathology. PIU was related to time spent online at weekends, obsessive-compulsive symptoms, hostility and paranoid ideation among the total sample of women; among men phobic anxiety was also significant. Regression analyses performed in each sample also suggest the importance of obsessive-compulsive symptoms (in seven samples), somatization (four samples) and hostility (three samples). Many cross-cultural and gender differences have been observed in terms of relationships with psychopathology and online activities. Prevalence estimates of PIU ranged between 14.3% and 54.9%. PIU was more prevalent among women in the respective samples, including the total sample. This European research highlights relevant relationships between PIU, psychopathology and time spent online, as important differences with regards to these variables in respective samples. This study's cross-cultural design also allows a better understanding of gender differences in PIU.

Stéphanie Laconi

January 17th, 2018

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Dear Editor,

We would like to submit our manuscript entitled “Cross-cultural study of problematic Internet use in nine European countries” to Computers in Human Behavior. Our manuscript has not been published elsewhere, accepted for publication or under editorial review for publication elsewhere.

Thank you for your time and consideration. We look forward to hearing from you.

Sincerely,

Stéphanie Laconi

Reply to reviewers

Reviewer #1

Comment 1: The aim of the study was to investigate the relationships between Problematic Internet Use (PIU) and time spent online, online activities and psychopathology, by taking cross-cultural and gender differences into account. Additionally it was aimed to explore the prevalence of PIU among European Internet users according the 5593 responding internet users. The topic is timely and interesting.

It is not clearly explained if problematic gaming, gambling and pornography are sub-dimensions of Problematic Internet Use (PIU) or different independent variables.

Answer 1: We provided some additional information on page 1: “Therefore, PIU represents generalized PIU (Davis, 2001) and can include several specific uses, such as online gaming, gambling or pornography use (Laconi, Tricard, & Chabrol, 2015).”.

Comment 2: Which gap in the literature will be filled through this research, in other words what is the value added to the literature by this paper?

Answer 2: We added additional information regarding this thanks to this comment, as follows: “Cross-cultural studies allow a better understanding of results given the use of the same methodology, timeline or statistical analysis. However, few cross-cultural studies have been performed on PIU, despite it being an international health issue. To our knowledge, only one cross-cultural study explored PIU among 989 adults of four European countries (Sariyska et al., 2014), the others being focused on adolescents, and none exclusively among European users. PIU has been the subject of many studies since the last decade, but there is a need for cross-cultural empirical research.”.

Comment 3: The possible reasons of the differences between countries based on the results of the study need to explained.

Answer 3: More explanation has been provided in the discussion section and the second paragraph of this section begins by “Apart from the question of whether PIU as a phenomenon is on the increase, it is fascinating that comparing the countries we investigated, startling differences in the numbers of problematic users were found. Further research is

needed to determine whether a stable pattern emerges and what the reasons for these differences may be.”.

Besides, in the limitations section, we added: “Cultural background may be a weaker predictor of online behavior than age of onset for Internet use or participation in specific online communities. It can be argued that the Internet is facilitating the spread of new trends worldwide at a much faster rate than before, but also that it creates an international community in its own right, which is evident with the community of online gaming or social media.”.

Comment 4: The conclusion part is not satisfactory, also implications are missing.

Answer 4: The conclusion has been modified. As all the reviewers suggested, an Implication section has been added.

Comment 5 : Although the researchers tried to sample all ages, 2/3 of it is university students which can dominate the sample and may lead to inaccurate deductions.

Answer 5: We made this clear in the limitations section: “Some samples were not homogeneously distributed and professional status should be cautiously considered for the validity of the proposed interpretations.”.

Reviewer #2

Comment 1: I have read a quite interesting study. With some recommendations, I believe that it can be finally accepted. I would recommend to not separate Abstract in sub-sections.

Answer 1: The abstract has been changed.

Comment 2: The problem statement and research questions need to be provided clearly in the Introduction.

Answer 2: As you suggested, we have added some information at the end of the introduction: “We assume that several differences will be observed, particularly between genders. The second objective was to provide the prevalence estimate of PIU among European Internet users with the hypothesis that the majority of participants in the respective subsamples will

have high rates of PIU. Each sub-sample has been compared in terms of PIU prevalence estimate, with a consideration for gender differences.”.

Comment 3: Some implications for practice required in the Conclusion.

Answer 3: We added implications for practice in the implications section.

Reviewer #4:

Comment 1: 1. Abstract- should make it clear that they are 2129 men and xxx female research participants. This paper is about gender.

2. Introduction - excellent

3. Methods - excellent

4. Results- Good

5. Discussion - Good, but there should be a section informing readers and researchers, what they should do in the future in term of research and professional applications lessons learned from this paper, similarly to the future research directions, not just reporting the comparison between men and women' Internet usage. It would make this paper more useful for the readers.

Answer 1: We clarified the number of women in the Abstract. Besides, we reformulated a large part of the discussion and conclusion, and added an implications section.

Comment 2: 6. References - Do not see this cited material in the text body. Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. Computers in Human Behavior, 17(2), 187-195. doi: 10.1016/S0747-5632(00)00041-8

Answer 2: This oversight has been corrected.

Highlights

- The prevalence of Problematic Internet Use (PIU) ranged from 14% to 55%.
- PIU was more frequent among women in all samples.
- Time online and psychopathological variables explained PIU in the total sample.
- PIU was explained by different variables depending on countries and gender.

Cross-cultural study of problematic Internet use in nine European countries

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Abstract

The main objective of the present study was to investigate the relationships between Problematic Internet Use (PIU) and time spent online, online activities and psychopathology, by taking cross-cultural and gender differences into account. The second objective was to provide the prevalence estimate of PIU among European Internet users. Our total sample consisted of 5593 Internet users (2129 men and 3464 women) of nine European countries, aged between 18 and 87 years old ($M = 25.81$; $SD = 8.61$). Recruited online, they completed several scales about their Internet use and psychopathology. PIU was related to time spent online at weekends, obsessive-compulsive symptoms, hostility and paranoid ideation among the total sample of women; among men phobic anxiety was also significant. Regression analyses performed in each sample also suggest the importance of obsessive-compulsive symptoms (in seven samples), somatization (four samples) and hostility (three samples). Many cross-cultural and gender differences have been observed in terms of relationships with psychopathology and online activities. Prevalence estimates of PIU ranged between 14.3% and 54.9%. PIU was more prevalent among women in the respective samples, including the total sample. This European research highlights relevant relationships between PIU, psychopathology and time spent online, as important differences with regards to these variables in respective samples. This study's cross-cultural design also allows a better understanding of gender differences in PIU.

Keywords: Internet addiction; Psychopathology; Cross-cultural; Gender.

1. Introduction

Worldwide, Problematic Internet Use (PIU) and problematic gaming are gaining popularity among health professionals, the general population, and researchers. On the one hand, Internet addiction has no consensual definition (Spada, 2014), even if many authors state that Internet addiction or PIU refers to an excessive and/or inappropriate use of the Internet which can lead to psychological, social, academic or professional difficulties (Beard & Wolf, 2001).

Therefore, PIU represents generalized PIU (Davis, 2001) and can include several specific uses, such as online gaming, gambling or pornography use (Laconi, Tricard, & Chabrol, 2015).

Besides, the conceptualization of Internet addiction is based on several models, including drug dependence and pathological gambling (Laconi, Rodgers, & Chabrol, 2014; Weinstein & Lejoyeux, 2010). Consequently its diagnostic criteria stem mostly from the Diagnostic and Statistical Manual of Mental Disorders (DSM), with no clear consensus among researchers.

On the other hand, gaming addiction emerged in the DSM-5 (APA, 2013) as *Internet Gaming Disorder* (IGD). Defined as a “persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress” (APA, 2013, p. 795), its nine diagnostic criteria are similar to those of PIU, such as withdrawal, tolerance, difficulty or inability to stop use, or consequences on individual’s life. Many debates have been raised on the IGD since its introduction in section 3 of the DSM-5, suggesting a clear lack of clarity and differentiation between online and offline behaviors, and also between Internet addiction and gaming addiction (Király, Griffiths, & Demetrovics, 2015; Kuss, Griffiths, & Pontes, 2017; Laconi, Pirès, & Chabrol, 2017).

PIU has been frequently related to psychopathology, such as depressive and anxiety disorders (Gámez-Guadix, 2014; Ho et al., 2014; Kaess et al., 2014; Liang, Zhou, Yuan, Shao, &

Bian, 2016), pathological personality traits (Floros, Siomos, Stogiannidou, Giouzevas, & Garyfallos, 2014; Gnisci, Perugini, Pedone, & Di Conza, 2011; Laconi, Andreoletti, Chauchard, Rodgers, & Chabrol, 2016; Laconi, Vigouroux, Lafuente, & Chabrol, 2017) and other addictive disorders (Durkee et al., 2016; Gámez-Guadix, Calvete, Orue, & Las Hayas, 2015; Laconi, Tricard, & Chabrol, 2015). Studies using the Brief Symptom Inventory (BSI; Derogatis, 1993), a widely used scale to assess symptomatology, revealed significantly higher scores of each nine symptoms category (i.e., somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, phobic anxiety, hostility, paranoid ideation and psychoticism) among participants with PIU compared to non-problematic users, and significant correlations with PIU (Adalier & Balkan, 2012; Yen, Yen, Chen, Chung, & Chen, 2008). Studies using the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983) found similar results (Alavi, Maracy, Jannatifard, & Eslami, 2011; Koç, 2011; Koukia, Mangoulia, & Alexiou, 2014; Taymur et al., 2016; Dong, Lu, Zhou, & Zhao, 2011).

Prevalence rates vary considerably in PIU studies, although similar samples are used (Chakraborty, Basu, & Vijaya Kumar, 2010; Shaw & Black, 2008). In Europe, PIU affects around 1 to 12% of adults and adolescents (Petersen et al., 2009; Spada, 2014). Indeed, nine cross-cultural studies performed in European representative samples showed that the prevalence of problematic users was 1% to 6.8% (Blinka et al., 2014; Durkee et al., 2012, 2016; Kaess et al., 2014, 2016; Sariyska et al., 2014; Smahel et al., 2012; Tsitsika et al., 2012, 2014). Among these studies, one half found that men were clearly more at risk (Durkee et al., 2012, 2016; Tsitsika et al., 2012, 2014); the other half found mixed results. Gender differences were not clearly demonstrated in recent studies, with some studies suggesting no gender differences (Kuss, Griffiths, & Binder, 2013).

Gender differences might have an influence on PIU and concurrent psychiatric disorders (Ko, Yen, Chen, Yeh, & Yen, 2009) as gender impacts time spent online and the online activities engaged in (Laconi, Tricard, & Chabrol, 2015), both of which influence PIU scores (Dufour et al., 2017; Durkee et al., 2012). The large differences and inconsistencies in previous results on PIU are mainly explained by methodological differences (APA, 2013; Laconi, Rodgers, & Chabrol, 2014). Cross-cultural studies allow a better understanding of results given the use of the same methodology, timeline or statistical analysis. However, few cross-cultural studies have been performed on PIU, despite it being an international health issue. To our knowledge, only one cross-cultural study explored PIU among 989 adults of four European countries (Sariyska et al., 2014), the others being focused on adolescents, and none exclusively among European users. PIU has been the subject of many studies since the last decade, but there is a need for cross-cultural empirical research.

Therefore, it seems particularly relevant to explore the similarities and differences between several large samples in a cross-cultural way (APA, 2013; Ko, 2014; Kuss, Griffiths, & Binder, 2013). Accordingly, the main objective of the present study was to investigate the relationships between PIU and time spent online, online activities and psychopathology, by taking cross-cultural and gender differences into account. We assume that several differences will be observed, particularly between genders. The second objective was to provide the prevalence estimate of PIU among European Internet users with the hypothesis that the majority of participants in the respective subsamples will have high rates of PIU. Each sub-sample has been compared in terms of PIU prevalence estimate, with a consideration for gender differences.

2. Material and methods

2.1. Participants and procedure

All participants were recruited during December 2015 and May 2016 through an online website dedicated to the study. The website was available in nine languages and was advertised by the authors in their own countries. This study included Italy (Italian), Germany (Deutsch), France (French), Spain (Spanish), Poland (Polish), Turkey (Turkish), Hungary (Hungarian), Greece (Greek) and United Kingdom (English). Only participants aged of 18 and above were recruited. Information about the aims of the study, as well as anonymity and confidentiality of the data was provided at the beginning of the study. This study conformed to the 1964 Helsinki declaration and its later amendments, and received the approval from the ethics committee of a European university (*the name is preserved to maintain anonymity during the reviewing process*).

Participants who did not give their consent were first excluded ($n = 76$ in total), as were those who did not complete sociodemographic information including gender, age, countries of birth and residency ($n = 1048$). Then, we excluded participants who did not complete the Problematic Internet Use Questionnaire (PIUQ) or at least 90% of the questionnaire (i.e., only one missing answer was accepted and replaced by the PIUQ mean scores; $n = 842$) and the BSI or at least 10% of the questionnaire ($n = 407$). Therefore with 2376 excluded participants, the total completion rate was 70.18%. Our final sample included 5593 Internet users.

2.2.Measure

We assessed PIU with the short form of the PIUQ (Koronczai et al., 2011). Its nine items are rated on a 5-point scale from 1 = “never” to 5 = “always/almost always”. Total scores vary from 9 to 45, with higher score indicating higher problematic use. Participants scoring higher than or equal to 22 were considered problematic Internet users. The PIUQ and its 9-item form present good psychometric properties (Laconi, Rodgers, & Chabrol, 2014). In the present study, Cronbach’ alphas ranged between $\alpha = .80$ and $\alpha = .90$. Double back-translation from the English

version has been used to produce a complete translated version of each questionnaire and when no translated version was available.

The BSI (Derogatis, 1993) has been used in order to assess nine categories of psychopathological symptoms: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Each 53 items are rated on a 5-point scale from 0 = “not at all” to 4 = “extremely”, with higher scores suggesting higher psychological distress. The BSI has good psychometric properties with internal consistency ranging between $\alpha = .73$ and $\alpha = .88$ (Derogatis, 1993). Cronbach’ alphas in this study were excellent (between $\alpha = .95$ and $\alpha = .97$).

Participants also completed a set of sociodemographic (e.g., gender, age, professional status and educational level) and Internet-related questions. First, hours spent on Internet per week and per weekend have been evaluated (e.g., approximately how many hours/day do you spend online during a typical week [e.g., Monday to Friday]?). Then, the frequency of using online activities was evaluated through a 5-point scale, rated from 1 = “never” to 5 = “always/almost always” (i.e., How often do you use the following online activities when using the Internet for non-essential purposes?). Assessed categories were browsing web content, social networking sites, chatting on Social Networking Sites (SNS) or other channels, checking, sending or reading messages, playing online games, watching pornographic material, shopping, watching videos and listening to music online, downloading, gambling, and surfing with no specific purpose.

2.3.Data analysis

Chi-square tests and independent samples T-tests were used to assess gender differences. If Levene’s test indicated inhomogeneity of variance, the results of the Welch test and adjusted degrees of freedom were reported. Correlational analyses (Pearson) were

calculated to establish relationships between variables. Similarly, independent and unique predictors of PIU were studied between the variables (using the enter method). Total adjusted R² were reported. All analyses were performed on the whole sample and in each language-based sub-sample. One way analysis of variance (ANOVA and post-hoc test Tukey) was performed between all samples to compare Internet-related and psychopathology variables (i.e., mean scores of PIU, psychopathological symptoms, use of online activities, time spent online during the week and at weekends). Given the lack of homogeneity across samples in terms of size, eta squared was evaluated for the ANOVAs. According to Cohen's guidelines (1988), effect sizes can be considered small (close to .01), medium (close to .06) or large (close to .13). Internal consistency was ensured with Cronbach' alphas which may be considered "fair" between .70 and .79, "good" between .80 and .89, and "excellent" from .90 upwards (Cicchetti, 1994). SPSS 20 was used to perform these analyses.

3. Results

3.1.Descriptive results

Descriptive statistics of the nine samples are detailed in **Table 1** (i.e., mean age, age range, gender, professional status, educational level) and **Table 2** (i.e., mean scores of the PIUQ, the BSI and its subscales, time spent online and online activities). Results for the whole sample are presented as additional material (**Appendix 1**).

PIUQ mean scores of the English sample were significantly higher than all the other samples at $p < .001$ ($p < .05$ for the Greek sample), while the German sample had the lowest scores of each sub-sample at $p < .001$ ($p = 0.10$ for the Spanish sample). The results of the one-way variance analysis are presented in **Table 2**. Post-hoc results for the PIUQ mean scores are presented in **Appendix 2**.

3.2. Chi square and T tests

PIU was less prevalent among men in all samples. However, Chi-square tests revealed that PIU was only significantly more prevalent among women in the total sample ($\chi^2 = 8.947$; $df = 1$; $p < .01$) and in the Polish sample ($\chi^2 = 4.120$; $df = 1$; $p < .05$). The Hungarian sample was not tested given the very low rate of men.

T-tests showed that women had higher PIU scores ($M = 18.02$; $SD = 3.38$ versus $M = 17.59$; $SD = 6.02$) in the total sample ($t = 2.531$; $df = 4699.58$; $p = .013$). Among each sub-sample, women showed higher mean scores of PIU than men, except in the French sample. This difference was significant only in the Spanish sample. Results of the T-tests for each sample are presented in **Table 3** (except for the Hungarian sample). T-test results for the whole sample are presented as additional material (**Appendix 1**).

Among the total sample, men spent significantly more time online at weekends than women ($p < .05$), while women spent more time online during the week. Men spent significantly more time online during the week and at weekends in the German and French samples, and during the week in the Greek sample. T-tests revealed no difference in terms of time spent online during the week and at weekends for men and women in the other samples, even if in general men spent more time online than women.

Besides, among the total sample, women spent more time on Social Networking Sites (SNS; $p < .001$), on chatting ($p < .001$), on messages, and on surfing, while men spent more time on browsing ($p < .001$), gaming ($p < .001$), gambling ($p < .001$), pornography ($p < .001$), music and video ($p < .001$), downloading ($p < .001$) and shopping ($p < .05$).

3.3. Correlation analyses

Results of the correlational analysis are detailed in **Table 4** for the total population. In each

sample, all variables were correlated with PIU at $p < .01$ with few exceptions. In the Italian sample, time spent online at weekends was not significantly correlated with PIU. Similarly, time spent online during the week was not significant in the Hungarian sample, and only at $p < .05$ in the German sample. No relevant difference in terms of psychopathology was observed in any of the sub-samples.

3.4. Regression analyses

Multiple linear regression analyses explaining the contribution of the studied variables to PIU for the total sample and for each sample are presented in **Table 5**.

Only among women, obsessive-compulsive symptoms ($\beta = .272; p < .001$), time spent online at weekends ($\beta = .193; p < .001$), hostility ($\beta = .081; p < .001$), and paranoid ideation ($\beta = .065; p < .05$) were significant. The total R^2 adjusted was $.227 (p < .001); F = 93.094; p < .001$. Among men, PIU was explained by obsessive-compulsive symptoms ($\beta = .272; p < .001$), time spent online at weekends ($\beta = .148; p < .001$), hostility ($\beta = .090; p < .01$), paranoid ideation ($\beta = .071; p < .05$), phobic anxiety ($\beta = .058; p < .05$). The total R^2 was $.243 (p < .001); F = 61.730; p < .001$. Detailed results for each sample are presented in **Appendix 3**.

4. Discussion

4.1. Prevalence estimates and gender distribution

One of the main objectives of this study was to explore and compare the prevalence estimates of PIU among European Internet users from nine different countries. Our results revealed between 14% and 55% of problematic Internet users, with an average of 25% for the total sample ($n = 1376$). This range is higher than in previous investigations on PIU among European users (i.e., less than 14%; Blinka et al., 2014; Durkee et al., 2012, 2016; Kaess et al., 2014, 2016; Petersen et al., 2009; Sariyska et al., 2014; Smahel et al., 2012; Spada, 2014;

Tsitsika et al., 2012, 2014). An explanation for this discrepancy may be the methodological differences with the use of different assessment tools and the difference between samples' characteristics across studies, but it can also suggest that PIU rates are increasing over the years given the developments and uptake rates of Internet use; the growing accessibility of the Internet and the aging of individuals who grew up with the Internet, who therefore are probably more prone to have PIU than the previous generations (Council of Europe & European Commission, 2014; Kaess et al., 2016).

Apart from the question of whether PIU as a phenomenon is on the increase, it is fascinating that comparing the countries we investigated, startling differences in the numbers of problematic users were found. Further research is needed to determine whether a stable pattern emerges and what the reasons for these differences may be. However, the higher estimates among English, Greek and Turkish samples (more than 30%) can be explained by cross-cultural and societal differences. The particular low estimate found in the German sample is convergent with the result of a study by Kaess et al. (2016), which highlights more PIU in Estonian, Romanian, Spanish and Italian samples, but not in the included German sample. Hungarian, German and Polish samples also had fewer PIU symptoms (Smahel et al., 2012), while English (Smahel et al., 2012) and Spanish (Kaess et al., 2016) samples had more symptoms, which is in line with research on smartphone use (Lopez-Fernandez et al., 2017), which has suggested that the higher symptom prevalence estimate may correlate with increased use in English samples who may be keen to use mediated communication in preference over face-to-face communication, whereas Spanish samples may generally communicate more than other countries. Other studies retrieved lowest rates among German adolescent (Tsitsika et al., 2012, 2014) and highest rates among Greek, Polish (Tsitsika et al., 2012) and Spanish samples

(Tsitsika et al., 2012, 2014). Among other interesting results, our post-hoc tests (presented in the Appendix) similar to the results from Durkee et al. (2012) revealed significant differences between the samples in terms of PIU scores in the German sample (i.e., lower scores), compared to the Italian ($< .001$), the Hungarian ($< .01$) and the Spanish samples (NS).

Therefore, we can assume that German Internet users have a less problematic use given that compared to other European countries, they use SNS, such as Facebook, less than adults in other European countries (Internet World Stat, 2017). Besides, highly educated Germans (71% of the German sample were university students) use SNS less than other Europeans (Organisation for Economic Co-operation and Development [OECD], 2015), which have an addictive potential and were related to more time spent online (**See section 4.3**). This explanation seems legitimate, particularly when we consider SNS use among other countries. Indeed, individuals in the United Kingdom and Turkey have very high percentages of Facebook users among Internet users (Internet World Stat, 2017), and in these countries, the use of SNS is high among highly-educated users (OECD, 2015). One large European survey revealed that the United Kingdom has reached one of the highest frequencies of Internet use in 2016 (Eurostat, 2017).

Moreover, fewer Italian adolescents have been found to **be at risk of** PIU in comparison to several other European countries (Kaess et al., 2016; **Poli & Agrmini, 2012**; Smahel et al., 2012), and the Eurostat survey showed that Italy has one of the lowest frequencies of Internet use (Eurostat, 2017). **These results echo the results of a recent study using a sample of Italian high school students (Sergi, Pace, Gnisci, Sarno, & Raucci, 2016) that shows that none of the students had high scores of Internet addiction.** Therefore, PIU seems to be influenced by time spent online (which is associated with the frequency of use), which is also influenced by online

activities. However, it is difficult to determine whether the obtained differences are due to cultural differences in terms of Internet use (e.g., preference for online activities), or the result of other factors that we did not consider. The present findings require replication in future studies.

In the present study, women had significantly higher PIU mean scores than men ($p < .05$) among the whole sample. PIU was more prevalent among women in each sample, and 26% of women had PIU in comparison to 22% of men. These results can be explained by the fact that women use the Internet as much as men, and women use online activities which can lead to PIU (i.e., SNSs), similar to findings regarding the use of gaming, gambling and pornography in men (Guertler et al., 2014). Indeed, SNS and social media have been identified as risk factors for PIU and are more frequently used by women (Jang, Hwang, & Choi, 2008; Kuss, Griffiths, Karila, & Billieux, 2014; Laconi, Tricard, & Chabrol, 2015).

4.2. Time spent online

The average time spent online during the week and at weekends was 8.9 and 5.9 hours, respectively. This result was higher than in previous studies with adolescent European users (Durkee et al., 2012), but similar to those found in previous studies among university students (Kuss et al., 2013). In our study, time spent online during the week was significantly different across samples, and higher among the Turkish and the English samples ($M = 18.8$ hours and $M = 15.1$ hours) compared to the Spanish, Polish, Hungarian and German samples (between $M = 4.5$ hours and $M = 5.6$ hours). Some significant differences have been observed for the time spent online at weekends (between $M = 4$ hours and $M = 8.6$ hours) with higher scores for the English and Turkish samples. These results could be related to PIU prevalence estimates. English and Turkish samples had higher scores of PIU and a higher time spent online. Therefore, time spent

online, designated as an important risk factor for PIU, might indeed have an influence on PIU, even if it depends on other characteristics, such as gender, performed online activities or psychological factors (Király, Tóth, Urbán, Demetrovics, & Maraz, 2017; Laconi, Tricard, & Chabrol, 2015). Besides, it has been claimed that spending more than six hours online per day was related to more psychiatric symptoms (Adalier & Balkan, 2012; Koç, 2011).

Results of the T-test suggest that the time spent online during the week could lead to more problematic Internet use. Indeed, people using the Internet frequently during the week might fill a gap (e.g., loneliness, lack of occupation and life goals) or try to relieve psychiatric symptoms, as it has already been suggested by previous work (Caplan, 2010). Therefore, they might be more prone to increase their time spent online (during the week and at weekends) and the risk of PIU.

Regression analysis using the total sample revealed that time spent online at weekends is particularly related to PIU, as in previous studies (Wanajak, 2011; Xu et al., 2012). Indeed, this variable explained a significant part of the variance of the PIU scores among eight samples. However, time spent online during the week was only significant in three samples (Turkish, Italian and French), including two negatively (Italian and French). Given that the Turkish users had high scores of PIU, it would have been logical to observe a positive influence of time spent online during the week and at weekends on PIU. However, it seems that time spent online during the week is a significant predictor of PIU, while weekend days were not significant in the Turkish sample. It is complex to compare these data to previous studies given that the large majority of studies only assessed time spent online weekly (from Monday to Sunday). When both are explored, there is almost no difference in terms of relationship to PIU (Lai et al., 2013;

Xu et al., 2012). These results may have an impact on future research which should explore separately time spent on the Internet during the week and at weekends.

Besides, gender differences in regression analyses have been observed. Time spent online at weekends was a significant predictor of PIU for men and women among the French and Greek users, while it was only significant for women in Italian, Spanish, Hungarian and English samples, and only significant in men in German and Polish samples, and not in Turkish users. Among Greek users, PIU scores were explained by time spent online during the week and at weekends and they have a high rate of problematic users. A possible explanation is that people who are using the Internet mainly at weekends seems less at risk of PIU, compared to those who are also using it during the week. Time spent online and its relationship with PIU seem to be gender- and cultural-specific (Durkee et al., 2012; Laconi, Tricard, & Chabrol, 2015). A previous study suggested that people with PIU spent significantly more time online at weekends and during the week than individuals without PIU (Kuss, Griffiths, & Binder, 2013).

4.3. Online activities

In the whole sample, the most used online activities were browsing web content, SNS and watching or listening to videos and music, similar to findings of previous studies (Durkee et al., 2012; Tsitsika et al., 2012, 2014). Gambling and watching pornographic material were the online applications used least. SNS use was the most performed activity across all samples, except in the Greek and the Spanish samples, where browsing web content was number one. The second and third most performed activities were browsing web content and video and music listening (with identical results for some samples). Our results are convergent with those found in previous studies with regards to SNS use and music and video listening/watching (Durkee et al., 2012; Pontes, Szabo, & Griffiths, 2015). In the present study, some samples had

significantly higher mean scores of online activity use compared to other samples. A specific cross-cultural study of online activities would be necessary to discuss this subject in depth.

The average amount of time people spent using the respective online activities were significantly different between women and men in the total sample. Men spent significantly more time on gaming (in six samples) and pornography (in seven samples) than women, and women spent more time on SNS (six samples) and chatting (significant in four samples). It has already been demonstrated that women spent more time on SNS and social media while men are more prone to use gaming (Dufour et al., 2017; Durkee et al., 2012). As introduced in **4.1.**, it has already been argued that gambling and pornography are more addictive than other online activities and could lead to problematic use while in our study men are less prone to have PIU than female. The addictive potential of SNS use has also been claimed but well studied, particularly regarding Facebook use (Kuss & Griffiths, 2017). Therefore, our results suggest that SNS use could lead to PIU and consequently women are just more prone to develop a PIU given their preference for communication-based activities when using the Internet.

4.4. Psychopathology

In our total sample, correlational analyses suggest the higher PIU, the higher psychopathological symptoms are (between $r = .10$ and $r = .42$), similar to previous studies (Yang, Choe, Baity, Lee, & Cho, 2005; Yen et al., 2008). Correlational analysis performed in each sample showed few differences and none in terms of psychopathology. However, Turkish, Polish and English users had higher mean scores of general psychopathology and Turkish and English samples had the highest rates of problematic users, highlighting the relationship between PIU, time spent online and psychopathology. Many studies found significant relationships between PIU and general psychopathology (Adalier & Balkan, 2012; Alavi et al., 2011; Dong et al., 2011;

Koc, 2011; Koukia et al., 2014; Taymur et al., 2016). Even if they had high rates of PIU and psychopathology, there were few differences in terms of relationship between psychopathology and PIU. Among some samples of users, psychopathology might not be the best risk factor for PIU as in previous results (Adalier & Balkan, 2012) while time spent online at weekends could be more indicative.

Multiple regression analyses highlighted the relationships between PIU and psychopathology, and more particularly with obsessive-compulsive, hostility, phobic anxiety and paranoid ideation. Obsessive-compulsive symptoms appear as the psychopathology most related to PIU in both genders, similar to the findings of a previous study (Chou, Condrón, & Belland, 2005; Jang et al., 2008; Yang et al., 2005), including hostility, which has also been related to PIU as one of the major predictors of PIU among adolescents (Yen et al., 2008; Yang et al., 2005). Therefore, problematic users appear to be more sensitive, irritable and impulsive than regular users, which can exacerbate the vicious circle between negative feelings and Internet use, whereby the Internet may be used more frequently in order to cope with daily life problems (Kuss, Dunn, et al., 2017). Little data has been provided for phobic anxiety and for paranoid ideation. A study conducted in 25 European countries found the importance of emotional and conduct problems on PIU among the majority of samples (Blinka & Smahel, 2012). However, to date there is scarce research available on this subject, and therefore future research is encouraged to assess these relations in more depth.

Regression analyses performed in each sample also suggest the importance of obsessive-compulsive symptoms (in seven samples) and somatization (four samples and one negatively). Hostility (three samples) and paranoid ideation (two samples) were significant positive predictors of PIU, while there were ambivalent results for anxiety, phobic anxiety and depression (negative

and positive coefficients). Previous research found that obsessive-compulsive traits were related to PIU (Adalier & Balkan, 2012; Alavi et al., 2011; Dong et al., 2011; Taymur et al., 2016), similar to hostility and somatization (Adalier & Balkan, 2012; Alavi et al., 2011; Ko et al., 2009; Koukia et al., 2014). Some studies highlighted a significant relationship with paranoid ideation symptoms (Adalier & Balkan, 2012; Taymur et al., 2016), while others did not (Alavi et al., 2011; Koc, 2011). One longitudinal Chinese study suggested that somatization, paranoid ideation and phobic anxiety were not related to IA among students (Dong et al., 2011). The outlined differences in the findings across different countries may provide an explanation for the differences found in the present study regarding samples characteristics and methodology. Interpersonal sensitivity and psychoticism (Koc, 2011) had a lower impact on PIU on the present users; previous studies found opposite results (Adalier & Balkan, 2012; Alavi et al., 2011; Dong et al., 2011; Koukia et al., 2014). However, a logical explanation for these inconsistencies could be found in sampling and methodology, which are hardly comparable: $n = 126$ Cypriot students; $M = nc$; $SD = nc$; sex-ratio = 1.7 (Adalier & Balkan, 2012); $n = 250$ Iranian students; $M = 22.5$; $SD = 2.6$; $SR = 1.6$ (Alavi et al., 2011); $n = 59$ Chinese students; $M = nc$; $SD = nc$; $SR = nc$ (Dong et al., 2011); $n = 856$ Greek students; $M = 20.8 - 21.6$; $SD = 2.3 - 2.8$; $SR = 1.0$ (Koukia et al., 2014).

Gender differences have also been observed, but there is a lack of consistency, as for obsessive-compulsive symptoms which were not consistently significant among each sub-sample and among both gender. Hostility predicted PIU among German and Greek men, and among Italian, Spanish, Turkish and Hungarian women. Hostility is known as an important predictor of PIU among male adolescents (Ko et al., 2009) but it seems that among adults, women with hostility are more prone to use the Internet and particularly SNS such as Twitter where anonymity allows the sharing of negative thoughts. Anxiety was a significant predictor of PIU among men (German,

Polish, English and Greek samples) and negatively among Polish and English samples, while it was only significant among French women negatively. This interesting result highlights one important gender difference. Men with high PIU scores might use the Internet in order to relieve stress due to anxiety while women might use the Internet for other purposes.

Somatization was only a significant predictor of PIU among men in the French, Polish and German samples (negatively in the last one). Interpersonal sensitivity was only significant among Greek men and negatively predicted PIU. Depression was a significant negative predictor of PIU among Spanish women. This result is interesting given that depressive symptoms have been frequently related to PIU and described as risk factors for PIU in European studies (Kaess et al., 2014). Phobic anxiety negatively predicted PIU significantly among Spanish and Greek women and among Polish men. Paranoid ideation was a significant predictor for English women and among Italian and German samples (negatively for the German one). This can be explained by cultural and gender differences and the absence of paranoid ideation symptoms could be a relevant indicator of PIU given that German users had lower rates of PIU in the present study. Paranoid ideation should be thoroughly explored. Finally, psychoticism was not significant. These findings suggest that somatization, interpersonal sensitivity, depression, phobic anxiety, paranoid ideation and more importantly psychoticism had less influence on PIU, as suggested by the results on the whole sample. As previously stated, psychopathology cannot be considered as consistent predictor of PIU (Laconi et al., 2016), while time spent online (Adalier & Balkan, 2012), which is related to online activities, might be more relevant. Moreover, gender seems to have a great influence on the relationship between psychopathology and PIU scores (Laconi et al., 2016).

4.5. Implications

Based on the data collected from the participants in the present study, recommendations for clinical practice and future research would be to assess explicit and implicit motives (e.g., relieve stress, depression, loneliness) and characteristics of use (e.g., time spent online, online activities). Health professional should pay particular attention to their assessment of PIU and related variables by distinguishing generalized PIU from PIU due to one or several specific Internet uses. A large amount of time spent online during the week could be a sign of PIU. Moreover, as many studies raised the importance of gender in PIU and given our results, it also appears as a logical and practical approach to systematically distinguish men from women. Differences in terms of time spent online and on gaming and SNSs as preference for online activities are additional arguments in favor of distinguishing between genders.

4.6. Limitations

Limitations of the present study include the possible sampling and the recruitment bias (e.g., self-selection, online recruitment) and evaluating methods (e.g., validity of the used scales, self-report measures, lack of diagnosis). Some samples were not homogeneously distributed and professional status should be cautiously considered for the validity of the proposed interpretations. Cultural background may be a weaker predictor of online behavior than age of onset for Internet use or participation in specific online communities. It can be argued that the Internet is facilitating the spread of new trends worldwide at a much faster rate than before, but also that it creates an international community in its own right, which is evident with the community of online gaming or social media. There were significant differences across samples, including in socio-demographic variables (i.e., age, sex ratio, status and educational level). Gender differences were not explored in the Hungarian sample and should be discussed cautiously for the Polish sample because of the low number of women. Besides, given the number of language-based sub-samples,

some analyses have not been detailed in this paper (e.g., post hoc tests performed with ANOVA, regression analyses including online activities, particularly depending on gender) given space and scope limitations. Finally, it is worth to note that in the case of disorders with low prevalence rates, prevalence estimates obtained by using screening instruments tend to be overestimated (Maraz, Király, & Demetrovics, 2015). Therefore, the interpretation of prevalence estimates in general and in this study in particular warrants caution, especially due to the convenience nature of the samples.

5. Conclusions

To date, no study had already been conducted including adults in the European countries that have participated in the present study. This work highlights the different prevalence rates of PIU among nine European countries and more importantly reveals high estimates of PIU across all the samples. Moreover, since the emergence of PIU, male gender appeared as an important risk factor in many studies, while this study highlights that women are as likely to have a PIU as men, if not more. Besides, the assessed relationships between PIU and psychopathology highlight specific risk factors for PIU across the respective European countries. PIU appears as a health problem particularly because it is related to more psychiatric symptoms and more time spent online. There is a need for empirical research to explore which factors impact Internet and gaming use and whether each problematic online behavior is similarly influenced. Future research on PIU should consistently distinguish between genders and focus on using validated tools allowing comparisons with other studies.

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Table 1.

Descriptive Statistics of Socio Demographic Variables.

	Italian <i>n</i> = 1346	German <i>n</i> = 1190	French <i>n</i> = 1030	Polish <i>n</i> = 548	Spanish <i>n</i> = 473	Turkish <i>n</i> = 432	Hungarian <i>n</i> = 245	English <i>n</i> = 175	Greek <i>n</i> = 154
Age range	18-58	18-75	18-87	18-72	18-73	18-57	18-72	18-59	18-61
Mean age (SD)	23.60 (5.07)	27.21 (9.59)	25.33 (8.73)	25.46 (7.80)	30.46 (10.76)	23.42 (6.48)	27.11 (9.29)	23.28 (8.88)	32.02 (12.06)
Gender									
Men	504 (37.4%)	407 (32.5%)	302 (29.4%)	533 (97.3%)	210 (44.4%)	70 (16.2%)	1 (.4%)	42 (24%)	60 (39%)
Women	842 (62.5%)	783 (65.7%)	728 (70.6%)	15 (2.7%)	263 (55.6%)	362 (83.8%)	244 (99.6%)	133 (76%)	94 (61%)
Status									
High school students	63 (4.7%)	6 (.5%)	3 (0.3%)	21 (3.8%)	14 (3%)	3 (.7%)	8 (3.3%)	-	2 (1.3%)
University students	924 (68.6%)	846 (71.1%)	713 (69.2%)	347 (63.3%)	126 (26.6%)	294 (68.1%)	136 (55.5%)	141 (80.6%)	62 (40.3%)
Employed	229 (17%)	327 (27.5%)	226 (21.9%)	161 (29.4%)	272 (57.5%)	127 (29.4%)	90 (36.7%)	34 (19.4%)	70 (45.5%)
Not employed	130 (9.7%)	11 (.9%)	88 (8.5%)	19 (3.5%)	61 (12.9%)	8 (1.9%)	11 (4.5%)	-	20 (13%)
Educational level									
In a secondary/high school	13 (.9%)	2 (.2%)	6 (.6%)	23 (4.2%)	13 (2.7%)	3 (.7%)	8 (3.3%)	4 (2.3%)	4 (2.6%)
Second. school finished (without dipl.)	78 (5.8%)	1 (.1%)	39 (3.8%)	5 (.9%)	45 (9.5%)	3 (.7%)	39 (15.9%)	-	21 (13.6%)
High school diploma	867 (64.4%)	718 (60.3%)	407 (39.5%)	295 (53.8%)	143 (30.2%)	52 (12%)	115 (46.9%)	127 (72.6%)	44 (28.6%)
BA degree/engineer dipl.	297 (22.1%)	175 (14.7%)	354 (34.4%)	61 (11.1%)	167 (35.3%)	317 (73.4%)	54 (22%)	27 (15.4%)	34 (22.1%)
MA diploma	75 (5.6%)	227 (19.1%)	199 (19.3%)	141 (25.7%)	95 (20.1%)	38 (8.8%)	23 (9.4%)	11 (6.3%)	34 (22.1%)
PhD/doctorate	16 (1.2%)	67 (5.6%)	25 (2.4%)	23 (4.2%)	10 (2.1%)	19 (4.4%)	6 (2.4%)	6 (3.4%)	17 (11%)

Note. SD: Standard deviation.

Table 2.

Descriptive Statistics and One Way Variance Analysis of Internet-Related and Psychopathological Variables

	Italian <i>n</i> = 1346	German <i>n</i> = 1190	French <i>n</i> = 1030	Polish <i>n</i> = 548	Spanish <i>n</i> = 473	Turkish <i>n</i> = 432	Hungarian <i>n</i> = 245	English <i>n</i> = 175	Greek <i>n</i> = 154	<i>F</i> (8)	η^2
Problematic users	356 (26.4%)	170 (14.3%)	255 (24.8%)	134 (24.5%)	112 (23.7%)	142 (32.9%)	53 (21.6%)	96 (54.9%)	58 (37.7%)		
Women/Men	236/120	115/55	183/72	7/127	67/45	120/22	53/0	77/19	41/17		
PIUQ mean scores (SD)	17.96 (6.20)	16.26 (5.17)	17.99 (5.90)	18.10 (6.31)	17.21 (6.35)	19.46 (7.63)	17.91 (6.32)	22.26 (6.46)	19.88 (7.11)	28.03***	.03
Online W	11.64 (15.27)	5.65 (7.87)	8.94 (11.06)	5.12 (4.12)	4.52 (6.80)	18.81 (15.71)	5.44 (6.66)	15.12 (14.26)	8.50 (11.02)	89.16***	.10
Online WE	5.98 (5.52)	5.14 (4.60)	6.77 (5.64)	5.49 (3.36)	4.07 (3.52)	7.91 (6.57)	5.51 (4.02)	8.60 (6.93)	5.52 (5.11)	29.72***	.00
Online activities (SD)											
Browsing web content	3.87 (.96)	3.83 (.93)	3.80 (.92)	3.96 (.94)	4.09 (.93)	3.96 (.96)	3.69 (1.0)	3.71 (1.03)	3.99 (.94)	8.63***	.01
Social networking sites	4.11 (1.1)	4.21 (1.08)	4.00 (1.06)	4.02 (1.14)	3.61 (1.39)	4.00 (1.26)	3.85 (1.07)	4.21 (.98)	3.08 (1.42)	77.93***	.10
Chatting	3.12 (1.31)	3.80 (1.23)	3.38 (1.29)	3.58 (1.38)	3.23 (1.44)	3.08 (1.5)	2.91 (1.24)	3.84 (1.26)	2.78 (1.4)	36.56***	.04
Messages	3.72 (1.13)	3.49 (1.14)	3.17 (1.15)	3.28 (1.19)	3.80 (1.15)	3.47 (1.1)	3.14 (1.17)	3.25 (1.22)	3.51 (1.07)	25.51***	.03
Gaming	2.55 (1.47)	1.90 (1.1)	2.18 (1.35)	1.89 (1.26)	1.88 (1.15)	2.07 (1.27)	1.80 (1.16)	2.14 (1.31)	2.00 (1.28)	21.22***	.02
Pornographic material	1.74 (1.0)	1.55 (.95)	1.68 (1.04)	1.80 (1.07)	1.72 (.93)	1.72 (.94)	1.23 (.64)	1.62 (.95)	1.63 (.93)	13.18***	.01
Shopping	2.68 (.93)	3.18 (.97)	2.33 (1.05)	2.36 (1.02)	2.35 (.96)	2.64 (.91)	2.15 (1.03)	2.34 (.87)	2.51 (.89)	31.35***	.04
Videos and music	3.87 (1.05)	3.90 (1.03)	3.80 (1.0)	3.57 (1.1)	3.62 (1.11)	3.95 (.98)	3.75 (1.01)	3.80 (1.01)	3.47 (1.12)	17.69***	.02
Downloading	2.76 (1.33)	2.78 (1.24)	2.78 (1.26)	2.54 (1.27)	2.78 (1.32)	2.77 (1.11)	3.10 (1.21)	3.04 (1.16)	1.86 (1.03)	76.32**	.09
Gambling	1.12 (.50)	1.23 (.72)	1.12 (.49)	1.19 (.61)	1.10 (.46)	1.09 (.44)	1.13 (.53)	1.12 (.50)	1.07 (.40)	4.10***	.00
Surfing	2.73 (1.20)	2.72 (1.18)	2.67 (1.15)	2.24 (1.16)	2.63 (1.07)	2.58 (1.12)	2.57 (1.20)	2.12 (1.07)	2.35 (1.08)	18.42***	.02
BSI mean scores (SD)	36.61 (31.29)	25.31 (23.19)	27.19 (28.66)	42.37 (33.11)	25.18 (27.21)	46.74 (39.47)	39.81 (32.45)	41.08 (34.37)	31.43 (32.59)	42.10***	
SOM	3.80 (4.35)	2.11 (2.81)	2.26 (3.67)	3.82 (4.44)	2.60 (3.93)	4.89 (5.24)	3.40 (4.77)	4.30 (4.65)	2.90 (4.14)	35.52***	.04
OC	5.50 (4.71)	4.55 (3.91)	4.21 (4.25)	6.69 (5.10)	4.20 (4.25)	6.75 (5.46)	5.76 (4.72)	7.49 (5.59)	5.15 (4.89)	31.86***	.04
SENS	3.13 (3.49)	2.70 (3.96)	2.44 (3.21)	3.93 (3.69)	1.88 (2.74)	4.07 (3.90)	3.55 (3.19)	4.06 (4.06)	2.79 (3.30)	25.84***	.03
DEP	4.88 (4.78)	3.47 (4.22)	3.39 (4.43)	6.13 (5.77)	3.29 (4.27)	6.00 (5.86)	6.26 (5.48)	4.53 (5.11)	4.00 (4.90)	35.58***	.04
ANX	4.10 (4.33)	2.47 (2.84)	2.89 (3.79)	4.96 (4.81)	3.06 (3.73)	4.70 (4.75)	5.18 (4.50)	4.47 (4.78)	2.74 (3.73)	38.02***	.05
HOS	3.73 (3.73)	2.29 (2.59)	2.39 (3.15)	3.96 (3.62)	2.30 (3.05)	4.71 (4.54)	3.49 (3.57)	3.01 (3.52)	2.90 (3.77)	39.64***	.05
PHO	1.99 (2.86)	1.38 (2.11)	2.08 (3.22)	2.18 (3.09)	1.31 (2.62)	3.19 (3.58)	2.68 (3.10)	3.19 (3.85)	1.85 (2.94)	24.79***	.03
PAR	4.21 (4.04)	2.34 (2.92)	3.06 (3.73)	4.06 (3.68)	2.73 (3.29)	5.31 (4.58)	3.82 (3.68)	3.70 (4.04)	4.08 (4.20)	39.94***	.05
PSY	2.97 (3.44)	1.89 (2.71)	2.18 (3.07)	3.53 (3.74)	1.87 (2.80)	3.81 (4.02)	3.08 (3.70)	2.94 (3.71)	2.62 (3.47)	27.58***	.03

Note. SD: Standard deviation; PIUQ: Problematic Internet Use Questionnaire; Online W: hours spent online during the weekend; Online WE: hours spent online at weekends; BSI: Brief Symptom Inventory; SOM: Somatization; OC: Obsessive-Compulsive; SEN: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism; η^2 = Eta squared; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3.

Mean Comparison of Internet-Related Variables According to Gender

	Italian		German		French		Polish		Spanish		Turkish		English		Greek	
	F/M	t	F/M	t	F/M	t	F/M	t	F/M	t	F/M	t	F/M	t	F/M	t
PIUQ	18.1/17.6	1.27	16.2/16.1	.31	17.9/18.1	.65	20.9/18	1.31	17.7/16.5	2.05*	19.5/19.1	.38	22.6/20.9	1.54	20.4/19	1.19
Online W	11.3/12.0	.75	5.1/6.6	2.99**	7.9/11.2	3.84***	5.2/5.1	.14	4.4/4.6	.29	18.6/19.8	.60	15.4/14.2	.46	6.9/10.9	1.99*
Online WE	5.9/6.0	.48	4.7/6.0	4.48***	6.1/8.3	5.02***	5.8/5.4	.35	4.2/3.9	.88	7.9/7.7	.28	8.8/7.9	.66	5.0/6.2	1.21
Browsing	3.7/3.8	.60	3.9/4.1	3.71***	3.8/3.8	.18	4.2/3.9	.97	3.9/3.9	.04	3.6/3.7	.38	3.7/4.0	1.51	4.0/4.2	1.15
SNS	4.1/3.7	5.42***	3.2/2.7	5.28***	4.2/3.8	5.30***	3.4/4.0	1.18	4.2/3.7	4.83***	3.8/3.7	.69	4.4/3.5	4.03***	3.8/3.2	2.60*
Chatting	3.4/3.2	2.97**	2.9/2.5	4.35***	3.1/3.0	1.49	2.9/3.0	.38	3.8/3.2	4.01***	2.9/2.7	1.01	3.9/3.2	3.18**	3.3/3.0	1.03
Messages	3.1/3.1	.69	3.5/3.5	.07	3.7/3.5	2.81**	3.3/3.4	.50	3.3/3.1	1.39	3.1/2.9	1.40	3.4/3.5	.40	3.7/3.8	.44
Gaming	2.0/2.3	4.27***	1.8/2.3	7.06***	2.2/3.2	10.48***	2.4/2.0	1.02	1.6/2.1	4.02***	1.6/2.3	3.65***	1.6/2.6	4.41***	1.7/2.0	1.29
Pornography	1.1/2.4	23.51***	1.2/2.3	20.48***	1.3/2.6	17.75***	1.8/1.7	.32	1.3/2.3	11.65***	1.1/1.8	6.05***	1.2/2.3	6.19***	1.3/2.2	6.03***
Shopping	2.2/2.5	4.91***	2.5/2.4	2.12*	2.7/2.5	1.91	2.9/2.6	1.25	2.3/2.3	.30	2.1/2.3	2.00*	3.3/2.7	3.69	2.2/2.4	1.37
Video/music	3.7/3.8	2.47*	3.3/3.6	3.50***	3.8/4.0	2.87**	4.0/3.9	.46	3.5/3.5	.31	3.7/3.7	.10	3.9/3.7	1.01	3.6/3.6	.08
Downloading	2.7/2.9	2.58*	1.7/2.1	6.06***	2.6/3.0	3.79***	3.0/2.7	1.03	2.5/2.5	.59	3.1/2.9	1.15	2.8/2.6	.54	2.6/2.9	1.40
Gambling	1.0/1.2	8.62***	1.0/1.1	2.23*	1.0/1.2	3.60***	1.5/1.0	1.26	1.1/1.2	2.62**	1.1/1.2	1.06	1.1/1.1	1.85	1.0/1.2	2.61*
Surfing	2.7/2.5	2.54*	2.3/2.3	.64	2.7/2.7	.33	3.3/2.5	2.64*	2.3/2.1	1.52	2.6/2.3	1.67	2.7/2.6	.67	2.7/2.5	1.04

Note. F : Women; M : Men; t : T-test statistics; PIUQ: Problematic Internet Use Questionnaire; Online W: hours spent online during the weekend; Online WE:

hours spent online at weekends; SNS: Social Networking Sites; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4.Correlational Analysis Between Problematic Internet and Psychopathological Variables ($n = 5593$)

	1	2	3	4	5	6	7	8	9	10	11	12
1.PIUQ	-											
2.Online W	.167**	-										
3.Online WE	.247**	.592**	-									
4.SOM	.307**	.119**	-.009	-								
5.OC	.424**	.106**	-.014	.587**	-							
6.SENS	.346**	.089**	-.011	.524**	.674**	-						
7.DEP	.353**	.112**	.000	.542**	.700**	.767**	-					
8.ANX	.336**	.089**	-.004	.677**	.670**	.677**	.710**	-				
9.HOS	.349**	.135**	-.007	.540**	.597**	.603**	.641**	.661**	-			
10.PHO	.326**	.108**	-.008	.606**	.588**	.638**	.600**	.694**	.534**	-		
11.PAR	.351**	.129**	-.007	.530**	.609**	.709**	.676**	.607**	.646**	.590**	-	
12.PSY	.105**	.108**	-.009	.557**	.682**	.739**	.807**	.685**	.633**	.638**	.699**	-

Note. PIUQ: Problematic Internet Use Questionnaire; SOM: Somatization; OC: Obsessive-Compulsive; SEN: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism Online W: hours spent online during the weekend; Online WE : hours spent online at weekends; * = $p < .05$; ** = $p < .01$.

Table 5.Multiple Regression Analyses Predicting Problematic Internet Use (*β* statistics)

Variables	Total sample	Italian	German	French	Polish	Spanish	Turkish	Hungarian	English	Greek
Online W	.009	-.093**	.034	-.078*	.076	.056	.210***	-.078	.065	-.016
Online WE	.174***	.229***	.066*	.199***	.201***	.196***	.063	.298***	.248**	.322***
SOM	.029	.034	-.090*	.083*	.126*	-.007	-.006	-.046	.019	.204*
OC	.270***	.238***	.346***	.259***	.370***	.323***	.170*	.282**	.026	.106
SENS	.001	-.022	.048	.027	-.051	.116	-.010	.164	-.209	-.131
DEP	-.019	.016	-.013	.054	-.035	-.166*	.021	-.126	.292*	-.116
ANX	-.020	.007	.057	-.123**	-.185*	.116	-.066	.033	-.130	.308*
HOS	.084***	.063	.021	.056	.092	.216**	.152*	.218**	.109	.197
PHO	.042*	.080*	-.034	.066	.117*	-.085	.095	-.150	.030	-.227*
PAR	.067**	.092*	-.011	.042	.008	.119	-.009	.055	.349**	.014
PSY	.037	.033	.034	.032	.075	-.091	.071	-.036	.007	.224
<i>R</i> ² adjusted	.232***	.259***	.146***	.224***	.266***	.294***	.213***	.237***	.269***	.387***
<i>F</i>	154.009	37.177	19.472	28.080	19.049	18.627	11.538	7.854	6.829	9.788
<i>n</i>	5593	1346	1190	1030	548	473	432	245	175	154

Note. Online W: hours spent online during the weekend; Online WE: hours spent online at weekends; SOM: Somatization; OC: Obsessive-Compulsive; SEN: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism; **p* < .05; ***p* < .01; ****p* < .001.

Appendix 1.

Descriptive Statistics Among the Total Sample and Comparisons of Gender

	Total sample (<i>n</i> = 5593)	Women (<i>n</i> = 3464)	Men (<i>n</i> = 2129)	<i>t</i>	<i>df</i>	<i>p</i>
Age range	18-87					
Mean age (SD)	25.81 (8.61)	25.50 (8.63)	26.31 (8.57)	3.410	5591	.001
Status						
High school students	120 (2.1%)	62 (1.8%)	58 (2.7%)	-	-	-
University students	3589 (64.2%)	2327 (67.2%)	1262 (59.3%)	-	-	-
Employed	1536 (27.5%)	858 (24.8%)	678 (31.8%)	-	-	-
Not employed	348 (6.2%)	216 (6.2%)	131 (6.2%)	-	-	-
Educational level						
In a secondary/high school	76 (1.3%)	32 (.9%)	41 (1.9%)	-	-	-
Second. school finished (without dipl.)	231 (4.1%)	142 (4.1%)	92 (4.3%)	-	-	-
High school diploma	2768 (49.5%)	1645 (47.5%)	1123 (52.7%)	-	-	-
BA degree/engineer dipl.	1486 (26.6%)	1057 (30.6%)	429 (20.2%)	-	-	-
MA diploma	843 (15.1%)	479 (13.8%)	364 (17.1%)	-	-	-
PhD/doctorate	189 (3.4%)	109 (3.1%)	80 (3.8%)	-	-	-
Problematic users	1376 (24.6%)	899 (26%)	477 (22.4%)	-	-	-
PIUQ mean scores (SD)	17.85 (6.25)	18.02 (6.38)	17.59 (6.02)	2.531	4699.58	.011
Online W	8.93 (12.01)	9.06 (12.12)	8.70 (11.81)	1.106	4582.44	.269
Online WE	5.94 (5.21)	5.82 (5.12)	6.12 (5.36)	2.081	5567	.037
Online activities (SD)						
Browsing web content	3.88 (.940)	3.84 (.93)	3.94 (.94)	4.071	5577	.001
Social networking sites	3.82 (1.25)	3.94 (1.19)	3.63 (1.33)	8.665	4110.14	.001
Chatting	3.19 (1.38)	3.28 (1.35)	3.02 (1.41)	6.824	4311.00	.001
Messages	3.41 (1.15)	3.43 (1.16)	3.38 (1.14)	1.383	5582	.167
Gaming	2.13 (1.34)	1.96 (1.24)	2.40 (1.43)	11.841	4008.75	.001
Pornographic material	1.65 (.98)	1.29 (.65)	2.25 (1.12)	36.170	3008.76	.001
Shopping	2.48 (.98)	2.45 (.99)	2.52 (.98)	2.431	5574	.015
Videos and music	3.73 (1.06)	3.68 (1.07)	3.82 (1.03)	8.068	4634.11	.001
Downloading	2.60 (1.27)	2.53 (1.28)	2.70 (1.25)	4.761	4584.14	.001
Gambling	1.12 (.49)	1.07 (.40)	1.19 (.61)	7.526	3267.82	.001
Surfing	2.54 (1.16)	2.55 (1.17)	2.50 (1.14)	1.565	5572	.118
BSI mean scores (SD)	32.99 (30.93)	34.22 (31.25)	30.98 (30.32)	3.833	4606.85	.001

SOM	3.12 (4.13)	3.43 (4.33)	2.60 (3.71)	7.570	5022.15	.001
OC	5.23 (4.67)	5.30 (4.64)	5.11 (4.73)	1.443	5591	.149
SENS	3.00 (3.39)	3.20 (3.45)	2.66 (3.27)	5.940	4681.70	.001
DEP	4.41 (4.93)	4.42 (4.83)	4.38 (5.08)	.327	4329.62	.744
ANX	3.60 (4.11)	3.81 (4.12)	3.24 (4.08)	5.039	4535.86	.001
HOS	3.10 (3.50)	3.16 (3.53)	3.00 (3.45)	1.651	5591	.099
PHO	2.00 (2.96)	2.20 (3.06)	1.67 (2.75)	6.656	4873.50	.001
PAR	3.51 (3.81)	3.57 (3.89)	3.41 (3.67)	1.560	4700.64	.119
PSY	2.62 (3.35)	2.64 (3.38)	2.57 (3.30)	.754	5591	.451

Note. SD: Standard deviation; PIUQ: Problematic Internet Use Questionnaire; Online W: hours spent online during the weekend; Online WE: hours spent online at weekends; BSI: Brief Symptom Inventory; SOM: Somatization; OC: Obsessive-Compulsive; SEN: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism; t : T-test statistics; df: degree of freedom; p : significance.

Appendix 2.

Significance of Post-Hoc Comparison of PIUQ Scores

Country	Italian	German	French	Polish	Spanish	Turkish	Hungarian	English	Greek
Italian	-								
German	< .001	-							
French	NS	< .001	-						
Polish	NS	< .001	NS	-					
Spanish	NS	NS	NS	NS	-				
Turkish	< .001	< .001	< .01	< .05	< .001	-			
Hungarian	NS	< .01	NS	NS	NS	NS	-		
English	< .001	< .001	< .001	< .001	< .001	< .001	< .001	-	
Greek	< .01	< .001	< .05	NS	< .001	NS	NS	< .05	-

Note. NS: Not significant; p values are Bonferroni corrected.

Appendix 3.

Multiple Regression Analyses Predicting Problematic Internet Use (β statistics)

	Italian		German		French		Polish		Spanish		Turkish		Hungarian		English		Greek	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
W	-	.057	.066	-.010	-.059	-.111	.062	.066	.040	.083	.239**	-.013	-.079	-	.015	.110	.063	-.342*
	.187**										*							
	*																	
WE	.326**	.085	.030	.134**	.203**	.175*	.380	.205**	.213*	.115	.044	.279	.300**	-	.292**	.164	.295**	.414**
	*				*			*					*					
SOM	.058	-.026	-.052	-	.030	.231**	.008	.111*	.009	-.019	-.038	-.093	-.046	-	-.139	.170	.226	.203
				.222**														
				*														
OC	.250**	.225**	.367**	.272**	.213**	.338**	.572	.363**	.371**	.208*	.238**	-.365	.280**	-	.072	-.162	.003	.044
	*	*	*	*	*	*		*	*									
SENS	-.053	.037	.024	.113	.038	.024	.964	-.082	.061	.153	-.045	.161	.164	-	-.245	-.119	.037	-
																		.591**
DEP	.003	.047	-.058	.071	.073	.014	-	-.019	-.252*	.076	.051	-.130	-.125	-	.181	.703	-.036	-.223
							.495											
ANX	.026	-.052	.019	.194**	-.111*	-.168	-	-.148*	.160	.000	-.146	.553	.034	-	.072	-.865*	.347	.498**
							.723											
HOS	.111*	-.011	-.034	.140*	.017	.140	1.14	.090	.254**	.154	.156*	.158	.217**	-	.013	.185	.131	.441**
							.3											
PHO	.068	.090	-.025	-.068	.082	.051	-	.118*	-.168*	.115	.107	.033	-.151	-	.031	-.122	-.429*	.250
							.303											
PAR	.060	.174**	.055	-.148*	.031	.045	-	.015	.073	.185	.012	.107	.055	-	.390**	.433	.088	-.184
							.224											

PSY	.011	.054	.062	-.005	.099	-.120	-	.065	.001	-.213	.066	.073	-.037	-	.079	.384	.177	.274
							.480											
<i>R</i> ²	.284**	.238**	.139**	.190**	.210**	.271**	.821	.250**	.287**	.310**	.210**	.270**	.236**	-	.246**	.434**	.336**	.606**
ajuste	*	*	*	*	*	*		*	*	*	*	*	*		*	*	*	*
<i>F</i>	30.793	15.228	12.478	9.652	18.526	11.190	6.83	17.079	10.473	9.412	9.725	3.292	7.795	-	4.920	3.859	5.283	9.254
							3											
<i>n</i>	842	504	783	407	728	302	12	533	263	210	362	70	244	1	133	42	94	60

Note. F: Women; M: Men; W: hours spent online during the weekend; WE: hours spent online at weekends; SOM: Somatization; OC: Obsessive-Compulsive; SEN: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism; **p* < .05; ***p* < .01; ****p* < .001.

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