Cross-Cultural Research on Internet Addiction: A Systematic Review

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Abstract

Internet addiction (IA) is the most studied behavioral addiction. However, few studies have been conducted that simultaneously include several countries to attain an inter-cultural and international perspective on the phenomenon. The aim of this systematic review is to observe the characteristics of cross-cultural IA studies, in order to explore (i) their classification, (ii) the cultures involved, (iii) the IA issues treated, and (iv) the commonalities and differences among cultures. For this review the PsycINFO scientific database was selected to make searches without restrictions. Out of 23 documents, 8 were selected (34.8%), after applying two research paper selection phases with the following specific inclusion criteria: the paper needs to be (i) an empirical cross-cultural study, (ii) focused on IA or other related online excessive behaviors, and (iii) published in a journal. Between 2008 and 2015, the results show that from 2012 onwards until the present, there has been a continuing increase of papers, mostly cross-national intercontinental studies that usually research IA in its generalized subtype and estimate its prevalence with classic and valid scales, while only one study focuses on video gaming. The continents involved are usually Asia, America and Europe, and the commonalities show that the higher rates of IA exist in Asian countries, in male users who spend a lot of hours online. Differences among countries and risk factors have however also been detected and cultural factors are usually not analyzed. More cross-cultural research on IA and other potentially addictive technologies and online activities is needed, so that we may further explore cultural factors and achieve higher external validity of the findings.

Keywords

Internet addiction, Information and communication technologies, Cross-cultural research, Systematic review

Introduction

Since 1996, internet addiction (IA) has been the most studied behavioral addiction, and it is usually conceptualized as the excessive generalized usage of information and communication technologies (ICT) [1]. Nowadays, IA has gained a privileged status due to the last *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn (DSM-5) of the American Psychiatric Association (APA [2]). In this classification "Internet Gaming Disorder" (IGD) was included in the appendix (section III), in order to be studied for a potential future inclusion in the next DSM. Relating to this matter, Petry and colleagues [3] have recently published a highly debated paper [4],

which points out that one of the future research lines in the study of IGD is cross-cultural research.

Cross-cultural research uses information from different social groups in its attempt to obtain a general explanation of a phenomenon [5]. This type of research provides a comparison between different cultures by identifying patterns, as well as by looking for commonalities such as universally shared knowledge. Cross-cultural research has been classified along up to four dimensions, according to the following parameters: (i) geographical scope, (ii) type of data used, (iii) time of data collection, and (iv) the types of sample size [6]. One of the strengths of this type of research is that it aims for external validity, using the comparison for the purpose of generalizability. However, the researcher must be familiar with these societies, due to which it is not unusual to see several authors, at least one of each culture, participating in this type of scientific production.
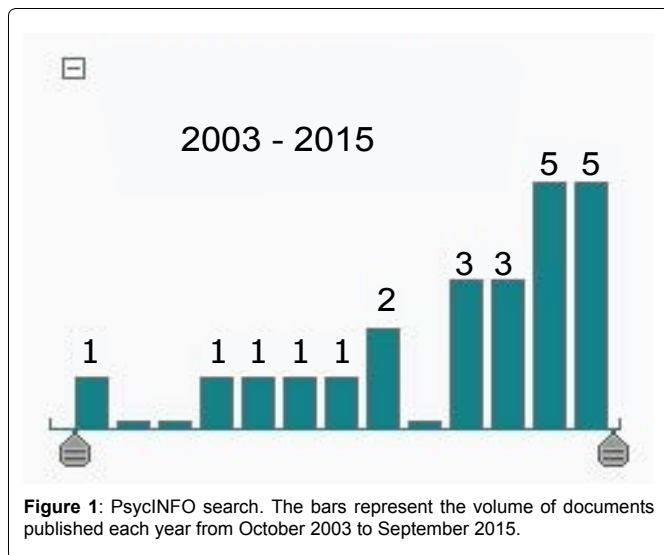
Previous reviews in IA [7,8] have stated that prevalence rates are problematic because they differ as a consequence of different assessment tools and cut-offs points. Similarly, the lack of a clear conceptualization of IA has produced the application of diverse assessment strategies with inconsistent diagnostic criteria. Cross-cultural research, however, could provide a solution for IA by introducing valid instruments with a common method to estimate prevalence. In this regard, this strategy could bridge part of the existing gap in the literature related to the assessment of IA-related problems through self-report measures, by adapting it to different cultures in order to estimate prevalence and other related measures (e.g., psychological constructs such as personality, impulsivity, etc.).

After two decades of research production in IA, only few cross-cultural studies have been conducted in this field relating to potential technology use disorders. This review intends to explore the existing cross-cultural research in order: (i) to extract the classification that is commonly used in this type of study, (ii) to see which cultures are usually compared, (iii) to learn which IA issues are studied, and (iv) to explore the commonalities and differences between peoples' excessive online behaviors.

Method

Search strategy

The literature review was performed by using the basic Proquest search option in the PsycINFO Database (search conducted in 2015 at the Catholic University of Louvain, Belgium). PsycINFO was

Figure 1: PsycINFO search. The bars represent the volume of documents published each year from October 2003 to September 2015.

selected because it is the most important scientific search engine in Psychology. The search equation was the following: [((internet addict*) or (problematic internet use) or (pathologic internet use)) AND cross-cultur* NOT drug*].

In the first phase, a total of 30 documents were retrieved: 23 were peer-reviewed results from scholarly journals (the rest were books) and the publication dates ranged from 2003 to 2015. From 2012 onwards, there has been an increasing tendency to publish these kinds of studies, due to which 69.57% of the results are relatively recent (Figure 1). Journal titles with more than one result were: *Addiction* (n = 3), *Computers in human behavior* (n = 2), *CyberPsychology & Behavior* (n = 2), and *Personality and Individual Differences* (n = 2), all of which have a relevant impact factor according to the *Journal Citation Reports*. The subjects identified by the database that produced more than two results were: cross-cultural differences (n = 18), IA (n = 10), psychometrics (n = 4), test validity (n = 4), test reliability (n = 3), college students (n = 3), and internet (n = 3). Similarly, the classification categories that produced more than two results were: *Behavior Disorders & Antisocial Behavior* (n = 8), *Substance Abuse & Addiction* (n = 4) and *Clinical Psychological Testing* (n = 3). In relation to methodology, 70% of the described studies were empirical (n = 16) with a preponderance of the quantitative approach (n = 13), and their samples were adults (n = 14) and adolescents (n = 8) from both genders equally. All the documents were in English.

In the second phase, a manual revision was conducted to select from the corpus of 23 documents those meeting the following three criteria: (i) they describe empirical cross-cultural research (i.e., comparing at least two cultures), (ii) they focus on IA (including other key words with a similar meaning; e.g., Problematic Internet Use (PIU) or other related online excessive behaviors (thus removing drugs)), and (iii) they are journal articles (thus removing books). As a result, 8 journal papers describing cross-cultural studies of technology use disorders were selected to be analyzed, constituting 34.8% of the initial sample.

Analytical strategy

An applied thematic (content) analysis was used [9] with the following pre-defined codes (or themes) system based on the research objectives: (i) a cross-cultural classification design study [5,6] including (i.a) the geographical scope (i.e., regions [R], countries [COUNT], and continents [CONT]), (i.b) the type of sources used as data (i.e., primary [P] vs. secondary [S]), (i.c) the type of data collection (i.e., synchronic [S] vs. diachronic [D]), and (i.d) the types of sample size (i.e., study case [SC], small [SS] or larger sample [LS] sizes); (ii) the cultures compared (name of the cultures, e.g., Europe vs. North-America); (iii) the IA issues investigated, and (iv) the commonalities and/or differences between cultures. However, flexibility was taken into account to have the freedom to collect other relevant information

not exactly matching the four categories, including the respective subcategories in the case of the first one (classifications), which presumably were exhaustive and mutually exclusive.

Preliminary Results

Characteristics of the cross-cultural studies and its classification

Table 1 summarizes the characteristics of the 8 studies selected with its objective, cross-cultural classification design. In this classification, the emergent data forced the creation of a subcategory inside the "(i.b) type of sources," adding a third code, mixed [M], which was a combination of primary and secondary data sources in the same study that would allow for the cross-cultural comparison, typical in diachronic designs (in which a previous part contains data from the present research, and the second part data from other previous research; or vice-versa). Also mentioned are sample size (including descriptive gender and age socio-demographics), the IA instrument (test) used and the main results (findings).

Almost all the studies were cross-national bridging different continents, due to which they were categorized as continentals [10,12,14,21,23,24]. The remaining studies compared countries on the same continent [16,18]. They all used primary sources collected by surveys using IA scales [14,15,17,18,21], synchronically in all cultures, except one. This exception [12] used mixed sources diachronically, in order to replicate a study previously conducted in Spain to validate a new videogame scale, so that throughout the paper their results could be compared with the original study conducted seven years ago [10]. Concerning sample sizes, almost all studies used small sample sizes (e.g. approximately 200 participants per country), and some had large samples sizes (consisting of approximately 1000 participants [16,24]). No cross-cultural studies were detected that had a geographical scope different from a country (i.e., regions in a same country with different cultures). Similar to the parameter of sources, the prevalent option was to use primary data collected by researchers. As Ember and Ember [5,6] highlight, almost all cross-cultural studies are synchronic. Additionally, no study cases with different sample sizes were detected, with the prevalent option being the small sample sizes of the groups studied.

Cultures compared

The compared cultures were usually located on different continents, and generally the comparison was between two continents, such as America and Asia (i.e., United States (US) vs. China [10], US vs. Taiwan [24], US vs. United Arab Emirate (UAE) [22]) or America and Europe (i.e., US vs. Spain [12], US vs. Germany [14]), or exceptionally more than two (i.e. America, Asia and Europe [21]). Other studies compared cultures co-existing within the same country with different strategies, such as a multi-group comparison (i.e., Durkee et al. [16] with European countries such as Austria, Estonia, France, Germany, Hungary, Ireland, Israel, Italy, Romania, Slovenia, Spain and Sweden) or made a two-group comparison (i.e. Japan vs. China [17]), which is the simplest form of comparing cultures in an explorative way).

IA issues

The most studied issue was IA in its generalized subtype, using the classical international instruments to estimate its prevalence such as the *Young Diagnostic Questionnaire (YDQ)* [17], the *Internet Addiction Test* (IAT) [19,20], and the *Compulsive Internet Use Scale* (CIUS) [15], among other ad-hoc items related to this type of technological addiction. Only one study focused on video gaming, using the *Problem Video game Playing (PVP) Questionnaire* [13].

Commonalities vs. differences

In general, studies of Eastern populations found more IA than the Western ones (e.g., in China there were 14% heavy Internet addicted students vs. 4% in their US counterparts, noting that the Chinese study related the hours online as well as the frequency to connect to

Table 1: Cross-cultural studies reviewed: characteristics and classification.

Study	Aims	Classification	Sample	IA Instrument	Results
Zhang, et al. [10]	To explore IA among university students in China and the US to develop a better understanding of IA in a cross-national setting.	CONT/P/S/SS	N = 340 university students; n_{US} = 171, $n_{Chinese}$ = 143; US: 51% females, mean age 22 ± 3.43; Chinese: 60% females, mean age 20 ± 1.34.	Ad-hoc questionnaire: demographic information, 10 IA symptoms, and a 28-item instrument measuring IA (Wang, [11])	Chinese students experience a higher rate of Internet addiction than their US counterparts. Gender was significantly related to IA for both samples. IA may result as an artifact of the stage of Internet adoption within a society.
Hart, et al. [12]	To compared a sample of American adolescents with a Spanish sample on a measure of video game addiction.	CONT/M/D/SS	N = 790 $n_{adolescent}$ = 204; female/male: 15%/85%, range age: 14-18; $n_{college\ students}$ = 262, female/male: 77%/23%, range age: 18-23; n_{adults} = 324; female/male: 63%/17%; range age: 23-55.	Ad-hoc scale: Computer/Video Game Behavior Inventory (CVGBI) embedding the Problem Video Game Playing (PVP; Salguero & Morán, [13])	It is supported the PVP and a similarity between the Spanish and American samples but not for relationships between the PVP and assessments of distress in areas of daily functioning.
Karl, et al. [14]	To examine culture and personality differences in student reports of the likelihood that they would post various types of information on their Facebook profiles.	CONT/P/S/SS	N = 1116 adults; female/male: 782/334; mean age in US: 20.5, and in Germany: 21.5	Compulsive Internet Use Scale (CIUS, 2010; Meerkerk, van den Eijnden, Franken & Garretsen, [15])	Those high on conscientiousness, agreeableness, and emotional stability proved less likely to report posting problematic contenton their profile. Those who scored high on CIUS indicated a greater likelihood to post such profile information. US students were more inclined than Germans to post problematic information to their Facebook site.
Durkee, et al. [16]	To investigate the prevalence of pathological internet use (PIU) and maladaptive internet use (MIU) among adolescents in 11 European countries in relation to demographic, social factors and internet accessibility.	COUNT/P/S/LS	N = 11956 adolescents; female/male: 6731/5225; mean age: 14.9 ± 0.89	Young Diagnostic Questionnaire for Internet Addiction (YDQ; Young [17])	The overall prevalence of PIU was 4.4%; it was higher among males than females and differed between countries. PIU correlated significantly with mean hour's online, male gender and living in urban areas. Lacking emotional and psychological support are at highest risk.
Yang, et al. [18]	To compare risk factors for PIU among Japanese and Chinese university students	COUNT/P/S/SS	N = 503 first year university students: $n_{Japanese}$ = 267, $n_{Chinese}$ = 236; female/male: 151/352, Japanese: 176/91 and Chinese 176/60; mean age: 14.9 ± 0.89, Japanese mean age 18.8 (17-24) and Chinese 19.4 (17-22)	Internet Addiction Test (IAT; Young, [19,20])	Japanese participants were more likely to demonstrate PIU than their Chinese counterparts. The PIU group had a higher depression score compared to the normal Internet use group, consisted of more male and Japanese participants. PIU is associated with depression, negative self-image, and parental relations (perceived mother's care).
Sariyska, et al. [21]	To replicate a cross-cultural approach on negative association between IA and the personality trait of self-directedness in Bulgaria, Germany, Spain, Colombia, China, Taiwan and Sweden and as well the finding that persons with a damaged self-esteem have a higher proclivity for becoming Internet addicted in Bulgaria, Spain, Germany and Colombia.	CONT/P/S/SS	N = 989 adults; $n_{Bulgaria}$ = 163, female/male: 126/37, meanage: 28.27 ± 12.11; n_{Spain} = 126, female/male: 126/104, meanage: 23.59 ± 6.59; $n_{Germany}$ = 122, female/male: 91/31, meanage: 23.08 ± 5.66; $n_{Colombia}$ = female/male: 64/16, meanage: 29.64 ± 10.97; $n_{China\ 1}$ = 344, female/male: 60/284, meanage: 19.92 ± 3.8; n_{China2} = 51, female/male: 28/23, meanage: 24.98 ± 2.94; n_{Taiwan} = 60, female/male: 37/23, meanage: 31.88 ± 9.06; n_{Sweden} = 43, female/male: 21/22, meanage: 24.86 ± 5.66.	IAT (Young [20])	Personality dimension self-directedness was negatively correlated to the IA score of the participants in all samples. In contrast, no interaction effect between implicit and explicit self-esteem on IA could be observed
Quinones – García, et al. [22]	To confirm that prevalence figures including the core dimensions of compulsive Internet use (CIU) were lower than those including the engagement dimensions as well. To test the role that self-concept clarity (SCC) and social support play in predicting core CIU in US subjects. To show the association between SCC and core CIU would be weak in the Eastern culture sample (UAE).	CONT/P/S/SS	N = 538 adults, female/male: 281/257; n_{US} = 268, female/male: 134/134, mean age: 45 ± 2.3; n_{UAE} = 270, female/male: 147/123, mean age: 41 ± 9.3.	CIUS (Meerkerk et al. [15]), including 2 tolerance items (created by Quiñones-García, et al. [23])	It is confirmed that prevalence figures were 20 - 40% lower when including the core dimensions only, and that SCC is a key predictor of CIU at low levels of social support in the US. Also was confirmed that this is not the case in the UAE.

| Kononova, et al. [24] | To explore how media and audience factors, such as country of residence, media ownership, polychronicity, or the preference to do multiple things at the same time, predict media multitasking behaviors and if different motivations to multitask mediate the effects of these factors between US and Taiwan | CONT/P/S/LS | N = 1972 from the US and Taiwan; n_{US} = 1040, female/male: 44%/47%, mean age: 35 ± 10.30; n_{Taiwan} = 932, female/male: 147/123, mean age: 41 ± 9.3. | Eighteen statements were derived from previous literature (Bardhi et al. [25]) to measure five motivations: control, efficiency, entertainment, connection, and addiction. | The findings indicated that media ownership, polychronicity, and four motivations (control, entertainment, connection, and addiction) positively predicted media multitasking behaviors. US were higher polychronics and heavier multitaskers than their Taiwanese counterparts. Taiwanese polychronicity and motivations increased the effects of media ownership on media multitasking, while in US, polychronicity contributed little to the effect of media ownership, and the mediating role of motivations decreased with the increase in the level of polychronicity |

IA, while in the American study only the hours counted [10]). If we include intra-continental Eastern cross-cultural studies, higher rates of IA can be observed that show significant differences (e.g., 18.4% in Japanese studies vs. 10.2% in Chinese studies [18]).

In the Western continents, such as Europe, 4% of adolescent internet users have been found to be problematic [16], which is associated with males, and also with hours online [21]. However, on this continent differences in relation to IA exist between countries. In Estonia and Slovenia and above all Israel (which was included in this European study) IA rates are higher, all of which are countries that are located near to the Asian continent. This evidence is also showed by inter-continental cross-cultural studies, in which China and Taiwan (together with Germany) are the countries with a higher prevalence of IA.

Furthermore, in the Eastern adult samples, a recent study [22] has shown that the UAE held significantly higher collectivist values than a US sample, but they continue to obtain higher IA measures. However, it should be pointed out that we still know less about the vulnerabilities in the Eastern or highly collectivistic cultures, and these factors should be investigated in relation to IA.

Discussion

The analyzed cross-cultural studies in IA date from 2008 until the present, which is less than a decade. The classification most commonly used in this type of studies was extracted: usually they are continental and trans-national, they have primary data as sources, they are synchronous through cross-sectional studies, and they have little sample sizes per cultural group studied.

The cultures most frequently compared usually involve three continents (ordered by higher to lower frequency): Asia, America and Europe. It is possible that this interest is due to the higher prevalence rates in Asian countries, and it is remarkable that no studies have been conducted (or published) in Oceania or Africa, which are continents that have a high IT usage as well. However, a large multi-national study conducted in Europe confirms approximately 4% of IA in adolescents with the YDQ, finding differences among the 11 EU countries [16]. However, a similar study conducted in Europe by Tsitsika and colleagues (i.e., COUNT/P/S/LS [26]) only found approximately 1% of adolescents with IA in seven countries (i.e., Greece, Spain, Poland, Germany, Romania, the Netherlands, and Iceland [26]) with the IAT with variation among countries. Another recent cross-cultural study that involved 25 European countries and used an ad-hoc measure, found an average of 2.6% of excessive internet use (EIU [27]), with differences among countries as well (e.g., high EIU in subjects with communication difficulties in Bulgaria and the lowest for risky online behavior in Italy). Therefore, the problem detected in the epidemiologic IA studies is observed once again, with different prevalence rates due to different tools [7]. However, it seems that the prevalence estimated in cross-cultural studies is lower than in the non-cross-cultural studies, with a narrow rate of IA (i.e., from 1 to 4.4%). Considering the capacity of generalization of these studies, it is feasible to consider these data more externally valid, due to the fact of usually replicate simultaneously (or diachronically) the same research strategy in different contexts in order to obtain probably similar findings (i.e., ecological validity).

Another aspect of this study is the nature of the IA issues discussed in the current cross-cultural studies. It is clear that all focus on generalized IA, except one which focuses on video gaming [12]. A few other studies have however also been conducted in an attempt to approach the recent phenomenon of the IGD [28]. With the advent of IGD and proposals such as the one made by Petry and colleagues [3], it is quite probable that soon a cross-cultural study will appear that focuses on this new phenomenon. However, it would also be interesting to learn from other cross-cultural research studies of other technological addictions, such as problematic mobile phone use, or other excessive online behaviors (e.g., such as cybersex, online gambling, etc.).

In relation to the commonalities in cross-cultural researches it seems that usually the most common strategy is the comparison of nations through classical IA tools, such as Young [17,20] scales, in order to estimate the phenomenon's prevalence (e.g., Eastern vs. Western countries, with the first ones always having higher rates of IA, in males and in those who spend a lot of hours online). However, the most differences have been detected in the prevalence estimated in intra-continental countries in combination with some detected risk factors (e.g., hours or frequency online), but almost no cultural factors have been studied (e.g., only one cross-cultural research addressed this explicitly [22]).

More cross-cultural research is needed in IA as generalized and specialized subtypes, per technology, per online activity or behavior that could include addictive components, addressing protective and risks factors, as well as cultural factors. It would especially be interesting to have more descriptive studies conducted in the countries and continents that remain under-represented until the present (e.g., Oceania), as well as relational studies (e.g., associating psychological mechanisms with online excessive usages, or predicting potential IA). A larger challenge could be provided by the replication of causal experiments in different cultures, as well as in-depth qualitative investigations into the phenomenology of these potentially addictive behaviors cross-culturally. The results of this challenging research may provide internal and external validity, as well as a holistic scenario concerning the extent and nature of this complex phenomenon: the potential technological behavioral addictions from a world-wide approach.

Acknowledgments

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