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Problematic internet use among older adolescents: A conceptual framework

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ABSTRACT

Problematic internet use (PIU) is of growing significance to adolescent health, but lacks a strong conceptual framework to guide ongoing work. We used Concept Mapping methodology to construct a theoretical framework describing PIU. This validated approach includes five steps: preparation, generation (brainstorming), structuring (sort and rank), representation (statistical analysis) and interpretation (focus groups). Analysis included hierarchical cluster analysis over the overall square similarity matrix to determine a cluster map. A total of 193 college students participated in one or more phases of the study. Students were from 13 universities across 10 states, had an average age of 19.4 years (SD = 1.8), were 67% female and 77% Caucasian. A total of 20 health professionals participated. The seven clusters depicted on the PIU Concept Map include: psychosocial risk factors, physical impairment, emotional impairment, social/functional impairment, risky internet use, impulsive internet use and internet use dependence. The stress value for the fit of the multidimensional solution to the structuring data was 0.28, indicating adequate fit. The concept map may be used towards development of a future comprehensive model of PIU as well as scale development efforts.

1. Introduction

Internet use has grown considerably in the last decade; the majority of young adults use the internet daily if not more so (Lenhart & Madden, 2007; Lenhart, Madden, & Hitlin, 2005; Sun et al., 2005). Young adults have been dubbed the "digital generation" or "digital natives" given that they have grown up with access to computers and the internet from an early age (McMullen, 2012). Given the significant role that internet use plays in the lives of today's young adults, understanding possible health implications is of clinical importance. In particular, problematic internet use (PIU) is a new and growing health concern for adolescents and young adults. PIU lacks a standardized definition, but it has also been referred to as internet addiction (Christakis & Moreno, 2009; Dell'Osso, Altamura, Allen, Marazziti, & Hollander, 2006). Several studies in the US and internationally, and numerous anecdotal reports, suggest links between internet overuse and negative mental and physical health consequences. These potential health consequences include attention-deficit-hyperactivity disorder, depression, excessive daytime sleepiness, as well problematic alcohol use and injury (Choi et al., 2009; Ko, Yen, Chen, Yeh, & Yen, 2009; Ko et al., 2008; Lam, Peng, Mai, & Jing, 2009; Yoo et al., 2004). Internet addiction has also been linked to negative academic consequences such as missed classes, lower grades and academic dismissal (Chen & Tzeng, 2010; Kubey, Lavin, & Barrows, 2001; Young, 1999). Internet addiction is currently proposed as a "disorder in need of further study" for the Diagnostic and Statistical Manual V (DSM-V) (Holden, 2010).

1.1. Previous approaches to PIU

A recent systematic review of PIU identified a lack of standardization of the conceptualization of PIU as a major impediment to advancing this area of study (Moreno, Jelenchick, Cox, Young, & Christakis, 2011). These inconsistencies may be related to the variety of approaches towards the study of PIU over the years. Two early approaches to PIU were based upon existing DSM-IV disorders: substance abuse/dependency and pathologic gambling (Young, 1996; Young, 1998). Three additional approaches were more conceptually focused; the first described PIU as a general behavioral addiction (Grant, Potenza, Weinstein, & Gorelick, 2010; Griffiths, 1999). A second model focused attention on the impact of an individual's thoughts on their development of prob-

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lematic behaviors (Davis, 2001). Third, a model proposed that PIU should be more widely classified as an impulse control disorder (Shapira et al., 2003). These differences in the conceptual approach towards PIU have influenced the various instruments that have been developed to evaluate PIU.

At present, there are at least 13 instruments designed to measure PIU, most of which lack validation. Several were adapted from the DSM-IV substance abuse and dependency criteria, such as the Internet Addiction Disorder Diagnostic Criteria (Goldberg, 1995) and the Internet-Related Addictive Behavior Inventory (Chang & Law, 2008). Others are based on the DSM-IV criteria for pathological gambling, including the Young Diagnostic Questionnaire (Young, 1998) and Young Internet Addiction Test (IAT) (Young, 1998) (the latter being an expansion of the former), the Chen Internet Addiction Scale, (Chen, Weng, Su, Wu, & Yang, 2003) and the Problematic Internet Usage Questionnaire (Jia & Jia, 2009).

1.2. Internet use as a problem: names and concepts

As described above, there are several terms and many approaches involved in conceptualizing problems with internet use. While the terms *PIU* and *internet addiction* and *internet overuse* have been used somewhat interchangeably, it is important to recognize that they may represent very different concepts. Internet addiction, with its roots in DSM criteria for other addictive behaviors represents addiction, in this case to the internet (Young, 1998, 1999). This term calls to mind concepts such as loss of control while on the internet and feelings of withdrawal when away from the internet that are typically associated with addiction (Villella et al., 2010; Young, 1996). As with other addictions, this term and the previous work related to it centers the problem on overuse of the internet leading to addiction (Ni, Yan, Chen, & Liu, 2009). The term internet overuse complements this concept by introducing a path by which one may acquire internet addiction. The broader term of problematic internet use may provide room for additional concepts beyond addiction, such as internet use that interferes with offline socialization. As internet use grows ever more woven into the fabric of our everyday lives, new concepts may be introduced into this broader notion of problematic internet use. Thus, we will apply this more comprehensive term of PIU for the focus of this study.

1.3. Prevalence estimates of PIU

Given the number of assessment instruments, it may not be surprising that prevalence estimates of PIU vary widely. In studies focused on adolescents, European prevalence estimates are reported as between 1% and 9%, (Gwaltney, Bartolomei, Colby, & Kahler, 2008; Kaltiala-Heino, Lintonen, & Rimpela, 2004; Pallanti, Bernardi, & Quercioli, 2006; Siomos, Dafouli, Braimiotis, Mouzas, & Angelopoulos, 2008; Villella et al., 2010). Middle Eastern prevalence estimates are between 1% and 12% (Canan, Ataoglu, Nichols, Yildirim, & Ozturk, 2009; Canbaz, Sunter, Peksen, & Canbaz, 2009; Ghassemzadeh, Shahraray, & Moradi, 2008) and Asian prevalence estimates are reported between 2% and 18% (Cao & Su, 2007; Deng, Hu, Hu, Wang, & Sun, 2007; Ko, Yen, Yen, Lin, & Yang, 2007; Park, Kim, & Cho, 2008; Song, Zheng, Li, Yu, & Wang, 2010; Wang, Wang, & Fu, 2008; Wu, Lin, & Lin, 2007; Xu et al., 2008). Similarly, the prevalence for international college students has been reported as between 6% and 35% (Frangos & Sotiropoulos, 2010; Ni et al., 2009; Salvy et al., 2008; Whalen et al., 2008). It is unclear whether the wide range of prevalence estimates reported is related to cultural differences between regions or countries, or due to different approaches in the definition and assessment of PIU. Over half of the studies reporting prevalence estimates were conducted over 5 years ago during a time where wide-scale internet use was still varied and growing. Immense changes in both internet access and use have occurred over the last decade which may also have influenced the varying prevalence estimates over time (Lenhart, Purcell, Smith, & Zickhur, 2010).

1.4. Identifying the population at risk

While the digital generation may have advantages over older adults given their early development of internet skills and experiences, young adults also may be the population most at risk for the development of PIU. Adolescents and young adults have the highest rates of internet use and frequency (Lenhart et al., 2005; Shiffman, 2009; Tokunaga, 2010). If internet use has potential to lead to addiction, this means that up to 93% of US adolescents and young adults are exposed to this risk. This exposure is far above exposure rates for any other behavioral or substance-based addiction (Lenhart et al., 2010).

1.5. A critical gap

At present, disagreement exists on whether PIU is consistent with a behavioral or substance-related addiction, whether it represents a completely novel condition, or whether it exists at all. Prior work has greatly advanced our understanding of PIU over the past few decades as the role of the internet in our daily lives has evolved. However, previous work has largely assumed that clinical guidelines and screening for PIU can be directly adapted from existing models for other conditions. Many study and clinical approaches to date have approached PIU only as related to another disorder, such as problematic gambling. In doing so, this disorder has been consistently framed as an offshoot of an existing disorder, rather than being investigated as an independent entity with possible unique components. Further, to the best of our knowledge, there have been no studies that use primary data towards a conceptual framework of PIU.

The perspective of PIU from the viewpoint of an at-risk population who has grown up in this digital age, young adults, remains a gap in our understanding. Thus, our research question for this study was to determine young adults', as well as young adult healthcare providers', perceptions of what comprises PIU. The goal of the study was to create a concept map based on those findings that could be used towards ongoing assessment and intervention strategies.

1.6. Study approach

To fulfill this purpose, we applied concept mapping. This methodology provides a standardized approach to the development of conceptual frameworks to describe complex topics (Trochim, 1989a, 1989b; Trochim, Cook, & Setze, 1994; Trochim & Kane, 2005). The concept mapping approach is ideally suited to data collection from more than one group of stakeholders relevant to the concept under investigation. Combining data from participant groups is intended to maximize the conceptual framework's depth and representativeness. The outcome of this process is a concept map, a pictorial representation of the key concepts and the relationships between them. This process grounds findings in the language of the participants and provides a visual product that can be interpreted. This method has been used in public health research to provide insights into complex phenomenon such as adolescent sexual behavior and mental illness (Bayer, Cabrera, Gilman, Hindin, & Tsui, 2010; Burke et al., 2005; Shern, Trochim, & Lacomb, 1995; Trochim et al., 1994).