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Using Social Media to Cope with Psychological Distress and Fear of Missing Out: The Role of Social Media Reward Expectancies in Social Media Addiction

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ABSTRACT

The purpose of the present study was to investigate the degree to which social media addiction is associated with reward expectancies and psychological distress. A sample of 305 Australian participants ($M_{age} = 33.75$; 70.8% female) completed an anonymous online questionnaire measuring social media reward expectancies, psychological distress, fear of missing out (FoMO), social media engagement, and social media addiction. Social media engagement mediated the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction. Social media reward expectancies mediated the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction. Social media engagement and social media reward expectancies serially mediated the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction. The study's findings suggest that reward expectancies may play a role in the development of social media addiction.

KEYWORDS

Social media; social networking; reward expectancies; coping style; addiction; I-PACE model; serial mediation; problematic social media use

1. Introduction

Behavioural addictions that result from excessive use of digital technologies have been of serious concern to researchers and practitioners since the early 1990s (Karakose et al., 2022; Tülübaş et al., 2023). However, these concerns have been amplified considerably over the past decade as the number of social media users and the time spent using social media each day have both increased drastically, raising public concern about possible detrimental effects of excessive social media use (Sun & Zhang, 2021). Researchers have gathered evidence that some individuals who engage in excessive social media use experience symptoms similar to those experienced by individuals addicted to gambling or addictive substances (Andreassen, 2015; Kuss & Griffiths, 2017).

Social media addiction is commonly measured by assessing six components of addiction in the model proposed by Griffiths (2005): salience, mood modification, conflict, withdrawal, tolerance, and relapse. Kuss and Griffiths (2017) discussed evidence that all these components may be present in a small minority of social media users. Some individuals are intensely preoccupied with using or thinking about social media (salience). They use these platforms to induce mood alterations, pleasurable feelings, or a numbing effect (mood modification). An increasing amount of time using social media is required to experience the same feelings that occurred during the initial phases of usage (tolerance). When social media use is ended or reduced, individuals

experience negative psychological and sometimes physiological symptoms (withdrawal), often leading to a reinstatement of their social media use (relapse). Problems arise as a consequence of excessive social media use, leading to intrapsychic and interpersonal conflicts (conflict; Kuss & Griffiths, 2017). However, while useful for describing the symptoms of social media addiction, Griffith's (2005) model offers few predictions concerning the development of social media addiction. In research investigating the development of social media addiction, cognitive-behavioural models of addiction are used to describe the factors underlying the developmental trajectory of addictive behaviour (Kuss & Griffiths, 2017).

The Interaction of Person-Affect-Cognition-Execution (I-PACE) model has emerged as a leading cognitive-behavioural model of specific Internet-use disorders that provides a detailed framework for studying the processes hypothesized to underlie social media addiction (Brand et al., 2016). The I-PACE model describes the mechanism underlying the shift from healthy engagement in a behaviour such as social media use to addiction to that behaviour (Brand et al., 2019). The model describes the gradual development of addiction using predisposing variables, like personality and symptoms of psychopathology, as well as cognitive mediator and moderator variables, such as one's cognitive biases and coping styles. The model posits that these cognitive variables influence one's perception of addiction-related cues, and thus act as mediators and moderators of the relationship

between (1) variables predisposing someone to develop addictive behaviour and (2) symptoms of addiction (Brand et al., 2019).

A key component of addiction shared by Griffith's (2005) model and the I-PACE model of addiction is the use of social media for emotional regulation. Griffith's (2005) model refers to this behaviour as mood modification, and considers it as one of the six core components of addiction; the I-PACE model refers to this behaviour as a specific coping style involving engagement in social media for mood regulation, and considers it a proximal cause of social media addiction that mediates the relationship between (1) personality traits that are predispositions for addiction and (2) symptoms of addiction. The I-PACE model defines *reward expectancies* as cognitive biases concerning whether using social media is perceived as an effective mood-regulation strategy (Brand et al., 2019).

1.1. Social media reward expectancies in the I-PACE model

Social media reward expectancies are cognitive biases concerning the effectiveness of engaging social media use for mood regulation through (a) achieving pleasurable emotional experiences (positive expectancies) and/or (b) avoiding or reducing negative emotional experiences (negative expectancies; Brand et al., 2019). Internet reward expectancies have been measured in studies aiming to identify important predictors of both Internet and social media addiction (Brand et al., 2014; Wegmann et al., 2015). Studies have found evidence supporting the I-PACE model's prediction that Internet reward expectancies mediate the relationship between personality traits and social media addiction (Wegmann et al., 2015; Wegmann & Brand, 2016). However, research on social media reward expectancies currently lacks studies investigating how reward expectancies and social media engagement mediate the effect on social media addiction of predispositions for social media addiction that create negative emotional experiences (such as psychological distress and fear of missing out [FoMO]).

The I-PACE model describes how social media reward expectancies and social media engagement both increase over time through a mutually strengthening cycle (Brand et al., 2016). According to the model, certain predispositions for social media addiction create negative emotional experiences that lead to social media engagement as a mood regulation strategy. This mood regulation strategy (or coping style) involves using social media for gratification (to achieve positive mental states) and/or compensation (to avoid, mitigate, or counteract negative mental states), which consequently strengthens social media reward expectancies through reinforcement learning. These reinforced reward expectancies consequently increase the level of future social media engagement for mood modification which, in turn, further strengthens social media reward expectancies (Brand et al., 2016). Therefore, the I-PACE model posits a mutually reinforcing relationship between social media engagement and reward expectancies, such that social media engagement

for mood regulation strengthens social media reward expectancies, and these stronger social media reward expectancies in turn cause greater engagement for mood regulation. This mutually reinforcing relationship will, over time, lead to symptoms of social media addiction, since the development of stronger reward expectancies will in turn cause greater social media engagement for mood regulation, which is a core component of addiction (Brand et al., 2016; Griffiths, 2005).

1.2. Psychological distress in the I-PACE model

Several studies have investigated the contribution of various personality traits on social media addiction and found that traits indicating tendencies for experiencing psychological distress and other negative emotional experiences are associated with social media addiction (e.g., Atroszko et al., 2018; Pontes et al., 2018). Psychological distress may play an important role in the development of social media addiction since it has been theorized to be both a risk factor for developing social media addiction, as well as a consequence of social media addiction (Keles et al., 2020; Pontes et al., 2018).

1.2.1. Fear of missing out (FoMO) in the I-PACE model

FoMO refers to a pervasive apprehension that others are having rewarding experiences that one is not part of, accompanied by a persistent desire to stay connected with people in one's social network (Przybylski et al., 2013). The feeling of apprehension that characterizes FoMO maps onto the cognitive aspect of anxiety (e.g., worry and rumination), while the desire to stay connected involves a behavioural strategy for reducing such anxiety – typically in a maladaptive manner analogous to how compulsions reduce anxiety in obsessive compulsive disorder (Elhai et al., 2021). FoMO has been theorized to relate to self-determination theory (Deci & Ryan, 2000) and represents a specific kind of psychological distress resulting from an unmet need for social relatedness, as well as a specific motivation for using social media in order to relieve this distress (Przybylski et al., 2013). FoMO has been identified as an important predictor of social media addiction in several studies (Elhai et al., 2021). For example, Pontes et al. (2018) found that FoMO was strongly correlated with social media addiction ($r=0.68$), and remained a significant predictor of social media addiction ($\beta=0.25$, $p<0.001$) after controlling for general psychiatric distress and level of social media use. This finding indicates that FoMO predicts social media addiction beyond its relationships with psychological distress and social media use.

1.3. Social media engagement and social media reward expectancies as mediators linking psychological distress and social media addiction

According to the I-PACE model, predisposing variables that represent a tendency to experience strong negative emotions (psychological distress, anxiety, loneliness, etc.) have a positive effect on social media addiction that is mediated by

both social media engagement and social media reward expectancies. The effect of predisposing factors (that cause negative emotional experiences) on social media addiction is mediated by social media engagement, such that stronger negative emotional experiences cause greater social media engagement for mood modification, and this greater engagement for mood modification causes greater social media addiction (since engagement for mood modification is a symptom of addiction; Griffiths, 2005). Further, the effect of predisposing factors on social media addiction is also mediated by social media reward expectancies, such that stronger negative emotional experiences caused by these predisposing factors lead to greater social media engagement (for mood regulation), which in turn reinforces social media reward expectancies, and stronger social media reward expectancies cause greater social media engagement for mood modification, which is a key component of addiction (Brand et al., 2016). Therefore, according to the I-PACE model, social media addiction is increased by predisposing factors, which cause stronger negative emotional experiences, and this effect is serially mediated by social media engagement and social media reward expectancies. More specifically, these predisposing factors cause greater social media engagement for mood modification, and this greater engagement for mood modification in turn strengthens reward expectancies which, in turn, increases future engagement in social media for mood modification (a key component of social media addiction).

In summary, according to the I-PACE model, the effect of psychological distress (and FoMO, which represents a specific kind of psychological distress) on social media addiction is mediated by both social media engagement and social media reward expectancies. Further, the model posits that the positive effect of psychological distress and FoMO on reward expectancies is mediated by greater social media engagement, and the positive effect of social media engagement on social media addiction is mediated by greater social media reward expectancies; this serial mediation model is shown in Figure 1.

1.4. Aims and hypotheses

The present study builds on previous research by adapting a pre-existing scale measuring positive and negative reward

expectancies in the context of Internet use (Brand et al., 2014) specifically to the context of social media use. The study aims to provide evidence of the social media reward expectancies scale's construct validity by investigating its factor structure and evidence of convergent validity by assessing its association with psychological distress, FoMO, social media engagement, and social media addiction, all of which are positively associated with social media reward expectancies according to the I-PACE model (Brand et al., 2019).

The present study primarily aims to investigate the role of social media engagement and social media reward expectancies as mediators linking psychological distress (and FoMO, which represents a specific kind of psychological distress) with social media addiction, as shown in Figure 1. The study aims to evaluate whether psychological distress and FoMO indirectly increase social media addiction by increasing both social media engagement and social media reward expectancies, as shown in Figure 1. Additionally, the study evaluates whether social media engagement and social media reward expectancies are serial mediators of the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction; specifically, the study evaluates whether both psychological distress and FoMO lead to greater social media engagement, which in turn leads to greater reward expectancies, and these greater reward expectancies lead to greater social media addiction. By investigating these relationships, the study aims to provide evidence regarding the role of reward expectancies in social media addiction according to the I-PACE model (Brand et al., 2016). Drawing on predictions of the I-PACE model and previous research findings (e.g., Pontes et al., 2018; Wegmann et al., 2015; Wegmann & Brand, 2016), we propose the following hypotheses:

H1: Social media reward expectancies will be positively associated with psychological distress, FoMO, social media engagement, and social media addiction.

H2: Social media engagement will mediate the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction.

H3: Social media reward expectancies will mediate the relationship between psychological distress and social media

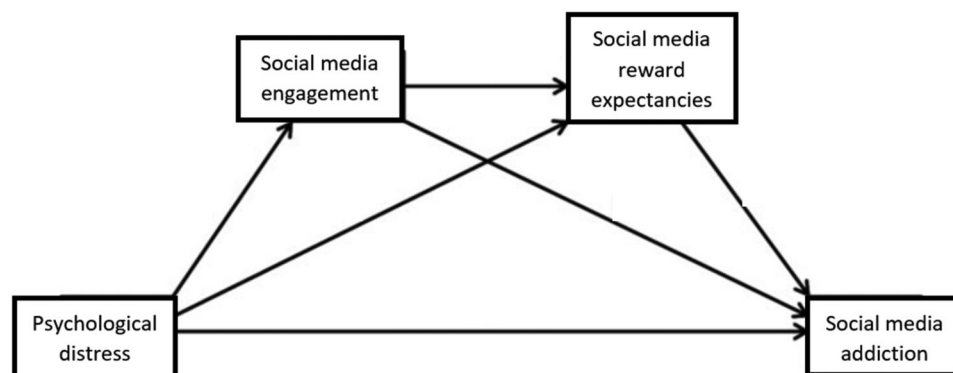


Figure 1. Hypothesised serial mediation model being tested in the present study.

addiction and the relationship between FoMO and social media addiction.

H4: Social media engagement and social media reward expectancies will serially mediate the relationship between psychological distress and social media addiction and the relationship between FoMO and social media addiction.

2. Method

2.1. Participants

The sample consisted of 305 participants with a mean age of 33.75 years ($SD = 10.62$). There were 216 (70.8%) females, 84 (27.5%) males, and 5 (1.6%) participants who identified as other. Individuals reported using an average of 3.49 ($SD = 1.41$) social media platforms at least once per week. Figure 2 shows the frequency distribution of the number of social media platforms used at least once per week. Table 1 shows the number of participants using each social media platform at least once per week.

2.2. Measures

2.2.1. Social media platforms used

Participants were asked whether they used the following social media platforms “at least once per week”: Facebook, Instagram, Snapchat, TikTok, YouTube, Reddit, Twitter, LinkedIn, WhatsApp, WeChat, and Discord. The number of social media platforms being used by participants was estimated by adding the number of the above social media platforms that participants reported using on a weekly basis.

2.2.2. Social media reward expectancies

To assess social media reward expectancies, we developed an 8-item scale, the Social Media Reward Expectancies Scale (SMRES), by adapting items from the Internet Use Expectancies Scale developed by Brand et al. (2014). Items were hypothesized to comprise two 4-item subscales: *positive expectancies* representing positive reinforcement resulting from social media use (e.g., “I use social media to experience pleasure”) and *negative expectancies* representing negative reinforcement resulting from social media use (e.g., “I use social media to distract me from my worries”). Items were rated using a 7-point Likert type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

We investigated the factor structure of the SMRES by randomly splitting the sample into two halves; an exploratory factor analysis (EFA) was conducted on one half, and a confirmatory factor analysis (CFA) was conducted on the other half. The EFA was conducted using IBM SPSS version 29 to explore the factor structure of the SMRES. The CFA was conducted using AMOS version 29 to test the model fit of the factor structure suggested by the EFA. Additionally, we tested a one-factor model to see if model fit could be improved by specifying a single overall factor with all items as indicators.

Table 1. Social media platforms used by participants on a weekly basis.

Social media platform	Number of users (% of sample)
Facebook	255 (83.6%)
Instagram	197 (64.6%)
YouTube	179 (58.7%)
WhatsApp	106 (34.8%)
TikTok	89 (29.2%)
Snapchat	82 (26.9%)
Reddit	53 (17.4%)
Twitter	51 (16.7%)
LinkedIn	51 (16.7%)
WeChat	5 (1.6%)

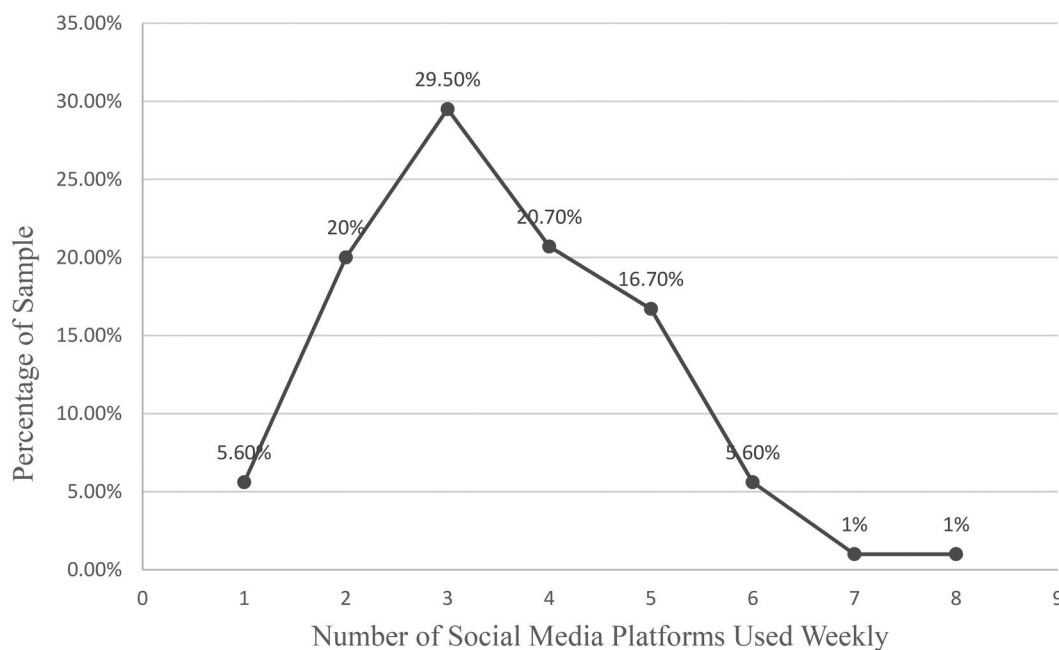


Figure 2. Frequency distribution of the number of social media platforms used by participants.

Sample 1 ($n=152$) was used to perform an EFA using the principal axis factoring extraction method and Promax rotation. We determined the number of factors to extract by examining the scree plot (Cattell & Vogelman, 1977) and using the Kaiser criterion of all factors with eigenvalues greater than one, as recommended by Kaiser (1960). To set factor-loading cut-offs, we followed Howard's (2016) rule which states that variables (a) should load above 0.40 onto their main factor, (b) should load below 0.30 onto other factors, and (c) should show a difference of 0.20 between their primary and other factor loadings.

The appropriateness of the EFA was confirmed by the Kaiser-Meyer-Olkin measure of sampling adequacy ($KMO = 0.85$) and Bartlett's test of sphericity ($\chi^2[28, 152] = 749, p < .001$). The Scree test suggested a two-factor solution that accounted for 65.7% of the variance. One item ("I use social media to avoid my negative feelings") was dropped from the scale because it loaded the same onto both factors (0.47). The item means, factor loadings, and communalities of the revised 7-item scale are presented in Table 2.

Sample 2 ($n=152$) was used to conduct a CFA. In this analysis, we compared two models. In Model 1, we tested a two-factor solution, with positive expectancies as the first factor and negative expectancies as the second factor. In Model 2, we tested a one-factor solution with all 7 items as indicators of social media reward expectancies as the single latent variable.

The Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) were used to evaluate how closely the data fit the model, along with the Comparative Fit Index (CFI) and Tucker-Lewis Fit Index (TLI) as incremental fit indices. RMSEA and SRMR values smaller than 0.08 indicate an acceptable fit, while values between 0 and 0.05 indicates a good fit (Schreiber et al., 2006). For both CFI and TLI, values greater than 0.90 are considered acceptable, whereas values above 0.95 are considered good (Hu & Bentler, 1999).

Results of the CFA for Model 1 showed acceptable model fit for a two-factor solution, supporting the finding of two factors identified in the EFA; $RMSEA = 0.11$ (90% CI [0.07, 0.15]), $SRMR = 0.06$, $CFI = 0.95$, $TLI = 0.93$. Although the RMSEA for this model was above the acceptable cut-off value, according to Kenny et al. (2015, p. 503) "using the RMSEA to assess model fit in models with small df is problematic and potentially misleading unless the sample size is very large." Following Kenny et al. (2015) recommendation to not dismiss models with large RMSEA values and small

df without examining other information, we considered the CFA for Model 1 to show acceptable model fit based on the SRMR, CFI, and TLI. The CFA for Model 2 did not show satisfactory model fit for a one-factor solution, $RMSEA = 0.24$, $SRMR = 0.12$, $CFI = 0.76$, $TLI = 0.66$. Internal consistency as assessed by Cronbach's α was 0.85 for overall social media reward expectancies, 0.87 for positive social media reward expectancies, and 0.76 for negative social media reward expectancies.

2.2.3. Social media engagement

Social media engagement was measured by a series of questions developed by Przybylski et al. (2013) that assess the extent to which participants spend time using social media throughout the day. The scale asked participants to reflect on how often they have used social media in the past week and then to rate the following statements using an 8-point Likert type scale ranging from 1 (*Not one day last week*) to 8 (*Every day last week*): "within 15 min of waking up" ($M=7.09$ $SD=3.15$), "when eating breakfast" ($M=5.67$, $SD=3.43$), "when eating lunch" ($M=6.25$, $SD=3.19$), "when eating dinner" ($M=4.69$, $SD=3.53$), and "within 15 min of going to sleep" ($M=7.03$ $SD=3.33$). The scale provided the following examples of social media: Facebook, Instagram, Snapchat, TikTok, YouTube, Reddit, Twitter, LinkedIn, WhatsApp, WeChat, and Discord. Principal components analysis indicated the five items loaded onto a single factor, explaining 49.17% of the observed variability, so items were summed to calculate a total engagement score. Cronbach's alpha for the overall scale was 0.75 in the present study.

2.4. Social media addiction

The Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2016) measures six core components of addiction: salience, mood modification, tolerance, withdrawal, relapse, and conflict. The 6-item scale was adapted from the Bergen Facebook Addiction Scale by replacing the word Facebook with "social media" (Andreassen et al., 2012). The BSMAS asks participants about their use of all social media platforms in the past year and lists the following examples of social media platforms: Facebook, Instagram, Snapchat, TikTok, YouTube, Reddit, Twitter, LinkedIn, WhatsApp, WeChat, and Discord. An example item is "How often during the past year have you tried to

Table 2. Promax rotated factor structure of the 7-item SMRES in sample 1 ($n=152$).

	<i>M (SD)</i>	Factor loadings		Communalities	
		F1	F2	Initial	Extraction
Factor 1: Positive expectancies					
1. I use social media to experience pleasure	5.03 (1.37)	0.91	−0.13	0.61	0.70
3. I use social media to have fun	5.07 (1.38)	0.78	−0.14	0.47	0.50
5. I use social media to gain positive emotions	4.71 (1.48)	0.77	0.10	0.65	0.69
7. I use social media to feel good	4.58 (1.54)	0.83	0.06	0.69	0.75
Factor 2: Negative expectancies					
2. I use social media to distract me from my worries	4.99 (1.64)	0.26	0.59	0.62	0.61
4. I use social media as an escape	4.94 (1.69)	−0.13	0.99	0.65	0.85
6. I use social media to avoid unappealing tasks	4.34 (1.74)	−0.14	0.75	0.46	0.46

cut down on the use of social media without success?” Participants respond to items using a 5-point Likert type scale ranging from 1 (*Very rarely*) to 5 (*Very often*). The BSMAS has demonstrated good psychometric properties and evidence of convergent and discriminant validity in several populations (Balcerowska et al., 2019; Chen et al., 2020). This scale showed good internal consistency in the present study ($\alpha = 0.83$).

2.4.1. Psychological distress

The Distress Questionnaire-5 (DQ-5; Batterham et al., 2016) was used to measure psychological distress. Participants rated how often the five distress statements applied to them in the last 30 days using a 5-point Likert type scale ranging from 1 (*Never*) to 5 (*Always*). Example items include “my worries overwhelmed me” and “I felt hopeless.” The DQ-5 showed good internal consistency in the present study ($\alpha = 0.88$).

2.4.2. Fear of missing out (FoMO)

FoMO was assessed with the 10-item Fear of Missing Out Scale developed by Przybylski et al. (2013). Participants rated items on a 5-point Likert type scale ranging from 1 (*Not at all true for me*) to 5 (*Extremely true for me*). An example of an item is “I fear others are having more rewarding experiences than me.” The scale showed good internal consistency in the present study ($\alpha = 0.87$).

2.5. Procedure

Prior to commencing the study, ethics approval was received from the host university’s Human Research Ethics Committee (Approval No. HE22-051). Following approval, the anonymous online survey was made available using Qualtrics™ (Provo, UT). Each participant was asked to read an information sheet before providing implied consent. Some participants ($n = 185$) were recruited through the host university’s first-year psychology pool and were offered course credit for completing the survey. Other participants ($n = 120$) were recruited from posts on Facebook and were able to enter a draw to receive a voucher for AUD\$50 as incentive for participation. On average, the survey took 13 minutes to complete.

2.6. Statistical analyses

All study data were analyzed using SPSS Version 29. Means, standard deviations, and bivariate correlation coefficients were calculated for all study variables for the entire sample to test the first hypothesis regarding associations between key study variables. Two serial mediation analyses were conducted using Hayes (2022) PROCESS macro (model 6) to test the remaining three hypotheses regarding social media engagement and social media reward expectancies as stand-alone and serial mediators. We tested ordinary least squares regression assumptions (normality, multicollinearity, and homoscedasticity) prior to conducting the mediation analyses. The assumption of homoscedasticity was not met, so heteroscedasticity consistent standard error (HC3) estimators were used. We added age and sex as covariates in both serial mediation models, as previous research has found that these variables are significantly associated with social media addiction (Kuss & Griffiths, 2017). To test the significance of indirect effects, we used 10,000 bootstrap samples to create 95% confidence intervals. Indirect effects were significant if the 95% CI did not include zero.

3. Results

3.1. Preliminary analyses

Table 3 shows the means, standard deviations, and bivariate correlations for the study variables using the total sample ($N = 305$). Two-tailed Pearson correlations showed that greater social media reward expectancies were significantly associated with greater FoMO, psychological distress, social media engagement, and social media addiction, supporting the first hypothesis.

3.2. Mediation analyses

3.2.1. Psychological distress → social media engagement → social media reward expectancies → social media addiction

Results showed a significant total effect of psychological distress on social media addiction ($B = 0.38$, $SE(HC3) = 0.07$, $p < 0.001$). The multiple mediation model was statistically significant and accounted for 40.86% of the variance in social media addiction.

Table 3. Pearson’s correlations between study variables ($N = 305$).

	1	2	3	4	5	6	7	8	9
1. SMRE	–								
2. PSMRE	0.87***	–							
3. NSMRE	0.90***	0.55***	–						
4. Psychological distress	0.38***	0.19***	0.46***	–					
5. FoMO	0.42***	0.34***	0.39***	0.34***	–				
6. Social media engagement	0.36***	0.26***	0.36***	0.29***	0.30***	–			
7. Social media addiction	0.57***	0.47***	0.53***	0.39***	0.51***	0.43***	–		
8. Age	–0.15*	–0.16**	–0.10	–0.18**	–0.35***	–0.25***	–0.21***	–	
9. Sex	0.09	–0.03	0.17**	0.19***	–0.07	0.08	0.02	0.02	–
<i>M</i>	38.70	19.39	19.30	13.11	29.71	30.71	14.49	33.75	–
<i>SD</i>	9.15	4.88	5.49	4.99	12.36	11.53	5.08	10.62	–

Note. SMRE: social media reward expectancies; PSMRE: positive social media reward expectancies; NSMRE: negative social media reward expectancies; FoMO: fear of missing out.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (all two-tailed).

Table 4. Effects in the serial mediation model with psychological distress as the predictor.

	<i>B</i>	<i>SE</i> (HC3)	LLCI	ULCI
Direct effects				
PD → SME	0.56***	0.13	0.30	0.82
PD → SRME	0.54***	0.15	0.24	0.84
SME → SMRE	0.21***	0.05	0.12	0.30
SME → SMA	0.10***	0.02	0.05	0.14
SMRE → SMA	0.23***	0.03	0.18	0.29
PD → SMA	0.17**	0.06	0.06	0.28
PD → SMA (total effect)	0.38***	0.07	0.24	0.52
Indirect effects	Boot effect	Boot SE	Boot LLCI	Boot ULCI
PD → SME → SMA	0.05	0.02	0.02	0.10
PD → SRME → SMA	0.13	0.03	0.06	0.19
PD → SME → SMRE → SMA	0.03	0.01	0.01	0.05

Note. *N*: 305; PD: psychological distress; SME: social media engagement; SMRE: social media reward expectancies; SMA: social media addiction; *B*: unstandardized coefficient; *SE*(HC3): heteroscedasticity consistent standard error; LLCI: 95% lower limit confidence interval; ULCI: 95% upper limit confidence interval; Boot: statistics for the indirect effects are the result of the bootstrapping method. Indirect effects are statistically significant if the 95% confidence interval does not contain 0.

Covariates: age and sex.

p* < 0.01; *p* < 0.001.

Table 5. Effects in the serial mediation model with FoMO as the predictor.

	<i>B</i>	<i>SE</i> (HC3)	LLCI	ULCI
Direct effects				
FoMO → SME	0.23***	0.06	0.12	0.34
FoMO → SRME	0.27***	0.04	0.18	0.35
SME → SMRE	0.20***	0.05	0.11	0.29
SME → SMA	0.09***	0.02	0.05	0.14
SMRE → SMA	0.21***	0.03	0.16	0.26
FoMO → SMA	0.12***	0.02	0.08	0.16
FoMO → SMA (total effect)	0.21***	0.02	0.16	0.25
Indirect effects	Boot effect	Boot SE	Boot LLCI	Boot ULCI
FoMO → SME → SMA	0.02	0.01	0.01	0.04
FoMO → SRME → SMA	0.06	0.01	0.03	0.08
FoMO → SME → SMRE → SMA	0.01	0.004	0.004	0.02

Note. *N*: 305. FoMO: fear of missing out; SME: social media engagement; SMRE: social media reward expectancies; SMA: social media addiction. *B*: unstandardized coefficient; *SE* (HC3): heteroscedasticity consistent standard error; LLCI: 95% lower limit confidence interval; ULCI: 95% upper limit confidence interval; Boot: statistics for the indirect effects are the result of the bootstrapping method. Indirect effects are statistically significant if the 95% confidence interval does not contain 0.

Covariates: age and sex.

****p* < 0.001.

Table 4 presents the coefficients for the direct and indirect effects in the model. As shown, all these effects were statistically significant. Social media engagement mediated the association between psychological distress and social media addiction; this result supported the second hypothesis. Social media reward expectancies mediated the association between psychological distress and social media addiction; this result supported the third hypothesis. Social media engagement and social media reward expectancies sequentially mediated the association between psychological distress and social media addiction; this result supported the fourth hypothesis. In sum, the results revealed two significant indirect effects such that the positive association between psychological distress and social media addiction was mediated separately by both social media engagement and social media reward expectancies. Additionally, the results revealed a third significant indirect effect involving social media engagement and social media reward

expectancies as serial mediators, such that psychological distress was positively associated with social media engagement, which was in turn positively associated with social media reward expectancies, which in turn, were positively associated with social media addiction. These results support H2, H3, and H4 of the present study.

3.2.2. FoMO → social media engagement → social media reward expectancies → social media addiction

Results showed a significant total effect of psychological distress on social media addiction ($B = 0.21$, $SE(HC3) = 0.02$, $p < 0.001$). The multiple mediation model was statistically significant and accounted for 44.71% of the variance in social media addiction.

Table 5 presents the coefficients for the direct and indirect effects in the model. As shown, all these effects were statistically significant. Social media engagement mediated the association between FoMO and social media addiction; this result supported the second hypothesis. Social media reward expectancies mediated the association between FoMO and social media addiction; this result supported the third hypothesis. Social media engagement and social media reward expectancies sequentially mediated the association between FoMO and social media addiction; this result supported the fourth hypothesis. In sum, the results revealed two significant indirect effects such that the positive association between FoMO and social media addiction was mediated separately by both social media engagement and social media reward expectancies. Additionally, the results revealed a third significant indirect effect involving social media engagement and social media reward expectancies as serial mediators, such that FoMO was positively associated with social media engagement, which was in turn positively associated with social media reward expectancies, which in turn, were positively associated with social media addiction. These results support H2, H3, and H4 of the present study.

4. Discussion

The present study investigated the mediating roles of social media engagement and social media reward expectancies in the relationship between psychological distress and social media addiction, and in the relationship between fear of missing out (FoMO) and social media addiction. The findings supported the hypothesis that greater social media reward expectancies would be associated with greater psychological distress, FoMO, social media engagement, and social media addiction. These results are consistent with findings of previous research examining the relationships of reward expectancies with psychological distress and addictive behaviour (Brand et al., 2014; Wegmann et al., 2017).

The findings of the present study also supported the hypothesis that social media engagement would mediate the relationship between psychological distress and social media addiction, and the relationship between FoMO and social media addiction. Specifically, greater psychological distress was associated with greater social media engagement, which

consequently predicted higher social media addiction. Similarly, greater FoMO was associated with greater social media engagement, which consequently predicted higher social media addiction. The findings also supported the hypothesis that social media reward expectancies would mediate the relationship between psychological distress and social media addiction, and the relationship between FoMO and social media addiction. Specifically, greater psychological distress was associated with greater social media reward expectancies, which consequently predicted higher social media addiction. Similarly, greater FoMO was associated with greater social media reward expectancies, which consequently predicted higher social media addiction.

These findings are consistent with previous research, which has reported that greater engagement in social media use as a means of mood regulation mediates the association between psychological distress and social media addiction (Wegmann et al., 2017), and the association between FoMO and social media addiction (Casale et al., 2018; Wegmann et al., 2017). These findings are also consistent with theoretical predictions that general psychological distress and FoMO will be related to social media addiction, and that this relationship will be mediated by (a) social media engagement, which will increase as one engages in social media more frequently for mood regulation, and (b) reward expectancies, which indicate stronger cognitive biases concerning the effectiveness of engaging in social media use as a method of mood regulation when experiencing negative emotion (Brand et al., 2016).

The findings support the hypothesis that social media engagement and social media reward expectancies would serially mediate the relationship between psychological distress and social media addiction, and the relationship between FoMO and social media addiction. Specifically, greater psychological distress was associated with greater social media engagement, which in turn was associated with greater social media reward expectancies, which consequently predicted higher social media addiction. Similarly, greater FoMO was associated with greater social media engagement, which in turn was associated with greater social media reward expectancies, which consequently predicted higher social media addiction.

These findings are consistent with the I-PACE model's (Brand et al., 2016) prediction that social media reward expectancies are reinforced by engagement as a means of mood regulation, when social media engagement is triggered by negative emotional experiences; in this way, social media engagement mediates the relationship between psychological distress (and FoMO) and social media reward expectancies. Additionally, the findings support the I-PACE model's prediction that social media reward expectancies lead to the development of social media addiction, as greater social media engagement for mood regulation reinforces reward expectancies, which in turn leads to greater social media engagement for mood regulation, such that a mutually reinforcing relationship exists. This mutually reinforcing relationship can be viewed as a maladaptive downward spiral involving the gradual strengthening of reward expectancies,

leading to a gradual increase in the frequency of social media engagement for mood regulation, which is a central component of social media addiction; in this way, social media reward expectancies mediate the relationship between social media engagement and social media addiction (Brand et al., 2016).

The present study's findings contribute to research on the relationship of social media reward expectancies with social media engagement and addiction. The study provides a unique contribution to this topic of research by investigating how reward expectancies are reinforced through social media engagement and differs from previous research findings that did not distinguish between social media engagement and social media addiction when investigating the role of reward expectancies in the development of addictive behaviour (Wegmann et al., 2017). The findings highlight the importance of reward expectancies in explaining the relationship between engagement and addiction, in that they represent a tendency for a specific kind of social media engagement for mood regulation that is maladaptive, since engagement for mood regulation reinforces one's reward expectancies and consequently increases the likelihood of future engagement for mood regulation, leading to a mutually reinforcing relationship (Brand et al., 2016). Thus, the findings are consistent with the I-PACE model's description of social media reward expectancies, in which these cognitive biases play a central role in the development of social media addiction by increasing the likelihood of social media engagement for mood regulation, a core component of social media addiction (Brand et al., 2016; Griffiths, 2005).

4.1. Limitations and directions for future research

A limitation of the present research was that findings are based on self-report instruments, making the data vulnerable to recall and social desirability biases (Nederhof, 1985). As well as bias due to common method variance (Lindell & Whitney, 2001). Additionally, the sample was largely comprised of university students, potentially limiting the generalizability of the results to the general population. Further, the use of Facebook as a recruitment method may have biased the number of Facebook users represented in the sample, limiting the generalizability of the results to users of other social media platforms. Using objective measures of social media use, such as applications that track social media use on online devices, and replicating the study with different populations and recruitment methods might address these limitations.

Another limitation was the study's cross-sectional design, which limits conclusions regarding causality. Longitudinal research and experimental studies of interventions targeting social media reward expectancies are needed to further investigate the links between psychological distress, social media engagement, social media reward expectancies, and social media addiction. Longitudinal research could investigate whether social media engagement for mood regulation and social media reward expectancies show a mutually reciprocal relationship that compounds both variables over time. Experimental research could provide evidence

regarding causal connections. For example, experimental research could investigate the effectiveness of reducing social media reward expectancies for reducing future addictive behaviour. This research could apply existing cognitive behaviour therapy protocols developed to treat Internet addiction that modify participants' cognitive biases like social media reward expectancies (Young & Brand, 2017). Additionally, the metacognitive therapy framework may provide alternative strategies for modifying cognitive biases that are involved in addiction in order to treat addictive behaviour (Spada et al., 2015).

5. Conclusion

The present research investigated the role of social media engagement and social media reward expectancies in the development of social media addiction. The study provided a unique contribution to understanding of social media addiction by providing evidence consistent with the I-PACE model's predictions regarding the role of reward expectancies in the development of social media addiction. Social media reward expectancies could be targeted in interventions for social media addiction to improve overall treatment outcomes. The current study furthered an important goal of social media addiction research, which is to merge experiments investigating treatment strategies with theoretical approaches to understanding the underlying mechanisms of social media addiction. Theoretical models like the I-PACE model can inspire treatment and prevention strategies, like an intervention targeting social media reward expectancies. Evaluating whether an intervention targeting reward expectancies leads to reductions in social media addiction would test the I-PACE model's predictions and could provide evidence that leads to improvements in the theory (Young & Brand, 2017). Since the present study's cross-sectional design precludes causal inferences, future experimental research is needed to investigate how reward expectancies influence the development of social media addiction. Future experimental research should test the I-PACE model's prediction that reducing reward expectancies leads to reductions in social media addiction to evaluate whether reducing reward expectancies is an effective treatment strategy.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The datafile that was generated and analysed in the current study is available in the OSF repository, <https://doi.org/10.17605/OSF.IO/K8SBQ>.

References

- Andreassen, C. S. (2015). Online social network site addiction: A comprehensive review. *Current Addiction Reports*, 2(2), 175–184. <https://doi.org/10.1007/s40429-015-0056-9>
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, 30(2), 252–262. <https://doi.org/10.1037/adb0000160>
- Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, 110(2), 501–517. <https://doi.org/10.2466/02.09.18.PR0.110.2.501-517>
- Atroszko, P. A., Balcerowska, J. M., Bereznowski, P., Biernatowska, A., Pallesen, S., & Andreassen, C. S. (2018). Facebook addiction among Polish undergraduate students: Validity of measurement and relationship with personality and well-being. *Computers in Human Behavior*, 85, 329–338. <https://doi.org/10.1016/j.chb.2018.04.001>
- Balcerowska, J., Biernatowska, A., Golińska, P., & Barańska, J. (2019). Relationship between dimensions of grandiose narcissism and Facebook addiction among university students. *Current Issues in Personality Psychology*, 7(4), 313–323. <https://doi.org/10.5114/cipp.2019.92957>
- Batterham, P. J., Sunderland, M., Carragher, N., Calear, A. L., Mackinnon, A. J., & Slade, T. (2016). The Distress Questionnaire-5: Population screener for psychological distress was more accurate than the K6/K10. *Journal of Clinical Epidemiology*, 71, 35–42. <https://doi.org/10.1016/j.jclinepi.2015.10.005>
- Brand, M., Laier, C., & Young, K. S. (2014). Internet addiction: Coping styles, expectancies, and treatment implications. *Frontiers in Psychology*, 5, 1256. <https://doi.org/10.3389/fpsyg.2014.01256>
- Brand, M., Wegmann, E., Stark, R., Müller, A., Wölfling, K., Robbins, T. W., & Potenza, M. N. (2019). The Interaction of Person-Affect-Cognition-Execution (I-PACE) model for addictive behaviors: Update, generalization to addictive behaviors beyond internet-use disorders, and specification of the process character of addictive behaviors. *Neuroscience and Biobehavioral Reviews*, 104, 1–10. <https://doi.org/10.1016/j.neubiorev.2019.06.032>
- Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neuroscience and Biobehavioral Reviews*, 71, 252–266. <https://doi.org/10.1016/j.neubiorev.2016.08.033>
- Casale, S., Rugai, L., & Fioravanti, G. (2018). Exploring the role of positive metacognitions in explaining the association between the fear of missing out and social media addiction. *Addictive Behaviors*, 85, 83–87. <https://doi.org/10.1016/j.addbeh.2018.05.020>
- Cattell, R. B., & Vogelman, S. (1977). A comprehensive trial of the scree and KG criteria for determining the number of factors. *Multivariate Behavioral Research*, 12(3), 289–325. https://doi.org/10.1207/s15327906mbr1203_2
- Chen, I. H., Strong, C., Lin, Y.-C., Tsai, M.-C., Leung, H., Lin, C.-Y., Pakpour, A. H., & Griffiths, M. D. (2020). Time invariance of three ultra-brief internet-related instruments: Smartphone Application-Based Addiction Scale (SABAS), Bergen Social Media Addiction Scale (BSMAS), and the nine-item Internet Gaming Disorder Scale-Short Form (IGDS-SF9) (Study Part B). *Addictive Behaviors*, 101, 105960. <https://doi.org/10.1016/j.addbeh.2019.04.018>
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01
- Elhai, J. D., Yang, H., & Montag, C. (2021). Fear of missing out (FOMO): Overview, theoretical underpinnings, and literature review on relations with severity of negative affectivity and problematic technology use. *Revista Brasileira de Psiquiatria*, 43(2), 203–209. <https://doi.org/10.1590/1516-4446-2020-0870>

- Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191–197. <https://doi.org/10.1080/14659890500114359>
- Hayes, A. F. (2022). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach* (3rd ed.). Guilford Press.
- Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human-Computer Interaction*, 32(1), 51–62. <https://doi.org/10.1080/10447318.2015.1087664>
- Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20(1), 141–151. <https://doi.org/10.1177/001316446002000116>
- Karakose, T., Tülübaşı, T., & Papadakis, S. (2022). Revealing the intellectual structure and evolution of digital addiction research: An integrated bibliometric and science mapping approach. *International Journal of Environmental Research and Public Health*, 19(22), 14883. <https://doi.org/10.3390/ijerph192214883>
- Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth*, 25(1), 79–93. <https://doi.org/10.1080/02673843.2019.1590851>
- Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research*, 44(3), 486–507. <https://doi.org/10.1177/0049124114543236>
- Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health*, 14(3), 311. <https://doi.org/10.3390/ijerph14030311>
- Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *The Journal of Applied Psychology*, 86(1), 114–121. <https://doi.org/10.1037/0021-9010.86.1.114>
- Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. *European Journal of Social Psychology*, 15(3), 263–280. <https://doi.org/10.1002/ejsp.2420150303>
- Pontes, H. M., Taylor, M., & Stavropoulos, V. (2018). Beyond "Facebook addiction": The role of cognitive-related factors and psychiatric distress in social networking site addiction. *Cyberpsychology, Behavior and Social Networking*, 21(4), 240–247. <https://doi.org/10.1089/cyber.2017.0609>
- Przybylski, A., Murayama, K., DeHaan, C., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29(4), 1841–1848. <https://doi.org/10.1016/j.chb.2013.02.014>
- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99(6), 323–338. <https://doi.org/10.3200/JOER.99.6.323-338>
- Spada, M. M., & Caselli, G. (2017). The metacognitions about Online Gaming Scale: Development and psychometric properties. *Addictive Behaviors*, 64, 281–286. <https://doi.org/10.1016/j.addbeh.2015.07.007>
- Spada, M. M., Caselli, G., Nikčević, A. V., & Wells, A. (2015). Metacognition in addictive behaviors. *Addictive Behaviors*, 44, 9–15. <https://doi.org/10.1016/j.addbeh.2014.08.002>
- Sun, Y., & Zhang, Y. (2021). A review of theories and models applied in studies of social media addiction and implications for future research. *Addictive Behaviors*, 114, 106699. <https://doi.org/10.1016/j.addbeh.2020.106699>
- Tülübaşı, T., Karakose, T., & Papadakis, S. (2023). A holistic investigation of the relationship between digital addiction and academic achievement among students. *European Journal of Investigation in Health, Psychology and Education*, 13(10), 2006–2034. <https://doi.org/10.3390/ejihpe13100143>
- Wegmann, E., & Brand, M. (2016). Internet-communication disorder: It's a matter of social aspects, coping, and Internet-use expectancies. *Frontiers in Psychology*, 7, 1747. <https://doi.org/10.3389/fpsyg.2016.01747>
- Wegmann, E., Oberst, U., Stodt, B., & Brand, M. (2017). Online-specific fear of missing out and Internet-use expectancies contribute to symptoms of Internet-communication disorder. *Addictive Behaviors Reports*, 5, 33–42. <https://doi.org/10.1016/j.abrep.2017.04.001>
- Wegmann, E., Stodt, B., & Brand, M. (2015). Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet literacy, and psychopathological symptoms. *Journal of Behavioral Addictions*, 4(3), 155–162. <https://doi.org/10.1556/2006.4.2015.021>
- Young, K. S., & Brand, M. (2017). Merging theoretical models and therapy approaches in the context of Internet gaming disorder: A personal perspective. *Frontiers in Psychology*, 8, 1853. <https://doi.org/10.3389/fpsyg.2017.01853>

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