



## Frequency is not enough: Patterns of use associated with risk of Internet addiction in Portuguese adolescents



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### ABSTRACT

This paper reports an exploratory analysis of the relation between Internet addiction and patterns of use among Portuguese adolescents ( $n = 2617$ ) from the WHO 2010 Health Behavior in School-aged children study, with a short version of Young's Internet Addiction Test (the brief Internet Addiction Questionnaire – bIAQ) and self-reports on online behaviors and access. Two-Step Cluster analysis identified two clusters of users based on their usage pattern: a minority of high-frequency users, with higher bIAQ scores, and a majority of low-frequency users, with lower bIAQ scores. Low and high-frequency users are particularly distinct in specific activities, which converges with previous research showing addiction to specific Internet activities rather than to the Internet as a whole.

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## 1. Introduction

The flip side of the growing ubiquity of the Internet in people's lives over the past couple of decades is the emergence of behavioral patterns suggesting psychological dependency on the Internet, often called Internet addiction (IA; Chen, Weng, Su, Wu, Yang, 2003; Gámez-Guadix, 2014; Griffiths, 1996; Koronczai et al., 2011; Young, 1998; for reviews, see Douglas et al., 2008; and Kuss, Griffiths, Karila, & Billieux, 2014). Whether these patterns can be actually classified as an addiction is still a matter of debate. Indeed, they are often referred to as, e.g., compulsive computer use (Black, Belsare, & Schlosser, 1999) or compulsive Internet use (Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009), pathological Internet use (Morahan-Martin & Schumacher, 2000), and problematic Internet use (Caplan, 2002; Yellowlees & Marks, 2007). Indeed, some argue that rather than treating excessive Internet use as a specific addiction to be diagnosed, research should focus on identifying personal and contextual factors that lead to excessive

use of the Internet as a behavioral syndrome (Van Rooij & Prause, 2014). Furthermore, in some views, Internet-focused addictive behavior is specific to certain behaviors for which the Internet is merely an accessible medium (Davis, 2001), such as gaming (Griffiths, Kuss, & King, 2012; Liu & Peng, 2009), and porn (Young, 2008). Here we present a study that explores the relation between patterns of specific forms of Internet use and Internet-related addictive symptoms among Portuguese adolescents.

### 1.1. Internet addiction

Three models of Internet addiction have been particularly influential (Van Rooij & Prause, 2014): Griffiths (2005) components model, Young's Internet Addiction Test (1998), and Tao and colleagues' diagnostic criteria for Internet addiction (Tao et al., 2010). These three models have a lot in common, mostly because they are all based on models of other behavioral addictions not involving substance use, such as the gambling addiction criteria included in the DSM-IV: salience (thinking about the activity); negative mood management, tolerance (need to increase use just to maintain pleasure), withdrawal (e.g. irritability and negative mood associated to lack of use), negative impact on other (in particular social) activities, relapse and lack of control over Internet activity. The IAT

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and diagnostic criteria models also include craving, and the IAT further includes lying about the activity, as aspects of Internet addiction. Another model also includes a refusal to admit that a problem exists (Alavi et al., 2012), but this is problematic to measure, as it assumes that a problem *does indeed* exist.

Conversely, many of the patterns of Internet addiction do not seem particularly focused on the Internet alone, but are correlated with other mental disorders, such as depressive individual factors. Accordingly, some researchers prefer to define IA as an emergent behavioral disorder, which can be associated with a variety of other psychiatric disorders, rather than a specifically distinct addiction (e.g. Van Rooij & Prause, 2014). IA has been associated with substance abuse (Yen, Ko, Yen, Chen, & Chen, 2009); to attention-deficit, but not hyperactivity, disorder (Yılmaz, Hergüner, Bilgiç, & Işık, 2015); and to depression, hostility, and social anxiety disorder (Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013; Lee & Stapinski, 2012; Lim et al., 2015). The relationship between IA and depression has also found to be mediated by negative life events (Yang et al., 2014). All this suggests that IA is a symptom of more general problems rather than simply an effect, and that treatment of other psychological and psychiatric disorders offers some buffer against IA (Ko, Yen, Yen, Chen, & Chen, 2012).

Like other forms of dependencies, whether substance-related or not, dependencies on Internet-based activities are related to the pursuit of gratification. People seek go online seeking virtual community, information, thrills, aesthetic experience, monetary compensation, diversion, personal status and relationship maintenance (Song, LaRose, Eastin, & Lin, 2004). The pursuit of all these forms of gratification online, where they are reachable literally at one's fingertips, can thus easily lead to loss of control over Internet use. However, the specific purpose for which the Internet is used can also related to the probability of showing symptoms of dependence. A study in Lebanon found that the higher the self-reported risk of addiction, the less the Internet was accessed for information and research, and the more it was used for entertainment (Hawi, 2012).

In sum, a diversity of uses of the Internet can lead to risk of overuse and addictive symptoms, which some researchers define as an addiction, and others as an emergent behavioral disorder not particularly focused either on Internet use as such, but which finds an outlet in Internet-based activities. However, what is not yet well known is which Internet-based activities and patterns of use are more associated with the symptoms of addiction that are defined by some researchers as 'Internet addiction'.

## 1.2. Study overview

The current study explores the association between Portuguese adolescents' Internet use and their risk of developing Internet addiction. Early studies targeted undergraduates because at the time Internet access was most prevalent on campuses; however, the currently ubiquity of access makes adolescents the most vulnerable group (Ha et al., 2007). Our main goals were to uncover specific patterns of adolescent Internet use, on the one hand, and their association to Internet addiction, on the other hand. The data were collected as part of a larger 2010 survey study on young people's health behaviors (see Section 2), and included the brief Internet Addiction Questionnaire (bIAQ), a short measure of Internet addiction that we developed based on Young's (1998) Internet Addiction Test, as well as a small number of self-report measures of Internet behaviors. We first analyzed the reliability of the bIAQ measure, and next its association with patterns of Internet use (services and place of access), via cluster analysis. Finally, we analyzed the usefulness of the bIAQ in distinguishing between different types of Internet users. This approach allows us

to explore the interrelations of the diverse aspects of Internet addiction and behaviors, with the underlying goal of revealing the behavioral patterns that may underlie Internet addiction.

## 2. Methods

### 2.1. Participants and procedure

2617 secondary school students from the 2010 wave of the Portuguese Health Behaviour in School-aged Children (HBSC) survey (Matos et al., 2011) participated in this specific study, in which were introduced 9 items measuring Internet addiction and 8 items on frequency of different types of Internet use. The HBSC is a large cross-national collaborative study of the World Health Organization (WHO) Regional Office for Europe (for a description of the program, see Currie, Roberts, Morgan, & Smith, 2004). The survey runs once every four years in more than 40 different countries, and in Portugal it has been conducted since 1998. The Internet-related measures were developed and used for the Portuguese study only. Schools and classrooms were randomly selected from the official national list, stratified by the 5 Educational regions. The Portuguese sub-sample for the 2010 edition in which Internet items were introduced included students from the 8th ( $n = 1217$ ; 46.5%) and 10th grade ( $n = 1400$ ; 53.5%), ranging in age from 12 to 17yrs ( $Mage = 15yrs$ ;  $SDage = 1.12yrs$ ;  $female n = 1442$ , 55.1%), and is representative of Portuguese 8th and 10th grade students attending state-run schools. The survey was administered during the month of January 2010 in classrooms, during class time, by teachers who had received appropriate training. All head-teachers gave their consent, and written informed consent was previously obtained from both the students and their parents/legal guardians. No refusal was registered. The study was approved by a national ethics committee.

### 2.2. Measures

#### 2.2.1. Brief Internet Addiction Questionnaire

In order to understand the relation of IA both to behaviors and to other mental disorders, diverse screening instruments have been developed. The most widely used is Young's Internet Addiction Test (IAT; Young, 1998). It is based on the DSM-IV's criteria for pathological gambling, and consists of 20 questions on characteristic addictive behaviors, adapted to Internet use. Although three studies of the internal consistency of the IAT have identified more than one factor – either six factors (Widyanto & McMurrin, 2004) or three (Chang & Law, 2008; Widyanto, Griffiths, & Brunnsden, 2011) – most studies have found the IAT to have a good internal reliability as a single-dimension measure of Internet addiction (Jelenchick, Becker, & Moreno, 2012; Khazaal et al., 2008; Korkeila, Kaarlas, Jaaskelainen, Vahlberg, & Taiminen, 2010; Milani, Osualdella, & Di Blasio, 2009), including in Portugal (Pontes, Patrão, & Griffiths, 2014).

To construct the bIAQ scale, we included eight items from Young's Internet Addiction Test (IAT, Young, 1998). We also added one item tapping use of digital media to solve interpersonal problems in order to evade the anxiety of face-to-face encounters (Lee & Stapinski, 2012). We call this bIAQ scale a 'questionnaire' rather than 'test' because its purpose is for use in large-scale questionnaires rather than as a clinical diagnostic tool. Participants were asked to report the extent (1 – rarely; 2 – occasionally; 3 – frequently; 4 – often; 5 – always) to which they felt or behaved in certain ways due to their use of the Internet (see Table 1). We excluded 12 items from the IAT, either for lack of facial validity or for lack of applicability to teenagers, and others due to redundancy with items with better facial validity. In Table 2 we present the logic of exclusion of each of these items. Note that two of the excluded items have meanwhile been found to have low correlations with

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