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Motivational components of tolerance in Internet gaming disorder

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ABSTRACT

Tolerance in DSM-5 Internet gaming disorder (IGD) refers to a need for increasing time spent in gaming activities. However, the focus on 'time' has been criticized for being a superficial imitation of tolerance in substance-based addiction. Gaming tolerance may require a broader conceptualization of its motivational and cognitive features. The present study aimed to investigate tolerance-like processes in gaming and their association with IGD symptoms. An online survey that included a 20-item measure of gaming-related tolerance was administered to 630 adult gamers, including 4.0% who screened positively for IGD. Exploratory factor analysis indicated that a three-factor model for the tolerance items provided the best fit. These factors were: (1) *Wealth*, the need to accumulate in-game rewards of increasing rarity, novelty, or quantity; (2) *Achievement*, the need to pursue goal-driven activities of increasing complexity, difficulty, or uniqueness; and (3) *Inadequacy*, the need to rectify perceived insufficiencies in gaming capability or progress. A hierarchical regression analysis indicated that Inadequacy was modestly but significantly related to other IGD symptoms, after controlling for age, gender, and time spent gaming. These findings support the notion that problematic gaming may be motivated by the need for completion of increasingly more intricate, time-consuming, or difficult goals to achieve satisfaction and the need to rectify perceived inadequacies related to gaming.

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1. Introduction

Excessive and disordered gaming are recognized as topics of relevance to clinical psychology due to their negative impact on psychosocial functioning (Ng & Wiemer-Hastings, 2005; Petry et al., 2014a; van Rooij, Schoenmakers, Vermulst, Van Den Eijnden, & Van De Mheen, 2011; Weinstein & Lejowey, 2010), as well as their association with other mental disorders (Ferguson, Coulson, & Barnett, 2011; King, Delfabbro, Zwaans, & Kaptsis, 2013). In the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), Internet gaming disorder (IGD) is a condition for further study (i.e., not yet a legitimate diagnosis) that refers to persistent and recurrent gaming associated with clinical impairment or distress (American Psychiatric Association, 2013), with a set of criteria similar to other addictions, including gambling disorder. The beta draft International Classification of Diseases-11 (ICD-11) also recognizes 'Gaming disorder' as a type of addictive disorder, as characterized by persistent or recurrent gaming behavior. To support growing efforts to conceptualize gaming disorder as a subtype

of behavioral addiction (Kardefelt-Winther et al., 2017; Petry et al., 2016), it is now essential for researchers and clinicians to understand clearly the core motivations that initiate and maintain problematic gaming behaviors, including acts of repetitive and sustained playing of games, the planning of future gaming activities and prioritization of gaming over other responsibilities, and gaming-related obsessions and thinking styles.

Included within the proposed DSM-5 criteria is an explicit definition of tolerance to gaming which refers to a need to engage in an increasing amount of time spent gaming. However, it is evident that applying the concept of tolerance to a complex activity like gaming may be problematic because a lot still remains unknown about the range of stimuli and factors that maintain gaming activity and their effects on gamers. Neuroimaging studies of craving for gaming, for example, are only just beginning to understand the brain-related changes associated with gaming addiction (Dong, Wang, Du, & Potenza, 2017; Kim et al., 2011; Han et al., 2011). Gaming is an activity that can require a lot of time of players in its more advanced forms, and certain games (e.g., Massively Multiplayer Online [MMO] games) are designed to require increasingly more time and effort from players seeking to make consistent progress. This changing time requirement can therefore create an impression of 'tolerance' among enthusiastic

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but otherwise non-problematic players. Additionally, there would appear to be a physical limit beyond which it is difficult for a player to increase their gaming time, and therefore chronic problem gamers (i.e., those playing at very high levels for many years) may report that they no longer feel a need to 'increase' their gaming time. The DSM-5 proposes that individuals with IGD typically devote 8–10 h per day and at least 30 h per week to gaming activities but these observations do not explain what players may actually seek when gaming. Accordingly, some researchers have criticized the concept of gaming-related tolerance for lacking insight into the notion of 'gaming dose' and therefore being a superficial imitation of its counterpart in substance-based addictions (Blaszczynski, 2006; Charlton & Danforth, 2007; Starcevic, 2016). There is a need to define the basic characteristics of the tolerance relationship that develops between player and gaming stimuli in cases of disordered gaming, in order to provide a more adequate account of the psychological processes central to gaming as a behavioral addiction (Starcevic, 2016).

1.1. Tolerance in addiction

Tolerance and withdrawal are important concepts in addiction theory that help explain the addictive cycle of drug-using and other repetitive behaviors (Mendelson, Sholar, Mello, Teoh, & Sholar, 1998). For example, the drive to reduce aversive withdrawal states forms the basis for dependence in negative reinforcement models of addiction (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004). However, as West (2008) highlights, it is debateable how strong a feeling of desire must be to count as craving, just as it might be arbitrary to classify a diminishing feeling or need for an increasing dose as tolerance. The DSM-5 notes that the thresholds for tolerance differ across cultures, social settings, and families (APA, 2013). The presence of withdrawal symptoms (e.g., nausea, craving, irritability) also differs across addictive disorders (Hughes, Higgins, & Bickel, 1994). Nevertheless, withdrawal and tolerance are considered important features of behavioral addictions, but few empirical studies have observed these processes in action, particularly in relation to gaming. The DSM-5 states gaming tolerance is "the need to spend an increasing amount of time engaged in Internet games" (APA, 2013, p.795). Although this definition has appeal due to its simplicity and objectivity, it may not always be valid to equate time with *dosage*, in that this variable alone may fail to capture many other factors that motivate and maintain excessive behavior. It may also lead some researchers to the false conclusion that any individual who desires an increasing amount of gaming time is developing a 'tolerance' to gaming.

A central limitation of the DSM-5 concept of gaming tolerance is the lack of detail on what problematic gamers actually seek from games when they play. An alcoholic does not primarily seek increasing time spent in a bar, nor does a gambler seek increasing time spent in a casino; increasing time in these examples is by-product of a need to consume alcohol or place bets. An extensive literature on the motives for gaming provides some helpful reference points for potential indicators of healthy and problematic gaming (Chin-Sheng & Chiou, 2007; Dauriat et al., 2011; Hoffman & Nadelson, 2010; Puerta-Cortés, Panova, Carbonell, & Chamorro, 2017; Seok & DaCosta, 2014; Wan & Chiou, 2006), which may guide researchers in refining the concept of gaming tolerance. Self-determination theory, for example, suggests that the needs for autonomy, competence, and relatedness are related to game enjoyment, preferences, and future game play (Przybylski, Weinstein, Murayama, Lynch, & Ryan, 2012; Ryan, Rigby, & Przybylski, 2006).

1.2. Defining tolerance in gaming disorder

Several attempts to define tolerance specifically in relation to gaming have been made. Tao et al. (2010) and Weinstein and Lejoyeux (2010), for example, referred to gaming tolerance as the need for more advanced computer equipment, more software, or more hours of use. Petry et al. (2014b) referred to tolerance as "playing more exciting games", which could be interpreted in multiple ways (e.g., new levels, content, modes, or titles), among other components such as a need for increasing time. Some recent data indicates that gamers may not perceive such items measuring tolerance as being relevant to their problem gaming experiences. An ethnographic study by Snodgrass et al. (2017) reported that 'tolerance' (defined as a need to 'play more and more') did not fit within the understanding and experiences of most of the 672 gamers they surveyed, with only 24% of the sample agreeing that it was an important and typical negative gaming experience. This was confirmed in follow up interviews where many respondents "vocally rejected this concept's appropriateness for framing their negative experiences" (p. 298). Among researchers, too, there has been uncertainty about this concept, with multiple interpretations of tolerance proposed without a general consensus (Griffiths et al., 2016).

Standard measurement of tolerance in epidemiological and treatment studies has also been inconsistent (Lortie & Guitton, 2013). A systematic review of 18 psychometric instruments used worldwide reported that four instruments did not feature an item for tolerance (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013). There is also a lack of clarity in surveys regarding the player's reasons for playing. For example, a recent 10-item scale that assesses tolerance in IGD refers to the 'need to play more often' or 'to play for longer periods' to feel that one has played 'enough' (Király et al., 2017). Time investment is assumed to be related to player satisfaction when in fact this may vary greatly across gaming situations. For example, some long gaming sessions may be non-rewarding and cause frustration; conversely, a player may 'hit the jackpot' within a relatively brief gaming session. Finally, while there is some neurobiological evidence (Dong et al., 2017; Han et al., 2011; Weinstein & Lejoyeux, 2015) that reports that problem gamers experience craving for gaming following exposure to gaming-related cues, and that long term gaming can affect brain regions responsible for reward and loss of control, there is only limited detail on the specific stimuli and experiences that are 'craved' by players. Overall, there is a lack of clarity concerning how the process of tolerance, and even the concept of 'dose', might apply to gaming. Understanding the motivational components of gaming may be a useful starting point to guide the formulation of tolerance in gaming disorder, with implications for developing therapies that aim to lessen the persistence and associated harms of gaming reward-seeking behaviors.

1.3. Lessons from research on gaming motivations

Research on the motives of MMO players has identified many different motivations that sustain gaming activity in general. MMO games feature large, persistent online worlds that support social cooperative play and intricate reward systems wherein players aim to accomplish various goals. A study of 3000 MMO players by Yee (2006) identified 10 motivations for online gaming related to social, achievement, and immersion aspects of play. MMOs tend to feature 'end-game' activities, which are advanced sections of the game where level progression has reached a predetermined cap. The MMO end-game often involves playing within time-consuming

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