The independent contribution of desire thinking to problematic social media use

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Abstract

In the present study, we investigated the role of desire thinking in problematic social media use (PSMU) whilst accounting for negative affect, impulsivity, and thought suppression. A sample of individuals with PSMU (n = 350) who used social media at least 8 h daily was recruited. Participants completed measures of negative affect, impulsivity, thought suppression, craving, desire thinking, and PSMU. Results indicated that negative affect, impulsivity, and thought suppression had significant indirect effects on craving and PSMU through the significant mediating role of desire thinking. The present study shows that desire thinking is an underlying mechanism linking established variables associated with PSMU (negative affect, impulsivity, and thought suppression) to craving and PSMU. Focusing efforts on the interruption of desire thinking may be beneficial to support individuals in disengaging from PSMU.

Introduction

Billions of people across the world are now using social networks (Facebook, Instagram, WhatsApp, Youtube, Twitter, etc.) on different platforms, including mobile or computer devices. Problematic social media use (PSMU) is defined as an inappropriate pattern of using social media (Shensa et al., 2017) associated with low well-being and high distress (Huang, 2020). Numerous factors have been found to be linked with PSMU including craving, negative affect, impulsivity, and thought suppression.

Craving, as a core construct in addictive behaviors (Hartwell & Ray, 2018) has been found to be associated with PSMU (Leng et al., 2019; Turel & Bechara, 2016; Savci &

Griffiths, 2021). Furthermore, when individuals are deprived of internet access and its tools, such as social media, they experience craving (Wilcockson et al., 2019). In addition, in individuals who extensively engage in social media use, levels of negative affect, impulsivity, and thought suppression are highly prevalent (Efrati et al., 2021; Shensa et al., 2017; Sindermann et al., 2020). Negative affect (e.g., depression and anxiety) has been observed to be linked to craving in addictive behaviors (Enkema et al., 2020; Khosravani et al., 2017, 2019; Poormahdy et al., 2021; Spada et al., 2008; Wartberg et al., 2020). Some researchers have thus argued that social media use may be a strategy to regulate negative affect (Throuvala et al., 2019). Thus, PSMU may be associated with difficulty in emotion regulation and craving as postulated by some researchers (Hormes et al., 2014; Marino et al., 2020). Impulsivity refers to behaviors that are performed without thinking and without considering their consequences. Difficulty in impulse control has also been found to be associated with PSMU (Wartberg et al., 2021). In addition, maladaptive use of social media (e.g., sexting behaviors and cyber smearing) and media multitasking have been found to be associated with high impulsivity (Dir et al., 2013; Workman, 2012) and low self-control (Shin et al., 2019). As a conscious desire to stop thinking about a particular topic or thought (Wegner & Zanakos, 1994), thought suppression is associated with different addictive behaviors

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(Berke et al., 2020; Riley, 2014). Furthermore, high levels of thought suppression have been found to increase craving (Garland & Roberts-Lewis, 2013).

Overall, individuals with high levels of negative affect, impulsivity, and thought suppression show high levels of craving (Bernard et al., 2021) and PSMU (Efrati et al., 2021; Sindermann et al., 2020; Spada et al., 2008). The question as to how these precipitating factors affect PSMU remains an open one, with researchers encouraging the exploration of underlying cognitive mechanisms as an avenue for furthering our understanding (e.g., Moss et al., 2015). One of the possible underlying cognitive mechanisms potentially linking the precipitating factors identified and PSMU is termed 'desire thinking' (Caselli & Spada, 2010, 2011). Desire thinking is a voluntary elaboration of a desired target on two levels: imaginal prefiguration and verbal perseveration (Caselli & Spada, 2010; May et al., 2004). Imaginal prefiguration refers to the allocation of attention to desired behaviors and targets which is characterized by the tendency to anticipate positive imagery and target-related memories. Verbal perseveration refers to repetitive and continuous 'self-talk' about 'valid' reasons for engaging in desired behaviors and targets (Caselli & Spada, 2011).

Caselli & Spada (2011) argue that desire thinking is primarily aimed at controlling intrusive experiences linked to desired targets such as craving, negative affect, and the byproducts of thought suppression: escalating intrusive thoughts. The researchers postulate that in the short run desire thinking acts as a buffer against these intrusive experiences through the shifting of attention (thus distraction) onto the elaboration of desired targets. However, over time, the engagement in desire thinking brings to an escalation of precipitating factors (e.g., craving) through increasing the salience of intrusive experiences as the desired target is repeatedly imagined but not achieved. This, in turn, is believed to increase the probability of engaging in addictive behavior as a means to attain relief from escalating distress.

Evidence has shown that desire thinking is associated with a variety of problematic behaviors (Mansueto et al., 2019; Albery & Spada, 2021; Solem et al., 2020; Caselli et al., 2017; Brandtner et al., 2020; Efrati et al., 2021; Spada et al., 2015a), including PSMU Marino et al., 2019; Solem et al., 2020. Furthermore, desire thinking and craving have been found to be strongly correlated (Caselli et al., 2013; Chakroun-Baggioni et al., 2017; Martino et al., 2017). Desire thinking has also been found to be associated with negative affect, impulsivity, and thought suppression (Efrati et al., 2020) in predicting compulsive sexual behaviors.

To the best of our knowledge, no studies have been carried out to assess the role of desire thinking in the relationship between negative affect, impulsivity, and thought suppression on the one hand, and craving and PSMU on the other. Based on previous research we purported that desire thinking should be a form of maladaptive coping likely to independently predict craving and PSMU (Spada et al., 2013, 2015b). We, therefore, tested a model where desire thinking would be a mediator in the associations of negative affect, impulsivity, and thought suppression with craving and PSMU (Fig. 1).

Methods

Participants

After putting an announcement on different social networks to invite individuals to take part in the study, 950 social media users accepted our invitation. Among these people, based on inclusion and exclusion criteria, 350 individuals with PSMU (e.g., Facebook, Instagram, WhatsApp, Youtube, Twitter, etc.) were finally selected to take part in the study between October 2020 and March 2021 (females = 51.1%; age range = 16–59 years; mean age = 31.39). To evaluate PSMU, the Problematic Social Media Use Scale (PSMUS; Khosravani et al., 2022) was used. This scale does not have any cut-off scores to determine if individuals are displaying PSMU. Thus, for the purposes of the present study, a theoretical approach to determine the tendency to engage in PSMU was adopted. This theoretical approach was suggested by Griffiths (2005) who recommends six criteria to detect individuals presenting with PSMU, including salience, mood modification, tolerance, withdrawal, relapse, and conflict (Kuss & Griffiths, 2011, 2017). Based on Griffiths et al's (2014) approach,

Fig. 1 Hypothesized theoretical model
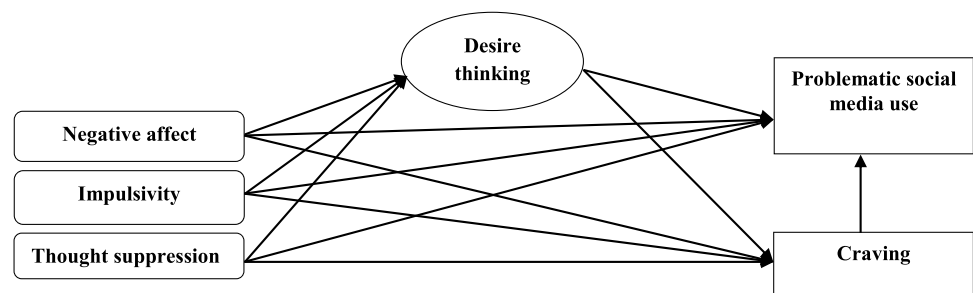
"Any behavior (e.g., social networking) that fulfills the aforementioned six criteria can be operationally defined as an addiction" (Pg. 121). To check each of these criteria in individuals with potential PSMU based on Griffiths's model, the following questions were designed to survey participants online: 1- "Do you have a strong desire for social networks emotionally, cognitively and behaviorally?" (being salience), 2- "When you use social media, will your mood or emotional states improve?" (mood modification), 3- "Do you spend more time following social media that you would want to?" (tolerance: In the current study, participants spent a large portion of their day using social media, approximately 7–8 h every day), 4- "When you do not use social media or its restricted, do you experience unpleasant physical and emotional symptoms?" (withdrawal), 5- "When you cannot use social media due to any reasons do you quickly return to your excessive use when availability is reinstated?" (relapse), and 6- "When you use social media, do you experience interpersonal problems?" (conflict). All participants were asked these questions and the final sample was selected based on the criteria aimed at detecting PSMU, with all selected participants meeting at least 5 criteria. The current study was ethically approved by Shahid Beheshti University of Medical Sciences. All participants were willing to take part in the current study and all of them signed forms of informed consent. The study was run according to the Helsinki Declaration.

Measures

Negative Affect The Depression Anxiety and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995). This self-report measure contains 21 items that are designed to evaluate anxiety, depression, and stress. Items on this measure are scored on a 4-point Likert scale from 0 (never) to 3 (always) and higher scores denote higher negative affect. The Persian version of the DASS-21 (Asghari et al., 2008) was used for the current study. The Cronbach's alpha for the current study was 0.91.

Impulsivity The Barratt Impulsiveness Scale-15 (BIS-15; Spinella, 2007). This self-report measure contains 15 items that are designed to evaluate impulsivity. Items on this measure are scored on a 4-point Likert scale from 1 (never) to 4 (completely) and higher scores denote higher impulsivity. The Persian version of the BIS-15 (Javid et al., 2012) was used for the current study. The Cronbach's alpha for the current study was 0.79.

Thought Suppression The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994). This self-report measure contains 15 items that are designed to evaluate the tendency to suppress thoughts. Items on this measure

are scored on a 5-point Likert scale from 1 (completely disagree) to 5 (completely agree) and higher scores denote higher thought suppression. The Persian version of the WBSI (Farrokhi & Mostafapour, 2018) was used for the current study. The Cronbach's alpha for the current study was 0.90.

Craving The Penn Craving Scale (PCS; Flannery et al., 1999). This self-report measure contains 5 items that are designed to detect craving in individuals who drink alcohol. Items on this measure are scored on a 6-point Likert scale from 0 (never) to 6 (almost always) and higher scores denote higher levels of craving. In the present study, the PACS was adapted for social media use so that the term "use of social media" replaced the term "use of alcohol" in each of the five questions of the PCS. The Persian version of the PACS (Zemestani & Ottaviani, 2016) was used for the current study. The Cronbach's alpha for the current study was 0.95.

Desire Thinking The Desire Thinking Questionnaire (DTQ; Caselli & Spada 2011). This self-report measure contains 10 items that are designed to evaluate desire thinking including verbal perseveration (5 items) and imaginal prefiguration (5 items). Items on this measure are scored on a 4-point Likert scale from 1 (never) to 4 (always) and higher scores denote higher desire thinking. The Persian version of the DTQ (Khosravani et al., 2022) was used for the current study. The Cronbach's alpha for the current study was 0.89.

PSMUS The Problematic Facebook Use Scale (PFUS; Marino et al., 2016). This self-report measure contains 15 items that are designed to evaluate problematic Facebook use. Items on this measure are scored on an 8-point Likert scale from 1 (completely disagree) to 8 (completely agree) and higher scores denote high problematic Facebook use. In the present study, the PFUS was adapted for social media and named the Problematic Social Media Use Scale (PSMUS; Khosravani et al., 2022). The term "use of Facebook" was replaced by "use of social media". The Cronbach's alpha for the current study was 0.96.

Statistical Analyses

Regarding the adequacy of the sample size, a "large" sample size has been recommended by most researchers to conduct a SEM model so that a sample size equal to 300 or more participants is widely accepted to be sufficient to undertake valid analyses (see Comrey & Lee, 2013; Tabachnick & Fidell, 2013). The relationships among variables were evaluated using Pearson's correlation analysis in SPSS-22 software. In addition, structural equation modeling (SEM) with the maximum likelihood estimator (MLE) was conducted to evaluate the effect of desire thinking on the

associations of negative affect, impulsivity, and thought suppression with craving and PSMU. SEM models were analyzed using AMOS software. In addition, bootstrapping with 5000 resamples was performed to more closely examine the significance of the indirect pathways that do not cover zero in 95% of the confidence interval (CI). The adequacy of model fit was checked through model fit indexes that show an acceptable fit if the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMSR) are lower than < 0.08 and also the Tucker-Lewis Index (TLI), the comparative fit index (CFI), and the goodness-of-fit index (GFI) have a value higher than 0.92 (MacCallum et al., 1996; Hu & Bentler, 1999; Kline, 2015; Schermelleh-Engel et al., 2003). Evaluating skewness and kurtosis indices showed that the data were normally distributed (range between − 1/+1 and + 1/-1; Byrne, 2010; Kline, 2015).

Results

Demographic and clinical characteristics are presented in Table 1.

Correlational Analyses

Table 2 shows the results of the Person's Product Moment correlation analyses between the study variables. Results showed that negative affect, impulsivity, thought suppression, craving, and desire thinking significantly and positively correlated with PSMU (all p values < 0.01). Negative affect, impulsivity, thought suppression, and craving significantly and positively correlated with desire thinking (all p's values < 0.01).

Table 1 Demographic and clinical characteristics of individuals with problematic social media use

Clinical and demographic characteristics	Mean ± S.D or n (%)		
Age, years	31.39 ± 10.10		
Gender			
Male	171(48.9%)		
Female	179 (51.1%)		
Education, years	14.37 ± 2.85		
Marital status			
Single	201 (57.43%)		
Married	137 (39.14%)		
Divorced	12 (3.43%)		
Age of onset use	19.35 ± 7.44		
Duration of social media use (years)	11.96 ± 5.73		
Clinical and psychological variables	Mean ± S.D	Skewness	Kurtosis
Negative affect	30.95 ± 10.57	-0.23	0.01
Impulsivity	34.73 ± 5.19	-0.35	0.89
Thought suppression	48.12 ± 9.92	-0.39	0.28
Craving	17.41 ± 4.91	0.06	-0.27
Desire thinking	25.01 ± 6.11	0.20	-0.50
Problematic social media use	70.49 ± 20.28	-0.44	-0.36

Table 2 Correlations among all variables

	1	2	3	4	5	6
1- Negative affect	-					
2- Impulsivity	0.46*	-				
3- Thought suppression	0.31*	0.33*	-			
4- Craving	0.25*	0.20*	0.34*	-		
5- Desire thinking	0.28*	0.25*	0.22*	0.25*	-	
6- Problematic social media use	0.28*	0.39*	0.44*	0.45*	0.20*	-

Note. * $p < 0.01$

Testing Direct Relationships

Before running the SEM model, the direct effects of negative affect, impulsivity, and thought suppression on craving and PSMU were evaluated. The findings confirmed the direct link of negative affect ($\beta = 0.14$, $p < 0.01$), impulsivity ($\beta = 0.13$, $p < 0.05$) and thought suppression ($\beta = 0.28$, $p < 0.001$) to craving, with a good model fit of the data (TLI = 1.00, GFI = 1.00, CFI = 1.00, RMSEA = 0.023). In addition, the direct links of negative affect ($\beta = 0.16$, $p < 0.01$), impulsivity ($\beta = 0.25$, $p < 0.001$) and thought suppression ($\beta = 0.33$, $p < 0.001$) to PSMU were supported (TLI = 1.00, GFI = 1.00, CFI = 1.00, RMSEA = 0.024).

The SEM Models

The SEM model for assessing the direct and indirect effects of negative affect, impulsivity and thought suppression on craving and PSMU through desire thinking had a good model fit ($\chi^2 = 1.61$, df = 4, CMIN/DF = 0.80, $p < 0.001$, TLI = 0.99, GFI = 1.00, CFI = 0.99, RMSEA = 0.001). In this model, thought suppression, but not impulsivity and negative affect (p > 0.05), had a direct link to craving ($p < 0.001$). Also, impulsivity and thought suppression, but not negative affect (p > 0.05), had direct links to PSMU ($p < 0.001$). Negative affect, impulsivity, and thought suppression had direct links to desire thinking ($p < 0.001$). In turn, desire thinking was directly linked to both craving and PSMU ($p < 0.001$).

Craving was directly linked to PSMU ($p < 0.001$). In this model, all factors together explained 17% and 35% of the total variances of craving and PSMU, respectively (see Fig. 2).

Indirect Effects

The results of 95% CI to further assess the significance of indirect effects are shown in Table 3. The indirect effects from both negative affect and thought suppression to both craving and PSMU through the mediating role of desire thinking were found to be significant ($p < 0.001$). Also, impulsivity was significantly and indirectly associated with PSMU ($p < 0.001$), but not craving ($p < 0.05$), through desire thinking.

Discussion

In the present study, we investigated the role of desire thinking in craving and PSMU whilst accounting for negative affect, impulsivity, and thought suppression. Results indicated that negative affect, impulsivity, and thought suppression had significant indirect effects on craving and PSMU through the significant mediating role of desire thinking. Although there are no studies that have tested, in combination, the variables examined in our research, our findings align themselves with previous work in the area. (e.g.,
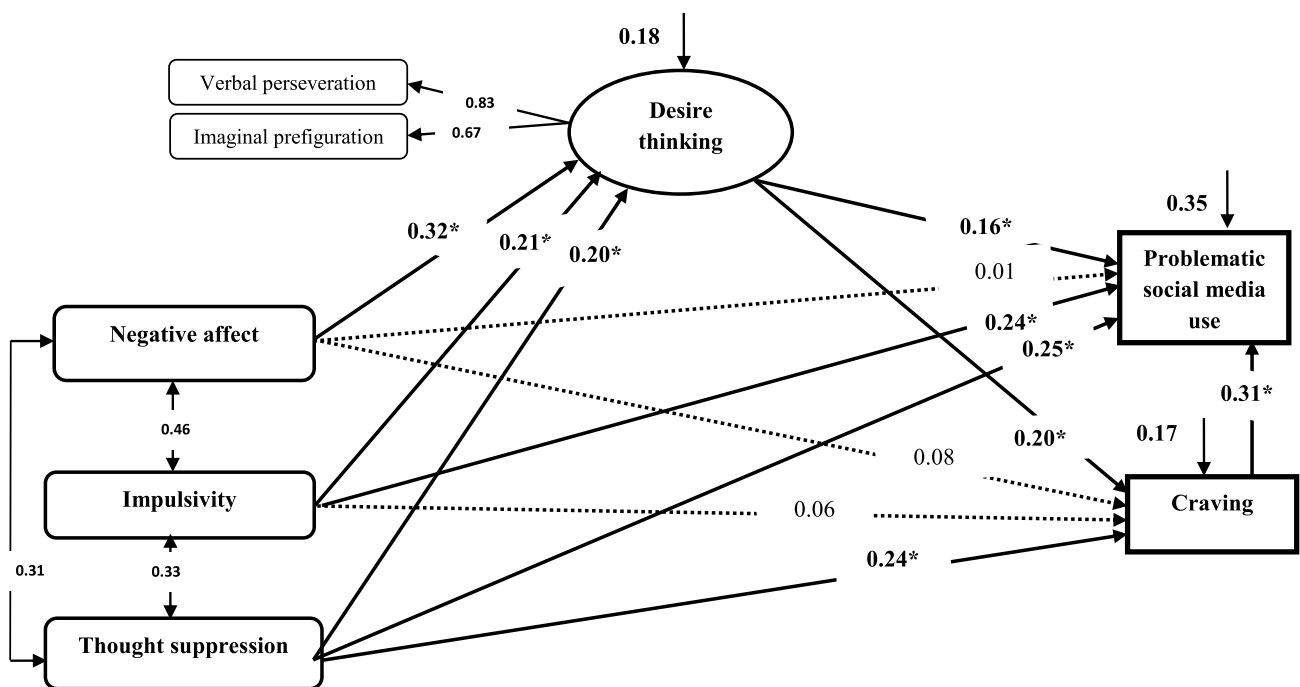

Fig. 2 Model tested. *Note*: Standardized coefficients for the direct effects of negative affect, impulsivity, and thought suppression on craving and PSMU, and their indirect effects through desire thinking. Short arrows indicate the explained variances. * $p < 0.001$

Table 3 Standardized indirect effects using bootstrapping with 5000 resamples

Paths	Effect	SE boot	p	95% Bias corrected CI	
				Lower bound	Upper bound
Negative affect → Desire thinking → Problematic social media use	0.11[a]	0.03	0.001*	0.05	0.18
Negative affect → Desire thinking → Craving	0.08[a]	0.03	0.001*	0.03	0.15
Impulsivity → Desire thinking → Problematic social media use	0.08[a]	0.02	0.001*	0.03	0.13
Impulsivity → Desire thinking → Craving	0.03	0.02	0. 06	-0.001	0.08
Thought suppression → Desire thinking → Problematic social media use	0.12[a]	0.03	0.001*	0.07	0.18
Thought suppression → Desire thinking → Craving	0.06[a]	0.02	0.001*	0.02	0.11

Note

Indirect effects of negative affect, impulsivity, and thought suppression on craving and problematic social media use through desire thinking

[a]Confidence intervals not including zero

* $p < 0.001$

Caselli et al., 2015; Chakroun-Baggioni et al., 2017; Efrati et al., 2021). Thus, desire thinking may be a short-term strategy aimed at regulating unwanted internal states (negative affect, impulsivity, and intrusive thoughts generated by thought suppression) that backfires as in the medium to longer term it leads to an escalation and perseveration of emotional distress, as well as craving, making the desired target (in this case social media use) perseveringly elaborated upon but not achieved. This, in turn, will lead to the desired activity being perceived as the only, and increasingly urgent, route to regulate both emotional distress and craving (Brandtner & Brand, 2021; Caselli & Spada, 2010), consequently increasing the probability of engaging in PSMU as a form of self-regulation (Solem et al., 2020). Overall, desire thinking can thus be considered a risk factor for PSMU (Marino et al., 2019) as confirmed by our findings.

Clinical Implications

Our findings provide further support for the contention that focusing on desire thinking may be of therapeutic use (e.g., Martino et al., 2019) in tackling PSMU and may also serve to potentially limit the impact of negative affect, impulsivity, and thought suppression (Allen et al., 2017; Efrati et al., 2020) on PSMU. From this perspective, interventions such as Metacognitive Therapy (MCT; Wells 2008) may be useful in targeting desire thinking and consequently PSMU (Caselli & Spada, 2015). As argued by Caselli & Spada (2015), the notion that intrusive experiences are not problematic per se, but that the response to such intrusions through desire thinking should be considered as part of psycho-educational programs targeting addictive behaviors. Creating 'metacognitive awareness' that desire thinking may be activated as a means of temporarily reducing distress, which will eventually bring to an escalation in PSMU, can be achieved through MCT strategies such as detached mindfulness and attention training (Wells, 2009), combined with verbal reattribution

about the controllability of thinking. Furthermore, acceptance- and imagery-based strategies (e.g., guided imagery or mind-wandering control) may help reduce the intrusiveness of thoughts and craving intensity (Schumacher et al., 2017). In addition, the effective suppression of thoughts through focused and valued distraction strategies could also be considered in therapy as a means to prevent mere thought suppression (e.g., Wang et al., 2017).

Limitations

Although this study added new literature to previous theoretical and incremental evidence, some limitations should be noted. Firstly, the cross-sectional design of the study precludes causal inferences. This highlights the importance of employing longitudinal and experimental designs in future research. Secondly, the use of self-report measures entails that findings may be subject to participant biases. Thus, the use of structural interviews is recommended for future studies. Thirdly, individuals with PSMU were recruited in accordance with a theoretical model for conceptualizing behavioral addiction (Griffiths, 2005). Therefore, future studies may use this model alongside measures that specify cut-off points for PSMU, such as the Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2016). Fourthly, PSMU and craving were assessed through scales modified by the authors of the current study although many studies have followed such a process, but they may not be complete scales to evaluate these constructs; as a result, future studies should consider scales that are more appropriate for evaluating the construct. Fifthly, since the current study was carried out during the COVID-19 pandemic, which had remarkable effects on using social media (Wu et al., 2020), the findings of the present study may be affected by the pandemic. This said, the prevalence of COVID-19 was not at its peak and was almost normal at the time of this study in Iran. However, we did not control for the effects of COVID-19, so upcoming studies can pay attention to this issue. Sixthly, all constructs deemed 'behavioral addictions'

(including problematic social media use) have raised concerns as to whether these problems can or should be attributed to, and conceptualized as, a new disorder (Aarseth et al., 2017; Billieux et al., 2015; Spada, 2015). The central criticism has been the use of current operationalization of substance misuse and gambling, as proxies for conceptualizing presumed behavioral addictions, together with a broad-ranging absence of consensus on symptomatology and assessment of presumed behavioral addictions. In the context of this observation, our findings need to be viewed with caution as they may result in premature applications of the treatment of 'false-positive cases', as argued by Aarseth and colleagues (2017) in the case of gaming disorder for example. Finally, the presence of other mental health problems was not examined in the current study. Future research efforts will need to focus on controlling for mental health problems in study samples.

Conclusions

The present study shows that desire thinking is an independent cognitive mechanism in the relationship between negative affect, impulsivity, and thought suppression on the one hand and craving and PSMU on the other. Our study provides further evidence for the adoption of a metacognitive understanding for targeting desire thinking in treatment programs for individuals presenting PSMU, especially those who have high levels of negative affect, impulsivity, and thought suppression.

Data Availability The datasets generated and/or analyzed during the current study are not publicly available because the data collection is still going to be extended by more evaluation of the participants of this study to extract longitudinal results. Also, since the non-availability of datasets to the public is subject to the terms of the study approval and permission at the institute, we are not permitted to make the data available. However, these are available from the corresponding author on reasonable request.

Declarations

Ethically, Shahid Beheshti University of Medical Sciences confirmed this study. Also, the evaluation of the participants was based on the observance of the 1989 revision of the Helsinki Declaration.

Conflict of Interest There are no conflicts of interest to report.

Informed Consent All participants participated in the study with full consent.

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