

Technology-Mediated Problematic Behaviors

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Introduction

The definition of maladaptive consumption has undergone a substantial revision in the past two decades (e.g., Reimann & Jain, 2021), accommodating the changes that have affected, during the same period, global consumerism, primarily the advent of online media and electronic devices to access the internet. New technologies can affect important spheres of an individual's life, such as social interaction and communication, education, work, provision of goods and services, pursuit of intimate or romantic relationships, entertainment, and sexuality, among others.

Consistently, it has been hypothesized that in the attempt to adapt to new lifestyles and offset internal stressors (e.g., anxiety, negative emotions) as well as environmental pressures (e.g., work-life demands, including high-performance expectations), some individuals may overexpose themselves to technology and use it for coping purposes, which in turn, may result in a detrimental excess of stimulation and reward (Griffiths et al., 2017; Reimann & Jain, 2021).

There has been growing scientific interest in the potential of technology-mediated behaviors to become maladaptive and problematic at the individual's level, and there is a need for the definition of conceptual and diagnostic criteria to distinguish a healthy—no matter whether excessive—enthusiasm from problematic behaviors and truly addictive syndromes. The present chapter articulates a brief although non-exhaustive review of the state of the art of the literature on technology-mediated problematic behaviors, focusing on internet use, online gambling, online gaming, and use of online video streaming services. The present chapter reviews theory, evidence, and future trajectories with respect to the conceptualization, assessment, and unresolved questions in the field, in an attempt to summarize the available evidence and offer a perspective regarding this relatively new but extremely lively research field.

Internet Use and Theoretical Models of Problematic Behaviors

The term 'internet addiction' (IA) dates back to the mid-1990s publications in the area by Griffiths (1996) and Young (1996). The term was, and still is, commonly used to describe compulsive internet use in the same way as clinically diagnosable

behavioral and substance use addictions. However, there is lack of agreement regarding basic terminology and definitions pertaining to IA, especially with regards to whether this may or may not represent a diagnosable condition or disorder (Griffiths et al., 2016; Mitchell, 2000).

The case of IA represents the unresolved theoretical fragmentation over behavioral addictions that characterizes the field. In fact, for most problematic behaviors, several terms exist and overlap in the literature. For example, with regard to IA, these include (among others) 'compulsive internet use', 'internet use disorder', 'internet addiction disorder', 'pathological internet use', '(PIU), problematic internet use' 'cyberspace addiction', 'online addiction', 'internet communication disorder', 'internet dependence' and 'digital addiction' (Samaha et al., 2019; Wegmann et al., 2018). These terms share conceptual notions of underlying pathology but vary with regards to diagnostic criteria (Griffiths, 2020), whether the excessive and dysfunctional behavior should be characterized as a psychiatric disorder (Yellowlees & Marks, 2007), and whether the problems associated with the given behavior arise from the medium itself or specific uses of it (e.g., in the case of the internet: social networking, gaming, etc.) (Griffiths, 2000, 2020; van Rooij et al., 2010).

An early attempt to define internet problem behaviors argued for a distinction between specific pathological internet use (PIU) and generalized PIU (Davis, 2001). On the one hand, specific PIU is an instance in which the user has an addictive disorder, such as pathological gambling, which would then hypothetically migrate to the internet to satisfy the addiction. In that case, use is restricted to a behavior that would otherwise occur offline. On the other hand, generalized PIU is a broader condition that refers exclusively to online activities, more in line with Young's (1996) approach. Davis argued that in such instances, the internet may be used to overcome problems in maintaining satisfying social relationships offline. Griffiths (2016) also argued that the term 'internet addiction' is a misnomer, because most studies in the field have investigated addictions *on* the internet rather than *to* the internet.

Griffiths argues that excessive and problematic engagement in activities such as online gaming, online gambling, or online shopping is distinct from problematic internet use (Griffiths, 1999, 2000, 2010, 2012; Widyanto & Griffiths, 2006). Rather, the internet is the means through which individuals engage in their relevant behavior. There are, however, some activities—such as social media use—that could be argued to be genuinely related to the internet because they only take place online. However, Griffiths (2016) questioned whether technology-mediated problematic behaviors are to be intended in relation to the internet in general, or rather, to its specific applications, and the same question has been raised in the context of smartphone use (Kuss & Griffiths, 2017).

The concept of IA or problematic internet use was introduced well before specific maladaptive online behaviors were studied. The DSM-5 generalized one form of

internet addiction, i.e., internet gaming disorder (IGD) to all problematic internet behaviors, even though the original concept proposed by Young (1996) and Griffiths (1996) applied to all forms of disordered use of the internet. Nevertheless, in the absence of agreement upon the structure and the dimensionality of problematic behaviors, and consequently, of comprehensive assessments of different forms of them, it is hard to determine whether a generalized tendency toward problematic internet use underlies distinct practices.

Despite what is known about the symptoms of PIU and IGD, researchers have been trying to examine and understand the underlying mechanisms of these behaviors using various theoretical assumptions and models that were originally developed to investigate substance addictions. The following section outlines four of the most used models that have been helpful for gaining knowledge regarding the measurement, correlates, and outcomes of online problematic behaviors. Namely, these are the cognitive-behavioral model (CBM; Davis, 2001), the compensatory internet use model (CIUM; Kardefelt-Winther, 2014); the biopsychosocial 'components' model of addiction (BCM; Griffiths, 2005a, b), and the interaction of person-affect-cognition-execution (I-PACE) model (Brand et al., 2016, 2019).

The Cognitive-Behavioral Model

Davis (2001) early advocated a cognitive-behavioral approach that labelled the behavior in question as PIU, rather than IA. This model posits the pre-existence of other mental disorders as a diathesis for PIU. In particular, the model suggests that individuals suffering from depression, anxiety, or substance use disorders may retreat to the internet as a way of coping with their disorder, a substitute for offline social activity. Furthermore, specific maladaptive cognitions (e.g., beliefs of low self-worth) that accompany these disorders can enhance attraction to the internet, leading the user to retreat to more satisfying online forms of interaction with other people who are unknown to the individual, such as gaming or specific types of social networking. According to this model, social isolation and lack of social support in the offline world, often associated with other psychiatric disorders, are thought to increase attraction to online forms of social interaction.

Compensatory Internet Use Model (CIUM)

Another model that focuses on pre-existing life problems as diatheses of excessive and problematic use of the internet is the CIUM (Kardefelt-Winther, 2014). This model is motivated in part by a skepticism toward the treatment of what other approaches that defined internet addiction as a true addiction. Through the lenses of this model, many behaviors that involve intense engagement may be considered as problematic, to a certain extent, but are not usefully treated as addictions, such as excessive training for sports, to cite one example (Kardefelt-Winther et al., 2017). Indeed, Infanti et al. (2023) suggested that heavy gamers may be either obsessive in their passion for gaming or simply more engrossed in the activity. Therefore, the CIUM objects to considering any behavior that involves intense

engagement as an addiction, unless it persisted for extended periods and an individual was unable to control it, despite clear negative consequences (Kardefelt-Winther, 2014, 2017).

The CIUM posits that negative life situations can motivate individuals to use the internet to diminish negative feelings or as an escape from other problems (Kardefelt-Winther, 2014). For instance, someone with poor interpersonal communication skills may feel lonely in real-life and engage in online social interaction by using internet platforms. As a result, if an individual can successfully compensate for real-life social needs via the internet, this person may become a heavy user of the internet in repeated attempts to deal with their needs (Kardefelt-Winther, 2014). Similarly, the constant use of the internet to fulfil other offline needs may result in the repeated use of internet technologies, ultimately paving the way to online problematic behaviors.

Empirical studies support the notion of the CIUM according to which using the internet to compensate real-life unattained needs results in online behaviors that function as a maladaptive coping strategy to deal with real-life problems, and in turn, repeated attempts lead to experiencing more real-life problematic outcomes in the long term, possibly due to an excessive engagement in online activities (Kuss et al., 2017a, b). However, whether problematic internet use may be considered as indicative of an addictive syndrome comparable to substance use disorder remains an open question.

Biopsychosocial Components Model (BCM)

The argument that problematic behaviors are manifestations of a point on a continuum that goes from a healthy engagement to truly addictive behaviors has been advanced by Griffiths and colleagues. They suggest that problematic behaviors develop as a result of the interaction of biopsychosocial processes with situational and structural factors (Griffiths & Calado, 2022; Kuss et al., 2014a). Therefore, all behaviors have the potential to become problematic, and when that happens, they share commonalities that define a core set of criteria (Griffiths, 2017, 2019). The BCM posits that problematic behaviors include six distinct core components: salience, tolerance, mood modification, withdrawal, relapse, and conflict (Griffiths, 2005a, b). Kuss et al. (2014b) assessed these criteria in two samples of adolescents and young adults, using self-reports, and found support to the notion of IA as a disorder, similarly to substance use disorder. Moreover, IA and other online problematic behaviors were found to share features with other impulse control disorders (Lee et al., 2019; S,alvarlı & Griffiths, 2022; Shapira et al., 2003).

Some researchers of behavioral addictions (e.g., Kuss & Griffiths, 2012; Shaffer et al., 2004) argue that all addictions, including those associated with technology-mediated behaviors, are manifestations of an underlying syndrome and share common neurobiological and behavioral characteristics. In systematic reviews of

neurobiological studies examining IA and other online problematic behaviors (Burleigh et al., 2020; Kuss et al., 2018), it has been noted that there is compelling evidence for similarities between substance-related addictions and online addictions (i.e., IA and IGD), at various levels. At the molecular level, IA is characterized by an overall reward deficiency resulting in decreased dopaminergic activity among addicted individuals. At the neural circuitry level, IA leads to neuroadaptation and structural changes that occur because of prolonged increased activity in brain areas associated with addiction. At the behavioral level, IA appears to be constricted with regard to cognitive functioning in various domains.

Griffiths (2019) argued that the best way to unify the behavioral addiction field is to adopt a confirmatory approach (i.e., the BCM), which aims to identify different addictive behaviors in online and offline contexts by applying the same criteria shared with other forms of addictions. However, some researchers argued against this approach, considering that the focus on similarities instead of the unique features of behaviors would result in over-pathologizing everyday life as well as misconception of behavioral addictions (Billieux et al., 2015; Kardefelt-Winther et al., 2017). In fact, there is no consensus or definitive evidence in support of either approach, with ultimate objective definitional criteria yet to be defined and agreed upon (Griffiths, 2019).

Interaction of Person-Affect-Cognition-Execution (I-PACE) Model

The I-PACE model posits that several components contribute to the development of problematic behaviors, such as an individual's core characteristics (e.g., personality, social cognitions, psychopathology, specific motives for engaging in a behavior, and biopsychological constitution), subjectively perceived situations (e.g., being exposed to addiction-related factors, negative mood, and personal conflicts), affective responses (e.g., coping style and internet-related expectancies), and gratifications (Brand et al., 2016, 2019). Similar to the CMA, the I-PACE model represents an attempt to encompass and explain all forms of problematic and addictive behaviors, whether online or not, as a result of a common set of mechanisms. The model also recognizes that the medium may not be as important to the development of psychological problems as the behavior itself, although it acknowledges that the internet may have features that predispose individuals to greater development of excessive engagements, such as cues of attraction and immediate gratification.

The model splits the development of an addiction disorder into two phases, respectively, an early and a later stage. In the early stage, predispositions toward various rewarding stimuli act as triggers. In later stages, after repeated exposures, the behavior becomes habitual and outside of one's inhibitory control capacity, leading to a range of negative consequences. Individual dispositions toward greater impulsivity and lack of behavioral control may enhance the transition to addiction. Therefore, the I-PACE model provides a theoretical framework that describes problematic and addictive behaviors by combining psychological and

neuroscientific theories of substance use disorders and behavioral addictions (Brand et al., 2019). However, it is also acknowledged that the evidence for its application to many behavioral addictions is far from conclusive.

Evaluating Theories of Problematic and Addictive Behaviors

One way to evaluate theories of problematic and addictive behaviors is to examine their specific nomological network. Addiction models would predict that technology-mediated behaviors are associated with the same factors that predict substance use disorders. Coping models would predict that individuals prone to problematic behaviors exhibit comorbidities in other forms of psychopathology, especially depression and anxiety. However, individuals with substance use disorders also exhibit such comorbidities, making it difficult to distinguish correlates from diatheses.

Various meta-analyses have examined correlates and potential precursors of IA. In a review of 76 studies examining problematic internet use among students, Sánchez-Fernández et al. (2022) reported there were ten key predictive factors for IA across three categories (psychological variables, patterns of use, and lifestyles). Among these, nine were identified as risk factors (depression, negative affect, impulsivity, time spent online, life stress, maladaptive cognitions, poor sleep quality, online gaming, and substance use [alcohol and drugs]). The remaining one was a protective factor (i.e., the personality trait of conscientiousness).

Vahedi and Zannella (2021) carried out a meta-analysis examining the relationship between social media use and self-reported depressive symptoms in 55 studies. Their results indicated a small, positive, significant association between self-reported symptoms of depression and social media use. Among those with problematic social media use, the association was even stronger. Indeed, a problematic use of the internet may be an underlying source of the small but often observed relationship between social media use and depression among adolescents, especially females (Hancock et al., 2022).

Another health-related outcome associated with IA is sleep problems. The results of a range of studies have indicated a relationship between IA and sleep disorders such as reduced sleeping time, increased fatigue, tendency to go to sleep late, daytime drowsiness, and sleep disorders (e.g., insomnia). In fact, a meta-analysis by Alimoradi et al. (2019) examined 23 studies comprising 35,684 participants, with results showing sleep problems and reduced sleep duration in individuals with IA. Research has also shown that IA is associated with musculoskeletal disorders and pain (Yang et al., 2019).

A review by Tereshchenko and Kasparov (2019) concluded that IA has high comorbidity with depression, anxiety disorders, and attention deficit-hyperactivity disorder (ADHD). The association between IA and ADHD was also found in a meta-analysis of 44 studies (Marin et al., 2021). Moreover, two meta-

analytic reviews showed that depressive disorders and ADHD had strong associations with IA, and lesser (but still meaningful) associations were found between IA and anxiety, obsessive compulsive disorders, social phobia, and aggressive behavior (Carli et al., 2013; González-Bueso et al., 2018). A meta-analysis by Tokunaga and Rains (2016) also reported a highly positive association between IA and depressive symptoms.

A systematic review by Anderson et al. (2017) evaluated 29 longitudinal studies and reported that psychopathology (i.e., depression, anxiety, social anxiety, general psychological distress, ADHD) was predictive of IA. Some of these variables were also identified as a consequence of IA. Males were at significantly higher risk of developing IA over time than females. A recent systematic review identified 17 studies that had investigated the relationship between PIU and quality of life (QoL)/health-related quality of life (HRQoL) (Masaeli & Billieux, 2022). These studies suggest that IA is negatively associated with both QOL or HQOL and most of their respective domains (especially physical and mental health).

According to coping models, individuals with problems of depression and anxiety are more prone to problematic internet use. Addiction models, on the other hand, consider individuals with impulse control problems as prone to problematic internet use, which aligns with evidence on individuals with substance use disorders. In conclusion, each of the presented models has merits and may help explaining problematic behaviors under various circumstances, e.g., the characteristics of the individual and the social context that the individual is embedded in (Perales et al., 2020).

Problematic Online Gambling

Online gambling has become one of the most popular forms of gambling in the last two decades (Auer et al., 2023; Calado & Griffiths, 2016; Hopfgartner et al., 2023). High accessibility, immersive interface, and the ease at which money can be spent have changed the nature of gambling, resulting in concerns that online forms may contribute to higher rates of excessive and problematic engagement, globally. Any type of gambling behavior conducted on the internet through a range of devices, including laptops, smartphones, tablets, and digital television can be considered a form of online gambling. In recent years, there has been a proliferation of gambling operators over the internet (Calado & Griffiths, 2016; Hopfgartner et al., 2023), even more during and in the aftermath of the COVID-19 pandemic (Hodgins & Stevens, 2021). An increasing push to legalization of online gambling activities across several countries has further paved the way to unprecedented accessibility of advanced gambling platforms (Chóliz, 2016).

An unresolved question about online gambling, as highlighted by several studies, is that it may be more problematic than other forms of gambling (McBride & Derevensky, 2009; Meyer et al., 2011). Some authors attributed the greater problematic potential of online gambling to its situational and structural

foundations, based on characteristics such as availability, accessibility, anonymity, immediacy of reinforcement, or speed and frequency of gambling (Chóliz, 2016; Griffiths, 2005a, b). Additionally, marketing strategies developed by gambling operators seem to be highly effective, especially among problem gamblers (Gainsbury, 2015; Gainsbury et al., 2016). However, other authors have argued that online gambling may not constitute a problematic behavior *per se*. For example, evidence indicates that problem gamblers are more likely to get involved in online gambling (Emond et al., 2020), which may explain the higher prevalence of problem gambling among online gamblers. Online gamblers are also more likely to gamble more frequently and intensively than land-based gamblers (Hubert & Griffiths, 2018; MacKay & Hodgins, 2012) and to diversify their activities (Leslie & McGrath, 2023).

Specific demographic profiles based on gender and age have been associated with higher rates of online gambling and prevalence of problematic forms of it. Evidence suggests that adolescents are particularly vulnerable to online gambling and prone to developing problematic gambling behavior (Calado et al., 2016; King et al., 2020). This general vulnerability can be explained by developmental features like age-related urges to engage in risky activities and sensation seeking (Jessor, 1991), as well as lack of self-regulation, which may prevent younger individuals from correctly appraising the risks and long-term consequences of gambling (Hollén et al., 2020). It has also been found that a greater familiarity with the internet is associated with higher vulnerability to online gambling advertisements, e.g., offers of gifts and free play, visually exciting win messages, and emotive graphics (Derevensky & Gupta, 2007). These findings are particularly concerning when considering that gambling among adolescents can compromise their cognitive and emotional development (Calado et al., 2016) and that people who start gambling during their adolescence are more likely to become problematic gamblers (Burge et al., 2006). Some studies have also found associations between online problem gambling and gender. For example, research found that males are at greater risk for the development of online problematic gambling than females, especially adolescents (Dowling et al., 2017). However, more recently, other studies have shown an increase in online gambling involvement among females (Hollén et al., 2020), possibly reflecting fast changing social and economic scenarios and the continuous redefinition of profiles of risk in consequence of mutate gender roles, norms, and expectations.

Evidence also indicates that problematic online gamblers are more likely to experience psychological distress and higher negative affect than problematic land-based gamblers (Goldstein et al., 2016). Redondo (2015) found that online gamblers show lower levels of sociability and higher levels of frugality. Moreover, a more recent study conducted by Leslie and McGrath (2023) among a sample of US participants found that mixed-mode gamblers were higher in extraversion scores compared to online gamblers, and other studies have reported that greater predisposition to boredom (Hopley & Nicki, 2010) and the lack of premeditation (Khazaal et al., 2017) were associated with online gambling. However, significant

differences in extraversion were not observed between mixed-mode gamblers and offline gamblers. Although these findings require replication, they suggest possible links between online problematic gambling and a need to establish and maintain social interactions. On the other hand, research showed that individuals with a personality profile characterized by high sensation seeking are more likely to engage in risky activities to boost their adrenaline levels and to develop problematic forms of gambling (Ghelfi et al., 2023).

Future research will need to clarify the links between personality profiles and behavioral expressions of specific online problematic behaviors, among several other unresolved issues. In fact, it is yet to be understood whether the same patterns of relationships between individual differences in personality, excessive engagement, and problematic behavior would equally manifest across all excessive and problematic behaviors, as posited by confirmatory addiction models, or conversely, whether these may be specific to the characteristics (e.g., accessibility, anonymity) and the context of expression (e.g., the internet, social media, gaming platforms) of a given activity. With regard to online gambling, Auer et al. (2023) have recently developed the Online Problem Gambling Behavior Index, a self-report assessment of online problem gambling using insight from large online account-based tracking datasets. This provides information on key individual consequences of online problematic gambling (e.g., harm or distress) in relation to specific gambling behavioral manifestations and contexts of expression (e.g., gambling late at night on the internet). This approach carries several benefits and potential for future research and practice, including informing theoretical development based on evidence from large representative samples and facilitating the design of targeted behavioral interventions, as discussed elsewhere (James & Tunney, 2017).

Problematic Online Gaming

While most gamers who play judiciously will not experience detrimental outcomes, for a minority of them excessive and disordered gaming will lead to harmful consequences that affect their health, well-being, and overall functioning (Männikkö et al., 2020; Montag & Pontes, 2023; Moore et al., 2022). In light of its potential health-related impact and public health implications, disordered gaming has gained increased medical recognition and relevance. In the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, the American Psychiatric Association (APA, 2013) proposed 'Internet Gaming Disorder' (IGD) as a tentative label for the condition, defined as excessive and harmful use of videogames (online and/or offline), leading to significant functional impairment and/or clinical distress within a 12-month period.

Clinically, IGD may be diagnosed when at least five out of the following nine criteria are endorsed: (i) excessive preoccupation with gaming; (ii) experiencing withdrawal symptoms when unable to engage in gaming; (iii) increasing levels of gaming over time; (iv) experiencing relapse when attempting to cease or reduce

the behavior; (v) losing interest in previous hobbies because of gaming; (vi) continuing to engage in gaming despite problems; (vii) deceiving significant others about the amount of time spent on gaming; (viii) using gaming to achieve a positive mood; and (ix) risking, jeopardizing, and/or losing a job or relationships due to gaming.

The World Health Organization (WHO, 2022) formally recognized GD as a mental health condition in the 11th revision of the *International Classification of Diseases*, defining it as a pattern of excessive online and/ or offline gaming behavior, manifesting through impaired control over the gaming activity, increased priority assigned to gaming to the detriment of other important activities, and continuation of gaming despite the experience of harm. The WHO further specified that the pattern of gaming behavior is characterized by marked distress and significant functional impairment in personal, family, social, educational, occupational, and/or other critical areas of functioning. A distinction between GD and 'hazardous gaming' has also been made to describe a sub-clinical, excessive but not disordered behavior that may escalate to GD if left unchecked (WHO, 2022).

Within each diagnostic framework, several measurement tools have been developed to assess disordered gaming. The following paragraph presents the Internet Gaming Disorder Scale–Short-Form (IGDS9-SF) (Pontes & Griffiths, 2015) and the Gaming Disorder Test (GDT) (Pontes et al., 2021) as they have been validated across a number of contexts and respectively covering the APA and WHO diagnostic frameworks (see Karhulahti et al., 2021; Poon et al., 2021).

The IGDS9-SF was the first brief standardized psychometric tool to assess IGD, based on the definition by the APA in the DSM-5. The IGDS9-SF has been widely used in research on disordered gaming and several cross-cultural psychometric studies were conducted to validate the test in more than 15 languages. More recently, the GDT has been developed to measure GD as per the WHO's conceptualization. The test contains a total of four items that have also been extensively validated and translated to ten languages. Although researchers and clinicians alike can rely on the tools above to assess disordered gaming, emerging research highlighted important discrepancies and differences across the two diagnostic frameworks that may impact severity levels, prevalence levels, and degree of association between GD and other comorbidities (see Montag et al., 2019; Pontes et al., 2022).

The field of GD is evolving rapidly, with new insights and developments being proposed regularly. Gaming is a popular activity worldwide, and only a minority of individuals develop GD symptoms due to excessive gaming. For affected individuals, several treatment options are available and the field has evolved significantly over the last decade, although researchers and health professionals are still working toward a better understanding of the core features of GD and how best to assess and diagnose this condition.

Problematic Online Video Streaming Use

Recent literature has reported on the potential harm associated with an excessive exposure to and fruition of online video streaming services, including a variety of media and contents. These reports have appeared at approximately the same time as two other major changes in global consumerism, specifically, the large popularity of subscription-based online video streaming services, and their widespread diffusion during the COVID-19 pandemic. For example, a study conducted in individuals from the Italian community in the early months of 2020, showed a pattern of anxiety and stress associated with problematic series watching, whereas the authors of the study interpreted the trend in terms of a need for coping with the pandemic-related restrictions (Boursier et al., 2021). Another study conducted in the first half of 2021 (Raza et al., 2021), showed associations between binge-watching, defined in terms of excessive and back-to-back watching of multiple series' episodes, stress, loneliness, insomnia, depression, and anxiety, suggesting links between the former and negative emotionality.

Research has examined the major correlates of problematic use of online video streaming. In a recent study, Flayelle et al. (2020) found that problematic binge-watching was associated with coping/escapism motives, as well as impulsivity traits such as urgency and lack of perseverance (Flayelle et al., 2020), conversely to non-harmful binge-watching, which was found to be predicted by emotional enhancement motivation, enrichment, and social motivations. The authors of the study argued that these results may help differentiating between non-harmful versus problematic engagement in online series watching, highlighting the importance of a compensation vs. a reward logic in conceptualizing problematic watching. Consistently, assessment and interventions should target individuals' emotion regulation strategies, based on the rationale that individuals presenting such problematic patterns may not tend to engage with the activity *per se*, rather, they might use it as a means for mood modification or compensation.

Other studies using confirmatory approaches have reported similar results. For example, Orosz et al. (2016) showed that impulsivity predicted obsessive and not harmonious passion toward social media, whereas harmonious passion was positively associated with adaptive factors, such as self-development motives through series watching, in two samples of Hungarian participants. Additionally, Fino et al. (2022) showed that problematic series watching assessed through a confirmatory approach positively correlated with negative affect, and negatively with mental well-being and sleep quality.

The debate on whether problems associated with a given behavior arise from a medium itself, its content, or specific uses of the medium is long dated (Griffiths, 2000, 2020; van Rooij et al., 2010) and does not seem to spare online video streaming use. In fact, recent research has focused on excessive and problematic fruition of specific content via online streaming platforms. One such is *mukbang* (i.e., online eating broadcasts). Mukbang started as live-stream eating shows on

AfreecaTV, in South Korea, around 2008, and was introduced to western audiences on English-language social media channels in 2014 (Donnar, 2017). Mukbang is derived from the South Korean words 'eating' and 'broadcast' and is an emerging leisure activity across the world (Anjani et al., 2020). It can be described as watching shows in which individuals consume a large portion of food while interacting with the audience (Kircaburun et al., 2021a). Several beneficial uses of recreational mukbang watching have been recently identified in different scholarly fields, including promoting a sense of communal eating, decreased feelings of loneliness and alienation, obtaining virtual satiation for harmful food consumption without going through the physical health consequences, and getting entertainment and relaxation (Anjani et al., 2020; Bruno & Chung, 2017; Choe, 2019).

According to the compensatory internet use model (Kardefelt-Winther, 2014), individuals use the internet to satisfy specific psychological, emotional, and physical needs. Therefore, to understand a specific online behavior, underlying motivational factors should be examined (Kardefelt-Winther, 2014). It has been proposed that mukbang videos can facilitate the following: (i) development of social connectedness with other viewers and 'mukbangers'; (ii) vicarious satisfaction of eating without going through the negative consequences of consumption of desired high caloric food; (iii) sexual sensations of watching attractive individuals devour food; (iv) sense of happiness and relief with auditory and visual stimuli (Anjani et al., 2020; Kircaburun et al., 2021a). Consistently, a recent survey-based study has concluded that vicarious satisfaction of eating, enjoyment, and information were related to higher intention to watch mukbang (Song et al., 2023).

To date, research has indicated that virtual compensation of real-life eating, gaining social connectedness, and diminishing feelings of loneliness derived by becoming part of a social mukbang community are the primary motivations for higher engagement in mukbang watching (Bruno & Chung, 2017; Choe, 2019; Kircaburun et al., 2022a, 2022b). Furthermore, mukbang watching can also be instrumental to escaping from unpleasant reality, entertainment, relaxation, and obtaining sexual gratification (Donnar, 2017; Kircaburun et al., 2021a; Woo, 2018). Nevertheless, mukbang viewers may also be at more risk for negative consequences, including obesity, disordered eating, and exacerbation of bad table and eating manners, when compared to those who do not watch mukbang (Donnar, 2017; Kircaburun et al., 2021a). An experimental study that used neurofeedback of brainwaves during mukbang watching identified that doing it every day may result in worsening one's relationship with food via promoting bingeing behavior (Jenging et al., 2023). Another study in social media users indicated that greater body dissatisfaction and eating disorder symptoms of binge eating and purging are related to watching mukbang more frequently and to a tendency not to consume food while watching mukbang (von Ash et al., 2023). Additionally, a study showed that frequent mukbang watching increased the likelihood of being overweight by 7.4–7.6% among adults (Yeon, 2022).

Regular mukbang watching may also transform into an unregulated and excessive online behavior, resulting in what has been defined as addictive mukbang watching (AMW; Kircaburun et al., 2021a). A study with 236 Turkish emerging adult mukbang watchers developed and validated the Mukbang Addiction Scale using symptoms outlined in the components model of addiction, including salience, withdrawal, relapse, tolerance, mood modification, and conflict (Griffiths, 2005a, b; Kircaburun et al., 2021a). As a result, 19% of the participants were reported as a 'high endorsement' group, at risk for AMW (Kircaburun et al., 2021b). A smaller study with 140 Turkish university students who watched mukbang in the past month reported AMW being positively associated with both internet addiction and disordered eating (Kircaburun et al., 2021c). A pilot study with 170 Turkish university students explored the uses and gratifications of AMW and concluded that AMW may be an extension of real-life food addiction and/or disordered eating (Kircaburun et al., 2022a). However, the aforementioned studies recruited a relatively small number of participants from a poorly diversified population (e.g., narrow age difference, same ethnicity/nationality).

To date, few attempts have been made to understand the underlying mechanisms and correlates of problematic use of mukbang watching. According to the I-PACE model (Brand et al., 2016), it is important to investigate individual differences and psychosocial correlates of behavioral addictions to determine similarity and uniqueness. A preliminary study with 217 Turkish university students who watched mukbang in the past year reported that AMW was positively related to daily time spent watching mukbang, loneliness, and problematic *YouTube* use, but not to depression (Kircaburun et al., 2021d). The authors argued that mukbang watching might be used as a maladaptive coping strategy in attempts to diminish the feeling of loneliness and escape an unpleasant sense of reality, whereby individuals feel alienated and less socially connected. Individual differences' correlates of mukbang watching have also been identified. A cross-sectional pilot survey study in university students reported that extraversion was negatively associated with AMW (Kircaburun et al., 2022b). Furthermore, conscientiousness, sadism, and procrastination were positively related to AMW. The authors argued that maladaptive personality-related procrastination was associated with higher engagement in AMW and that some individuals engage in addictive mukbang watching more than others due to, among other factors, their personality structure and proneness to procrastination (Kircaburun et al., 2022b).

To conclude this section, online video streaming use is an emerging online activity that attracts increasing numbers of viewers over several countries. Expectedly, there is a large gap in the literature regarding the psychology of this relatively novel behavior use. Prevalence rates, correlates, and consequences of regular and excessive watching are yet to be determined, reflecting the relative novelty of the phenomenon. A limited number of studies have developed psychometric tools to assess problematic watching of specific content, such as series (Fino et al., 2022; Flayelle et al., 2020) and mukbang (Kircaburun et al., 2021a). So far, empirical evidence suggests that these behaviors may be present among a small number of

individuals, anyway, and that they appear correlated with individual differences in personality as well as other psychopathological symptoms.

Conclusions

Evidence regarding technology-mediated behaviors has markedly grown over the past 25 years. Although many related yet different assessment tools have been used across various populations to assess problematic forms of online behaviors, it is difficult to generalize findings, since problematic behaviors are phenomena whose manifestations can vary across contexts. Whether these truly represent forms of addiction or the attempt to cope with other problems is, at this point, still a matter of debate. The future use of more sensitive instruments as suggested by Castro-Calvo et al. (2021) may provide greater sensitivity in assessment. Nevertheless, irrespective of the theoretical approach to the condition, the main correlates of problematic addictive behaviors appear to be the same as the ones of addiction, suggesting that internalizing problems and poor impulse control are involved. In addition, online addictions may exhibit high rates of remission, perhaps reflecting the heterogeneous nature of their underlying genesis, with some sources reflecting more serious and chronic influence (e.g., impulse control problems) and others reflecting more transient factors (e.g., weak social support). As more longitudinal research and greater methodological rigor is applied, the ability to elucidate the etiological pathways that lead to the various problematic online behaviors should be forthcoming.

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