The role of desire thinking in the problematic use of social networking sites among adults

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ABSTRACT

The problematic use of social networking sites (SNS) is associated with several psychiatric disorders. This behavior closely resembles addiction in terms of neurological basis and behavioral patterns. Nevertheless, successful intervention strategies and the etiology of problematic SNS use are not yet thoroughly investigated. We aimed to study whether desire thinking is associated with problematic SNS use among adults when controlling for some confounders, including boredom, affect, and impulsivity. With the help of convenience sampling, we enrolled 546 Turkish adults in this study to whom we administered a sociodemographic form, the Social Media Addiction Scale (SMAS), the Leisure Boredom Scale (LBS), the Positive and Negative Affect Schedule (PANAS), the Barratt Impulsiveness Scale (BIS-11), and the Desire Thinking Questionnaire (DTQ). To explore the association between the variables, we performed Pearson correlational and hierarchical regression analyses. The results showed that higher scores on two sub-dimensions of desire thinking, namely verbal perseveration and imaginal prefiguration, were associated with higher scores on problematic SNS use after we controlled for boredom, affect, and impulsivity. This study demonstrates that desire thinking may play a role in problematic SNS use among adults. We recommend targeting desire thinking as a potential area in treatments which may help alleviate problematic SNS use.

1. Introduction

Nowadays, the most salient online activity of individuals revolves around social networking sites (SNS) in which users have the unique ability to create identifiable profiles (Ellison & Boyd, 2013). As of January 2022, Facebook has more than 2.9 billion monthly active users, followed by YouTube (2.5 billion), Instagram (1.4 billion), and TikTok (1 billion) (Statista, 2022). Motivations for SNS use include easier communication and socializing, information-seeking entertainment, creating content (Bulut & Doğan, 2017), connecting with others, and alleviating boredom (Rauch & Schanz, 2013).

SNS may pose a potential risk for individuals in developing problematic behavior patterns due to the miscellaneous possibilities of interaction (Chen & Kim, 2013). Problematic SNS use has been conceptualized as a behavioral addiction (Andreassen et al., 2012; Griffiths et al., 2014) since it appears to possess components that are also featured in addictive behaviors, including salience, conflict, mood

modification, tolerance, withdrawal, and relapse, as well as escapism, mental preoccupation, neglect of personal life, and the concealment of its use (Schou Andreassen & Pallesen, 2014; Young, 2009). Individuals engaged in problematic SNS use tend to show psychological and physiological symptoms related to the presence or absence of this behavior (Kuss & Griffiths, 2017). The negative consequences of problematic SNS use include a lack of real social contact and social isolation, symptoms of anxiety, depression, and stress (Berryman et al., 2018; Coyne et al., 2020; Mullen et al., 2018).

However, SNS use also shows positive effects, such as social contact, improved well-being, reduced anxiety, low mood, and loneliness, as well as no significant effects on the quality of life at all. Therefore, it is debatable whether problematic SNS use only leads to negative consequences (Kim et al., 2020; Lee et al., 2011; Pang, 2020; Phu & Gow, 2019; Utz & Breuer, 2017).

One of the prominent acknowledged negative factors is craving for SNS use. This is believed to trigger arousal and to increase addictive use

over time (Hill & Zheng, 2018). Previous research has suggested that craving and 'desire thinking' could be core features and direct mediators for problematic SNS use (Leng et al., 2019). Craving appears to play a central role in addictive behaviors through the exacerbation of negative affect that typically serves as a pathway to addictive patterns of behavior (Enkema et al., 2020; Khosravani et al., 2017; Poormahdy et al., 2021; Throuvala el al., 2019).

As a multi-dimensional and voluntary cognitive process, desire thinking includes the spontaneous and conscious elaboration of memories, images, and information regarding a desired target (Caselli & Spada, 2015). Influenced by neural systems, desire thinking has been found to have a salient and central role in the activation, escalation, and maintenance of craving and addictive behaviors (Caselli & Spada, 2011, 2015, 2016; Spada, Caselli, Nikčević, et al., 2015). The need to obtain the desired target, which is central to desire thinking, may lead an individual to engage in behaviors without considering and thinking about their consequences (i.e., impulsivity), which appears to be related to problematic SNS use (Dir et al., 2013; Wartberg et al., 2021; Workman, 2012).

Both aspects of desire thinking, verbal perseveration and imaginal prefiguration, have shown significant associations with addictive behaviors in both clinical and community samples (Mansueto et al., 2019). It has been suggested that desire thinking is an independent construct in the prediction of problematic behavior (Spada et al., 2014), where desire thinking may temporarily alleviate craving in the short-term but is exacerbating it in the medium- to long-term (Marino et al., 2019). Previous studies have shown that desire thinking is associated with binge-eating (Spada, et al., 2015), drinking behavior (Caselli, et al., 2012; Efrati et al., 2020), nicotine dependence (Caselli, et al., 2012), Alcohol Use Disorder (Martino et al., 2019), gambling (Fernie et al., 2014), problematic internet use (Spada et al., 2014), Internet Gaming Disorder, (Aydın et al., 2022) and internet pornography (Allen et al., 2017). More recently-two different studies have found desire thinking to be significantly related to problematic SNS use. Verbal perseveration was observed as a strong predictor of this behavior whereas imaginal prefiguration was not (Khosravani et al., 2022a; Solem et al., 2021). In these studies, researchers confirmed that desire thinking is a maladaptive coping style activated in response to emotional reactivity and that it results in increased craving (Brandtner & Brand, 2021; Caselli & Spada, 2010; Khosravaniet al., 2022).

There is a paucity of studies exploring desire thinking in problematic SNS use while also considering the cultural differences in SNS use behavior across nationalities; thus, different results can be expected from data collected from different nations (Aydın et al., 2022; Brandtner et al., 2020; Dragan & Grajewski, 2021; Zilberman et al., 2020). We acknowledge that the potential relationship between desire thinking, negative affect, and impulsivity may blur the lines of the prominence of desire thinking in predicting craving and addictive patterns of behavior. However, desire thinking was found to play an independent role in problematic social media use (Sharifi et al., 2022), Alcohol Use Disorder, and nicotine dependence (Khosravaniet al., 2022), regardless of negative affect and impulsivity. Additionally, the existing literature has shown that boredom may be a potential predictor of problematic SNS use (Li et al., 2015). Previous studies that investigated desire thinking as a predictor for problematic SNS use have not considered boredom as a control variable. Therefore, we controlled for three proven predictors while observing the association between desire thinking and problematic SNS use to assess whether desire thinking is an underlying mechanism and independent predictor of problematic SNS use. To our knowledge, no previous studies have examined the relationship between desire thinking and problematic SNS use in the Turkish adult population while controlling for several previously recognized predictors. We hypothesized that desire thinking would predict problematic SNS use independently of boredom, affect, and impulsivity.

2. Materials and methods

2.1. Participants

We used a convenience sampling method in which we reached out to potential participants via the SNS accounts of the relevant faculty and university. This way, we managed to recruit 546 participants overall. To be included in the study, potential participants had to be at least 18 years old and had to have at least one SNS account. Exclusion criteria were the inability to participate in the study (e.g., participants who did not want to sign the consent form or who did not want to complete the study) or missing values in data collection. The data collection lasted six months. Participation in the study was voluntary, without any incentives or allowances included. Completing the study required approximately 30 min per participant. We provided the participants with written informed consent. We also informed them that they had the right to withdraw from the study at any time and without any consequences or penalties. This study was approved by the Institutional Review Board of the International University of Sarajevo (IUS-REC-01–253/2021).

2.2. Measures

2.2.1. Sociodemographic form
The form included questions regarding age, gender, education level, hours spent on SNS, current psychiatric treatment, and type of SNS.

2.2.2. Social media Addiction Scale (SMAS, Sarıçam and Karduz, 2018)
The SMAS is a self-report measure containing nine items that are designed to evaluate problematic SNS use. Items on this measure are scored on a 7-point Likert scale from 0 (never) to 7 (more than 40 times a day). One example of an item is "Have you found yourself constantly unable to think of anything else until you can use social media again?" where higher scores indicate higher problematic SNS use. The Cronbach alpha was 0.85 for this study.

2.2.3. Leisure boredom Scale (LBS; IsoAhola & Weissinger, 1990)
The LBS is a self-report measure that contains 16 items designed to evaluate how individuals feel about their leisure time, defined as non-working hours. Items on this scale are scored on a 5-point Likert scale from 1 (strongly) to 5 (strongly disagree). One example of an item is "During my leisure time, I become highly involved in what I do." Higher scores indicate higher boredom during leisure time. Soylu and Siyez (2014) adapted the Leisure Boredom Scale to fit a Turkish context and we used this modified scale in the present study. The Cronbach alpha was 0.33.

2.2.4. Positive and negative affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)
The PANAS, as a 20-item self-report measure, has been designed to evaluate positive and negative affect. Items on this measure are scored on a 5-point Likert scale from 1 (very slightly or not at all) to 5 (extremely). Higher scores indicate a higher positive/negative affect. In our study, we used the Turkish PANAS as developed by Gençöz (2000). The Cronbach alpha was 0.82 for positive affect and 0.84 for negative affect in our study.

2.2.5. Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995)
The BIS-11 is an 11-item self-report measure designed to evaluate impulsivity, including non-planning (e.g., "I plan tasks carefully"), motor impulsivity (e.g., "I act in the spur of the moment"), and attention impulsivity (e.g., "I get easily bored when solving thought problems"). Items on this measure are scored on a 4-point Likert scale from 1 (rarely/never) to 4 (almost always/always). Higher scores indicate higher impulsivity. We used the Turkish BIS-11 by Tamam et al. (2013). In the present study, the Cronbach alpha was 0.51.

2.2.6. Desire thinking Questionnaire (DTQ, Caselli & Spada, 2011)

The DTQ is a self-report measure containing 10 items to assess desire thinking on two dimensions: Verbal Perseveration (VP) (e.g., "I repeat mentally to myself that I need to practice the desired activity") and Imaginal Prefiguration (IP) (e.g., "I imagine myself doing the desired activity"). Higher scores indicate a higher degree of desired thinking. Aydin et al. (2022) developed the Turkish DTQ that we used in this study. The Cronbach alpha was 0.89 for VP and 0.84 for IP.

2.3. Statistical analyses

We used descriptive statistics methods to calculate the mean, standard deviation, frequency, and total count of the sociodemographic and study variables. With the help of the Kolmogorov-Smirnov test, kurtosis, and skewness we examined the normality of distribution. Normality assumptions were met, except for SMAS-T, time, DTQ-VP, and DTQ-IP, and these variables were log-transformed to obtain less skewed data. After transformation, the normality assumptions were met for these variables. Then Pearson correlation and hierarchical regression analysis were conducted. Afterward, we included significant correlations from the hierarchical regression models and checked multicollinearity by using the Variance Inflation Factor (VIF). We also computed Cohen's f^2, which is appropriate for calculating the effect size within regression models. According to Cohen's guidelines (Cohen, 1988), $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ respectively represent small, medium, and large effect sizes. The criteria for statistical significance was set to 0.05, and we performed all analyses with the Statistical Package for Social Sciences (SPSS) using the 25.0 version (IBM Corp, 2017).

3. Results

3.1. Descriptive statistics

Our study sample consisted of 224 male (41 %) and 322 female (59 %) participants. A total of 68 participants (12 %) reported that they had received psychiatric treatment during the study. In terms of SNS use, most of the participants reported using WhatsApp ($n = 222$); The participants also stated that they used Instagram ($n = 204$), YouTube ($n = 56$), Twitter ($n = 41$), and Facebook ($n = 23$). The mean and standard deviation values of age, daily SNS time, overall education duration, and self-report measures are presented in Table 1.

3.2. Pearson correlation analysis

Pearson correlation analyses are shown in Table 1. These indicated that daily SNS time, LBS-B, PANAS-N, BIS-M, BIS-A, DTQ-VP, and DTQ-IP were positively correlated with problematic SNS use ($p < .001$). Age and BIS-NP were negatively correlated with problematic SNS use ($p < .001$).

3.3. Hierarchical regression analysis

Results from the hierarchical regression analysis are presented in Table 2. We did not include BIS-A and BIS-M into the regression analysis due to high multicollinearity with the BIS-NP subscale (Tomaschek et al., 2018) and low internal consistency. Additionally, we calculated multicollinearity statistics for the variables regarding age (VIF = 1.25), time spent on social media (VIF = 1.32), LBS-B (VIF = 1.20), PANAS-N (VIF = 1.13), BIS-NP (VIF = 1.15), DTQ-VP (VIF = 2.31), and DTQ-IP (VIF = 2.31). Due to all variables being under the threshold value of 2.5, multicollinearity between the variables was eliminated. Accordingly, in the first step, age and time spent on SNS were significant predictors of problematic SNS use ($F(2, 543) = 28.32$, $p < .001$), accounting for 24.3 % of the total variance. The effect size of the first regression model was medium ($f^2 = 0.32$). In the second step, we added LBS-B, PANAS-N, and BIS-NP, where PANAS-N and BIS-NP served as

Table 1
Inter-correlations between the variables.

Variable	Mean	S.D.	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.SMAS-T	8.3	8.2	−0.8	0.9	—													
2.Age	32.8	11.2	0.9	0.4	−0.275**	—												
3.Gender			0.4	−1.9	−0.072	0.024	—											
4.Time	3.3	2.6	0.1	−0.5	0.376**	−0.397**	−0.076	—										
5.Education	15.4	4.4	−0.3	1.1	0.002	0.136**	0.107*	−0.123**	—									
6.LBS-B	12.7	4.3	0.3	−0.4	0.221**	−0.288**	0.064	0.223**	−0.158**	—								
7.LBS-S	17.5	3.4	−0.5	0.7	−0.025	−0.003	−0.137**	−0.001	0.105*	−0.422**	—							
8.PANAS-P	18.6	5.3	0.1	0.7	0.023	−0.116*	0.074	0.064	−0.123**	0.064	0.140**	—						
9.PANAS-N	14.9	5.2	0.5	0.9	0.192**	−0.245**	0.072	0.205**	−0.065	0.183**	0.040	0.641**	—					
10.BIS-NP	15.7	2.6	−0.6	0.4	−0.212**	0.211**	0.025	−0.238**	0.068	−0.275**	0.273**	0.132**	−0.039	—				
11.BIS-M	9.0	2.1	0.8	1.5	0.313**	−0.245**	−0.102*	0.354**	−0.139*	0.337**	−0.091*	0.129**	0.302**	−0.578**	—			
12.BIS-A	10.0	1.8	0.4	0.4	0.141**	−0.077	−0.026	0.185**	−0.121*	0.161**	−0.212**	−0.146**	−0.033	−0.615**	0.427**	—		
13.DTQ-VP	1.8	2.5	−0.3	−0.6	0.473**	−0.104**	0.001	0.246**	−0.060	0.183**	−0.047	0.054	0.069	−0.177**	0.282**	0.138**	—	
14.DTQ-IP	1.1	2.0	0.2	−0.9	0.451**	−0.191**	0.077	0.245**	−0.003	0.113	−0.031	0.89	0.142**	−0.237**	0.248**	0.064	0.609**	—

Notes for Table 1: **Correlation significant at the 0.01 level; *Correlation significant at the 0.05 level; S.D.: Standard Deviation; SMAS-T = Social Media Addiction Scale Total score; Time = Time spent on SNS (hours); Education = Education years; LBS-B = Leisure Boredom Scale Boredom; LBS-S = Leisure Boredom Scale Satisfaction; PANAS-P = Positive and Negative Affect Schedule Positive; PANAS-N = Positive and Negative Affect Schedule Negative; BIS-NP = Barratt Impulsivity Scale Non-Planning; BIS-M = Barratt Impulsivity Scale Motor Impulsivity; BIS-A = Barratt Impulsivity Scale Attentional Impulsivity; DTQ-VP = Desire Thinking Questionnaire Verbal Perseveration; DTQ-IP = Desire Thinking Questionnaire Imaginal Prefiguration.

Table 2
Hierarchical regression statistics with SMAS-TOTAL as the outcome variable.

Predictors	β	Standardized Beta	t	p	R^2
Step 1					
Age	-0.011	-0.339	−4.723	<0.001	0.243
Time	0.288	0.247	3.439	0.001	
Step 2					
Age	-0.009	-0.279	−3.920	<0.001	0.313
Time	0.224	0.192	2.692	0.008	
LBS-B	0.000	0.006	0.088	0.930	
PANAS-N	0.009	0.142	2.194	0.030	
BIS-NP	-0.031	-0.231	−3.436	0.001	
Step 3					
Age	-0.008	-0.244	−3.835	<0.001	0.463
Time	0.125	0.107	1.648	0.101	
LBS-B	-0.002	-0.029	−0.464	0.643	
PANAS-N	0.008	0.133	2.271	0.024	
BIS-NP	-0.027	-0.203	−3.350	0.001	
DTQ-VP	0.340	0.289	3.921	<0.001	
DTQ-IP	0.191	0.164	2.226	0.027	

Note: Time = Time spent on SNS; SMAS-T = Social Media Addiction Scale Total score; LBS-B = Leisure Boredom Scale Boredom; PANAS-N = Positive and Negative Affect Schedule Negative; BIS-NP = Barratt Impulsivity Scale Non-Planning; DTQ-VP = Desire Thinking Questionnaire Verbal Perseveration; DTQ-IP = Desire Thinking Questionnaire Imaginal Prefiguration.

significant predictors of problematic SNS use ($F(5, 540) = 15.74$, $p <.001$), explaining an additional 6.9 % of the total variance. The effect size of the second regression model was large ($f^2 = 0.45$). In the last step, DTQ-VP and DTQ-IP were inserted; they were significant predictors of problematic SNS use ($F(7, 538) = 21.04$, $p <.001$), accounting for an extra 15.0 % of the total variance. The effect size of the final regression model was large ($f^2 = 0.85$). In this last step, time spent on SNS has lost its significance after adding DTQ variables; however, the other variables from the second step remained significant.

4. Discussion

This study was designed to determine the association between desire thinking and problematic SNS use among adults while controlling for a series of established variables. Our findings reveal that both factors of desire thinking, imaginal prefiguration and verbal perseveration, were positively associated with problematic SNS use after controlling for boredom, affect, and impulsivity, as well as for other confounding variables including age and time spent on SNS.

These results are consistent with earlier studies, which reported an association between desire thinking and addictive behaviors (Caselli & Spada, 2015), including problematic SNS use (Khosravani et al., 2022a; Solem et al., 2021), problematic Facebook use (Marino et al., 2019), problematic internet use (Spada et al., 2014), problematic internet pornography use (Allen et al., 2017; Brandtner & Brand, 2021), and Internet Gaming Disorder (Aydın et al., 2022; Brandtner et al., 2020; Brandtner & Brand, 2021; Dragan & Grajewski, 2021).

In our sample, we found verbal perseveration to be the strongest predictor of problematic SNS use, which is consistent with the finding of Solem et al. (2021). The self-talk characteristic of verbal perseveration may be a marker of a proximal phase to using SNS following the activation of imaginal prefiguration, as argued by Caselli and Spada (2015). In addition, verbal perseveration may lead to an escalation of craving and reinforced SNS use when the craving is eventually satisfied (Marino et al., 2019). In the long run, this may lead to problematic patterns of SNS use. Our findings partially contradict those of Spada et al. (2014) who found imaginal prefiguration to be a stronger predictor than verbal perseveration in problematic internet use. The difference could be due to our sample showing lower problematic engagement with SNS, and cultural differences in SNS use behavior. Caselli and Spada (2010) have argued that although desire thinking may temporarily alleviate craving and negative affect by moving attention from these affective states to the

desired target (e.g., SNS use), this positive effect can only be observed in the short term as the desired target becomes increasingly salient and the growing sense of deprivation eventually leads to engagement as a means of reducing distress.

Understanding desire thinking may have significant clinical implications in the alleviation of problematic SNS use, enabling the incorporation of techniques aimed at its interrupting the psychotherapeutic practice (Martino et al., 2019). Furthermore, such an attempt to delineate the role of desire thinking may provide insights for psychoeducational practice as a form of early prevention of addictive behaviors (Sharifi Bastan et al., 2022). Interventions that directly modify desire thinking through attention control (e.g., detached mindfulness and attention training) may be valuable for reducing problematic SNS use (Caselli & Spada, 2013). Studies on the problematic use of internet pornography and problematic internet use in general have shown that desire thinking may be triggered by positive metacognitions (e.g., "Imagining the desired activity makes me feel energized and ready to act."). As a result, desire thinking may generate negative metacognitions (e.g., "I cannot avoid thinking about a desired activity/object when it comes to my mind.") (Allen et al., 2017; Caselli & Spada, 2015). Furthermore, Caselli and Spada (2016) have suggested that desire thinking is similar to other perseverative thinking styles, such as worry and rumination. Thus, metacognitive techniques that support changing perseverative thinking patterns may help managing maladaptive desire thinking patterns (Caselli & Spada, 2015).

A number of significant limitations need to be considered. First, the generalizability of our findings is limited since our study has included only Turkish adults. Second, we utilized self-report online tests, which may threaten the validity of the findings. Another issue are the low DTQ and SMAS scores, which may result from recall bias and response accuracy. Likewise, the small sample size, wide age range, and a gender imbalance with a majority of female participants may represent additional sources of error. In our study, 68 participants reported that they were under psychiatric treatment; however, they neither reported the medication type nor did we collect data for mental disorder diagnosis. Given the potential relationship between the study variables and mental disorders, our results may have been affected by present psychiatric treatment and diagnosis. Thus, including structured clinical interviews in the study design would have provided a clearer picture regarding the presence of mental disorders and their potential effect on the study variables. Moreover, the cross-sectional design of this study cannot explain the causality of the perceived associations. We recommend that future studies on this topic incorporate supplementary scales and diagnostic criteria for assessing problematic SNS use. In a similar vein, it is important to report that the internal consistency values were low for LBS and BIS-11 scales in our sample. Lastly, due to the proposed associations between problematic SNS use and boredom, impulsivity, and affect, we advise that further investigations examine these psychosocial correlates in relation to desire thinking and problematic SNS use. The present study adds to the growing body of research that indicates the association between desire thinking and addictive behaviors, particularly for problematic SNS use. We propose applying metacognitive techniques to modify maladaptive desire thinking to reduce the risk of an onset of and relapses to problematic SNS use (Spada et al., 2015). There is a relative paucity of empirical research describing the impact of desire thinking on problematic SNS use; therefore, future studies on the current topic are recommended.

CRediT authorship contribution statement

Lejla Mustoo Başer: Formal analysis, Writing – original draft, Writing – review & editing. **Fikret Poyraz Çökmüş:** Investigation, Data curation. **Selma Tvrtković:** Formal analysis, Writing – original draft. **Faruk Obuća:** Formal analysis, Writing – original draft. **Pınar Ünal-**

Aydın: Resources. **Orkun Aydın:** Conceptualization, Methodology, Project administration. **Marcantonio M. Spada:** Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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