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The underlying mechanisms between problematic social media use and social anxiety: A cross-sectional study

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Abstract

This study aims to explore the underlying mechanisms in the association between teenage problematic social media usage and social anxiety, specifically emotion regulation difficulties. A total of 188 females and 125 males aged between 10 and 18 years participated in the study. Data were gathered between September 2022 and January 2023 using the convenience sampling method. The Social Media Addiction Scale Short Form for Adolescents (SMAS-SF), the Difficulties in Emotion Regulation Scale (DERS), the Social Anxiety Scale for Adolescents, and a demographic information form were given to the participants. Correlational, Hierarchical Regression, and multiple mediation analyses were conducted. Findings showed that difficulty in emotion regulation plays a significant mediating role in the association between problematic social media use and social anxiety. This link was mediated specifically by difficulties in emotional clarity and goal-directed behavior, as well as non-acceptance of emotional reactions. In addition, there was a significant direct effect of problematic social media use on social anxiety. Problematic social media use may harm emotional regulation, which could lead to a decline in emotional clarity, making it more difficult to accept and manage emotional reactions and cope with unpleasant emotional experiences. This, in turn, may exacerbate social anxiety.

Keywords: addictions to technology, adolescence, social anxiety, problematic social media use, emotion regulation

Main points

- Social media use has exponentially increased among adolescents in Türkiye.
- Excessive use of social media may lead to problematic usage, considering addictive behavior in adolescence.
- Problematic social media use may increase social anxiety through emotion regulation difficulties, specifically difficulty in understanding emotional reactions and accepting them, and acting in a goal-oriented manner in the face of negative emotions, in adolescence.

Introduction

Among adolescents aged between 10 and 14, at least one anxiety disorder is present in 3.6%, while 4.6% of those aged between 15 and 19 also experience at least one anxiety disorder (World Health Organization [WHO], 2020). Social anxiety disorder (SAD) is characterized by fear in one or more social situations, marked discomfort, hypersensitivity to possible negative social evaluations, and avoidance of feared social situations (American Psychiatric Association [APA], 2013). SAD typically develops around the age of 11-15 and can have long-term consequences for psychological well-being (WHO, 2020).

Adolescents who experience SAD are particularly vulnerable due to difficulties in areas including relationships with peers, gender norms, sexual violence, bullying, or economic problems (WHO, 2020). If left untreated, SAD can have long-term adverse effects and severely impact daily functioning. The consequences may include the deterioration of social and personal relationships, school attendance problems, substance abuse or addiction, behavioral problems, reluctance to study, emotion regulation difficulties, or even risk of suicide (Singh et al., 2020).

Across the world, the number of social media users increased to 4.62 billion in 2022 (Kemp, 2022). In Türkiye, the rate of internet use among children aged between 6 and 15 was

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82.7% in 2021 whilst it was 50.8% in 2013. Among these regular users, 31.3% spent almost three hours per day on social media (Turkish Statistical Institute [TSI], 2021). Social media encompasses platforms such as Instagram, Facebook, and YouTube, and it provides an important venue for entertainment, communication, and information sharing (Kaplan & Haenlein, 2010).

Although social media offers benefits such as strengthening social ties, reducing loneliness, and facilitating access to information, it can also pose potential dangers when used in a problematic manner. This pattern of use can negatively impact adolescents' mental health by contributing to emotional regulation difficulties, self-regulation difficulties, or symptoms of social withdrawal. This excessive and maladaptive engagement is characterized as problematic social media use, a concept that has attracted attention in adolescent mental health (She et al., 2023). In this regard, a compelling approach was proposed by van den Eijnden et al. (2016), who applied the DSM-5 criteria for internet game addiction to social media use and described this problematic behavior pattern as "Social Media Disorder." Various other terms have been used for this phenomenon in international publications. In this study, we employed the term "problematic social media use" to describe this behavior pattern (Shensa et al., 2017).

Although problematic social media usage has not been formally recognized as a disorder in diagnostic systems (e.g., DSM-5; APA, 2013), it has increasingly been conceptualized as a potential behavioral addiction within a biopsychosocial framework (Griffiths, 2005). This framework emphasizes that behavioral addictions emerge as a result of the interaction of biological, psychological, and social factors and defines them based on their core addiction components. According to Griffiths (2005), six basic components constitute behavioral addiction: *salience* (preoccupation with social media), *tolerance* (needing to spend more time to achieve the same level of pleasure), *withdrawal* (feeling discomfort due to not using social media), *conflict* (relational or personal issues caused by use), *relapse* (ineffective attempts to reduce or stop use), and *mood modification* (using social media to modify emotions). PSMU is commonly conceptualized using these criteria in research, even in the absence of an official diagnostic classification (Shensa et al., 2017).

According to the Compensatory Internet Use Model (CIUM) (Kardefelt-Winther, 2014), individuals may turn to the internet as a means of coping with problems in their lives or negative emotions. Internet use can help cope with psychosocial difficulties encountered in daily life, such as stress, loneliness, or social anxiety. For example, a person who lacks face-to-face interactions may use social networks to obtain social stimulation. Although this coping strategy may yield positive short-term outcomes, it can lead to negative long-term consequences, such as neglecting responsibilities at school or work, or becoming dependent on online socialization. The model emphasizes the significance of investigating the connection between motivations for internet use and psychological well-being. In this context, PSMU can be viewed as a maladaptive outcome of CIUM, particularly when social media becomes the primary means of coping with emotional or social difficulties.

Unlike general social media use, PSMU is associated explicitly with adverse consequences such as increased anxiety, depression, low academic performance, reduced life satisfaction, and diminished self-confidence (Karim et al., 2020). One factor contributing to negative self-comparison and emotional distress is the idealized or unrealistic portrayals to which adolescents are exposed on social media (Onyeizu et al., 2022). Although social media offers widespread online connectivity, it can also reduce face-to-face interactions and hinder the development of real-life social skills. Excessive use is associated with increased conflict in close relationships and a decrease in the quality of time spent with family (Li et al., 2021).

People with social anxiety who turn to online communication to avoid face-to-face discomfort may find that excessive involvement in social media reversely intensifies their anxiety symptoms, as the discomfort that occurs in face-to-face interactions may be further reinforced by avoidance (Carruthers et al., 2019). Moreover, adolescents who spend more than two hours per day on social media report more psychological distress, poor mental health, and higher rates of suicidal ideation (Sampasa-Kanyinga & Hamilton, 2015). These findings highlight that, although internet use is rapidly increasing among adolescents, the quality and intensity of social media use significantly influence mental health outcomes.

With the variation in types of social media use, adolescents' usage may not always be inherently harmful. Adolescents' social media use may also have positive effects, such as relieving stress, creating excitement, or receiving emotional support. They may also use it to improve their mood or distract themselves from negative emotions such as sadness, anger, or frustration. In some cases, observing positive content or receiving positive feedback may enhance emotional well-being. However, when usage becomes excessive or compulsive, it may lead to negative consequences, specifically in terms of emotion regulation (Lee & Hancock, 2023; Weinstein, 2018). Emotion regulation is the ability to monitor, evaluate, and modify emotional responses to achieve individual goals (Gratz & Roemer, 2004). It includes several dimensions, including emotional awareness, emotional clarity, acceptance of emotional responses, impulse control during negative emotions, and access to effective regulation strategies. When one has problems in one or more of these dimensions, difficulties with emotion regulation occur.

PSMU, characterized by excessive and compulsive usage despite harmful effects, has been linked to difficulties in regulating emotions (Andreassen et al., 2012). These difficulties may include experiential avoidance, difficulty in accepting emotional reactions, or a lack of adaptive emotion regulation strategies (Hormes et al., 2014). In problematic social media use, adolescents struggle to control their impulses

and behave in a goal-oriented manner (Wartberg et al., 2021). Additionally, excessive use of social media, especially in early adolescence, has been associated with elevated physical and relational anger (Hormes et al., 2014).

In addition to its effects on emotion regulation, social media can be a place where anxiety and social pressure occur. Sharing photos, updating statuses, or commenting on others' content can create anxiety in adolescents due to fear of negative evaluation or criticism. In this context, a constant need for social approval, driven by likes or incoming reactions, emerges. When these expectations are not satisfied, it can lead to discomfort, disappointment, or a decrease in self-worth (Weinstein, 2018). Being exposed to emotionally charged or disturbing content in virtual environments can harm emotional well-being. For example, during the COVID-19 pandemic, alarming social media posts shared by others contributed to emotional contagion and collective anxiety in users due to their internalization (Shao et al., 2021). Thus, although social media has social and emotional benefits, problematic usage patterns can make it difficult for adolescents to manage their emotions and result in increased anxiety.

Adolescence is a phase of development characterized by significant changes in cognitive abilities, emotional growth, and social interactions. During this stage, it is common for adolescents to feel some concern regarding their presence in the eyes of others, which is a normal reaction to peer evaluation and social feedback (Casey et al., 2011; Somerville & Casey, 2010). This increased awareness of social dynamics, combined with emotional growth, may expose them to a greater risk of social anxiety, particularly if they do not have effective strategies for coping with negative emotions (Zimmermann & Iwanski, 2014). In adolescents, difficulties in emotion regulation have been associated with various psychological difficulties, notably social anxiety (Young et al., 2019). Adolescents with social anxiety use maladaptive strategies, such as suppressing emotions, excessive self-focus, or avoidance (Golombek et al., 2019; Singh et al., 2020). At the same time, adolescents are also the most frequent users of social media. PSMU may be particularly detrimental for adolescents who already have difficulties with emotion regulation, as when they use social media to cope with distress, they potentially perpetuate a maladaptive pattern of emotion regulation (Sackl-Pammer et al., 2019).

Although a growing body of literature suggests relationships between social media and social anxiety, the underlying mechanisms—notably the mediating role of emotion regulation difficulties—have not been sufficiently investigated (Yang et al., 2023). Since social media engagement and emotion regulation are crucial during adolescence, it is important to explore how their interaction influences social anxiety. Moreover, previous research has highlighted the impact of age and gender on these factors, suggesting that developmental and gender-based differences may further influence these relationships (Neumann et al., 2010).

The present study seeks to examine the connections between problematic social media usage, challenges in emotional regulation, and social anxiety among adolescents. Additionally, we control for gender and age to account for their possible effects (Neumann et al., 2010). To the best of our knowledge, no previous study has concurrently investigated these variables in a non-clinical sample of adolescents, which emphasizes the novelty and relevance of the present research.

By considering the aforementioned literature, we propose the following hypotheses:

H1: *Problematic social media use would positively predict social anxiety.*

H2: *Problematic social media use would positively predict difficulties in emotion regulation.*

H3: Difficulties in emotion regulation would positively predict social anxiety.

H4: Problematic social media use would affect social anxiety through emotion regulation difficulties.

Method

Sample

Participants were recruited via the study announcement on online platforms (email, Instagram, Facebook) and were also reached face-to-face through their parents between September 2022 and January 2023. Participants were selected using the convenience sampling method and according to the following criteria: not having any psychiatric disorder based on self-report (autism, schizophrenia and related disorders, bipolar disorder, depression, disinhibited social engagement disorder, mental retardation, alcohol or substance addiction, and body image disorder), speaking Turkish, living in Türkiye, and being between the ages of 10 and 18.

During the study process, ethical permissions were first obtained. Then, informed consent forms were given to the parents and participants, who were informed about the study's content and ethical sensitivities. Finally, the study was conducted. We examined the correlation among the study variables and, using hierarchical regression, sought to identify the observed variability. Next, a multiple mediation analysis was conducted using the PROCESS macro v4.2 (model 4) for SPSS v.26 with the bootstrapping method (Hayes, 2013).

The participants were 188 girls (60.1%) and 125 boys (39.9%), aged between 10 and 18 (M = 15.54), mostly at the high school education level (52.7%), mostly at middle-income (80.5%), and mostly living in metropolitan cities (69.3%) (see Table 1).

Table 1. Demographic information

Variables	N	%	M (S)
Gender			
Girl	188	60.1	
Boy	125	39.9	
Age			15.54 (2.71)
Educational Level			
Primary School	15	4.8	
Secondary School	78	24.9	
High School	165	52.7	
University	55	17.6	
Income Level			
Low	36	11.5	
Middle	252	80.5	
High	25	8	

Our research focused on exploring patterns of socio-emotional attributes [e.g., social anxiety/emotional regulation] in Turkish adolescents aged 10 to 18, specifically within a community-based sample free of any prior mental health diagnoses. Consequently, the findings are most applicable to the generally developing adolescent population and should be cautiously evaluated in light of the characteristics of our sample.

Measurements

Demographic Information Form

Information was collected from the participants regarding their gender, education, income level, and age.

Social Media Addiction Scale Short Form for Adolescents (SMA-SF)

The scale was first developed by van den Eijnden et al. (2016) and adapted into Turkish by Taş (2017). It was developed as a unidimensional construct based on the diagnostic criteria for Internet Gaming Disorder listed in the DSM-5 section on conditions requiring further research. Initially, it consisted of 27 items, which were later reduced to a 9-item short form (e.g., over the past year, have you consistently found yourself unable to think about anything other than the moment you can get back on social media?) that can be answered as "yes" or "no." It is scored between 0 and 9 with a cutoff score of 5. Since we examined the relationships between the variables in our study, we did not use this measurement tool as a diagnostic instrument and did not work with a cutoff point. An increase in scale scores was associated with an increase in the level of problematic social media use (Wartberg et al., 2020). Cronbach's alpha internal consistency coefficient was found to be 0.82 in the original scale, 0.76 in the Turkish adaptation, and 0.73 in the current study.

The scale was developed using data from 2,198 Dutch adolescents, comprising a total of three samples with 724, 873, and 601 participants aged between 10 and 17 (approximately 49.5% of the participants were boys and 50.5% were girls across the three samples). For convergent validity, strong correlations were found between SMA-SF and the Compulsive Internet Use Scale, with correlations above 0.50. For criterion validity, medium positive correlations were found between the SMA-SF scores and related psychosocial constructs, including depression, attention deficit, frequency of daily social media use, and frequency of posts. For structural validity, confirmatory factor analysis revealed good model fits for the SMA-SF across multiple samples (e.g., in Sample 2: $\chi^2(27) = 62.852$, $p < 0.001$, *CFI* = 0.997, *RMSEA* = 0.041) (van den Eijnden et al., 2016). In the Turkish version, the sample consisted of 376 high school students (60.4% female, 39.6% male) aged between 14 and 18, attending an Anatolian high school in Gaziantep, Türkiye. As a result of the factor analysis, a single-factor structure explaining 35% of the variance was obtained. In the confirmatory factor analysis, it was observed that the one-dimensional structure of the scale provided a good fit: $\chi^2 = 61.29$, *df* = 27, $\chi^2/df = 2.27$, *RMSEA* = .058, *RMR* = .009, *S-RMR* = .045, *GFI* = .96, *AGFI* =.93, *CFI* = .93, *NNFI* = .91, *IFI* = .93 (Taş, 2017).

It is also evident that SMA-SF has been utilized in other studies. For example, Wartberg et al. (2020) measured problematic social media use using the German version of the SMA-SF scale in their study with adolescents aged 12-17. They found significant relationships between the scale and the Internet Gaming Disorder Scale. The scale was also related to other constructs, such as depression and trust. Yam et al. (2024) used this scale in their study with Turkish adolescents aged 11-18. The sample characteristics in this study were similar to those in our study (e.g., gender distribution). They reported that the SMA-SF is significantly related to loneliness and psychological resilience constructs.

Social Anxiety Scale for Adolescents (SAS-A)

The Social Anxiety Scale for Adolescents (SAS-A) (La Greca & Lopez, 1998; La Greca et al., 1988) consists of 18 self-statements and four filler items. In this study, we used the Turkish version of the scale (Aydın & Tekinsav Sütçü, 2007). Fear of negative evaluation (FNE; 7 items, e.g., I worry about what others think of me), distress and social avoidance due to new situations or unfamiliar peers (SAD-New; 6 items; e.g., I feel uneasy when meeting someone new), and generalized distress and social avoidance (SAD-General; 5 items; e.g., I feel shy even when I am around peers I know well) constitute the subscales. The scale is scored between "1" (never) and "5" (always), and higher scores on the scale indicate an increase in the level of social anxiety. Cronbach's alpha internal consistency coefficient was .93 for the original scale and .76-.91 for the subscales (Storch et al., 2004), .88 for the Turkish version, and .92 in this study for the general scale and. For the subscales in this study, Cronbach's alpha internal consistency coefficient was found in the range of .80 -.89.

The SAS-A has been supported in the literature as demonstrating good and adequate psychometric properties.

The association between high SAS-A scores and low sociometric status has confirmed the construct validity of this measure. Test-retest reliability over a 4-month period was found to be adequate, with a correlation of .70 (Cohen & Prinstein, 2006; La Greca, 1999). In the Turkish version of the scale, which was conducted with adolescents aged 12 to 15, it was reported to have good psychometric properties and significant correlations with other measures, such as assessing social anxiety and trait anxiety (Aydın & Tekinsav Sütçü, 2007). Additionally, in another study conducted with adolescents, the SAS-A has been found to have significant correlations with problematic social media usage and self-regulation (Yıldız Durak, 2018).

Difficulties in Emotion Regulation Scale (DERS)

The DERS was developed by Gratz and Roemer (2004) and adapted into Turkish with an adult sample aged between 19 and 31 by Rugancı and Gençöz (2010). The scale has 36 items and six subscales which consist of lack of emotional awareness (awareness; e.g., I pay attention to how I feel), lack of emotional clarity (clarity; e.g., I am clear about how I feel), lack of acceptance of emotional reactions (non-acceptance; e.g., When I feel bad, I get angry at myself for feeling that way), limited access to emotion regulation strategies (strategies; e.g., When I feel bad, I believe it will last for a long time), difficulty in controlling impulses (impulse; e.g., My emotions feel overwhelming and out of control), and difficulty in acting in a goal-oriented manner (goals; e.g., When I feel bad, I have difficulty getting things done). The DERS is scored between "1" (almost never) and "5" (almost always), with higher scores indicating increased difficulty in emotional regulation. Cronbach's alpha internal consistency coefficient was found to be in the range of .72-.87 for the original scale (Neumann et al., 2010), .94 for the Turkish adaptation, and .92 for the general scale in this study, as well as .69-.86 for the subscales, respectively. Only the "awareness" subscale reliability coefficient (.694) remained below .70, which was stated to be less effective than the other subscales in both the original and Turkish versions (Rugancı & Gençöz, 2010). Still, the data regarding this were carefully considered in our study.

The DERS has been supported in the literature as having good and adequate psychometric properties. It demonstrates strong construct and predictive validity through the differential associations of its subscales with various clinical variables (e.g., emotional avoidance) and behaviors (e.g., self-harm and intimate partner abuse) (Gratz & Roemer, 2004). The Turkish version of the DERS also shows strong construct validity (its six-factor structure explains 62.39% of the total variance), criterion validity (based on multivariate and univariate analyses), and good concurrent validity (e.g., strong correlations with the Brief Symptom Inventory). Though throughout these analyses, the awareness subscale was found to have relatively weak validity coefficients (Rugancı & Gençöz, 2010). The psychometric properties of the Turkish version of the DERS have also been examined in adolescents (595 adolescents aged 14-17), confirming the six-factor structure and demonstrating that the scale is reliable and valid for this age group (Sarıtaş-Atalar et al., 2015).

Results

This study aimed to examine the mediating role of difficulties in emotion regulation in the relationship between problematic social media use and social anxiety. We also considered the possible effects of age and gender. In the analyses, a power level of 0.95 and a medium effect size were targeted, and according to the power analysis using G*Power, it was determined that at least 134 participants were required (two-tailed, effect size = 0.3, α = 0.05, 1 – β = 0.95) (Faul et al., 2009).

Fundamental assumptions were tested before the analyses. The normality assumption was supported by finding the skewness and kurtosis values of the variables within the range of -2 to +2. The linearity assumption was supported by observing the linear relationships in the scatter plots created between the dependent and independent variables. For the multicollinearity assumption, VIF values ranged from 1.09 to 3.24, and tolerance values ranged from 0.31 to 0.92. According to these results, the basic assumptions were met, and analyses were conducted using parametric tests (Field, 2013).

Correlation analyses revealed significant positive relationships between PSMU and SAS-A total, as well as the subscales of SAS-A; however, the relationship between PSMU and the awareness subscale of DERS was not significant. At the same time, there were significant and positive relationships between PSMU and the total DERS score, as well as its remaining subscales. For social anxiety, total DERS and all its subscales had significant positive relationships. Further correlation coefficients for our study variables are presented in Table 2.

According to the results of hierarchical regression (see Table 3), the first step showed that gender (β = -.17, t = -3.06, p < .01, 95% CI = -8.21 to -1.79) and age (β = -.18, t = -3.17, p < .01, CI = -1.51 to -.35) accounted for .06% of the variance in social anxiety (F [2, 310] = 9.13, p < .001). In the second step, the inclusion of PSMU (β = .34, t = 6.47, p < .001, CI = 1.5 to 2.8) in the model explained 17% of the variance in social anxiety (F [3, 309] = 20.85, p < .001).

In the last step of the regression analysis, by adding the subscales of DERS (the significant ones were lack of emotional clarity [β = .22, t =3.48, p < .01, 95% CI = .31 to 1.12], non-acceptance of emotional responses [β = .25, t =4.08, p < .001, 95% CI = .36 to 1.04], and difficulty engaging in goal-directed behavior [β = .15, t =2.28, p < .05, 95% CI = .06 to .78]) the model accounted for 37% of the variance in social anxiety (F [9, 303]= 19.6, p < .001).

Table 2. Correlations among the study variables

Variables	1	2	2.1	2.2	2.3	3	3.1	3.2	3.3	3.4	3.5	3.6
1. SMA-SF	-											
2. SAS-A Total	.32**	-										
2.1. FNE	.35**	.90**	-									
2.2. SAD-New	.22**	.87**	.63**	-								
2.3. SAD-General	.27**	.87**	.67**	.71**	-							
3. DERS total	.43**	.52**	.54**	.35**	.47**	-						
3.1. Awareness	.10	.14**	.15**	.13*	.10	.35*	-					
3.2. Clarity	.27**	.39**	.43**	28**	.33**	.68*	.43*	-				
3.3. Non-acceptance	29**	.43**	.45**	.26**	.43**	.72*	.06	.34**	-			
3.4. Strategies	.43**	.45**	.46**	.29**	.44**	.88*	.09	.48**	.65**	-		
3.5. Impulse	.31**	.33**	.39**	.18**	.31**	.81*	.11	.37**	.51**	.70**	-	
3.6. Goals	.43**	.40**	.39**	.33**	.35**	.73*	-.04	.37**	.39**	.64**	.59**	-

*p<.01, **p<.001

Table 3. Hierarchical regression analysis

Predictor variables	*b*	*SE*	B	*t*	*R2*	*%95 CI*	
						LB	*UB*
Step 1					.06		
Constant	63.31	5.31		11.93		52.87	73.75
Gender	-5	1.63	-.17	-3.06**		-8.21	-1.79
Age	-.93	.30	-.18	-3.17**		-1.51	-.35
Step 2					.17		
Constant	59.30	5.03		11.8		49.41	69.19
Gender	-4.04	1.54	-.14	-2.62**		-7.08	-1
Age	-1.16	.28	-.22	-4.15***		-1.71	-.61
PSMU	2.14	.33	.34	6.47***		1.5	2.8
Step 3					.37	12.57	35.5
Constant	34.16	5.8		5.9		22.76	45.6
Gender	-1.14	1.44	-.04	-.79		-4	1.7
Age	-1.29	.25	-.24	-5.03***		-1.78	-.78
PSMU	.86	.33	.14	2.6*		.20	1.50
Clarity	.72	.21	.22	3.48**		.31	1.12
Awareness	.06	.17	.02	.34		-.28	.40
Impulse	-.21	.17	-.09	-1.27		-.53	.12
Non-acceptance	.70	.17	.25	4.08***		.36	1.04
Goals	.42	.19	.15	2.28*		.06	.78
Strategies	.23	.17	.11	1.31		-.11	.57

B= Standardized coefficient, *t*= Statistical significance of regression coefficients, *CI* = Confidence interval, *LB* = Lower bound; *UB* = Upper bound, R^2 = .06 for Step 1; ΔR^2 = .11 for Step 2; ΔR^2 = .20 for Step3 (all ps < 0.001), *p < .05; ** p < .01; *** p < .001, dependent variable: social anxiety.

Mediation Analysis

The mediating role of emotion regulation difficulties was explored according to the bootstrapping indirect paths method (Hayes, 2013; Preacher & Hayes, 2008). In this method, a confidence interval is created by drawing thousands of random samples from the available dataset. The bootstrapping method has the advantages of not being affected by sample size and normal distribution assumptions, not requiring the determination of a significant relationship between variables, and allowing for the control of Type 1 and Type 2 errors by supporting multiple mediator analyses simultaneously. An indirect effect is considered significant if the 95% bootstrap confidence intervals for the variable obtained from 1,000 bootstrap samples do not include zero. In the current study, we employed mediation analysis using the bias-corrected bootstrapping method with 5,000 samples, as provided by SPSS Macros (Preacher & Hayes, 2008).

The mediation analysis was first conducted using the composite scores of the scales employed in our study. Our findings showed that problematic social media use had a significant effect on difficulties in emotion regulation (b = 4.30, t = 8.5, p <0.001); difficulties in emotion regulation, in

Table 4. Mediation analysis summary

Relationship	Total Effect	Direct Effect	Indirect Effect	Confidence Interval		*t- statistics*	Conclusion
				Lower Bound	Upper Bound		
PSMU-->DER-->SA	2.05	.78	1.3	1.4	2.72	6.1***	Partial Mediation

*** $p < .001$, PSMU = Problematic social media use, DER = Difficulties in emotion regulation, SA= Social anxiety

Table 5. Indirect effects in multiple mediation analysis

		%95 CI		
Indirect effect PSMU-->SA	***Effect (b)***	**Boot SE**	**LLCI**	**ULCI**
Total	1.37	.25	.91	1.9
Clarity	.37	.14	.13	.66
Awareness	.002	.024	-.05	.06
Impulse	-.18	.16	-.50	.13
Non-acceptance	.47	.16	.19	.81
Goals	.44	.21	.06	.90
Strategies	.28	.27	-.26	.80

95% CI = 95% confidence interval, control variable = age; the 95% confidence intervals do not include zero, which shows that the indirect effect is significant

turn, had a significant effect on social anxiety (b = .30, t = 8.7, p <0.001). Finally, in the presence of the mediator, problematic social media use still had a significant effect on social anxiety (b = .78, t = 2.33, p <0.05) (see Table 4). Since the findings were in the expected direction, we conducted additional analyses with the DERS' subscales to determine which ones accounted for the observed relationships.

In the further mediation analysis (see Table 5), we first controlled for gender and age. However, gender did not have a significant effect on social anxiety; hence, we continued with age as a covariate. The mediating model was tested, and the findings showed a significant indirect effect of PSMU on social anxiety through clarity (b = .37, SE = .14, t = 2.64, p <0.001), non-acceptance (b = .47, SE = .16, t = 2.93, p <0.001), and goals (b = .44, SE = .21, t = 2.1, p <0.001). Additionally, the direct effect of PSMU on social anxiety, in the presence of the mediators, was found to be significant (b = .85, t = 2.58, p = .010).

As PSMU scores increase, difficulty in understanding emotional reactions also increases, and this leads to an increase in social anxiety scores (p < .001). As PSMU scores increase, difficulties in accepting emotional reactions also escalate, leading to a rise in social anxiety scores (p < .001). Lastly, as PSMU scores increase, difficulty in acting in a goal-oriented manner in the face of negative emotions exacerbates, and this leads to an increase in social anxiety scores (p = .014). In addition, age was found to be a significant covariate affecting social anxiety (p < .001) but had an insignificant effect on the mediators (p > .05).

Discussion

This study aimed to investigate the mediating role of emotion regulation difficulties in the relationship between problematic social media use and social anxiety in a healthy sample of adolescents in Türkiye. Findings showed that, specifically, difficulty in understanding emotional reactions, acceptance of emotional reactions, and acting in a goal-oriented manner in the face of negative emotions have a positive mediating role between problematic social media use and social anxiety.

According to our findings, first, we found that PSMU affects social anxiety through difficulty in understanding emotional reactions. Using social media to cope with negative emotions may exacerbate emotional discomfort in the long run, diverting adolescents from understanding their emotional reactions and leading to a decrease in social skills related to emotional understanding, as reflected in social interactions and communication. In turn, this chain of reactions can lead to an increase in the level of social anxiety (Michikyan et al., 2023).

Secondly, non-acceptance of emotional reactions had a mediating role between PSMU and social anxiety. Excessive engagement with social media may distract adolescents from experiencing emotions and make it challenging for them to acknowledge their emotional reactions; instead, it may cause them to feel weak, ashamed, or guilty about their emotional responses (Hormes et al., 2014). Adolescents who struggle to accept their emotional reactions may worry about negative emotional responses appearing in social situations and being perceived as unacceptable. Consequently, such behavior can exacerbate social anxiety (Michikyan et al., 2023).

Lastly, spending an excessive amount of time on social media may impair adolescents' ability to use adaptive emotion-regulating strategies, notably goal-oriented behavior (Hormes et al., 2014). When this difficulty applies to social situations in real life, it can evoke intense emotions (e.g., social anxiety) and hinder purposeful action. For instance, an adolescent may feel overwhelmed before a class presentation and be unable to prepare adequately due to an ineffective emotion regulation strategy. In line with this view, our findings showed that difficulty in acting in a goal-oriented manner behavior in the face of negative emotions played a significant mediating role between PSMU and social anxiety in adolescents.

Although there are various motivations for adolescents to use social media, including social interaction, access to information, and excitement, how they react to the content they are exposed to on these platforms is important (Onyeizu et al., 2022). For example, young people are often exposed to unrealistic personalities, characters, or socio-cultural standards on social media platforms. As a result, they may find themselves engaging in upward social comparison without even realizing it. This comparison can have significant

consequences for psychological health, particularly in terms of difficulties regulating emotions (Yang et al., 2023). Thus, adolescents may present more positive aspects of themselves on social media, as they have control over the persona they create online (Onyeizu et al., 2022). However, since these situations have little or no equivalence in real life, one may experience internal emotional conflicts and, further, struggle to accept their feelings and understand their emotional reactions.

At the same time, the problematic use of social media may deter adolescents from engaging in face-to-face interactions and negatively impact the development of emotional regulation skills that occur in such interactions, despite adolescents' social media use aiming to alleviate stress arising from real-life social interactions. If a problematic usage pattern continues frequently and for a prolonged period, maladaptive emotion regulation strategies can be amplified. Due to their difficulties in regulating emotions, their emotional states and regulatory control (excessive use) may be adversely affected, which can have a detrimental impact on their face-to-face social interaction skills (e.g., self-confidence or communication skills) and lead to an increase in social anxiety levels (Yang et al., 2023).

Extending these further, theoretical models for problematic social media use may provide insight into the interpretation of our findings. In this context, the Compensatory Internet Use Model (CIUM) (Kardefelt-Winther, 2014) and the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2014, 2019) may offer a more comprehensive understanding of the current findings. For instance in terms of the CIUM approach, adolescents who experience negative affect—social or emotional discomfort—may turn to social media use to cope with these adverse affects. This finding aligns with our previous finding, which suggests that problematic social media use is linked to difficulties in goal-oriented behavior. The I-PACE model further elucidates how individual characteristics (e.g., ineffective emotion regulation strategies) interact with affective states and executive control mechanisms, resulting in problematic use patterns. Adolescents who have difficulty engaging in goal-directed behavior, especially under affective distress, may be more prone to excessive use of social media, which reinforces avoidance behaviors and exacerbates social anxiety. Together, these two models help explain how PSMU influences social anxiety through emotion regulation difficulties in adolescents.

Although our findings align with previous research discussed above, some studies contradict our findings. Research has shown that social anxiety may be a predictor of PSMU, and in this case, lonely people may be at more risk. For example, Zsido et al. (2021) indicated that the relationship between social anxiety and problematic social networking sites (as an addictive behavior) is mediated by difficulties in emotion regulation (e.g., rumination), which are crucial to the development of problematic social networking sites usage. In our study, we found the opposite pathway, whereby PSMU increased social anxiety through specific difficulties in emotion regulation (e.g., difficulty with goal-directed behavior). Adolescents in our sample may be more prone to difficulties with regulating emotions due to their limited coping skills, which may be explained by cultural or developmental differences. Thus, our findings extend the I-PACE model by highlighting the context-specific aspect of the PSMU-social anxiety relationship in adolescence (Brand et al., 2014, 2019).

Additionally, some studies have not found a link between social media usage and social anxiety. For example, Rizvi (2016) found no relationship between social anxiety and excessive Facebook use in adults. Notably, in Rizvi's study, most participants entered Facebook several times a day and spent less than 30 minutes per session. Therefore, the intensity, frequency, and quality of time spent on social media may predict psychological outcomes rather than mere usage (Bednarek et al., 2024). Additionally, age may be an important moderating factor, as adolescents may be more sensitive to the social evaluation mechanisms inherent in social media platforms and more emotionally reactive than adults. Therefore, our findings, based on an adolescent sample with a more intensive usage pattern, offer a nuanced contribution to the literature from a developmental perspective.

Although social anxiety may increase social media use as an avoidance behavior (Carruthers et al., 2019), our findings suggest that social media use, in turn, may exacerbate social anxiety symptoms (e.g., reinforce avoidance behavior). This finding aligns with previous studies, which suggest that online communication cannot fully replace face-to-face communication and may even limit real-life social skills (Yang et al., 2023). This suggests that considering the relationship between PSMU and social anxiety as a potential dyadic relationship would be more explanatory. This perspective is consistent with the I-PACE model (Brand et al., 2019), which posits a dynamic interaction between personality traits, affective responses, and executive functioning. Furthermore, this interplay between PSMU and social anxiety can be understood in terms of Bandura's concept of reciprocal determinism, which posits that cognitive processes, behaviors, and environmental factors continuously influence each other (Bandura & National Institute of Mental Health, 1986).

Young people are active users of social media, and it is challenging to change their habits considering the ever-growing technology. Therefore, it is essential to be informed about the potential psychological risks of PSMU to receive effective preventive mental health interventions (Onyeizu et al., 2022). Our findings emphasize that adolescents with high levels of PSMU use maladaptive emotion regulation strategies—specifically, failure to accept and understand emotional reactions and difficulty in acting in a goal-oriented manner in the face of stress—which might contribute to an increase in their level of social anxiety.

Our findings have several practical implications for mental health professionals working with adolescents. First, it may be beneficial to consider emotion regulation difficulties as a potential mechanism linking social anxiety to PSMU. Interventions to strengthen skills in adaptive emotion regulation strategies, such as acceptance of feelings and

emotional reactions, goal-focused coping, and cognitive reappraisal, could be incorporated into the therapeutic process. Strengthening these skills not only reduces the negative emotional impact of PSMU but may also be beneficial to the psychotherapy process, potentially increasing the client's motivation and self-confidence in therapy (Sackl-Pammer et al., 2019). Consequently, a dual focus on developing adaptive emotion regulation skills and promoting healthy social media use patterns may offer a promising direction for both preventive and therapeutic interventions targeting socially anxious youth (Lai et al., 2023).

Studies regarding the mental health of children and adolescents in Türkiye have primarily focused on children, and adolescence is relatively neglected. The first extensive data on mental disorders in Türkiye were presented in the study of the "Turkey Mental Health Profile" in 1995, and the 12-month prevalence of mental disorders was found to be 17.2% (Kılıç, 2020). In more current studies, mental disorders are prevalent among children (10-20%), while emphasizing the lack of research on adolescence (Dursun et al., 2019).

In the study by Ercan et al. (2019), where data were collected from children aged 6-13 across Türkiye, the prevalence of mental disorders was 37.6% without disability and 17.1% with disability. Anxiety was found to be among the most common disorders (16.7%/5.3%); however, regional differences in Türkiye are evident, and prevalence has been reported to vary between 20.2% and 47.4%. Nonetheless, data for adolescents were not explicitly reported in this study. Similarly, the prevalence of mood disorders in children aged 8 to 10 in Türkiye was found to be 2.5% (if functionality is considered, 1.6%) (Karacetin et al., 2018). According to the Turkey Health Survey conducted by TSI (2023), any mental health problems in the last 6 months were reported as 1.1% in children aged 7-14. This rate is lower than the prevalence reported in other studies and is likely due to differences in the measurement tools, aims, and methods used in the study. In this context, it is clear that there is a lack of current evidence representing the prevalence of mental disorders in adolescence in Türkiye.

According to the Turkish Statistical Institute (TSI, 2024, 2025a), children (0-17 years old) constitute one-fourth of the Turkish population, and 67.2% of Türkiye's population lives in densely populated cities and 15.5% in medium-density cities (TSI, 2025b); within this child population, those aged 10-14 years comprise 45.4%. By 2024, the internet usage rate among the 6-15 age group was 91.3%, and the usage rate of social media was 72.6%. This rate is 79%, especially among adolescents aged 11-15, with 97.9% of users reporting regular social media use, and half of them spending more than two hours on social media on weekends. These digital habits have led to changes in the daily lives of children and adolescents, as 25.5% reported spending less time with their families, 18.6% reported fewer face-to-face meetings with their peers, and 17.2% reported sleeping less. According to the 2023 statistics of the Turkish Ministry of Health, anxiety disorders are one of the highest burdens in years of life lived with disability (YLD) in Türkiye and rank fifth among the top 10 causes of YLD (Ministry of Health, 2025).

Considering the aforementioned studies and research reports above, the female participants in our study outnumbered the male participants (60.1% female, 39.9% male); however, according to TSI (2025a), the ratio in Türkiye is 51.3% male and 48.7% female. This limits the representativeness of our study findings in terms of gender. Since social media use and social anxiety can be sensitive issues in terms of gender, the generalizability of our findings to male adolescents is limited. On the other hand, the age range of our study (10-18) appears to be compatible with the adolescent age ranges of 10–14 years (29.6%) and 15–17 years (17.8%) reported by TSI (2025a), which cover the adolescent age group. In this respect, the representativeness of our findings in terms of age is strong. According to TSI (2025a), the grade completion rate in Türkiye is 81.2% from 9th to 12th grade. The majority of our sample (77.8%) was at the middle and high school level, which is consistent with the general educational level of adolescents in Türkiye. The perceived family income level in our sample was mainly at the middle level (80.5%). Although there is no clear average directly related to the income level for Türkiye in TSI's reports, this level seems to be the most common group in terms of general income distribution in Türkiye (Combarnous et al., 2019). In terms of family income level, our sample appears to be representative of the general picture in Türkiye. The participants in our study primarily reside in urban settlements (95.2%), and according to TSI (2025a), 93.4% of the Turkish population resides in cities. In this context, our sample is quite close to the Turkish average, and in this respect, its generalizability appears to be high.

According to the TSI reports (TSI, 2024, 2025a), internet use is 91.3%, social media use is 79%, and usage of social media for two hours or more per day (especially on weekends) is 49.5% among adolescents in Türkiye. The effects of problematic social media use (alienation from family, sleep, academic decline, etc.) are striking in the 11–15 age group in Türkiye. The TSI reports, which are directly related to the subject of our research, show that investigating problematic social media use in adolescent samples is quite appropriate in the social context and coincides with general trends. When the prevalence of mental disorders is taken into account, studies conducted in Türkiye by Ercan et al. (2019) reported a prevalence of 16.7% for anxiety disorder and 5.3% with disability, while other studies reported a prevalence of 10-20% for mental disorder (Dursun et al., 2019; Kılıç, 2020). It is consistent with the scientific literature that anxiety disorders can be common in adolescence. Studies regarding the mental health of children and adolescents in Türkiye have focused on children aged between 6 and 10, and epidemiological data specific to adolescents have remained limited (Kılıç, 2020). Meanwhile, increased use of problematic social media has the potential to impair adolescents' social life, sleep quality, or academic success (TSI, 2024, 2025a). Accordingly, there is a need for current studies with representative samples specific to adolescence, as well as studies investigating the effects of social media use on mental health. Still, the findings obtained in the context of social anxiety in our study reflect the general mental health profile of the adolescent population in Türkiye.

Limitations and Future Directions

A significant limitation of our study is its cross-sectional design, which hinders the ability to draw firm conclusions about the evolution of social anxiety and emotion regulation strategies among adolescents. It is recommended that future studies consider longitudinal methods when addressing this issue. With this approach, the persistence, escalation, or abatement of initial difficulties can be investigated, and individual differences across age can be identified, as individuals may follow different developmental paths.

A further limitation of our research is the use of self-report measures. Although individuals may provide socially desirable responses, adolescents in particular may prefer anonymity due to their developmental stage, rather than disclosing personal experiences to others and being evaluated. Moreover, since internal experiences (e.g., emotions, thoughts, or motivations) cannot be directly observed, self-report can serve as a proper data collection method (Brener et al., 2003; De Los Reyes & Kazdin, 2005). Especially in mental health problems such as anxiety disorders, it offers individuals the opportunity to directly report their symptoms and perceptions of internal processes (Wehry et al., 2015). This method is also time-efficient and allows for administration to large samples (Paulhus & Vazire, 2007), while self-report-based data collection is quite common in epidemiological and clinical studies involving adolescents (Achenbach & Rescorla, 2004). As our sample did not include individuals with established clinical diagnoses, self-report instruments were employed in the current study. Future studies could incorporate formal diagnostic evaluations conducted by a psychiatrist or a qualified clinical team.

Another limitation of our study is the use of convenience sampling. Although convenience sampling has limitations, such as limited generalization, it was preferred in our study due to time and resource constraints in reaching the target population. Additionally, since we aimed to discover the relationships between specific variables, this method provided flexibility in the data collection process, facilitating the applicability of our study. The suitability of this method is mentioned in the literature, especially in exploratory research (Etikan et al., 2016).

In our study, we did not focus on types of social media use. Treating all types of social media use uniformly as problematic may oversimplify social media engagement (Winstone et al., 2022). Future studies that distinguish between problematic and beneficial types of use (e.g., maintaining social connections or participating in prosocial communities) could provide deeper insights into the nature of social media involvement.

Our research is cross-sectional; conducting a longitudinal RCT clinical study with adolescents diagnosed with SAD in the future may be important to understand causal relationships and possible mediators or moderators (e.g., family environment, academic stress, age, or culture) related to PSMU. Taking together the effective and dysfunctional strategies of emotion regulation in the relationship between PSMU and social anxiety might contribute to the development of effective psychotherapy mechanisms (Golombek et al., 2019).

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Author contributions

Conception and design: S.Y., E.B.; Data acquisition: S.Y.; Data analysis: S.Y.; Data interpretation: S.Y., E.B.; Drafting of the manuscript: S.Y., E.B.; Critical revision of the manuscript: S.Y., E.B.; All authors reviewed the results, approved the final version of the manuscript, and agreed to be accountable for all aspects of this study.

Ethical approval

This study was approved by the Ankara Hacı Bayram Veli Üniversitesi Etik Komisyonu (Date: September 7, 2022, Decision/Protocol No: 09.09.2022-124873). Informed consent was obtained from all participants involved in this study.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Generative AI statement

The authors declare that during the preparation of this study, the following AI-assisted technology was used: Grammarly (Grammarly Inc.) and ChatGPT (OpenAI) on 25/08/2025. Extent of Use: Grammarly was used for grammar, spelling, and punctuation checks to improve the overall language quality of the manuscript. ChatGPT was utilized as an assistive tool to interpret and clarify the technical feedback provided by

the reviewers, ensuring a more accurate and comprehensive revision process. The authors confirm that they have critically reviewed and edited any AI-generated content and take full responsibility for the integrity, accuracy, and originality of the publication. The authors certify that the original human contribution is maintained and that AI-assisted tools are not listed or cited as authors.

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