MUNI FSS

JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE
CYBERPSYCHOLOGY

Chatterjee, D., & Rai, R. (2023). Behind the screens: Proposing a mentalization-based theoretical model of problematic Internet use. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 17*(5), Article 6. https://doi.org/10.5817/CP2023-5-6

Behind the Screens: Proposing a Mentalization-Based Theoretical Model of Problematic Internet Use

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Abstract

Problematic Internet Use (PIU), with its adverse health outcomes, is a clinically established phenomenon that is not formally diagnosable yet. The latest PIU research reveals differential psychological mechanisms underlying two types of Internet usage: social use (like using social media, chatrooms, and others) and non-social use (like live streaming, short-form video viewing, and others). Social forms of PIU often signal underlying interpersonal issues, including loneliness, attachment problems, and social skill deficits. In comparison, non-social usage might indicate emotion regulation problems, including emotion recognition deficits, poor cognitive empathy, and emotion suppression. A common developmental concomitant of these functions is the ability to mentalize, operationalized as Reflective Functioning (RF). While studies supporting the role of impaired RF in problematic social uses of the Internet abound, only a few studies relating RF deficits to non-social PIU are identifiable. Also, mentalizing is multidimensional, with cognitive and affective poles influencing emotion regulation and interpersonal functioning. Deficits in both poles of mentalizing have been differentially implicated in non-social and social PIU. Based on the latest empirical evidence in Internet-use problems, the multifaceted role of mentalizing could be meaningfully assimilated into a novel social-cognitive model of PIU. To that end, the current paper attempts to theoretically integrate affective and cognitive mentalizing, with its roles in emotion regulation and interpersonal functioning, into Bandura's Social-Cognitive Theory of PIU. The theoretical model might have implications in developing a mentalization-based treatment modality for PIU that could train individuals in efficiently regulating emotions and navigating real-life social situations without resorting to an over-involvement with the virtual world.

Keywords: Problematic Internet Use; mentalizing; emotion regulation; interpersonal functioning; Social-Cognitive Theory; reflective functioning; affective mentalizing

Editorial Record

First submission received:
September 6, 2022

Revisions received:
February 14, 2023
June 26, 2023

Accepted for publication:
September 4, 2023

Editor in charge:
Maèva Flayelle

Introduction

Aristotle historically claimed humans as "social animals." What sets us apart from other species is our unique ability to interpret social information and navigate through a complex social environment (Shany-Ur & Rankin, 2014). Higher-level social-cognitive abilities help humans perceive, process, interpret, and respond to social stimuli (Beaudoin & Beauchamp, 2020). Social cognition entails our understanding that humans have minds that hold beliefs, desires, and intentions, known as the "Theory of Mind" (ToM; Premack & Woodruff, 1978). An ability to

"read" or imagine these mental states in ourselves and in others is called "mentalizing" (Fonagy & Allison, 2012). While ToM is "cold" knowledge about the possession of a mind with predictable thoughts and behaviors, mentalizing is a reflective understanding of self and others in socio-emotional contexts (Górska & Marszał, 2014).

ToM deficits show in autism spectrum disorders (ASD; O'Nions et al., 2014), attention deficit hyperactivity disorder (ADHD; Ilzarbe et al., 2020), and Schizophrenia (Pickup & Frith, 2001). These conditions entail neurodevelopmental pathologies with cognitive and social impairments at the ability level (Rees et al., 2021; Scandurra et al., 2019). Mentalizing deficits, on the other hand, exist in disorders with emotion regulation (Górska & Marszał, 2014) and impulse control problems at its core, such as borderline personality disorder (BPD; Rifkin-Zybutz et al., 2021), substance-use disorders (SUDs; Quednow, 2020; Savov & Atanassov, 2013), behavioral addictions to food (Innamorati, 2017) and gambling (Ciccarelli et al., 2021), and eating disorders (Gagliardini et al., 2020).

Studying social-cognitive correlates would be particularly important in behavioral addictions as they present more prominent emotional and social symptoms, while drug addictions show more physical signs and symptoms (Alavi et al., 2012). The relationship between social-cognitive functions and behavioral pathologies is bidirectional, with impaired social cognition presenting both as a cause and an outcome of drug or behavioral addictions (Brand et al., 2019; Quednow, 2020).

Over the past decade, unhealthy Internet use has gained attention as a possible behavioral addiction (Alavi et al., 2012; Jorgenson et al., 2016; Ryding & Kaye et al., 2018). Along with accessibility, ease, and other advantages, the Internet has unlocked unlimited media content and perpetual connectedness, which can adversely affect users' offline lives. The socio-emotional implications of Problematic Internet Use (PIU) are of particular interest to multidisciplinary researchers (e.g., Chao et al., 2020; Gioia et al., 2021). Internet use calls for a controlled expenditure of time, attention, and involvement, for which self-reflective and regulative mechanisms are important. A loss of ability to engage in adaptive and non-harmful Internet usage can lead to adverse functional outcomes such as reduced job or academic productivity, increased loneliness, and impaired physical well-being (e.g., body pain and sleep disturbances; Cai et al., 2023; Kelley & Gruber, 2013) among others. Mentalization ability guides a complex network of cognitive and affective functions that underlie emotion regulation (Bersani et al., 2022), self-control and monitoring (Fonagy, 2018), and overall self-regulatory behaviors (Savov & Atanassov, 2013). Difficulties in reflecting on internal mental processes, including thoughts, feelings, and needs, could lead to behavioral problems like PIU. The current paper aims to assimilate recent work on mentalizing deficits in PIU into an integrated social-cognitive conceptualization explaining the development of social and non-social PIU.

Methods

The authors report recent studies relating three manifestations of mentalizing: Reflective Functioning (RF; Fonagy et al., 1998), affect mentalizing or cognitive empathy (Baron-Cohen & Wheelwright, 2004), and cognitive mentalizing or perspective-taking (PT; Luyten et al., 2020) to PIU. The paper discusses the connection between mentalizing and PIU through problems in emotion regulation and interpersonal functioning. Mentalization-related variables are then integrated into the existing uses and gratification-based social cognitive theory (SCT) of addictive Internet use to explain how deficits in mentalization ability might underlie PIU and its adverse health outcomes.

The article search was not an exhaustive one. A streamlined search for studies over the past ten years was conducted across two databases: PUBMED and APA PsycNet. The authors searched for: (1) current understandings of PIU using terms "Internet addiction," "Compulsive Internet use," "Problematic Internet Use," "Internet use disorder," "Problematic Use of Internet," "Pathological Internet Use," "Internet Gaming Disorder," "Gambling Disorder," "SNS addiction," "Problematic Mobile Phone Use," "Problematic SNS Use," "Social Media Addiction," "Binge-watching" (2) studies relating RF, cognitive empathy, perspective-taking (PT), and PIU using a combination of terms "Reflective Functioning," "Cognitive Empathy," "Cognitive Mentalizing," "Affective Empathy," "Affect Mentalizing" with "Substance Abuse," "Substance Use Disorders," "Behavioral Addictions," and PIU related terms, and (3) social cognitive theory of PIU and PIU related terms.

The upcoming sections define PIU and discuss its types, ongoing debates around the concept, and its current clinical status. The authors discuss models of PIU that are relevant to the conceptualization proposed in the present article. Studies reporting mentalizing deficits in PIU and its various forms are reported in Tables 1 and 2. The article then attempts to explain how distal developmental factors, linked to proximal psychosocial factors, result in specific Internet use and misuse patterns.

Results and Discussion

Current Understanding of Problematic Internet Use (PIU)

PIU is being viewed from myriad research lenses ranging from communication to clinical psychology to neuroscience. The deleterious impacts of Internet overuse were first documented by Kimberly Young (1996), followed by further exploration of over 600 cases of heavy Internet users exhibiting clinical signs of addiction. The term "Internet Addiction Disorder" was fictitiously coined by Ivan Goldberg, who later renamed it "Pathological Internet-use Disorder" (Wallis, 1997). PIU is associated with adverse psychosocial outcomes such as poor sleep quality (Shadzi et al., 2020), anxiety (Kaess et al., 2014), depression (Lam & Peng, 2010), and social isolation (Caplan, 2002).

There are diverse concepts related to PIU that have often been used interchangeably or measured as a single phenomenon at the cost of overlooking conceptual nuances. The upcoming section sheds light on conceptual distinctions leading to a clearer understanding of PIU and its forms. The awareness of distinct phenomenology and processes underlying the broader rubric of PIU would ensure research reliability and yield results that can be translated into effective policies and preventive measures.

Specific and Generalized PIU

At least two patterns of PIU can be distinguished, namely, specific and generalized. This differentiation was introduced by R. A. Davis (2001) in his cognitive-behavioral model of PIU. While a specific form of PIU (SPIU) involves the use of particular Internet functions like online shopping or pornography sites, a generalized form (GPIU) involves spending excessive amounts of time in a variety of online activities with no particular purpose (Brand et al., 2016; Widyanto & Griffiths, 2006). SPIU signals pre-existing psychopathology that would manifest itself in channels other than the Internet. For instance, a pathological shopper would engage in problematic shopping behavior offline, i.e., even without available online opportunities. GPIU, however, exists because of the Internet itself and would have no existence outside of it. Social problems like poor perceived social support or social isolation often trigger GPIU (Widyanto & Griffiths, 2006).

As seen further in the text, psychosocial correlates and causative factors differ between SPIU and GPIU. Theoretical distinctions between the two have also been made by specific authors in their work (e.g., Brand, Laier, et al., 2014; Brand, Young, et al., 2014; Brand et al., 2016, 2019; Caplan, 2002, 2005; R. A. Davis, 2001; Widyanto & Griffiths, 2006). PIU studies must begin with this differentiation to identify the true nature of the problem and the psychosocial mechanisms associated with it. It would entail using proper tools based on the type of PIU being studied and a clearer understanding of whether users are overly dependent on specific activities readily available on the Internet (SPIU) or the Internet itself (GPIU).

Content and Process PIU

Another differentiation that could affect research outcome is content vs. process motivations underlying PIU. The classification proposed by Song et al. (2004) is recently being explored in the context of problematic Internet and smartphone use (e.g., Dai et al., 2021; Elhai, Hall, et al., 2017; Hao et al., 2022; Rozgonjuk & Elhai, 2021; Serra et al., 2021; van Deursen et al., 2015; Wickord & Quaiser-Pohl, 2022). Initially, Song et al. (2004) explained: (a) content use of Internet as fulfilling a user's purpose in connection to the outside world, e.g., someone looking-up job opportunities online in order to secure an interview in the real world, while (b) process use as involving the consumption of the Internet itself that distances the user from the outside world, e.g., a student spending time "doom-scrolling", (i.e., scrolling through social media and news for long hours seeking primarily negative information; Satici et al., 2022) to avoid studying for exams. Doomscrolling has been related to heightened states of anxiety, and people engaging in it can experience a loss of control over media consumption leading to compromised physical and mental well-being (Sharma et al., 2022). Thus, process use of the Internet has a greater likelihood of turning into PIU, given its potential to create a dependence on the Internet itself at the cost of offline activities and relationships (LaRose et al., 2001; Rozgonjuk & Elhai, 2021; Song et al., 2004). Subtypes of process Internet use, such as "binge-watching" (Raza et al., 2021; Starosta et al., 2021) and short-form video applications (SVA) viewing (J. Yang et al., 2022; X. Zhang et al., 2019), have significant addictive potential. Studies exploring the

relative strength of social and non-social Internet use in predicting PIU have reported that both can lead to addictive technology usage patterns (van Deursen et al., 2015; Wickord & Quaiser-Pohl, 2022).

Further, there are two broad classes of Internet applications: social and non-social. While social use (usually done through smartphones) comprises rewarding experiences obtained through online social interactions (van Deursen et al., 2015), non-social use comprises gratification from the mere consumption of online media (Song et al., 2004). Both process and content uses can be further typified as social or non-social. For instance, one may use a social feature of the Internet for both content and process gratifications, e.g., chatting on a social networking site (SNS) to connect with a possible suitor offline (content use) vs. spending time on SNS to escape real-life interpersonal deficits (process use). Studies exploring Problematic SNS Use (PSNSU; Hussain & Griffiths, 2018; Hussain & Wegmann, 2021) and Problematic Social Media Use (PSMU; Bányai et al., 2017; Shannon et al., 2022) can be said to have studied process type of social Internet use. Researchers need to collect information regarding how the Internet is being used (predominantly social or non-social) and for what purposes they are being used (predominantly content or process). Distinctive functional outcomes and underlying psychological mechanisms might characterize different Internet usage patterns.

"Internet Addiction" vs. "Problematic Internet Use": A Conceptual Debate

The addictive potential of the Internet has been argued upon since its first formal identification by Young (1996). There exists much disagreement over an appropriate diagnostic label for the phenomena. A variety of terminologies like "Problematic Internet Use," "Excessive Internet Use," "Compulsive Internet Use," "Internet Use Disorder," "Internet Addiction," "Pathological Internet Use," and "Cyber Dependence" (Laconi et al., 2014; Widyanto & Griffiths, 2006), and so on, exists in the literature. Experts in the field have long been discussing the need to assign a diagnostic label to the condition to aid universality in understanding (Shapira, 2003). Idiosyncratic features of the virtual world allow for disinhibition and enhanced risk-taking (Suler, 2004), less threatening interpersonal communications (Caplan, 2002), and avenues for overcoming offline social deficits (R. A. Davis, 2001) that could determine problematic usage patterns. Although certain SPIUs, like excessive online gaming or shopping, have addiction-like patterns characterized by salience, mood modification, tolerance, withdrawal, conflict, and relapse (Kuss & Griffiths, 2015; Kuss & Lopez-Fernandez, 2016; Zhao et al., 2017), GPIU patterns can hardly be explained using the addiction criterion alone.

Further complications arise from ambiguities in measuring the PIU construct. At least forty-five different measurement scales guided by varying PIU conceptualizations exist (Laconi et al., 2014). There are three main traditions in PIU assessment: (a) tools following the DSM-IV criteria for substance dependence, (b) tools guided by the cognitive-behavioral model of GPIU, and (c) tools following the behavioral addiction paradigm modelled after the DSM-IV criteria for pathological gambling (see Laconi et al., 2014 for a review). A few commonly used scales, such as Young's Internet addiction test (IAT; Young, 1998b), Chen's Internet addiction scale (CIAS; S.-H. Chen et al., 2003), and the Internet addiction scale (IAS; Nichols & Nicki, 2004) view Internet use problems as an addictive condition. They measure psychological dependence, withdrawal, tolerance, and significant costs to overall functioning through their items. Another class of tools uses impulse control conceptualizations, such as Young's Internet Addiction Diagnostic Questionnaire (IADQ; Young, 1996) and the updated version of Young's IAT (Aboujaoude, 2010). A few scales measuring PIU from a cognitive-behavioral framework (R. A. Davis, 2001) are the Generalized Problematic Internet Use Scale (GPIUS; Caplan, 2002) and the Online Cognition Scale (OCS; R. A. Davis et al., 2002).

Along similar lines, Tokunaga and Rains, (2016) have described three classes of PIU conceptualization: (a) substance dependence, (b) impulse control, and (c) relationship-building resource deficit. All three approaches measure a loss of control over Internet use as a core feature of PIU. In contrast, tolerance and withdrawal are measured under the substance use and impulse control perspectives alone. Finally, greater interpersonal efficacy online, as compared to offline, is uniquely measured under the relational deficit perspective. Many existing studies have failed to match PIU conceptualization to PIU measurement tool in research (Dahl & Bergmark, 2020).

Further, PIU measures based on the substance dependence framework usually assess mood-modifying effects of Internet use which is inconsistent with substance dependence definitions. On the other hand, PIU measures based on the impulse control and relational-deficit frameworks are better aligned with their respective conceptualizations. Overall, PIU shows greater construct validity when conceptualized as an impulse control problem or a relational-deficit problem than as a substance use disorder (Tokunaga & Rains, 2016). SPIUs, such as

PSNSU, have also been studied as an addiction or a cognitive-behavioral problem, with multiple assessment tools having variable cut-off points (Varona et al., 2022).

To sum up, there continues to be a mismatch between conceptualization and measurement in PIU research, a lack of consensus on the addictive nature of Internet-use problems, an underrepresentation of other existing models, such as the Interaction of Person-Affect-Cognition-Execution (I-PACE; to be discussed later in the current article; Brand et al., 2019) or the dual-system theory (DST; Turel & Qahri-Saremi, 2016), and the existence of a variety of different terms to address it by.

In the current paper, the term Problematic Internet Use (PIU) is used as it is inherently non-pathologizing, allowing space for further exploration until the exact nature of the problem is known. While reporting other researchers' works, the term originally used in their articles is used. Across most paradigms, maladaptive cognitions, affect, and behaviors related to self and others in inter and intrapersonal contexts have been associated with PIU (Brand et al., 2016; R. A. Davis, 2001; Tokunaga & Rains, 2016), further strengthening the need to view the condition through a social cognitive lens. Although the addiction paradigm was the first to emerge, empirical evidence supporting it is far from conclusive. For furthering the understanding of PIU, more psychosocial perspectives need to be explored. The current article attempts to propose one testable conceptualization that could fill existing gaps in the PIU literature.

Clinical Status of PIU

Neuroadaptation in the reward pathways of the brain, the crux of drug-related addictions, has also been noted in certain behaviors (e.g., gambling, buying, or eating) that produce short-term stimulation of the reward systems leading to the experience of addictive states (Grant et al., 2010; Karim & Chaudhri, 2012). The fifth revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) shifted Gambling Disorder from an Impulse Control Disorder classification to the Substance Related and Addictive Disorders section. Internet Gaming Disorder (IGD) got included in Section III of the manual, as a condition requiring further study. The International Statistical Classification of Diseases and Related Health Problems−11 (ICD-11; World Health Organization, 2019) includes IGD and Gambling Disorders alongside SUDs. Other SPIUs, such as excessive online shopping, PSNSU, PSMU, or GPIU, have not yet received formal diagnostic statuses. The clinical understanding of these conditions is continually evolving, and support for PIUs beyond gaming and gambling is not that straightforward.

Coming to clinical presentation, PIU shows some overlap with symptoms of substance and behavioral addictions. Repeated unsuccessful attempts at cutting down, preoccupation, and using the behavior when emotionally distressed have been reported in behavioral addictions to food and gaming (Meule & Gearhardt, 2014), and in PIU (Kuss & Lopez-Fernandez, 2016; Li et al., 2015). Particularly clinical signs seen in certain forms of SPIU, such as irritability, restlessness, and urge following cessation of gaming in IGD (Kaptsis et al., 2016; Yen et al., 2022), craving in SNS addiction (Leng et al., 2019), and altered attention to incentive stimuli in Internet gaming and gambling disorders (Werle et al., 2021) mimic symptoms of addiction to substances. Further, impulsivity has been consistently linked to certain forms of SPIU, such as IGD (Ryu et al., 2018; Şalvarlı & Griffiths, 2022), binge-watching (Starosta et al., 2021; Steins-Loeber et al., 2020), and Internet addiction (Lee et al., 2012; Y. Zhang et al., 2021). Impulsivity, in turn, is linked to higher levels of approach behaviors, as seen in behavioral addictions of compulsive buying and sexual addiction (Granero et al., 2016) and Internet addiction (Diotaiuti et al., 2022). Impulsivity and a biased preference for perceiving consequences of drug-taking as rewarding are noted in drug-related addictions consistently (Kozak et al., 2019; Poulton & Hester, 2020). Experts in the field have identified two types of PIU behaviors, namely, an impulsive type (including gaming, gambling, online buying/shopping, cybersex/pornography viewing, and social media use) and a compulsive type (including behaviors such as excessive health-related information searching, stalking people online, and digital hoarding), with significant overlap between the subtypes (Fineberg et al., 2022).

Early age of initiation is a risk factor for SUDs (e.g., tobacco, alcohol, cannabis; Bracken et al., 2013; Moss et al., 2014), certain SPIUs (e.g., IGD; Beard et al., 2017; Nakayama, Matsuzaki, et al., 2020) and for GPIU (Chang et al., 2014; Nakayama, Ueno, et al., 2020; Tsitsika et al., 2014).

However, researchers have deemed the confirmatory approach, i.e., utilizing substance addiction criteria for PIU, as undue confirmation of a medical model without adequate qualitative exploration of psychosocial factors in its phenomenology (Flayelle, Maurage, Vögele, et al., 2019; Kardefelt-Winther et al., 2017). Instead of viewing PIU as

a compulsion, more studies need to view it as a faulty coping mechanism stemming from maladaptive motivations underlying its use (Kardefelt-Winther, 2014a).

One of the reasons for the confirmatory approach might be the frequent failure of Internet addiction research in considering the nature of online activities one is involved in and associated functional outcomes in varied profiles of Internet users. Studies on Internet addiction have mainly covered some specific form (e.g., gaming, or online sex addiction). This gap in research questions the confirmation and indiscriminate application of addictive conceptualizations to all kinds of Internet use problems as pre-emptive.

Neurobiologically, similarities between PIU and other addictions show mixed findings. For instance, substance and behavioral addictions, such as binge eating and pathological gambling, activate the brain's reward pathways and directly affect the dopaminergic system (H. S. Kim & Hodgins, 2018; Werle et al., 2021). Similar activation in the mesocorticolimbic reward system with reduced resting-state glucose metabolism in dopaminergic projection areas in the striatum and cortical regions have been reported in problematic online gaming (Kuss & Griffiths, 2012; Park et al., 2010; Weinstein & Lejoyeux, 2022). Morphological changes in the fronto-striatal reward circuitries have been reported in habitual and addicted Internet users (Altbäcker et al., 2016; Kühn & Gallinat, 2015). A study exposing subjects with Instagram addiction to Instagram-themed cues reported activation of the dopaminergic reward system and deactivation of the executive control network, also seen in persons with various drug addictions (Nasser et al., 2020). Borrowing from theories of substance use, Brand (2022) identified two driving neural pathways to "online addictive behaviors": (a) a "feels better" path entailing positive (i.e., delivering pleasure) and negative (i.e., avoiding negative mood states) reinforcements involving the ventral striatum (nucleus accumbens), and the dorsal striatum, and (b) a "must do" path characterized by compulsive behaviors, involving the dorsal striatum (putamen and caudate nucleus). A third path regulating the two driving paths constitutes a "stop now" or self-control process maintained by the dorsolateral prefrontal cortex.

However, few other researchers have reported the absence of dopaminergic system alterations in gambling and binge-eating disorders as opposed to drug addictions (Majuri et al., 2017). Further, a recent study reported variabilities in resting state electroencephalography (EEG) readings between IGD (raised delta and theta activity and reduced beta activity) and Internet Addiction (raised gamma activity and reduced beta and delta activity; Burleigh et al., 2020). A study analyzing Magnetic Resonance Imaging (MRI) scans of SNS users reported: (a) bilateral reduction in grey matter volumes in the amygdala (like substance and gambling addictions) and (b) healthy anterior-/mid-cingulate cortical volumes (dissimilar to other addictions; He et al., 2017). Similarities and differences in brain morphology for PIUs and SUDs (Park et al., 2010) strengthen the call for distinct conceptualizations and treatment modalities. Also, future researchers need to study SPIUs and GPIU separately and extensively to reach conclusive findings. The nuanced role of application-specific features must be studied in greater detail to understand the roots of problematic Internet usage (Brand, 2022).

Overview of PIU Models

The existence of multiple classifications and terminologies for PIU is accompanied by diversity in theoretical models explaining the phenomena. Many of these theories need empirical testing. This section summarizes PIU models that helped identify the factors of the social cognitive model proposed in the current article.

Young (1998a) primarily suggested the role of catastrophic thinking and escape motivations in the compulsive use of the Internet. R. A. Davis's (2001) cognitive-behavioral conceptualization views PIU as a distinct pattern of Internet-related cognitions, such as ruminating about Internet use, poor self-efficacy, self-doubt, and behaviors that lead to adverse life outcomes. The theory explains pre-existing psychopathology, like depression, social anxiety, and substance dependence, as necessary distal causal factors coupled with proximal distortions in thinking leading to PIU. Caplan's (2002) model introduces a unique cognitive-behavioral variable called 'preference for online social interaction' (POSI) in the aetiology of PIU. POSI is seen in individuals with social skill deficits who experience screen-mediated social interactions as less distressing than face-to-face ones. Thus, cognitive-behavioral models associate defective self-regulation with underlying cognitive distortions related to self, others, and Internet use, resulting in PIU and its adverse health outcomes (Caplan, 2010).

Influenced by the cognitive-behavioral school of thought, Brand et al. (2014) used neuropsychological and neuroimaging evidence to formulate a model of SPIU under the addiction framework. They explained how reduced prefrontal control is associated with poor self-regulation and dysfunctional Internet usage to cope with negative affect, which reinforces Internet use as a rewarding experience. Subsequently, Brand et al. (2016) proposed a

revised moderated-mediation model of PIU where predispositions such as psychopathology (e.g., depression and anxiety) and personality traits (e.g., impulsivity and low self-esteem) interact with maladaptive coping styles and outcome expectancies in one's choice of Internet use. Internet use then leads to an experience of gratification, reinforcing the initial stream of cognitions and behaviors. This comprehensive model of SPIU, called the I-PACE model, also adapted to other addictive behaviors (Brand et al., 2019), explains how a complex interplay of personological and biological predispositions, affective and cognitive responses, and higher-level executive mechanisms result in problem behaviors.

Flayelle et al. (2023) recently proposed a need-based psychological conceptualization of PIU where design features of online applications influence Internet users' self-control abilities concerning PIU. In their theoretical model, the authors discuss two processes underlying PIU: (a) model-based processes and (b) model-free processes. Model-based processes involve subjective cost-benefit analyses leading to the choice of problematic online behaviors over alternatives guided by online design features catering to specific psychological needs. For example, immersive graphics in gaming or engaging narratives in TV series can help distract one from negative emotional states, or getting "likes" on social media can temporarily alleviate a sense of low self-worth. Model-free processes involve online behaviors triggered by cues. Such as personalized advertisements or push notifications on gaming apps and unpredictable online reinforcements like retweets or notifications on social media encourage compulsive online behaviors through learning processes such as habit formation and incentive sensitization.

Other models have proposed that SPIU using mobile phones can be driven by excessive reassurance-seeking, impulsivity, or extraversion, eventually leading to addictive, dangerous, or antisocial forms of problematic mobile phone use (PMPU; Billieux, 2012; Billieux et al., 2015; Canale et al., 2021). Models explaining PSNSU have implicated the role of 'Fear of Missing Out' (FoMO; a constant fear that one is absent from rewarding experiences that others might be having) as pivotal in the development of the problem (Fioravanti et al., 2021; Pontes et al., 2018; Yin et al., 2021). Recently, Dailey et al. (2020) proposed a biopsychosocial model for Problematic Social Media Use with biological (i.e., age), social (i.e., gender, the intensity of use, need for social media, and social comparison), and psychological (i.e., stress, empathic concern, conscientiousness, and depression) variables accounting for observed variance in the sample. For typically non-social online engagements, such as single-player gaming, binge-watching, and pornography watching, there exists a variety of models but little consensus among them. As discussed in previous sections, gaming and gambling have mainly been explained under addiction, impulse-control, and behavioral addiction frameworks. The recently proliferated online activity of binge-watching, viewed from a non-pathologizing lens, has been reported to involve multiple psychological processes in its aetiology, such as motivation to watch (e.g., relaxation, social interaction), impulsivity traits of the watchers and individual differences in emotional reactivity (Flayelle, Maurage, Karila, et al., 2019). Akin to the compensatory model, problematic binge-watching has been conceptualized as a maladaptive coping or emotion regulation strategy to deal with negative affective experiences (Flayelle, 2020).

Although parts of the I-PACE model have been tested, a proposed link between social cognitions (loneliness, perceived social support, and social distrust) and excessive use of communication applications remain sparingly addressed (Brand et al., 2016). While elaborate theoretical models supply essential information to clinicians, testing specific models that translate into targeted clinical interventions is equally important. Social cognitive factors also influence the preference for Internet applications (LaRose & Eastin, 2004). According to Kardefelt-Winther's (2014a) compensatory Internet use model, the motivation to use certain online applications over others is due to their compensatory potential. The deleterious effects of Internet use arise when it is used to gratify offline unmet psychosocial needs. Thus, merely studying psychological predictors of compulsive use patterns is not enough. For instance, in another study by Kardefelt-Winther (2014b), a widely cited association between social anxiety and excessive online gaming became insignificant when stress was statistically controlled. The findings highlighted that it is crucial to consider the function the Internet plays (e.g., reducing stress) in the context of psychosocial vulnerabilities (e.g., social anxiety), eventually resulting in PIU. To that end, the model proposed in the current article combines the psychological vulnerabilities approach with the motivations for use approach to explain the relationship between Internet use and PIU. The authors explain the relationship between social cognitive vulnerabilities and PIU through unfulfilled psychosocial needs that motivate specific patterns of Internet use and overuse.

Social Cognition and PIU: The Role of Mentalizing

'Mentalizing,' first described in the context of self-related pathology observed in borderline personality disorder (Fonagy & Bateman, 2007), develops in the backdrop of the first attachment relationship to one's mother or primary care-giver (Fonagy & Bateman, 2016) which influences the developing sense of self and its regulatory functions (Fonagy & Target, 2003; Fonagy et al., 2018, Schwarzer et al., 2021). Acquisitions in mentalizing continues over the course of development which peaks during adolescence owing to the expanding biological and socio-cultural demands of that age (Luyten et al., 2021). Poor mentalizing causes difficulty in grasping social cues and responding appropriately in complex social environments as is seen in individuals with Autism (Isaksson et al., 2019). Mentalization ability influences regulation of behaviour through self-monitoring, affect regulation and self-control (Fonagy, 2018).

Reflective Functioning

Mentalization is operationalized as Reflective Functioning (RF; Fonagy et al., 1998). RF is an unconscious, automatic process of self-reflection that influences one's self-regulatory behaviors that can sustain or inhibit impulsive behaviors in emotionally laden contexts (Debbané et al., 2016; Fonagy & Luyten, 2018). RF is implicated in forming a stable sense of self and self-regulatory behaviors, particularly in adolescence (Chevalier et al., 2021; Fonagy & Target, 1997).

Deficits in self-reflective and regulatory functions of mentalizing have been routinely implicated in SUDs (Håkansson et al., 2018). There is a dearth of studies exploring RF in the context of adolescent SUDs. A study exploring social cognitive determinants of SUDs in adolescents reported that multi-substance users held "unhealthy" positions on measures of attitude, intentions, prescriptive norms, and self-efficacy compared to those non-users (Victoir et al., 2007). Research with adults has focused primarily on parental RF (PRF), i.e., a parent's ability to reflect on their own and the offspring's mental states in the context of the parent-child relationship (Slade, 2005), in SUDs. Impaired RF in a parent with drug dependence can lead to difficulties in PRF, adversely influencing parent-child relations and the child's attachment patterns (Håkansson et al., 2018; Suchman et al., 2010). Persons with SUD show higher levels of uncertain RF (concrete, inflexible way of mentalizing of own or someone else's mind; Fonagy & Target, 2006) and impaired PRF (Handeland et al., 2019). Resting-state frontal electroencephalography (EEG) reports show: (a) enhanced beta and gamma spectral power reflecting higher arousal states and (b) positive correlation between delta spectral power and pre-mentalizing (a form of non-mentalizing/pretend mode where reality and perception do not match) in mothers with SUD (Ngoh et al., 2022). Maternal SUD is related to altered neural activity and adverse parent-child outcomes due to impaired PRF.

PRF also influences parental emotional availability, thereby affecting offspring's emotional states and forming the basis for adult attachments and emotion regulation, both of which show impairments in persons with SUDs (Luyten et al., 2017; Suchman et al., 2010).

Mentalizing difficulties can play a role in addictive food consumption, particularly in the presence of strong emotions (Innamorati et al., 2017). Women with binge-eating disorder (BED) and clinically overweight women reportedly exhibit lower RF, significantly contributing to BED over depression and interpersonal problems (Maxwell et al., 2017). Ciccarelli et al. (2021) showed that 'uncertainty about mental states' (Reflective Functioning Questionnaire-8 (RFQ-8) subscale) and emotion regulation problems, along with distorted patterns of thinking, were associated with adolescent gambling. RF deficits can cause rapid and inaccurate information processing and impair one's ability to form long-term goals leading to engagement in impulsive behaviors, such as gambling, to relieve negative emotional states in the short term (Cosenza et al., 2019). Hyper-mentalizing, or holding complex and rigid models of mind without adequate empirical evidence, has also been associated with gambling problems (Nigro et al., 2019).

Thus, accurate mental-state inference of self and others is vital for forming healthy attachments, emotional stability, and adequate self-regulation. RF deficits have been reported in the initiation and maintenance of problematic technology use (Musetti, Brazzi, et al., 2020). Although the addictive nature of PIU is still debatable, similarities with addictive disorders, when viewed through a developmental lens, deserve attention. Table 1 summarizes a handful of studies that have explored the role of RF in PIU and its various forms.

Table 1. *Summary of Studies Relating Reflective-Functioning (RF) to Various Forms of Problematic Internet Use (PIU).*

Author(s)	Aim	Mentalization-based variable		PIU-based variable		Theoretical model	Summary of findings
		Variable type	Tool	Variable type	Tool		
Musetti, Brazzi, et al. (2020)	Examine the role of childhood traumatic experiences, and RF in PMPU	RF (predictor)	RFQ-8	PMPU (outcome)	PMPU-SV	Moderated mediation model of traumatic experience, alexithymia, and Internet addiction (Schimmenti et al., 2017)	High mobile phone use, low RF and high childhood trauma predict PMPU
Musetti et al. (2021)	Examine the association between CEA and PSNSU	RF and self-other differentiation (mediator)	RFQ-u	PSNSU (outcome)	IAT-SNS	Attachment-oriented psychodynamic framework (Schimmenti & Caretti, 2010) and Compensatory Model of Internet Use (Kardefelt-Winther, 2014a)	History of CEA associated with PSNSU and relationship partially mediated by deficient self-other differentiation and uncertain RF
Borghesi et al. (2022)	Investigate the association between traumatic experiences, CIU, and RF	RF (mediator)	RFQ-8	CIU (outcome)	CIUS	Attachment-oriented psychodynamic framework (Schimmenti & Caretti, 2010)	Positive association between traumatic experiences, high RF uncertainty and compulsive Internet use
Imperato et al. (2022)	Examine the relationship between RF and adolescents' identity development, mediated by PSNSU	RF (independent)	RFQ-8	PSNSU (mediator)	IAT-SNS	Compensatory Model of Internet Use (Kardefelt-Winther, 2014a)	Negative association between RF and PSNSU; relationship between RF and Identity development problems mediated by PSNSU
Ciccarelli et al. (2022a)	Investigate common predictors of adolescent gambling and IGD	RF (predictor)	RFQ-8	IGD (outcome)	IGDS9-SF	No specific model discussed	Both gambling disorder and IGD in adolescents share common risk factors of male gender and impaired RF
Ciccarelli et al. (2022b)	Examine the role of mentalization, loneliness, psychological distress in problematic gaming behaviour	RF (predictor and mediator)	RFQ-8	IGD (outcome)	IGDS9-SF	Stress induced hyper-mentalization model (Bo et al., 2017)	Gender, anxiety, hyper-mentalizing, and loneliness are predictors of problematic gaming behaviour

Note. RFQ-8 = Reflective Functioning Questionnaire-8 items scale; PMPU-SV = Problematic Mobile Phone Use Questionnaire-Short Version; RFQ-u = Reflective Functioning Questionnaire-uncertain subscale; CEA = Childhood emotional abuse; IAT-SNS = Internet Addiction Test-Social Networking Site; CIU = Compulsive Internet Use; CIUS = Compulsive Internet Use Scale; IGDS9-SF = Internet Gaming Disorder Scale-Short Form.

Specific psychological factors are construed to underlie the reported relationships. Studies suggest that social features of the Internet might be overused as a maladaptive coping strategy by individuals with childhood adversities (Musetti, Brazzi, et al., 2020; Worsley et al., 2018). It might indicate an increased need to form virtual identities and connect to people online to deal with unpleasant emotional states and a perceived lack of social

connectedness offline (Benoit & DiTommaso, 2020; Schimmenti & Caretti, 2010). Negative emotionality and emotion dysregulation have been found to mediate the relationship between early trauma and excessive engagement in online behaviors (Lim et al., 2020). Individuals with emotional and relational problems offline might seek SNS platforms as a safer space to exist (Imperato et al., 2022). Deficits in RF might explain the existence of such emotional and social problems in the first place. The preponderance of unmet socio-emotional needs might explain the preference for predominantly one type of Internet use over another (i.e., social vs. non-social use and vice versa). This relationship, however, is still in its nascent stage of exploration.

The findings regarding psychosocial factors in PIU are not unequivocal. In a study using both behavioral and neuroimaging tools, Facebook use (a prominent SNS) was found to be associated with greater socio-semantic processing (i.e., assigning social meaning to one's environment) by its users as it requires interacting simultaneously with more extensive networks of online friends than one can interact with in real-life settings (Turel et al., 2018). The increased mentalizing in people with higher SNS use is also reflected in grey matter volume (GMV) changes in brain areas underlying reflective functions. It is unclear whether such brain volume differences were predisposing factors or outcomes of increased SNS use. Another study found that adolescents' use of Online Social Networks (OSN) like Facebook, Twitter, and Snapchat fostered their ToM abilities, helping them identify unethical marketing attempts online and better define their personal and social identities (Gentina et al., 2021). Some studies have observed Facebook's use to benefit users by enhancing social capital and adjustment (Ellison et al., 2007; C. C. Yang & Brown, 2015). However, none of these studies assessed whether Internet use was at problematic levels or its association with the emotional functioning of users. Such gaps offer the potential to clarify the psychosocial implications of modulated vs. problematic Internet-use.

Cognitive Empathy (Emotion Recognition and Perspective-Taking)

Empathy is a multidimensional concept with both cognitive and affective elements. Perspective-Taking (PT), i.e., the tendency to spontaneously adopt the psychological point of view of others, is the cognitive aspect of empathy (M. H. Davis, 1983). PT and recognition of emotions are crucial to affective mentalizing (Baron-Cohen & Wheelright, 2004; Perry & Shamay-Tsoory, 2013).

Multiple studies have reported deficits in facial emotion recognition in persons with alcohol use disorder (PwAUD; Attwood & Munafo, 2014; Castellano et al., 2015; Eastwood et al., 2020), with patients often showing recovery of deficits post abstinence (Erol et al., 2017). PwAUD are more likely to misidentify emotions as anger or disgust (Bora & Zorlu, 2016), and this negativity bias correlates with AUD severity (Freeman et al., 2018). Emotion recognition deficits are acquired from prolonged alcohol abuse and have adverse interpersonal implications that increase the risk of relapse (Kornreich et al., 2002; Quednow, 2020). PwAUD and non-dependant high-risk individuals with a family history of alcohol dependence have shown impaired emotion recognition on the Reading the Mind in the Eyes Task (RMET; Hill et al., 2007; Maurage et al., 2016). RMET, an experimental task consistently used for assessing affective ToM, cognitive empathy, and perspective-taking, involves choosing between four basic emotional states by looking at standardized pictures of the eye region (Baron-Cohen et al., 1997, 2001). However, other studies have reported intact cognitive but impaired affective subcomponent of empathy, indicating an emotional-affective pathology in PwAUD (Maurage et al., 2016; Nandrino et al., 2014). Some other studies report a contradictory effect of acute alcohol consumption in enhancing happy emotion decoding and fostering sociability (Dolder et al., 2017; Kano et al., 2003). Emotion recognition deficits have also been reported in abstinent cannabis (Bayrakçı et al., 2015), active methamphetamine (Y. T. Kim et al., 2011), opioid (Garland et al., 2017; Macfie et al., 2020), and cocaine (Decker et al., 2016) users.

Studies exploring affective mentalizing deficits in behavioral addictions also exist. There is evidence of impaired cognitive empathy and emotion recognition problems in persons with eating disorders, such as Anorexia Nervosa and BED (Kerr-Gaffney et al., 2019; Saure et al., 2022), and emotion dysregulation can trigger food addiction symptoms (Pivarunas & Conner, 2015). Multiple studies have reported significant deficits in affective and cognitive empathy in gambling behaviors (Hurel et al., 2019; Wu et al., 2022). A cross-generational study of video gamers revealed a negative association between the amount of time spent on games and cognitive empathy, as game playing reduces the need to infer mental states, thereby lessening the need to activate one's social brain (Shin & Ahn, 2013). Alexithymia (difficulty in identifying, verbalizing, and analyzing one's emotions) is conceptually related to cognitive empathy. It has been implicated in gambling disorders (Marchetti et al., 2019) with deficits in emotion identification in the form of over-identification of negative emotions leading to efforts at emotional suppression and experiential avoidance through excessive Internet gambling (Rogier & Velotti, 2018).

Summarized in Table 2 are a few PIU studies that used the RMET, the standard measuring tool for affective mentalizing. A handful of other PIU studies have used the perspective-taking (PT) subscale of the Interpersonal Reactivity Index (IRI), a direct measure of cognitive empathy or affective mentalizing. A few other studies have used alternative behavioral measures of emotion recognition, which reflects affective mentalizing.

Table 2. *Summary of Studies Relating Cognitive Empathy and Perspective-Taking (PT) to Various Forms of Problematic Internet Use (PIU).*

Author(s)	Main aim (s)	Mentalization-based variable		PIU-based variable		Theoretical model	Summary of findings
		Variable type	Tool	Variable type	Tool		
Melchers et al. (2015)	Examine the association between empathy and PIU	PT, as part of detailed empathy assessment (correlational)	IRI, EQ	PIU (correlational)	IAT	Social skill deficit and PIU (Caplan, 2005)	Low EQ associated with higher PIU
Z. Chen et al. (2017)	Examine the relationship between facial emotion recognition, stress, and Internet Addiction	Emotion Recognition (independent)	FERT	Internet Addiction (dependent)	IAT	Socio-cognitive model (Caplan, 2005), Evolutionary perspective, and Escape-from-self theory (Baumeister, 1990)	Positive relationship between disgust facial expression recognition and Internet Addiction mediated by stress
Hui et al. (2019)	Examining effect of cognitive vs. affective empathy on IGD symptoms	PT, as part of detailed empathy assessment (predictor)	Empathy component from PBT	IGD (outcome)	IGD criteria of DSM-5	Affect-oriented mediation and escape from reality model (Hui et al., 2019)	Perspective taking and empathic concern may have protective effect on IGD; personal distress and escape from reality motive may predict IGD
Chun et al. (2017)	Assessing the association between excessive smartphone use and facial emotional processing and behavioral activation/inhibition systems	Facial emotion processing (correlational)	Facial emotion discrimination task	Excessive smartphone use	SAPS	Neurocogniti-ve and neurophysio-logical models	Excessive smartphone use correlated with (a) failure of cognitive emotional processing, (b) neural deactivation of DLPFC and dACC and (c) approach behavior towards emotional rewards
Ge et al. (2017)	Exploring how Internet Addiction affects facial expression recognition	Facial expression recognition (correlational)	Chinese FAPS, Eye-tracking system	Internet Addiction (correlational)	Adolescent PIUS	Information processing deficit model	Variability in information processing in Internet Addiction vs. healthy controls with more complex negative emotion processing in former

Lachmann et al. (2018)	Explore the relationship between IAD, SUD, empathy, and life satisfaction	PT, as part of detailed empathy assessment (correlational)	IRI	IUD, SUD (correlational)	s-IAT, SAS	No specific model discussed	IUD, lower empathy, and lower life satisfaction are correlated; higher PT and lower SUD reported in Chinese males
Ünal-Aydın et al. (2020)	Examine the role of emotion recognition in SNS addiction	Emotion Recognition (independent)	IRI, EQ	SNS addiction (dependent)	SMAS	No specific model discussed	Emotion recognition and SNS addiction are negatively correlated and poor positive emotion recognition ability predicts SNS addiction
Aydın et al. (2020)	Examine the role of metacognitions and emotion recognition as predictors of IGD	Emotion Recognition (predictor)	RMET	IGD (outcome)	IGDT	Developmental pathology	Meta-worry and poor recognition of negative emotions predict IGD
Ünal-Aydın et al. (2021)	Investigate metacognitions and emotion recognition as predictors of PSNSU	Emotion Recognition and metacognitions (predictor)	Children's versions of RMET, MCQ	PSNSU (outcome)	BSMAS	Developmental pathology	Maladaptive metacogniti-ons, but not emotion recognition deficits, predict PSNSU
Dalvi-Esfahani et al. (2021)	Study the effect of EC empathic concern and PT on SMA, moderated by personality	PT (predictor)	IRI	SMA (outcome)	SMDS	No specific model discussed	Both EC and PT predict SMA with a moderating role played by extraversion
Arató et al. (2023)	Examine EFE-related functional brain changes in PIU and ESU	EFE Recognition (correlational)	FMRI during FERP	PIU and ESU (correlational)	PIUQ, SABAS	Neurocogniti-ve-functional brain model	PIU and ESU associated with amygdala's functional connections for cognitive control functions and social cognition

Note. EQ = Empathy Quotient; FERT/P = Facial Expression Recognition Task/Paradigm; PBT = Prosocial Personality Battery; SAPS = Smartphone Addiction Proneness Scale; DLPFC = Dorsolateral Prefrontal Cortex; dACC = Dorsal Anterior Cingulate Cortex; FAPS = Facial Affective Picture System; IUD = Internet Use Disorder; SUD = Smartphone Use Disorder; s-IAT = short-Internet Addiction Test; SAS = Smartphone Addiction Scale; SMAS = Social Media Addiction Scale; IGDT = Internet Gaming Disorder Test; MCQ = Metacognitions Questionnaire; SMA = Social Media Addiction; BSMAS = Bergen Social Media Addiction Scale; SMDS = Social Media Disorder Scale; EFE = Emotional Face Expression; FERP = Facial Emotion Recognition Paradigm; ESU = Excessive Smartphone Use; PIUQ = Problematic Internet Use Questionnaire; SABAS = Smartphone Application-Based Addiction Scale.

One of the earliest studies relating empathy and Internet use problems reported positive associations between emotional quotient (EQ) and PIU but none with any of the IRI subscales, particularly PT (Melchers et al., 2015). A study on IGD showed deficits in personal distress but not in empathic concern or PT (Hui et al., 2019). Studies have reported associations between IAD and difficulty identifying negative facial expressions (Z. Chen et al., 2017; Ge et al., 2017). A study on PIU using smartphones reported lower cognitive empathy reflected in poor PT skills (Lachmann et al., 2018). Studies exploring PSNSU have mixed observations, including both presence (Ünal-Aydın et al., 2020) and absence of emotion recognition deficits on the RMET (Ünal-Aydın et al., 2021). Another study reported empathic concern, and PT negatively predicted social media addiction (SMA), with the personality trait of extraversion negatively mediating this relationship (Dalvi-Esfahani et al., 2021). The only study, in the authors'

knowledge, assessing affective mentalizing in IGD, utilizing the RMET, reported insufficient ability of negative emotion recognition along with negative meta-worry (i.e., psychological distress and worry arising from a perceived loss of control over internal states; Aydin et al., 2020) in persons with IGD. Functional MRI of excessive smartphone users, when exposed to facial expression images, have reported functional alterations: (a) in connections between the amygdala and frontal cortex, and various cortical gyri (such as temporal, supramarginal, and cingulate; Arató et al., 2023), and (b) in the dorsolateral prefrontal and dorsal anterior cingulate cortices (Chun et al., 2017). These brain areas deal with emotion regulation, cognitive control of emotions, and social-cognitive functions (such as emotion recognition in social contexts). Studies using event-related potentials for exploring overall empathy have reported lowered discrimination of painful images at both early automatic (N200 amplitude; Wang et al., 2014) and later cognitive processing (P300 amplitude) levels (Jiao et al., 2017).

However, findings related to affective mentalizing and PIU are not free from inconsistencies. A study on cognitive and affective components of empathy in SMA found no significant relationship between the variables under study (Bhojak & Bapu, 2021). Turel et al. (2018) reported that MRI scans of excessive Facebook users show greater GMV in posterior regions of the left and right superior temporal gyri, which is associated with facial emotion perception, and in left and middle temporal gyri and left fusiform gyri, which deals with face recognition.

Although contradictions exist, studies have primarily indicated a deficit in mentalizing of affect in self and others, as reflected in poor cognitive empathy and emotion recognition, in persons with PIU. Individuals exhibiting PIU might be turning to negative Internet use patterns to maladaptively cope with negative emotional states (Aydin et al., 2020). The ability to infer emotional states and the re-appraisal of cognitions underlying emotions in self and others is a prerequisite to healthy emotion regulation (Tully et al., 2016). Emotion dysregulation has been associated with generalized PIU, specifically with PSNSU (Gioia et al., 2021; Quaglieri et al., 2021). Poor affective mentalizing would affect interpersonal functioning as accurate judgments about internal emotional states of self and others are central to social functioning (van Kleef et al., 2016).

The latest support for affective pathologies in PIU arrives with research in short-form video application (SVA) viewing (e.g., YouTube shorts and Instagram reels) and binge-watching (e.g., video streaming on Netflix and Voot) on mobile phones (Elhai, Levine, et al., 2017). There has been a proliferation in SVA-watching, which usually runs for 15 to 30 seconds and poses great addictive potential (Lu et al., 2022; X. Zhang et al., 2019), leading to constant scrolling behaviors seen in mobile phone users. Problematic series watching can lead to loss of control, poor sleep, and neglected overall health (Orosz et al., 2016). While reports claim that such non-social uses of the Internet are related to emotional suppression (Rozgonjuk & Elhai, 2021; J. Yang et al., 2022), boredom (Lu et al., 2022), and escape motivations (Starosta et al., 2021), other studies have identified positive binge motivations involving relaxation and experience of reward (Boca, 2017). Studies on binge-watching must surpass the disorder framework and identify specific watcher profiles showing irregular over-involvement and non-addictive patterns (Flayelle et al., 2017). Researchers need to consider the underlying motivations for binge or SVA watching. Reasons might range from enjoyable to problematic aspects, such as dealing with loneliness or as a maladaptive emotion regulation strategy (Flayelle et al., 2020; Rubenking & Bracken, 2018; Starosta et al., 2019).

There is a growing understanding of the roles of emotional and interpersonal problems in PIU. However, studies are yet to adopt a developmental conceptualization in explaining the differential role of cognitive and affective functions of mentalizing on emotion regulation and interpersonal functioning in the context of PIU. The authors thread the ongoing discussion in the upcoming sections by proposing a social-cognitive conceptualization of PIU.

A Social-Cognitive Conceptualization of PIU

Summarizing Extant Knowledge: From Bandura to the Present

Bandura (1989) first proposed a Social-Cognitive Theory (SCT) explaining human behavior in the context of social learning. According to his initial conceptualization, an interaction between cognitive expectations of positive and gratifying outcomes and beliefs about self-efficacy in certain behaviors influences a person's behavioral choices (Bandura, 1986, 1989). SCT has been applied to various human phenomena, like the choice of health-promoting vs. damaging behaviors (Bandura, 1998; Van Zundert et al., 2009), media consumption (Katz et al., 1974), and Internet usage (LaRose, 2001; LaRose et al., 2001). Researchers applying SCT to substance use explain how social facilitative outcome expectancies and beliefs of low self-efficacy to self-regulate can facilitate substance consumption in certain social situations (Gilles et al., 2006).

In the context of Internet use, SCT assumes: (a) users actively seek out applications that fulfill or gratify particular needs and (b) self-reflective beliefs around one's efficacy and self-regulation capacities influence the nature of use (LaRose, 2001; LaRose et al., 2001). SCT highlights that goal-directed Internet consumption to obtain desired gratifications is based on personal standards, social norms, and psychosocial functioning. This reciprocal transaction between the self, society, and behavior forms the crux of SCT.

SCT researchers begin with identifying common Internet uses, then computing the frequency or importance of those uses among users, and finally treating the data using factor analysis to secure gratification factors that correlate with PIU. Song et al. (2004) identified seven gratifying effects of Internet use: Virtual Community, Information Seeking, Aesthetic Experience, Monetary Compensation, Diversion, Personal Status, and Relationship Maintenance. Stafford et al. (2004) identified three groups of Internet use gratifications: Process (related to online resources, search engines, surfing, technology), Content (related to education, information, learning), and Social (related to chatting, interacting, making friends).

Thus, the SCT model of uses-and-gratifications (U&G), until the early 2000s, focused on motivations underlying the choice of media use while failing to focus on the effects of media use (So, 2012). Also, U&G research did not consider the role of emotions in media use. Building on these lacunae, SCT-based models of Internet use started connecting motivations to functional outcomes and considering the role of emotions in PIU.

Pourrazavi et al. (2014), using the SCT approach, identified that: (a) higher self-efficacy to avoid problematic mobile phone use (MPU) decreased the chance of excessive mobile phone use (EMPU), and (b) poor self-control, positive attitude towards MPU, observing others overuse, and poor self-regulation predicted EMPU. Wegmann et al. (2015) reported psychopathologies (depression and anxiety) and gratifications experienced through relief from negative emotions as predictive of SNS addiction. Caplan & High (2007), adopting a cognitive-behavioral approach based on social-cognitive literature, explained how interpersonal problems predispose one to prefer online social interactions leading to maladaptive emotions, poor self-regulation, and other adverse psychosocial outcomes. SCT has also influenced comprehensive models of PIU built by Brand et al. (2014, 2016, 2019) that need extensive empirical testing.

The U&G research has not yet related cognitive and affective mentalizing to one's interpersonal and emotional needs offline, whose gratification one seeks through specific online activities. Decoding mentalizing domains and their related psychological functions within the context of U&G theory might contribute to understanding the distal and proximal mechanisms underlying problematic and non-Problematic Internet Use.

A Mentalization-Based Conceptualization: Proposing Pathways to Social vs. Non-Social PIU

So far, the two primary motivators of PIU highlighted are: (a) emotional (i.e., to cope with negative affect) and (b) social (i.e., to compensate for offline interpersonal deficits; Kardefelt-Winther, 2014a; Musetti et al., 2021). Developmentally, a person's socio-emotional functioning is influenced by their capacity to mentalize, a crucial reflective mechanism for inferring internal psychological states that guide behavior. As seen in the above sections, studies exploring mentalizing correlates and predictors of PIU are gaining impetus. However, interactions between the proximal motivations and distal developmental factors in the context of PIU have not yet been unified. Further, the possibility of differential psychosocial pathways leading to two variants of PIU: predominantly social vs. predominantly non-social, needs to be examined.

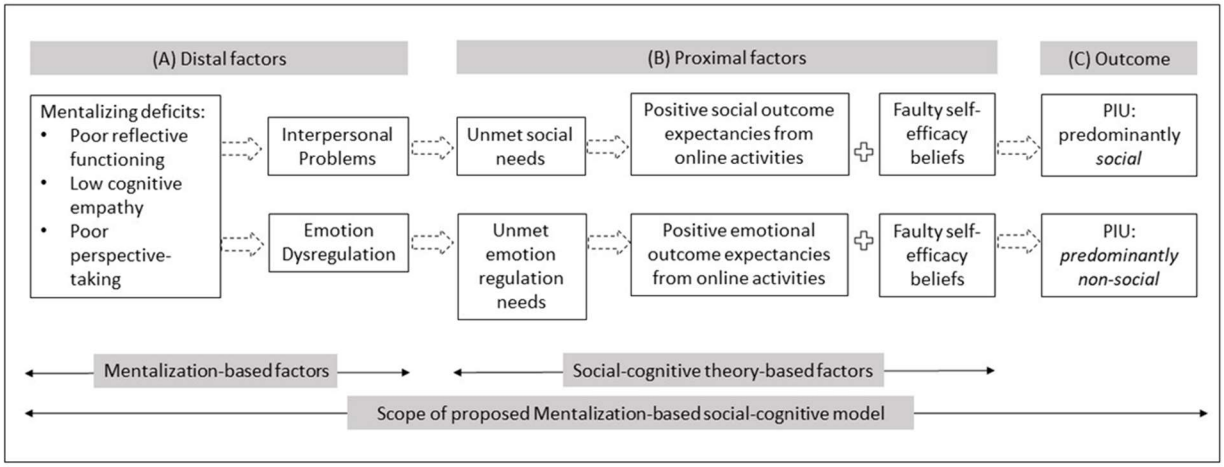
As discussed earlier, cognitive and affective mentalizing play crucial roles in interpersonal functioning by enabling one to connect behaviors to intentions, beliefs, and desires in self and others (Bateman & Fonagy, 2011). Likewise, an adequate ability to mentalize affect in self and others is necessary for affect regulation and empathy (Schwarzer et al., 2021; Shamay-Tsoory et al., 2010). Faulty decoding of internal states, in self and others, inadvertently makes affect regulation and interpersonal functioning difficult. Inter and intra-personal deficiencies are associated with SPIU and GPIU (Laier et al., 2018; Musetti, Corsano, et al., 2020). A unique qualitative exploration of IA/PIU, using a focus group approach, reported negative affective states (including sadness, depression, boredom, and stress) as triggers, and physical (including disturbed sleep and reduced exercise) and interpersonal problems as outcomes of PIU (Li et al., 2015). What might connect socio-emotional problems to Internet use problems are the positive expectancies one has from Internet use (Laier et al., 2018; LaRose et al., 2001). For example, certain individuals turn to online applications such as SVA to distract from emotional pain or turn to SNS to overcome experienced challenges of face-to-face interactions.

Reflecting on previously discussed PIU models, specific understandings have emerged. Pre-existing personality deficits have been hypothesized to interact with biological, psychological, and social-cognitive factors in predicting specific forms of PIU (e.g., Brand et al., 2016). Psychodynamic-oriented work has shown that mentalizing deficits embedded in early attachment wounds predispose one to emotion dysregulation and interpersonal problems leading to behavioral pathologies like PIU (e.g., Borghesi et al., 2022; Musetti, Brazzi, et al., 2020). Cognitive-behavioral theorists have contemplated the role of faulty cognitions like perceived lack of social support and social-skill deficits in developing a preference for online social interactions (Caplan, 2003, 2005; R. A. Davis, 2001). Social-cognitive models show how expectations of gratification from online applications, once obtained, increase the chances of frequent usage when coupled with faulty self-efficacy beliefs and deficient self-regulation (LaRose & Eastin, 2004).

The current authors take vital constructs of the proposed conceptual model from gaps in existing models. The new model collates psychosocial factors not previously tested as part of a unified framework. The model begins with mentalizing deficits that exist distally and develop through childhood and adolescence, resulting in emotional and interpersonal deficits reflected in habitual behavior patterns. However, these variables alone are not enough to explain PIU. Socio-emotional problems that give rise to unfulfilled needs lead to faulty choices of coping and managing unpleasant states via one of two routes: (a) an emotional route characterized by the overvaluation of negative emotional states leading to expressive suppression, emotional avoidance, escapism as coping strategies (Velotti et al., 2021), and (b) a social route characterized by the perception of low social support, the experience of social isolation, and loneliness leading to maladaptive behaviors to compensate for the social lacuna (Caplan, 2005, 2007). The authors hypothesize that the emotional route inclines one towards predominantly non-social and the social route to predominantly social Internet usage. They are not airtight compartments; one might also exhibit mixed social and non-social use patterns. Thus, social-cognitive deficits could help one draw unique profiles of Internet users and understand the psychosocial mechanisms involved in PIU. When individuals exhibiting mentalizing deficits and unmet socio-emotional needs go online and experience short-term relief from their concerns, their behaviors get reinforced. Such gratifications and unrealistically high or low self-efficacy beliefs about one's ability to control online engagement become ingredients for PIU.

No single model to date has considered the differential role of mentalizing deficits in developing social vs. non-social types of PIU. Also, studying users' motivations in the context of socio-emotional deficits would explain why a person chooses a particular application and whether underlying psychological processes differ between GPIU and SPIUs (such as SNS, SVA viewing, binge-watching, and online shopping, among others). Based on the above discussion, a novel model, which is a testable integration of existing evidence, is schematically explained in Figure 1.

Figure 1. *Proposed Mentalization-Based Social-Cognitive Model of PIU.*



Note. (A) distal mentalizing deficits including poor RF, low cognitive empathy, and poor PT as developmental factors predisposing one to difficulties in interpersonal functioning and emotion regulation, causing (B) dissatisfaction of socio-emotional needs, which when combined proximally with expected gratifications from specific online activities and faulty self-efficacy beliefs, result in maladaptive Internet-use, predominantly social or non-social, as a means of compensating for or maladaptively coping with existing social or emotional difficulties respectively.

Conclusion

Any new technology developed with human progress in mind has the potential of being misused, thereby overriding positive impacts with negative ones. The Internet has not been an exception to this. A growing number of online applications have inflated the dependence on mobile phones, laptops, tablets, and other gadgets connected to the World Wide Web. An addiction to or on the Internet has been identified with caution. Researchers worldwide are increasingly acknowledging the Internet's pathological nature while being careful not to over-pathologize an everyday behavior. The emerging line of research is replete with addiction models being applied to PIU. There is a need for an entirely new line of research to develop psychosocial models unique to specific Internet use patterns. Internet users are often responding to underlying socio-emotional needs by projecting themselves into a virtual world. There are several implications for studying self-reflective functions in determining these behavioral choices, and the current article suggests one potential conceptualization. The implication of mentalizing in self-organization, agency, impulse control, affect regulation, and behavioral regulation places the multidimensional construct at the core of various behavioral pathologies. Strengthening one's ability to reflect and regulate thoughts, emotions, and behaviors might preserve one's mental health while engaging in online social or non-social activities.

Finally, a psychosocial yardstick for identifying individuals at risk of developing PIU might be developed by correlating social-cognitive functioning to biomarkers (i.e., observed structural and functional changes in the brain) and digital markers (i.e., Internet use patterns including duration, timings, and types of use) of PIU (Fineberg et al., 2022). Future research focusing on delineating psychosocial markers of PIU could help develop guidelines for safe and adaptive technology use in a world where the Internet has become an almost indispensable part of everyday life.

Conflict of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Diya Chatterjee: conceptualization, methodology, investigation, resources, writing—original draft, writing—review & editing, visualization. **Rishabh Rai:** resources, writing—review & editing, supervision.

Acknowledgement

The authors would like to thank seniors and colleagues in the Department of Psychology, IIT-KGP whose insights helped conceptualize the manuscript.

References

Aboujaoude, E. (2010). Problematic Internet use: An overview. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, *9*(2), 85–90. https://doi.org/10.1002/j.2051-5545.2010.tb00278.x

Alavi, S. S., Ferdosi, M., Jannatifard, F., Eslami, M., Alaghemandan, H., & Setare, M. (2012). Behavioral addiction versus substance addiction: Correspondence of psychiatric and psychological views. *International Journal of Preventive Medicine, 3*(4), 290–294. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3354400/

Altbäcker, A., Plózer, E., Darnai, G., Perlaki, G., Horváth, R., Orsi, G., Nagy, S. A., Bogner, P., Schwarcz, A., Kovács, N., Komoly, S., Clemens, Z., & Janszky, J. (2016). Problematic Internet use is associated with structural alterations in the brain reward system in females. *Brain Imaging and Behavior, 10*(4), 953–959. https://doi.org/10.1007/s11682-015-9454-9

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington

Arató, Á., Nagy, S. A., Perlaki, G., Orsi, G., Szente, A. T., Kis-Jakab, G., Áfra, E., Alhour, H. A., Kovács, N., Janszky, J., & Darnai, G. (2023). Emotional face expression recognition in problematic Internet use and excessive smartphone use: Task-based fMRI study. *Scientific Reports, 13*(1), Article 354. https://doi.org/10.1038/s41598-022-27172-0

Attwood, A. S., & Munafò, M. R. (2014). Effects of acute alcohol consumption and processing of emotion in faces: Implications for understanding alcohol-related aggression. *Journal of Psychopharmacology, 28*(8), 719–732. https://doi.org/10.1177/0269881114536476

Aydın, O., Güçlü, M., Ünal-Aydın, P., & Spada, M. M. (2020). Metacognitions and emotion recognition in Internet gaming disorder among adolescents. *Addictive Behaviors Reports, 12*, Article 100296. https://doi.org/10.1016/j.abrep.2020.100296

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*(9), 1175–1184. https://doi.org/10.1037/0003-066X.44.9.1175

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health*, *13*(4), 623–649. https://doi.org/10.1080/08870449808407422

Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., Andreassen, C. S., & Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PloS One, 12*(1), Article e0169839. https://doi.org/10.1371/journal.pone.0169839

Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another advanced test of theory of mind: Evidence from very high functioning adults with autism or Asperger syndrome. *Journal of Child Psychology & Psychiatry, 38*(7), 813–822. https://doi.org/10.1111/j.1469-7610.1997.tb01599.x

Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, *34*(2), 163–175. https://doi.org/10.1023/B:JADD.0000022607.19833.00

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the Mind in the Eyes" Test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *The Journal of Child Psychology and Psychiatry*, *42*(2), 241–251. https://doi.org/10.1111/1469-7610.00715

Bateman, A. W., & Fonagy, P. (2011). *Handbook of mentalizing in mental health practice.* American Psychiatric Publishing. https://psycnet.apa.org/record/2011-19854-000

Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review, 97*(1), 90–113. https://doi.org/10.1037/0033-295x.97.1.90

Bayrakçı, A., Sert, E., Zorlu, N., Erol, A., Sarıçiçek, A., & Mete, L. (2015). Facial emotion recognition deficits in abstinent cannabis dependent patients. *Comprehensive Psychiatry, 58*, 160–164. https://doi.org/10.1016/j.comppsych.2014.11.008

Beard, C. L., Haas, A. L., Wickham, R. E., & Stavropoulos, V. (2017). Age of initiation and Internet gaming disorder: The role of self-esteem. *Cyberpsychology, Behavior, and Social Networking*, *20*(6), 397–401. https://doi.org/10.1089/cyber.2017.0011

Beaudoin, C., & Beauchamp, M. H. (2020). Social cognition. In A. Gallagher, C. Bulteau, D. Cohen, & J. L. Michaud (Eds.), *Handbook of clinical neurology* (Vol. 173, pp. 255–264). Elsevier. https://doi.org/10.1016/B978-0-444-64150-2.00022-8

Benoit, A., & DiTommaso, E. (2020). Attachment, loneliness, and online perceived social support. *Personality and Individual Differences, 167*, Article 110230. https://doi.org/10.1016/J.PAID.2020.110230

Bersani, F. S., Accinni, T., Carbone, G. A., Corazza, O., Panno, A., Prevete, E., Bernabei, L., Massullo, C., Burkauskas, J., Tarsitani, L., Pasquini, M., Biondi, M., Farina, B., & Imperatori, C. (2022). Problematic use of the Internet mediates the association between reduced mentalization and suicidal ideation: A cross-sectional study in young adults. *Healthcare, 10*(5), Article 948. https://doi.org/10.3390/healthcare10050948

Bhojak, A. K., & Bapu, V. K. G. (2021). Social media addiction and empathy among emerging adults. *Indian Journal of Mental Health, 8*(3), 247–253. https://doi.org/10.30877/IJMH.8.3.2021.247-253

Billieux, J. (2012). Problematic use of the mobile phone: A literature review and a pathways model. *Current Psychiatry Reviews*, *8*(4), 299–307. doi: 10.2174/157340012803520522

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports, 2*(2), 156-162. https://doi.org/10.1007/s40429-015-0054-y

Bo, S., Sharp, C., Fonagy, P., & Kongerslev, M. (2017). Hypermentalizing, attachment, and epistemic trust in adolescent BPD: Clinical illustrations. *Personality Disorders: Theory, Research, and Treatment, 8*(2), 172–182. https://doi.org/10.1037/per0000161

Boca, P. (2017). Binge-watchers. Behavior patterns and emotions. *Studia Universitatis Babeș-Bolyai Ephemerides, 62,* 5–27. https://doi.org/10.24193/subbeph.2017.2.01

Bora, E., & Zorlu, N. (2016). Social cognition in alcohol use disorder: A meta-analysis. *Addiction, 112*(1), 40–48. https://doi.org/10.1111/add.13486

Borghesi, F., Cipresso, P., Franceschini, C., Guglielmucci, F., & Musetti, A. (2022). Understanding the relationship between traumatic experiences and compulsive Internet use through the lens of mentalization: A mediation analysis. *Annual Review of Cybertherapy and Telemedicine, 20*, 121–126. https://hdl.handle.net/2318/1880902

Bracken, B. K., Rodolico, J., & Hill, K. P. (2013). Sex, age, and progression of drug use in adolescents admitted for substance use disorder treatment in the northeastern United States: Comparison with a national survey. *Substance Abuse, 34*(3), 263–272. https://doi.org/10.1080/08897077.2013.770424

Brand, M. (2022). Can Internet use become addictive? *Science, 376*(6595), 798–799. https://doi.org/10.1126/science.abn4189

Brand, M., Laier, C., & Young, K. S. (2014). Internet addiction: Coping styles, expectancies, and treatment implications. *Frontiers in Psychology*, *5*, Article 1256. https://doi.org/10.3389/fpsyg.2014.01256

Brand, M., Wegmann, E., Stark, R., Müller, A., Wölfling, K., Robbins, T. W., & Potenza, M. N. (2019). The interaction of person-affect-cognition-execution (I-PACE) model for addictive behaviors: Update, generalization to addictive behaviors beyond Internet-use disorders, and specification of the process character of addictive behaviors. *Neuroscience & Biobehavioral Reviews, 104*, 1–10. https://doi.org/10.1016/j.neubiorev.2019.06.032

Brand, M., Young, K. S., & Laier, C. (2014). Prefrontal control and Internet addiction: A theoretical model and review of neuropsychological and neuroimaging findings. *Frontiers in Human Neuroscience, 8,* Article 375. https://doi.org/10.3389/fnhum.2014.00375

Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An interaction of person-affect-cognition-execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews, 71*, 252–266. https://doi.org/10.1016/j.neubiorev.2016.08.033

Burleigh, T. L., Griffiths, M. D., Sumich, A., Wang, G. Y., & Kuss, D. J. (2020). Gaming disorder and Internet addiction: A systematic review of resting-state EEG studies. *Addictive Behaviors*, *107*, Article 106429. https://doi.org/10.1016/j.addbeh.2020.106429

Bussone, S., Trentini, C., Tambelli, R., & Carola, V. (2020). Early-life interpersonal and affective risk factors for pathological gaming. *Frontiers in Psychiatry, 11*, Article 423. https://doi.org/10.3389/fpsyt.2020.00423

Cai, Z., Mao, P., Wang, Z., Wang, D., He, J., & Fan, X. (2023). Associations between problematic Internet use and mental health outcomes of students: A meta-analytic review. *Adolescent Research Review, 8*(1), 45–62. https://doi.org/10.1007/s40894-022-00201-9

Canale, N., Moretta, T., Pancani, L., Buodo, G., Vieno, A., Dalmaso, M., & Billieux, J. (2021). A test of the pathway model of problematic smartphone use. *Journal of Behavioral Addictions, 10*(1), 181–193. https://doi.org/10.1556/2006.2020.00103

Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior, 18*(5), 553–575. https://doi.org/10.1016/S0747-5632(02)00004-3

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being. *Communication Research, 30*(6), 625–648. https://doi.org/10.1177/0093650203257842

Caplan, S. E. (2005). A social skill account of problematic Internet use. *Journal of Communication, 55*(4), 721–736. https://doi.org/10.1111/j.1460-2466.2005.tb03019.x

Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior, 26*(5), 1089–1097. https://doi.org/10.1016/j.chb.2010.03.012

Caplan, S. E., & High, A. C. (2007). Online social interaction, psychosocial well-being, and problematic Internet use. In K. S. Young & C. N. de Abreau (Eds.), *Internet addiction: A handbook and guide to evaluation and treatment* (pp. 35–53). https://doi.org/10.1002/9781118013991.ch3

Castellano, F., Bartoli, F., Crocamo, C., Gamba, G., Tremolada, M., Santambrogio, J., Clerici, M., & Carrà, G. (2015). Facial emotion recognition in alcohol and substance use disorders: A meta-analysis. *Neuroscience & Biobehavioral Reviews, 59*, 147–154. https://doi.org/10.1016/j.neubiorev.2015.11.001

Chang, F.-C., Chiu, C.-H., Lee, C.-M., Chen, P.-H., & Miao, N.-F. (2014). Predictors of the initiation and persistence of Internet addiction among adolescents in Taiwan. *Addictive Behaviors, 39*(10), 1434–1440. https://doi.org/10.1016/j.addbeh.2014.05.010

Chao, C.-M., Kao, K.-Y., & Yu, T.-K. (2020). Reactions to problematic Internet use among adolescents: Inappropriate physical and mental health perspectives. *Frontiers in Psychology, 11,* Article 1782. https://doi.org/10.3389/fpsyg.2020.01782

Chen, S.-H., Weng, L.-J., Su, Y.-J., Wu, H.-M., & Yang, P.-F. (2003). *Chinese Internet Addiction Scale—Revised (CIAS, CIAS-R)* [Database record]. APA PsycTests. https://doi.org/10.1037/t44491-000

Chen, Z., Poon, K.-T., & Cheng, C. (2017). Deficits in recognizing disgust facial expressions and Internet addiction: Perceived stress as a mediator. *Psychiatry Research, 254*, 211–217. https://doi.org/10.1016/j.psychres.2017.04.057

Chevalier, V., Simard, V., Achim, J., Burmester, P., & Beaulieu-Tremblay, T. (2021). Reflective functioning in children and adolescents with and without an anxiety disorder. *Frontiers in Psychology, 12,* Article 698654. https://doi.org/10.3389/fpsyg.2021.698654

Chun, J.-W., Choi, J., Kim, J.-Y., Cho, H., Ahn, K.-J., Nam, J.-H., Choi, J.-S., & Kim, D.-J. (2017). Altered brain activity and the effect of personality traits in excessive smartphone use during facial emotion processing. *Scientific Reports, 7*(1), Article 12156. https://doi.org/10.1038/s41598-017-08824-y

Ciccarelli, M., Cosenza, M., Nigro, G., Griffiths, M., & D'Olimpio, F. (2022). Gaming and gambling in adolescence: The role of personality, reflective functioning, time perspective and dissociation. *International Gambling Studies, 22*(1), 161–179. https://doi.org/10.1080/14459795.2021.1985583

Ciccarelli, M., Nigro, G., D'Olimpio, F., Griffiths, M. D., & Cosenza, M. (2021). Mentalizing failures, emotional dysregulation, and cognitive distortions among adolescent problem gamblers. *Journal of Gambling Studies, 37*(1), 283–298. https://doi.org/10.1007/s10899-020-09967-w

Ciccarelli, M., Nigro, G., D'Olimpio, F., Griffiths, M. D., Sacco, M., Pizzini, B., & Cosenza, M. (2022). The associations between loneliness, anxiety, and problematic gaming behavior during the COVID-19 pandemic: The mediating role of mentalization. *Mediterranean Journal of Clinical Psychology, 10*(1). https://pesquisa.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/resource/pt/covidwho-1863350

Cosenza, M., Ciccarelli, M., & Nigro, G. (2019). The steamy mirror of adolescent gamblers: Mentalization, impulsivity, and time horizon. *Addictive Behaviors, 89*, 156–162. https://doi.org/10.1016/j.addbeh.2018.10.002

Dahl, D., & Bergmark, K. H. (2020). Problematic Internet use: A scoping review–longitudinal research on a contemporary social problem, 2006–2017. *Nordic Studies on Alcohol and Drugs*, *37*(6), 497–525. https://doi.org/10.1177/1455072520941997

Dai, C., Tai, Z., & Ni, S. (2021). Smartphone use and psychological well-being among college students in China: A qualitative assessment. *Frontiers in Psychology, 12*, Article 708970. https://doi.org/10.3389/fpsyg.2021.708970

Dailey, S. L., Howard, K., Roming, S. M. P., Ceballos, N., & Grimes, T. (2020). A biopsychosocial approach to understanding social media addiction. *Human Behavior and Emerging Technologies*, *2*(2), 158–167. https://doi.org/10.1002/hbe2.182

Dalvi-Esfahani, M., Niknafs, A., Alaedini, Z., Ahmadabadi, H. B., Kuss, D. J., & Ramayah, T. (2021). Social media addiction and empathy: Moderating impact of personality traits among high school students. *Telematics and Informatics, 57*, Article 101516. https://doi.org/10.1016/j.tele.2020.101516

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113–126. https://doi.org/10.1037/0022-3514.44.1.113

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*, *17*(2), 187–195. https://doi.org/10.1016/S0747-5632(00)00041-8

Davis, R. A., Flett, G. L., & Besser, A. (2002). *Online Cognition Scale (OCS)* [Database record]. APA PsycTests. https://doi.org/10.1037/t44755-000

Debbané, M., Benmiloud, J., Salaminios, G., Solida-Tozzi, A., Armando, M., Fonagy, P., & Bateman, A. (2016). Mentalization-based treatment in clinical high-risk for psychosis: A rationale and clinical illustration. *Journal of Contemporary Psychotherapy, 46*(4), 217–225. https://doi.org/10.1007/s10879-016-9337-4

Decker, S. E., Morie, K., Hunkele, K., Babuscio, T., & Carroll, K. M. (2016). Emotion regulation strategies in individuals with cocaine use disorder maintained on methadone. *The American Journal on Addictions*, *25*(7), 529–532. https://doi.org/10.1111/ajad.12439

Diotaiuti, P., Mancone, S., Corrado, S., De Risio, A., Cavicchiolo, E., Girelli, L., & Chirico, A. (2022). Internet addiction in young adults: The role of impulsivity and codependency. *Frontiers in Psychiatry*, *13*, Article 893861. https://doi.org/10.3389/fpsyt.2022.893861

Dolder, P. C., Holze, F., Liakoni, E., Harder, S., Schmid, Y., & Liechti, M. E. (2017). Alcohol acutely enhances decoding of positive emotions and emotional concern for positive stimuli and facilitates the viewing of sexual images. *Psychopharmacology, 234*(1), 41–51. https://doi.org/10.1007/s00213-016-4431-6

Eastwood, A. P., Penton-Voak, I. S., Munafò, M. R., & Attwood, A. S. (2020). Effects of acute alcohol consumption on emotion recognition in high and low trait aggressive drinkers. *Journal of Psychopharmacology*, *34*(11), 1226–1236. https://doi.org/10.1177/0269881120922951

Elhai, J. D., Hall, B. J., Levine, J. C., & Dvorak, R. D. (2017). Types of smartphone usage and relations with problematic smartphone behaviors: The role of content consumption vs. social smartphone use. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 11*(2), Article 3. https://doi.org/10.5817/CP2017-2-3

Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2017). Non-social features of smartphone use are most related to depression, anxiety and problematic smartphone use. *Computers in Human Behavior, 69*, 75–82. http://dx.doi.org/10.1016/j.chb.2016.12.023

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*(4), 1143–1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

Erol, A., Akyalcin Kirdok, A., Zorlu, N., Polat, S., & Mete, L. (2017). Empathy, and its relationship with cognitive and emotional functions in alcohol dependency. *Nordic Journal of Psychiatry, 71*(3), 205–209. https://doi.org/10.1080/08039488.2016.1263683

Fineberg, N. A., Menchón, J. M., Hall, N., Dell'Osso, B., Brand, M., Potenza, M. N., Chamberlain, S. R., Cirnigliaro, G., Lochner, C., Billieux, J., Demetrovics, Z., Rumpf, H. J., Müller, A., Castro-Calvo, J., Hollander, E., Burkauskas, J., Grünblatt, E., Walitza, S., Corazza, O., … Zohar, J. (2022). Advances in problematic usage of the Internet research - A narrative review by experts from the European network for problematic usage of the Internet. *Comprehensive Psychiatry*, *118*, Article 152346. https://doi.org/10.1016/j.comppsych.2022.152346

Fioravanti, G., Casale, S., Benucci, S. B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. *Computers in Human Behavior, 122*, Article 106839. https://doi.org/10.1016/j.chb.2021.106839

Flayelle, M. (2020). *Improving the understanding of binge-watching behavior: An exploration of its underlying psychological processes* [Doctoral dissertation, University of Luxembourg]. ORBilu. https://orbilu.uni.lu/handle/10993/42598

Flayelle, M., Brevers, D., King, D. L., Maurage, P., Perales, J. C., & Billieux, J. (2023). A taxonomy of technology design features that promote potentially addictive online behaviours. *Nature Reviews Psychology, 2*(3), 136–150. https://doi.org/10.1038/s44159-023-00153-4

Flayelle, M., Maurage, P., & Billieux, J. (2017). Toward a qualitative understanding of binge-watching behaviors: A focus group approach. *Journal of Behavioral Addictions, 6*(4), 457–471. https://doi.org/10.1556/2006.6.2017.060

Flayelle, M., Maurage, P., Di Lorenzo, K. R., Vögele, C., Gainsbury, S. M., & Billieux, J. (2020). Binge-watching: What do we know so far? A first systematic review of the evidence. *Current Addiction Reports, 7*(1), 44–60. https://doi.org/10.1007/s40429-020-00299-8

Flayelle, M., Maurage, P., Karila, L., Vögele, C., & Billieux, J. (2019). Overcoming the unitary exploration of binge-watching: A cluster analytical approach. *Journal of Behavioral Addictions, 8*(3), 586–602. https://doi.org/10.1556/2006.8.2019.53

Flayelle, M., Maurage, P., Vögele, C., Karila, L., & Billieux, J. (2019). Time for a plot twist: Beyond confirmatory approaches to binge-watching research. *Psychology of Popular Media Culture, 8*(3), 308–318. https://doi.org/10.1037/ppm0000187

Fonagy, P. (2018). *Attachment theory and psychoanalysis*. Routledge. https://doi.org/10.4324/9780429472060

Fonagy, P., & Allison, E. (2012). What is mentalization? The concept and its foundations in developmental research. In N. Midgley & I. Vrouva (Eds.), *Minding the child: Mentalization-based interventions with children, young people and their families* (pp. 11–34). Routledge. https://psycnet.apa.org/record/2012-09926-001

Fonagy, P., & Bateman, A. W. (2007). Mentalizing and borderline personality disorder. *Journal of Mental Health, 16*(1), 83–101. https://doi.org/10.1080/09638230601182045

Fonagy, P., & Bateman, A. W. (2016). Adversity, attachment, and mentalizing. *Comprehensive Psychiatry, 64*, 59–66. https://doi.org/10.1016/j.comppsych.2015.11.006

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2018). *Affect regulation, mentalization, and the development of the self*. Routledge. https://doi.org/10.4324/9780429471643

Fonagy, P., & Luyten, P. (2018). Conduct problems in youth and the RDoC approach: A developmental, evolutionary-based view. *Clinical Psychology Review, 64*, 57–76. https://doi.org/10.1016/j.cpr.2017.08.010

Fonagy, P., & Target, M. (2006). The mentalization-focused approach to self pathology. *Journal of Personality Disorders, 20*(6), 544–76. https://doi.org/10.1521/pedi.2006.20.6.544

Fonagy, P., & Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Development and Psychopathology, 9*(4), 679–700. https://doi.org/10.1017/s0954579497001399

Fonagy, P., & Target, M. (2003). *Psychoanalyse und die Psychopathologie der Entwicklung* [Psychoanalytic theories: Perspectives from developmental psychopathology]. Klett-Cotta. https://api.semanticscholar.org/CorpusID:142664754

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). *Reflective-functioning manual version 5 for application to adult attachment interviews.* UCL Discovery. https://discovery.ucl.ac.uk/id/eprint/1461016

Freeman, C. R., Wiers, C. E., Sloan, M. E., Zehra, A., Ramirez, V., Wang, G. J., & Volkow, N. D. (2018). Emotion recognition biases in alcohol use disorder. *Alcoholism: Clinical and Experimental Research, 42*(8), 1541–1547. https://doi.org/10.1111/acer.13802

Gagliardini, G., Gullo, S., Tinozzi, V., Baiano, M., Balestrieri, M., Todisco, P., Schirone, T., & Colli, A. (2020). Mentalizing subtypes in eating disorders: A latent profile analysis. *Frontiers in Psychology, 11*, Article 564291. https://doi.org/10.3389/fpsyg.2020.564291

Garland, E. L., Bryan, C. J., Nakamura, Y., Froeliger, B., & Howard, M. O. (2017). Deficits in autonomic indices of emotion regulation and reward processing associated with prescription opioid use and misuse. *Psychopharmacology*, *234*(4), 621–629. https://doi.org/10.1007/s00213-016-4494-4

Gentina, E., Chen, R., & Yang, Z. (2021). Development of theory of mind on online social networks: Evidence from Facebook, Twitter, Instagram, and Snapchat. *Journal of Business Research, 124*, 652–666. https://doi.org/10.1016/j.jbusres.2020.03.001

Ge, Y., Zhong, X., & Luo, W. (2017). Recognition of facial expressions by urban Internet-Addicted Left-Behind children in China. *Psychological Reports, 120*(3), 391–407. https://doi.org/10.1177/0033294117697083

Gilles, D. M., Turk, C. L., & Fresco, D. M. (2006). Social anxiety, alcohol expectancies, and self-efficacy as predictors of heavy drinking in college students. *Addictive Behaviors, 31*(3), 388–398. https://doi.org/10.1016/j.addbeh.2005.05.020

Gioia, F., Rega, V., & Boursier, V. (2021). Problematic Internet use and emotional dysregulation among young people: A literature review. *Clinical Neuropsychiatry, 18*(1), 41–54. https://doi.org/10.36131/cnfioritieditore20210104

Górska, D., & Marszał, M. (2014). Mentalizacja i teoria umysłu w organizacji osobowości borderline--róznice pomiedzy afektywnymi i poznawczymi aspektami poznania społecznego w patologii emocjonalnej [Mentalization and Theory of Mind in borderline personality organization: Exploring the differences between affective and cognitive aspects of social cognition in emotional pathology]. *Psychiatria Polska*, *48*(3), 503–513. https://www.psychiatriapolska.pl/Mentalizacja-i-teoria-umyslu-w-organizacji-osobowosci-borderline-roznice-pomiedzy-afektywnymi-i-poznawczymi-aspektami-poznania-spolecznego-w-patologii-emocjonalnej,58178,0,2.html

Granero, R., Fernández-Aranda, F., Mestre-Bach, G., Steward, T., Baño, M., Del Pino-Gutiérrez, A., Moragas, L., Mallorquí-Bagué, N., Aymamí, N., Gómez-Peña, M., Tárrega, S., Menchón, J. M., & Jiménez-Murcia, S. (2016). Compulsive buying behavior: Clinical comparison with other behavioral addictions. *Frontiers in Psychology*, *7*, Article 914. https://doi.org/10.3389/fpsyg.2016.00914

Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2010). Introduction to behavioral addictions. *The American Journal of Drug and Alcohol Abuse, 36*(5), 233–241. https://doi.org/10.3109/00952990.2010.491884

Håkansson, U., Söderström, K., Watten, R., Skårderud, F., & Øie, M. G. (2018). Parental reflective functioning and executive functioning in mothers with substance use disorder. *Attachment & Human Development, 20*(2), 181–207. https://doi.org/10.1080/14616734.2017.1398764

Handeland, T. B., Kristiansen, V. R., Lau, B., Håkansson, U., & Øie, M. G. (2019). High degree of uncertain reflective functioning in mothers with substance use disorder. *Addictive Behaviors Reports*, *10*, Article 100193. https://doi.org/10.1016/j.abrep.2019.100193

Hao, Z., Jin, L., Huang, J., & Wu, H. (2022). Stress, academic burnout, smartphone use types and problematic smartphone use: The moderation effects of resilience. *Journal of Psychiatric Research, 150*, 324–331. https://doi.org/10.1016/j.jpsychires.2022.03.019

He, Q., Turel, O., & Bechara, A. (2017). Brain anatomy alterations associated with social networking site (SNS) addiction. *Scientific Reports, 7*(1), Article 45064. https://doi.org/10.1038/srep45064

Hill, S. Y., Kostelnik, B., Holmes, B., Goradia, D., McDermott, M., Diwadkar, V., & Keshavan, M. (2007). fMRI BOLD response to the eyes task in offspring from multiplex alcohol dependence families. *Alcoholism: Clinical and Experimental Research, 31*(12), 2028–2035. https://doi.org/10.1111/j.1530-0277.2007.00535.x

Hui, B. P. H., S. Wu, A. M., & Pun, N. (2019). Disentangling the effects of empathy components on Internet gaming disorder: A study of vulnerable youth in China. *Journal of Behavioral Addictions, 8*(1), 181–189. https://akjournals.com/view/journals/2006/8/1/article-p181.xml

Hurel, E., Challet-Bouju, G., Bukowski, N., Eyzop, E., & Grall-Bronnec, M. (2019). Gambling and social cognition: A systematic review. *Current Addiction Reports, 6*, 547–555. https://doi.org/10.1007/s40429-019-00280-0

Hussain, Z., & Griffiths, M. D. (2018). Problematic social networking site use and comorbid psychiatric disorders: A systematic review of recent large-scale studies. *Frontiers in Psychiatry*, *9*, Article 686. https://doi.org/10.3389/fpsyt.2018.00686

Hussain, Z., & Wegmann, E. (2021). Problematic social networking site use and associations with anxiety, attention deficit hyperactivity disorder, and resilience. *Computers in Human Behavior Reports, 4*, Article 100125. https://doi.org/10.1016/j.chbr.2021.100125

Ilzarbe, D., Lukito, S., Moessnang, C., O'Daly, O. G., Lythgoe, D. J., Murphy, C. M., Ashwood, K., Stoencheva, V., Rubia, K., & Simonoff, E. (2020). Neural correlates of theory of mind in autism spectrum disorder, attention-

deficit/hyperactivity disorder, and the comorbid condition. *Frontiers in Psychiatry*, *11*, Article 544482. https://doi.org/10.3389/fpsyt.2020.544482

Imperato, C., Mancini, T., & Musetti, A. (2022). Exploring the role of problematic social network site use in the link between reflective functioning and identity processes in adolescents. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-022-00800-6

Innamorati, M., Imperatori, C., Harnic, D., Erbuto, D., Patitucci, E., Janiri, L., Lamis, D. A., Pompili, M., Tamburello, S., & Fabbricatore, M. (2017). Emotion regulation and mentalization in people at risk for food addiction. *Behavioral Medicine, 43*(1), 21–30. https://doi.org/10.1080/08964289.2015.1036831

Isaksson, J., Van't Westeinde, A., Cauvet, É., Kuja-Halkola, R., Lundin, K., Neufeld, J., Willfors, C., & Bölte, S. (2019). Social cognition in autism and other neurodevelopmental disorders: A co-twin control study. *Journal of Autism and Developmental Disorders*, *49*(7), 2838–2848. https://doi.org/10.1007/s10803-019-04001-4

Jiao, C., Wang, T., Peng, X., & Cui, F. (2017). Impaired empathy processing in individuals with Internet addiction disorder: An event-related potential study. *Frontiers in Human Neuroscience, 11*, Article 498. https://doi.org/10.3389/fnhum.2017.00498

Jorgenson, A. G., Hsiao, R. C.-J., & Yen, C.-F. (2016). Internet addiction and other behavioral addictions. *Child and Adolescent Psychiatric Clinics*, *25*(3), 509–520. https://doi.org/10.1016/j.chc.2016.03.004

Kaess, M., Durkee, T., Brunner, R., Carli, V., Parzer, P., Wasserman, C., Sarchiapone, M., Hoven, C., Apter, A., Balazs, J., Balint, M., Bobes, J., Cohen, R., Cosman, D., Cotter, P., Fischer, G., Floderus, B., Iosue, M., Haring, C., Kahn, J. P., … Wasserman, D. (2014). Pathological Internet use among European adolescents: Psychopathology and self-destructive behaviours. *European Child & Adolescent Psychiatry*, *23*(11), 1093–1102. https://doi.org/10.1007/s00787-014-0562-7

Kano, M., Gyoba, J., Kamachi, M., Mochizuki, H., Hongo, M., & Yanai, K. (2003). Low doses of alcohol have a selective effect on the recognition of happy facial expressions. *Human Psychopharmacology*, *18*(2), 131–139. https://doi.org/10.1002/hup.440

Kaptsis, D., King, D. L., Delfabbro, P. H., & Gradisar, M. (2016). Withdrawal symptoms in Internet gaming disorder: A systematic review. *Clinical Psychology Review, 43*, 58–66. https://doi.org/10.1016/j.cpr.2015.11.006

Kardefelt-Winther, D. (2014a). A conceptual and methodological critique of Internet addiction research: Towards a model of compensatory Internet use. *Computers in Human Behavior, 31*, 351–354. https://doi.org/10.1016/j.chb.2013.10.059

Kardefelt-Winther, D. (2014b). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior, 38*, 68-74. https://doi.org/10.1016/j.chb.2014.05.020

Kardefelt-Winther, D., Heeren, A., Schimmenti, A., van Rooij, A., Maurage, P., Carras, M., Edman, J., Blaszczynski, A., Khazaal, Y., & Billieux, J. (2017). How can we conceptualize behavioral addiction without pathologizing common behaviors? *Addiction, 112*(10), 1709–1715. https://doi.org/10.1111/ADD.13763

Karim, R., & Chaudhri, P. (2012). Behavioral addictions: An overview. *Journal of Psychoactive Drugs, 44*(1), 5–17. https://doi.org/10.1080/02791072.2012.662859

Katz, E., Blumler, J. G., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communications: Current perspectives on gratifications research* (pp. 19–31). Sage Publications.

Kelley, K. J., & Gruber, E. M. (2013). Problematic Internet use and physical health. *Journal of Behavioral Addictions*, *2*(2), 108–112. https://doi.org/10.1556/jba.1.2012.016

Kerr-Gaffney, J., Harrison, A., & Tchanturia, K. (2019). Cognitive and affective empathy in eating disorders: A systematic review and meta-analysis. *Frontiers in Psychiatry*, *10*, Article 102. https://doi.org/10.3389/fpsyt.2019.00102

Kim, H. S., & Hodgins, D. C. (2018). Component model of addiction treatment: A pragmatic transdiagnostic treatment model of behavioral and substance addictions. *Frontiers in Psychiatry*, *9*, 406. https://doi.org/10.3389/fpsyt.2018.00406

Kim, Y. T., Kwon, D. H., & Chang, Y. (2011). Impairments of facial emotion recognition and theory of mind in methamphetamine abusers. *Psychiatry Research*, *186*(1), 80–84. https://doi.org/10.1016/j.psychres.2010.06.027

Kornreich, C., Philippot, P., Foisy, M.-L., Blairy, S., Raynaud, E., Dan, B., Hess, U., Noël, X., Pelc, I., & Verbanck, P. (2002). Impaired emotional facial expression recognition is associated with interpersonal problems in alcoholism. *Alcohol and Alcoholism, 37*(4), 394–400. https://doi.org/10.1093/alcalc/37.4.394

Kozak, K., Lucatch, A. M., Lowe, D. J., Balodis, I. M., MacKillop, J., & George, T. P. (2019). The neurobiology of impulsivity and substance use disorders: Implications for treatment. *Annals of the New York Academy of Sciences*, *1451*(1), 71–91. https://doi.org/10.1111/nyas.13977

Kühn, S., & Gallinat, J. (2015). Brains online: Structural & functional correlates of habitual Internet use. *Addiction Biology, 20*(2), 415–422. https://doi.org/10.1111/adb.12128

Kuss, D. J. (2013). Internet gaming addiction: Current perspectives. *Psychology Research and Behavior Management*, *6*, 125–137. https://doi.org/10.2147/PRBM.S39476

Kuss, D. J., & Griffiths, M. D. (2012). Internet and gaming addiction: A systematic literature review of neuroimaging studies. *Brain Sciences*, *2*(3), 347–374. https://doi.org/10.3390/brainsci2030347

Kuss, D. J., & Griffiths, M. D. (2015). Internet addiction treatment: The therapists' view. In *Internet addiction in psychotherapy* (pp. 6–14). Palgrave Pivot. https://doi.org/10.1057/9781137465078_2

Kuss, D. J., & Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. *World Journal of Psychiatry, 6*(1), 143–176. https://doi.org/10.5498/wjp.v6.i1.143

Lachmann, B., Sindermann, C., Sariyska, R. Y., Luo, R., Melchers, M. C., Becker, B., Cooper, A. J., & Montag, C. (2018). The Role of Empathy and Life Satisfaction in Internet and Smartphone Use Disorder. *Frontiers in Psychology*, 9, 398. https://doi.org/10.3389/fpsyg.2018.00398

Laconi, S., Rodgers, R. F., & Chabrol, H. (2014). The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. *Computers in Human Behavior, 41*, 190–202. https://doi.org/10.1016/j.chb.2014.09.026

Laier, C., Wegmann, E., & Brand, M. (2018). Personality and cognition in gamers: Avoidance expectancies mediate the relationship between maladaptive personality traits and symptoms of Internet-Gaming Disorder. *Frontiers in Psychiatry, 9*, 304. https://doi.org/10.3389/fpsyt.2018.00304

Lam, L. T., & Peng, Z. W. (2010). Effect of pathological use of the Internet on adolescent mental health: A prospective study. *Archives of Pediatrics & Adolescent Medicine, 164*(10), 901–906. https://doi.org/10.1001/archpediatrics.2010.159

LaRose, R. (2001). On the negative effects of e-commerce: A sociocognitive exploration of unregulated on-line buying. *Journal of Computer-Mediated Communication*, *6*(3), JCMC631. https://doi.org/10.1111/j.1083-6101.2001.tb00120.x

LaRose, R., & Eastin, M. S. (2004). A social cognitive theory of Internet uses and gratifications: Toward a new model of media attendance. *Journal of Broadcasting & Electronic Media*, *48*(3), 358–377. https://doi.org/10.1207/s15506878jobem4803_2

LaRose, R., Mastro, D., & Eastin, M. S. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social Science Computer Review*, *19*(4), 395–413. https://doi.org/10.1177/089443930101900401

Lee, H. W., Choi, J. S., Shin, Y. C., Lee, J. Y., Jung, H. Y., & Kwon, J. S. (2012). Impulsivity in Internet addiction: A comparison with pathological gambling. *Cyberpsychology, Behavior, and Social Networking*, *15*(7), 373–377. https://doi.org/10.1089/cyber.2012.0063

Leng, Y., He, X., Zhu, B., Li, P., Xiao, C., & He, W. (2019). The craving and excitement of social networking sites addicts: Based on cue-reactivity. *Frontiers in Psychology*, *10*, Article 1717. https://doi.org/10.3389/fpsyg.2019.01717

Li, W., O'Brien, J. E., Snyder, S. M., & Howard, M. O. (2015). Characteristics of Internet addiction/pathological Internet use in US university students: A qualitative-method investigation. *PloS One, 10*(2), Article e0117372. https://Doi.org/10.1371/journal.pone.0117372

Lim, M. S. M., Cheung, F. Y. L., Kho, J. M., & Tang, C. S.-K. (2020). Childhood adversity and behavioral addictions: The mediating role of emotion dysregulation and depression in an adult community sample. *Addiction Research & Theory, 28*(2), 116–123. https://doi.org/10.1080/16066359.2019.1594203

Lu, L., Liu, M., Ge, B., Bai, Z., & Liu, Z. (2022). Adolescent addiction to short video applications in the mobile Internet era. *Frontiers in Psychology, 13,* Article 893599. https://doi.org/10.3389/fpsyg.2022.893599

Luyten, P., Campbell, C., Allison, E., & Fonagy, P. (2020). The mentalizing approach to psychopathology: State of the art and future directions. *Annual Review of Clinical Psychology*, *16*, 297–325. https://doi.org/10.1146/annurev-clinpsy-071919-015355

Luyten, P., Malcorps, S., & Fonagy, P. (2021). Adolescent brain development and the development of mentalizing. In T. Rossouw, M. Wiwe, & I. Vrouva (Eds.), *Mentalization-based treatment for adolescents—A practical treatment guide* (pp. 25–40). Routledge. https://doi.org/10.4324/9780429323928

Luyten, P., Mayes, L. C., Nijssens, L., & Fonagy, P. (2017). The parental reflective functioning questionnaire: Development and preliminary validation. *PloS One, 12*(5), Article e0176218. https://doi.org/10.1371/journal.pone.0176218

Macfie, J., Zvara, B. J., Stuart, G. L., Kurdziel-Adams, G., Kors, S. B., Fortner, K. B., Towers, C. T., Gorrondona, A. M., & Noose, S. K. (2020). Pregnant women's history of childhood maltreatment and current opioid use: The mediating role of reflective functioning. *Addictive Behaviors, 102*, Article 106134. https://doi.org/10.1016/j.addbeh.2019.106134

Majuri, J., Joutsa, J., Johansson, J., Voon, V., Alakurtti, K., Parkkola, R., Lahti, T., Alho, H., Hirvonen, J., Forsback, S., & Kaasinen, V. (2017). Dopamine and opioid neurotransmission in behavioral addictions: A comparative PET study in pathological gambling and binge eating. *Neuropsychopharmacology, 42*(5), 1169–1177. https://doi.org/10.1038/npp.2016.265

Marchetti, D., Verrocchio, M. C., & Porcelli, P. (2019). Gambling problems and alexithymia: A systematic review. *Brain Sciences, 9*(8), Article 191. https://doi.org/10.3390/brainsci9080191

Maurage, P., D'Hondt, F., de Timary, P., Mary, C., Franck, N., & Peyroux, E. (2016). Dissociating affective and cognitive theory of mind in recently detoxified alcohol-dependent individuals. *Alcoholism: Clinical and Experimental Research, 40*(9), 1926–1934. https://doi.org/10.1111/acer.13155

Maxwell, H., Tasca, G. A., Grenon, R., Faye, M., Ritchie, K., Bissada, H., & Balfour, L. (2017). The role of coherence of mind and reflective functioning in understanding binge-eating disorder and co-morbid overweight. *Attachment & Human Development*, *19*(4), 407–424. https://doi.org/10.1080/14616734.2017.1318934

Melchers, M., Li, M., Chen, Y., Zhang, W., & Montag, C. (2015). Low empathy is associated with problematic use of the Internet: Empirical evidence from China and Germany. *Asian Journal of Psychiatry, 17*, 56–60. https://doi.org/10.1016/j.ajp.2015.06.019

Meule, A., & Gearhardt, A. N. (2014). Food addiction in the light of DSM-5. *Nutrients, 6*(9), 3653–3671. https://doi.org/10.3390/nu6093653

Moss, H. B., Chen, C. M., & Yi, H. Y. (2014). Early adolescent patterns of alcohol, cigarettes, and marijuana polysubstance use and young adult substance use outcomes in a nationally representative sample. *Drug and Alcohol Dependence*, *136*, 51–62. https://doi.org/10.1016/j.drugalcdep.2013.12.011

Musetti, A., Brazzi, F., Folli, M. C., Plazzi, G., & Franceschini, C. (2020). Childhood trauma, reflective functioning, and problematic mobile phone use among male and female adolescents. *The Open Psychology Journal, 13*(1), 242–252. https://doi.org/10.2174/1874350102013010242

Musetti, A., Corsano, P., Boursier, V., & Schimmenti, A. (2020). Problematic Internet use in lonely adolescents: The mediating role of detachment from parents. *Clinical Neuropsychiatry: Journal of Treatment Evaluation, 17*(1)*,* 3–10. https://doi.org/10.36131/clinicalnpsych20200101

Musetti, A., Starcevic, V., Boursier, V., Corsano, P., Billieux, J., & Schimmenti, A. (2021). Childhood emotional abuse and problematic social networking sites use in a sample of Italian adolescents: The mediating role of deficiencies in self-other differentiation and uncertain reflective functioning. *Journal of Clinical Psychology, 77*(7), 1666–1684. https://doi.org/10.1002/jclp.23138

Nakayama, H., Matsuzaki, T., Mihara, S., Kitayuguchi, T., & Higuchi, S. (2020). Relationship between problematic gaming and age at the onset of habitual gaming. *Pediatrics International, 62*(11), 1275–1281. https://doi.org/10.1111/ped.14290

Nakayama, H., Ueno, F., Mihara, S., Kitayuguchi, T., & Higuchi, S. (2020). Relationship between problematic Internet use and age at initial weekly Internet use. *Journal of Behavioral Addictions, 9*(1), 129–139. https://doi.org/10.1556/2006.2020.00009

Nandrino, J. L., Gandolphe, M. C., Alexandre, C., Kmiecik, E., Yguel, J., & Urso, L. (2014). Cognitive and affective theory of mind abilities in alcohol-dependent patients: The role of autobiographical memory. *Drug and Alcohol Dependence, 143*, 65–73. https://doi.org/10.1016/j.drugalcdep.2014.07.010

Nasser, N. S., Sharifat, H., Rashid, A. A., Hamid, S. A., Rahim, E. A., Loh, J. L., Ching, S. M., Hoo, F. K., Ismail, S. I. F., Tyagi, R., Mohammad, M., & Suppiah, S. (2020). Cue-reactivity among young adults with problematic Instagram use in response to Instagram-themed risky behavior cues: A pilot fMRI study. *Frontiers in Psychology*, *11*, Article 556060. https://doi.org/10.3389/fpsyg.2020.556060

Ngoh, G., Wu, J., Potenza, M. N., Mayes, L. C., & Rutherford, H. J. V. (2022). Exploring resting frontal EEG and reflective functioning in maternal substance use. *Infant Mental Health Journal*, *43*(4), 519–532. https://doi.org/10.1002/imhj.21991

Nichols, L. A., & Nicki, R. (2004). Development of a psychometrically sound Internet addiction scale: A preliminary step. *Psychology of Addictive Behaviors, 18*(4), 381–384. https://doi.org/10.1037/0893-164X.18.4.381

Nigro, G., Matarazzo, O., Ciccarelli, M., D'Olimpio, F., & Cosenza, M. (2019). To chase or not to chase: A study on the role of mentalization and alcohol consumption in chasing behavior. *Journal of Behavioral Addictions, 8*(4), 743–753. https://doi.org/10.1556/2006.8.2019.67

O'Nions, E., Sebastian, C. L., McCrory, E., Chantiluke, K., Happe, F., & Viding, E. (2014). Neural bases of theory of mind in children with autism spectrum disorders and children with conduct problems and callous-unemotional traits. *Developmental Science, 17*(5), 786–796. https://doi.org/10.1111/desc.12167

Orosz, G., Bőthe, B., & Tóth-Király, I. (2016). The development of the Problematic Series Watching Scale (PSWS). *Journal of Behavioral Addictions, 5*(1), 144–150. https://doi.org/10.1556/2006.5.2016.011

Park, H. S., Kim, S. H., Bang, S. A., Yoon, E. J., Cho, S. S., & Kim, S. E. (2010). Altered regional cerebral glucose metabolism in Internet game overusers: A 18F-fluorodeoxyglucose positron emission tomography study. *CNS Spectrums, 15*(3), 159–166. https://doi.org/10.1017/S1092852900027437

Perry, A., & Shamay-Tsoory, S. (2013). Understanding emotional and cognitive empathy: A neuropsychological perspective. In S. Baron-Cohen, H. Tager-Flusberg, & M. V. Lombardo (Eds.), *Understanding other minds: Perspectives from developmental social neuroscience* (pp. 178–194). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199692972.003.0011

Pickup, G. J., & Frith, C. D. (2001). Theory of mind impairments in schizophrenia: Symptomatology, severity and specificity. *Psychological Medicine*, *31*(2), 207–220. https://doi.org/10.1017/s0033291701003385

Pivarunas, B., & Conner, B. T. (2015). Impulsivity and emotion dysregulation as predictors of food addiction. *Eating Behaviors, 19*, 9–14. https://doi.org/10.1016/j.eatbeh.2015.06.007

Pontes, H. M., Taylor, M., & Stavropoulos, V. (2018). Beyond "Facebook Addiction": The role of cognitive-related factors and psychiatric distress in social networking site addiction. C*yberpsychology, Behavior, and Social Networking, 21*(4), 240–247. https://doi.org/10.1089/cyber.2017.0609

Poulton, A., & Hester, R. (2020). Transition to substance use disorders: Impulsivity for reward and learning from reward. *Social Cognitive and Affective Neuroscience*, *15*(10), 1182–1191. https://doi.org/10.1093/scan/nsz077

Pourrazavi, S., Allahverdipour, H., Jafarabadi, M. A., & Matlabi, H. (2014). A socio-cognitive inquiry of excessive mobile phone use. *Asian Journal of Psychiatry, 10*, 84–89. https://doi.org/10.1016/j.ajp.2014.02.009

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 1*(4), 515–526. https://doi.org/10.1017/S0140525X00076512

Quaglieri, A., Biondi, S., Roma, P., Varchetta, M., Fraschetti, A., Burrai, J., Lausi, G., Martí-Vilar, M., González-Sala, F., Di Domenico, A., Giannini, A. M., & Mari, E. (2021). From emotional (dys)regulation to Internet addiction: A

mediation model of problematic social media use among Italian young adults. *Journal of Clinical Medicine, 11*(1), Article 188. https://doi.org/10.3390/jcm11010188

Quednow, B. B. (2020). Social cognition in addiction. In A. Verdejo-Garcia (Ed.), *Cognition and addiction* (pp. 63–78). Academic Press. https://doi.org/10.1016/B978-0-12-815298-0.00005-8

Raza, S. H., Yousaf, M., Sohail, F., Munawar, R., Ogadimma, E. C., & Siang, J. M. L. D. (2021). Investigating binge-watching adverse mental health outcomes during Covid-19 pandemic: Moderating role of screen time for web series using online streaming. *Psychology Research and Behavior Management*, *14*, 1615–1629. https://doi.org/10.2147/PRBM.S328416

Rees, E., Creeth, H. D. J., Hwu, H. G., Chen, W. J., Tsuang, M., Glatt, S. J., Rey, R., Kirov, G., Walters, J. T. R., Holmans, P., Owen, M. J., & O'Donovan, M. C. (2021). Schizophrenia, autism spectrum disorders and developmental disorders share specific disruptive coding mutations. *Nature Communications*, *12*(1), Article 5353. https://doi.org/10.1038/s41467-021-25532-4

Rifkin-Zybutz, R. P., Moran, P., Nolte, T., Feigenbaum, J., King-Casas, B., Fonagy, P., & Montague, R. P. (2021). Impaired mentalizing in depression and the effects of borderline personality disorder on this relationship. *Borderline Personality Disorder and Emotion Dysregulation, 8*(1), Article 15. https://doi.org/10.1186/s40479-021-00153-x

Rogier, G., & Velotti, P. (2018). Conceptualizing gambling disorder with the process model of emotion regulation. *Journal of Behavioral Addictions, 7*(2), 239–251. https://doi.org/10.1556/2006.7.2018.52

Rozgonjuk, D., & Elhai, J. D. (2021). Emotion regulation in relation to smartphone use: Process smartphone use mediates the association between expressive suppression and problematic smartphone use. *Current Psychology, 40*(7), 3246–3255. https://doi.org/10.1007/s12144-019-00271-4

Rubenking, B., & Bracken, C. C. (2018). Binge-watching: A suspenseful, emotional, habit. *Communication Research Reports, 35*(5), 381-391. https://doi.org/10.1080/08824096.2018.1525346

Ryding, F. C., & Kaye, L. K. (2018). "Internet addiction": A conceptual minefield. *International Journal of Mental Health and Addiction*, *16*, 225–232. https://doi.org/10.1007/s11469-017-9811-6

Ryu, H., Lee, J.-Y., Choi, A., Park, S., Kim, D.-J., & Choi, J.-S. (2018). The relationship between impulsivity and Internet gaming disorder in young adults: Mediating effects of interpersonal relationships and depression. *International Journal of Environmental Research and Public Health*, *15*(3), Article 458. https://doi.org/10.3390/ijerph15030458

Şalvarlı, Ş. İ., & Griffiths, M. D. (2022). The association between Internet gaming disorder and impulsivity: A systematic review of literature. *International Journal of Mental Health and Addiction, 20*(1), 92–118. https://doi.org/10.1007/s11469-019-00126-w

Satici, S. A., Gocet Tekin, E., Deniz, M. E., & Satici, B. (2022). Doomscrolling Scale: Its association with personality traits, psychological distress, social media use, and wellbeing. *Applied Research in Quality of Life, 18*(2), 833–847. https://doi.org/10.1007/s11482-022-10110-7

Saure, E., Raevuori, A., Laasonen, M., & Lepistö-Paisley, T. (2022). Emotion recognition, alexithymia, empathy, and emotion regulation in women with anorexia nervosa. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 27*(8), 3587–3597. https://doi.org/10.1007/s40519-022-01496-2

Savov, S., & Atanassov, N. (2013). Deficits of affect mentalization in patients with drug addiction: Theoretical and clinical aspects. *International Scholarly Research Notices*, Article 250751. https://doi.org/10.1155/2013/250751

Scandurra, V., Emberti Gialloreti, L., Barbanera, F., Scordo, M. R., Pierini, A., & Canitano, R. (2019). Neurodevelopmental disorders and adaptive functions: A study of children with autism spectrum disorders (ASD) and/or attention deficit and hyperactivity disorder (ADHD). *Frontiers in Psychiatry, 10*, Article 673. https://doi.org/10.3389/fpsyt.2019.00673

Schimmenti, A., & Caretti, V. (2010). Psychic retreats or psychic pits?: Unbearable states of mind and technological addiction. *Psychoanalytic Psychology, 27*(2), 115–132. https://doi.org/10.1037/a0019414

Schimmenti, A., Passanisi, A., Caretti, V., La Marca, L., Granieri, A., Iacolino, C., Gervasi, A. M., Maganuco, N. R., & Billieux, J. (2017). Traumatic experiences, alexithymia, and Internet addiction symptoms among late adolescents: A moderated mediation analysis. *Addictive Behaviors*, *64*, 314–320. https://doi.org/10.1016/j.addbeh.2015.11.002

Schwarzer, N. H., Nolte, T., Fonagy, P., & Gingelmaier, S. (2021). Mentalizing and emotion regulation: Evidence from a nonclinical sample. *International Forum of Psychoanalysis*, *30*(1), 34–45. https://doi.org/10.1080/0803706X.2021.1873418

Serra, G., Lo Scalzo, L., Giuffrè, M., Ferrara, P., & Corsello, G. (2021). Smartphone use and addiction during the coronavirus disease 2019 (COVID-19) pandemic: Cohort study on 184 Italian children and adolescents. *Italian Journal of Pediatrics, 47*(1), Article 150. https://doi.org/10.1186/s13052-021-01102-8

Shadzi, M. R., Salehi, A., & Vardanjani, H. M. (2020). Problematic Internet use, mental health, and sleep quality among medical students: A path-analytic model. *Indian Journal of Psychological Medicine, 42*(2), 128–135. https://doi.org/10.4103/IJPSYM.IJPSYM_238_19

Shamay-Tsoory, S. G., Harari, H., Aharon-Peretz, J., & Levkovitz, Y. (2010). The role of the orbitofrontal cortex in affective theory of mind deficits in criminal offenders with psychopathic tendencies. *Cortex: A Journal Devoted to the Study of the Nervous System and Behavior, 46*(5), 668–677. http://dx.doi.org/10.1016/j.cortex.2009.04.008

Shannon, H., Bush, K., Villeneuve, P. J., Hellemans, K. G., & Guimond, S. (2022). Problematic social media use in adolescents and young adults: Systematic review and meta-analysis. *JMIR Mental Health, 9*(4), Article e33450. https://doi.org/10.2196/33450

Shany-Ur, T., & Rankin, K. P. (2014). Cognition, social. In M. J. Aminoff & R. B. Daroff (Eds.), *Encyclopedia of the neurological sciences* (2nd ed., pp. 814–817). Academic Press. https://doi.org/10.1016/B978-0-12-385157-4.00461-9.

Shapira, N. A., Lessig, M. C., Goldsmith, T. D., Szabo, S. T., Lazoritz, M., Gold, M. S., & Stein, D. J. (2003). Problematic Internet use: Proposed classification and diagnostic criteria. *Depression and Anxiety*, *17*(4), 207–216. https://doi.org/10.1002/da.10094

Sharma, B., Lee, S. S., & Johnson, B. K. (2022). The dark at the end of the tunnel: Doomscrolling on social media newsfeeds. *Technology, Mind, and Behavior, 3*(1). https://doi.org/10.1037/tmb0000059

Shin, D. H., & Ahn, D. (2013). Associations between game use and cognitive empathy: A cross-generational study. *Cyberpsychology, Behavior, and Social Networking, 16*(8), 599–603. https://doi.org/10.1089/cyber.2012.0639

Slade, A. (2005). Parental reflective functioning: An introduction. *Attachment & Human Development*, *7*(3), 269–281. https://doi.org/10.1080/14616730500245906

So, J. (2012). Uses, gratifications, and beyond: Toward a model of motivated media exposure and its effects on risk perception. *Communication Theory, 22*(2), 116–137. https://doi.org/10.1111/j.1468-2885.2012.01400.x

Song, I., Larose, R., Eastin, M. S., & Lin, C. A. (2004). Internet gratifications and Internet addiction: On the uses and abuses of new media. *Cyberpsychology & Behavior, 7*(4), 384–394. https://doi.org/10.1089/cpb.2004.7.384

Stafford, T. F., Stafford, M. R., & Schkade, L. L. (2004). Determining uses and gratifications for the Internet. *Decision Sciences, 35*(2), 259–288. https://doi.org/10.1111/j.00117315.2004.02524.x

Starosta, J., Izydorczyk, B., & Lizińczyk, S. (2019). Characteristics of people's binge-watching behavior in the "entering into early adulthood" period of life. *Health Psychology Report, 7*(2), 149–164. https://doi.org/10.5114/hpr.2019.83025

Starosta, J., Izydorczyk, B., Sitnik-Warchulska, K., & Lizińczyk, S. (2021). Impulsivity and difficulties in emotional regulation as predictors of binge-watching behaviors. *Frontiers in Psychiatry, 12,* Article 743870. https://doi.org/10.3389/fpsyt.2021.743870

Steins-Loeber, S., Reiter, T., Averbeck, H., Harbarth, L., & Brand, M. (2020). Binge-watching behavior: The role of impulsivity and depressive symptoms. *European Addiction Research, 26*(3), 141–150. https://doi.org/10.1159/000506307

Suchman, N. E., DeCoste, C., Leigh, D., & Borelli, J. (2010). Reflective functioning in mothers with drug use disorders: Implications for dyadic interactions with infants and toddlers. *Attachment & Human Development, 12*(6), 567–585. https://doi.org/10.1080/14616734.2010.501988

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior*, 7(3), 321–326. https://doi.org/10.1089/1094931041291295

Tokunaga, R. S., & Rains, S. A. (2016). A review and meta-analysis examining conceptual and operational definitions of problematic Internet use. *Human Communication Research, 42*(2), 165–199. https://doi.org/10.1111/hcre.12075

Tsitsika, A., Janikian, M., Schoenmakers, T. M., Tzavela, E. C., Olafsson, K., Wójcik, S., Macarie, G. F., Tzavara, C., The EU NET ADB Consortium, & Richardson, C. (2014). Internet addictive behavior in adolescence: A cross-sectional study in seven European countries. *Cyberpsychology, Behavior, and Social Networking, 17*(8), 528–535. https://doi.org/10.1089/cyber.2013.0382

Tully, E. C., Ames, A. M., Garcia, S. E., & Donohue, M. R. (2016). Quadratic associations between empathy and depression as moderated by emotion dysregulation. *The Journal of Psychology: Interdisciplinary and Applied, 150*(1), 15–35. https://doi.org/10.1080/00223980.2014.992382

Turel, O., He, Q., Brevers, D., & Bechara, A. (2018). Social networking sites use and the morphology of a social-semantic brain network. *Social Neuroscience, 13*(5), 628–636. https://doi.org/10.1080/17470919.2017.1382387

Turel, O., & Qahri-Saremi, H. (2016). Problematic use of social networking sites: Antecedents and consequence from a dual-system theory perspective. *Journal of Management Information Systems*, *33*(4), 1087–1116. https://doi.org/10.1080/07421222.2016.1267529

Ünal-Aydın, P., Balıkçı, K., Sönmez, İ., & Aydın, O. (2020). Associations between emotion recognition and social networking site addiction. *Psychiatry Research, 284*, Article 112673. https://doi.org/10.1016/j.psychres.2019.112673

Ünal-Aydın, P., Obućа, F., Aydın, O., & Spada, M. M. (2021). The role of metacognitions and emotion recognition in problematic SNS use among adolescents. *Journal of Affective Disorders, 282*, 1–8. https://doi.org/10.1016/j.jad.2020.12.103

van Deursen, A. J. A. M., Bolle, C. L., Hegner, S. M., & Kommers, P. A. M. (2015). Modeling habitual and addictive smartphone behavior. *Computers in Human Behavior, 45*, 411–420. https://doi.org/10.1016/j.chb.2014.12.039

van Kleef, G. A., Cheshin, A., Fischer, A. H., & Schneider, I. K. (2016). The social nature of emotions. *Frontiers in Psychology, 7*, Article 896. https://doi.org/10.3389/fpsyg.2016.00896

Van Zundert, R. M., Nijhof, L. M., & Engels, R. C. (2009). Testing social cognitive theory as a theoretical framework to predict smoking relapse among daily smoking adolescents. *Addictive Behaviors*, *34*(3), 281–286. https://doi.org/10.1016/j.addbeh.2008.11.004

Varona, M. N., Muela, A., & Machimbarrena, J. M. (2022). Problematic use or addiction? A scoping review on conceptual and operational definitions of negative social networking sites use in adolescents. *Addictive Behaviors, 134,* Article 107400. https://doi.org/10.1016/j.addbeh.2022.107400

Velotti, P., Rogier, G., Zobel, S. B., & Billieux, J. (2021). Association between gambling disorder and emotion (dys) regulation: A systematic review and meta-analysis. *Clinical Psychology Review, 87*, 102037. https://doi.org/10.1016/j.cpr.2021.102037

Victoir, A., Eertmans, A., Van den Bergh, O., & Van den Broucke, S. (2007). Association of substance-use behaviors and their social-cognitive determinants in secondary school students. *Health Education Research, 22*(1), 81–94. https://doi.org/10.1093/her/cyl050

Wallis, D. (1997, January 13). *Just click no*. The New Yorker. https://www.newyorker.com/magazine/1997/01/13/just-click-no

Wang, T., Ge, Y., Zhang, J., Liu, J., & Luo, W. (2014). The capacity for pain empathy among urban Internet-addicted left-behind children in China: An event-related potential study. *Computers in Human Behavior, 33*, 56–62. https://doi.org/10.1016/j.chb.2013.12.020

Wegmann, E., Stodt, B., & Brand, M. (2015). Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet literacy, and psychopathological symptoms. *Journal of Behavioral Addictions, 4*(3), 155–162. https://doi.org/10.1556/2006.4.2015.021

Weinstein, A., & Lejoyeux, M. (2022). Neurobiological mechanisms underlying Internet gaming disorder. *Dialogues in Clinical Neuroscience, 22*(2), 113–126. https://doi.org/10.31887/DCNS.2020.22.2/aweinstein

Werle, D., Schroeder, P. A., Wolz, I., & Svaldi, J. (2021). Incentive sensitization in binge behaviors: A mini review on electrophysiological evidence. *Addictive Behaviors Reports, 13,* Article 100344. https://doi.org/10.1016/j.abrep.2021.100344

Wickord, L. C., & Quaiser-Pohl, C. M. (2022). Does the type of smartphone usage behavior influence problematic smartphone use and the related stress perception? *Behavioral Sciences, 12*(4), Article 99. https://doi.org/10.3390/bs12040099

Widyanto, L., & Griffiths, M. (2006). 'Internet addiction': A critical review. *International Journal of Mental Health and Addiction*, *4*(1), 31–51. https://doi.org/10.1007/s11469-006-9009-9

World Health Organization. (2019). *International classification of diseases (11th revision).* https://icd.who.int/en/

Worsley, J. D., McIntyre, J. C., Bentall, R. P., & Corcoran, R. (2018). Childhood maltreatment and problematic social media use: The role of attachment and depression. *Psychiatry Research, 267*, 88–93. https://doi.org/10.1016/j.psychres.2018.05.023

Wu, A. M., Zhou, H., Dang, L., & Chen, J. H. (2022). Is empathy associated with gambling and its addiction? A scoping review of empirical studies. *Journal of Gambling Studies, 39*(2), 689–711. https://doi.org/10.1007/s10899-022-10130-w

Yang, C. C., & Brown, B. B. (2015). Factors involved in associations between Facebook use and college adjustment: Social competence, perceived usefulness, and use patterns. *Computers in Human Behavior, 46*, 245-253. http://dx.doi.org/10.1016/j.chb.2015.01.015

Yang, J., Ti, Y., & Ye, Y. (2022). Offline and online social support and short-form video addiction among Chinese adolescents: The mediating role of emotion suppression and relatedness needs. *Cyberpsychology, Behavior, and Social Networking, 25*(5), 316–322. https://doi.org/10.1089/cyber.2021.0323

Yee, N. (2006). Motivations for play in online games. *Cyberpsychology & Behavior*, *9*(6), 772–775. https://doi.org/10.1089/cpb.2006.9.772

Yen, J.-Y., Lin, P.-C., Wu, H.-C., & Ko, C.-H. (2022). The withdrawal-related affective, gaming urge, and anhedonia symptoms of Internet gaming disorder during abstinence. *Journal of Behavioral Addictions, 11*(2), 481–491. https://doi.org/10.1556/2006.2022.00008

Yin, L., Wang, P., Nie, J., Guo, J., Feng, J., & Lei, L. (2021). Social networking sites addiction and FoMO: The mediating role of envy and the moderating role of need to belong. *Current Psychology, 40*(8), 3879–3887. https://doi.org/10.1007/s12144-019-00344-4

Young, K. S. (1996). Internet addiction: The emergence of a new clinical disorder [poster presentation]. The 104th Annual Convention of the American Psychological Association, Toronto, Canada. https://www.netaddiction.com/articles/newdisorder.pdf

Young, K. S. (1998a). *Caught in the net: How to recognize the signs of Internet addiction–and a winning strategy for recovery*. John Wiley & Sons.

Young, K. S. (1998b). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior, 1*(3), 237–244. https://doi.org/10.1089/cpb.1998.1.237

Zhang, X., Wu, Y., & Liu, S. (2019). Exploring short-form video application addiction: Socio-technical and attachment perspectives. *Telematics and Informatics*, *42*, Article 101243. https://doi.org/10.1016/j.tele.2019.101243

Zhang, Y., Liu, Z., & Zhao, Y. (2021). Impulsivity, social support and depression are associated with latent profiles of Internet addiction among male college freshmen. *Frontiers in Psychiatry*, *12*, Article 642914. https://doi.org/10.3389/fpsyt.2021.642914

Zhao, H., Tian, W., & Xin, T. (2017). The development and validation of the online shopping addiction scale. *Frontiers in Psychology*, *8*, Article 735. https://doi.org/10.3389/fpsyg.2017.00735

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