



Fear of missing out as the key pathway linking psychological distress to Facebook addiction and smartphone orientation

Patrycja Uram¹ · Sebastian Skalski-Bednarz^{2,5} · Paolo Soraci³ · Attila Szabo⁴ · Janusz Surzykiewicz^{2,6}

Received: 26 June 2026 / Accepted: 25 September 2026
© The Author(s) 2026

Abstract

Aim Guided by Griffiths' components model of addiction and the I-PACE (Interaction of Person-Affect-Cognition-Execution) framework, this study tested whether psychological distress is associated with Facebook addiction and smartphone orientation through two emotion-regulation pathways: fear of missing out (FoMO) and escapism.

Subject and methods A cross-sectional sample of $N=480$ adults (86.3% female, 11.7% male) completed measures of psychological distress, FoMO, escapism, Facebook addiction, and smartphone orientation. Structural equation modeling was used to compare mediation models linking these variables.

Results Psychological distress was not directly associated with Facebook addiction ($\beta=0.01$, nonsignificant), but it was positively related to FoMO ($\beta=0.49$) and escapism ($\beta=0.38$). FoMO ($\beta=0.46$) and escapism ($\beta=0.09$) were both associated with Facebook addiction. Facebook addiction ($\beta=0.21$), FoMO ($\beta=0.32$), and escapism ($\beta=0.26$) were associated with smartphone orientation. Model comparisons showed that the full mediation model was the most parsimonious and best-fitting representation of the data.

Conclusion Psychological distress appears to be linked to problematic Facebook use and smartphone orientation indirectly, primarily through FoMO and secondarily through escapism. Interventions may therefore benefit from targeting FoMO and maladaptive escapist coping rather than distress alone.

Keywords Escapism · Facebook addiction · FoMO · Mediation · Psychological distress · Smartphone orientation

Introduction

A steady increase in smartphone use has been observed for years; given their capabilities, smartphones can now effectively substitute for computers (De Araujo and Reinhard 2019). Consequently, users are engaging with their portable devices more frequently and for longer durations. Recent data indicate that, depending on the geographical region, members of the youngest generation spend from 4 to even 6 h per day on their smartphones, and this trend is rising (DataReportal 2025). The ubiquity and excessive use of smartphones create a continuous stream of personal stimuli that bring numerous advantages but also introduce psychosocial and physical health issues. Among the advantages are the functionalities of mobile applications that can be downloaded to smartphones, supporting social and professional interactions, entertainment, and work (Kawata et al. 2023). On the downside, a growing phenomenon of problematic smartphone use (PSU) has been documented for years (Soraci et al. 2026). Problematic smartphone use can be

✉ Patrycja Uram
patrycja.uran@sd.psych.pan.pl

¹ Institute of Psychology, Polish Academy of Sciences, Warsaw, Masovian Voivodeship, Poland

² Katholische Universität Eichstätt-Ingolstadt, Eichstätt, Bavaria, Germany

³ Department of Economics, Psychology, Communication, Education, and Motor Sciences, University Niccolò Cusano, Rome, Lazio, Italy

⁴ Faculty of Sport and Health Sciences, Széchenyi István University, Győr, Győr-Moson-Sopron, Hungary

⁵ Faculty of Psychology, Ignatianum University in Cracow, Cracow, Małopolska Voivodeship, Poland

⁶ Faculty of Education, Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Masovian Voivodeship, Poland

understood as a maladaptive pattern of excessive and poorly regulated smartphone engagement that produces withdrawal-like symptoms, interferes with daily functioning, and undermines well-being (Sohn et al. 2019). Literature reviews suggest that PSU is associated with fear of missing out (FoMO), which is described as the distress or unease individuals feel when they perceive themselves as excluded from relevant social experiences or updates conveyed through social media (Akyol et al. 2021; Servidio et al. 2021), psychological distress (Elhai et al. 2020; Soraci et al. 2026), and problematic social media use (PSMU) (Akyol et al. 2021; Elhai et al. 2017).

Psychological distress and smartphone use

Psychological distress refers to a broad condition of mental burden and unease, manifested through varied emotional, cognitive, and behavioral indicators, including helplessness, irritability, heightened tension, and problems with everyday coping. Rather than constituting a separate clinical disorder, it reflects general, nonspecific reactions to stressors and a decline in psychological well-being (Ridner 2004). Notably, psychological distress and smartphone use are bidirectionally related (Khan et al. 2023). Higher levels of distress are associated with more frequent and more compulsive device checking, while intensive use, especially in the evening, contributes to fragmented attention, sleep disturbances, and the maintenance of negative affect (Elhai et al. 2017; Thomée 2018).

In such contexts, the smartphone serves as a readily accessible tool for short-term emotion regulation, reinforcing avoidance strategies and engendering problematic use habits. Literature reviews indicate numerous co-occurrences of smartphone use with mood and anxiety disorders (Panova and Carbonell 2018; Wacks and Weinstein 2021). Empirical findings suggest that FoMO, boredom proneness, self-regulation deficits, and social comparison processes, along with “doomscrolling,” often mediate this relationship by amplifying tension and ruminations (Przybylski et al. 2013; Price et al. 2022). Consequently, a feedback loop emerges; distress predicts more frequent, impulsive smartphone checking, while habitual use (via sleep deprivation, cognitive overload, and exposure to negative content) sustains distress (Elhai et al. 2017; Thomée 2018; Wacks and Weinstein 2021).

Psychological distress, fear of missing out, and escapism

Escapism is defined as the deliberate or habitual diversion from negative affect and problems (Melodia et al. 2020). It is often considered ambivalent: initially, it provides short-term relief, but in the long run (especially at higher intensities) it is associated with diminished offline presence and

poorer functioning (Hirschman 1983; Stenseng et al. 2021; Gabbiadini et al. 2021). Empirical results on escapism are mixed. One body of research confirms positive associations between escapism and mental health problems; another reports weaker effects or null findings, suggesting the importance of moderators (e.g., motivation, stress context) (Akyol et al. 2021). It is worth noting that higher FoMO is linked to stronger escapist tendencies, and FoMO itself correlates with anxiety and depression, thereby sustaining a feedback loop in which distress relates to FoMO and escapism that deliver short-term relief but increase vulnerability to distress over time (Akyol et al. 2021; Uram and Skalski 2022).

Fear of missing out, escapism, and smartphone use

Fear of missing out refers to an anxious state experienced by individuals when they are unable to participate in social life (initially defined outside the digital context and later linked to social media (Przybylski et al. 2013). Fear of missing out is assumed to result from unmet needs for belonging and fears of exclusion, and the ubiquity of smartphones (which offer constant, immediate access to social platforms) intensifies the compulsion to be “always online” (Fabris et al. 2020). High FoMO manifests as anxiety about missing events; the belief that others (including close contacts) are having more and better experiences; habitual monitoring of others’ activities and reporting one’s own (typically positive) content; and keeping the phone within arm’s reach (Uram and Skalski 2022). This pattern promotes problematic social media use (PSMU) and PSU, triggering a vicious cycle of anxiety, frustration, and social comparison, with individuals perceiving themselves as excluded from social activities or inferior in their experiences (Soraci et al. 2026).

As a result, FoMO is understood as a sense of rejection and a fear of missing out (driving sustained social media engagement, hindering digital “disconnection” and screen-time reduction) (Huțul et al. 2025). Fear of missing out is also linked to poorer mood, depressive symptoms, and lower life satisfaction (Fabris et al. 2020; Soraci et al. 2026). Moreover, FoMO may mediate the relationship between deficits in psychological needs and addictive engagement with platforms (e.g., Facebook).

In recent years, the construct has appeared with increasing frequency in the psychological literature, particularly in the context of social media expansion and the widespread use of mobile devices (Marino et al. 2018; Przybylski et al. 2013; Servidio 2023). Constant network access fosters the habit of “being logged in,” which can readily evolve into problematic smartphone use patterns and sustain spirals of anxiety and frustration (Elhai et al. 2017), as well as feelings of inadequacy and dissatisfaction (Fox and Moreland 2015).

Research increasingly highlights escapism as a key mechanism underlying PSU (Hagström and Kaldo 2014).

Evidence suggests that escapism may mediate the relationship between psychological distress and addictive behaviors, with adolescents frequently perceiving social media as a source of reassurance through shared opinions and supportive feedback (Ohno 2016). Moreover, existing studies have conceptualized both FoMO and escapism as mediating factors in the association between distress and problematic engagement with smartphones and social media (Akyol et al. 2021).

Psychological distress, smartphone use, and Facebook addiction

Although the term “Facebook addiction” is retained here to remain consistent with the Bergen Facebook Addiction Scale (BFAS), it is not a formally recognized diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) and is more appropriately understood as problematic Facebook use. Facebook addiction can be defined as a pattern of excessive and poorly regulated use of the platform that functions as a maladaptive emotion-regulation strategy, is positively associated with psychological distress, and is linked to interpersonal dysfunction and broader problematic smartphone use (Elhai et al. 2017; Sha et al. 2019). Research findings indicate that psychological distress (symptoms of depression, anxiety, and stress) positively predicts problematic smartphone use (Akyol et al. 2021; Wacks and Weinstein 2021). This is consistent with reports that indicate that smartphone use serves as a compensatory strategy aimed at regulating negative emotions. Research on problematic Facebook use documents a positive association with psychological distress in meta-analyses, and basic research on “Facebook intrusion” shows that excessive use of the platform co-occurs with relationship dysfunction, highlighting the importance of unregulated use of the platform (Marino et al. 2018). Thus, Facebook use, especially when using a smartphone, appears to be a significant link that exacerbates psychological distress (Elhai et al. 2017; Sha et al. 2019).

Theoretical assumptions of the present research

According to Gross’s (2015) process model, emotion regulation unfolds through the following elements: situation selection, situation modification, attentional deployment, cognitive reappraisal, and response modulation. This implies that when the level of distress is elevated and persists over an extended period, these regulatory processes become weakened. As a result, the use of adaptive strategies, such as cognitive reappraisal, is constrained, while the tendency to rely on short-term, maladaptive strategies increases (Gratz and Roemer 2004).

Referring to Gross’s model (2015), fear of missing out (FoMO) can thus be conceptualized as a form of deregulated attentional deployment, characterized by heightened vigilance toward social cues. Escapism, on the other hand, can be understood as avoidance-oriented response modulation, namely, a behavioral tendency to withdraw from negative affect through immersion in digital content. In this sense, both FoMO and escapism represent strategies that provide immediate relief; however, in the long term, they reinforce problematic patterns through mechanisms of negative reinforcement and cue–response learning (Gratz and Roemer 2004; Gross 2015). The affordances generated by the contemporary use of smartphones and access to social media (namely, constant availability, salient notifications, and personalized streams) render them fast and readily accessible channels for maladaptive regulatory responses.

Referring to the above model (Gross 2015), the selection of FoMO and escapism as potential mediators is grounded in contemporary models of emotion regulation and behavioral addiction. Within Gross’s model (2015), FoMO and escapism represent two qualitatively distinct yet parallel maladaptive pathways. FoMO is associated with a strategy characterized by heightened vigilance, whereby distress is reduced through constant monitoring of online social information, which in turn minimizes the perceived sense of exclusion. This pathway is rooted in socio-attentional processes and aligns with evidence indicating that distress amplifies vigilance toward cues of belongingness and rejection (Przybylski et al. 2013).

Escapism, on the other hand, reflects an avoidance-oriented strategy (Hirschman 1983). In threatening situations, individuals withdraw from aversive self-awareness and emotional discomfort by consuming digital content (Akyol et al. 2021). This is consistent with both the concept of avoidance coping (Folkman 1984; Lazarus and Folkman 1984) and the escape-from-self theory (Baumeister 1990). Importantly, we assume that these two mediators are not redundant but complementary: FoMO channels distress into compulsive social vigilance and the pursuit of online interactions, whereas escapism channels distress into withdrawal from offline discomfort and immersion in digital distraction. In this way, they capture independent yet convergent routes of emotion regulation through which distress can contribute to the development of addictive patterns of platform use (e.g., Facebook addiction) and device-related habits (e.g., smartphone orientation).

Griffith’s model (components model of addiction) assumes that both substance and behavioral addictions are characterized by a common set of six components: salience, mood modification, tolerance, withdrawal, conflict, and relapse. This set of six components serves as a diagnostic and conceptual framework that allows us to assess whether a given behavior exhibits an addictive profile and to what extent each of the components is

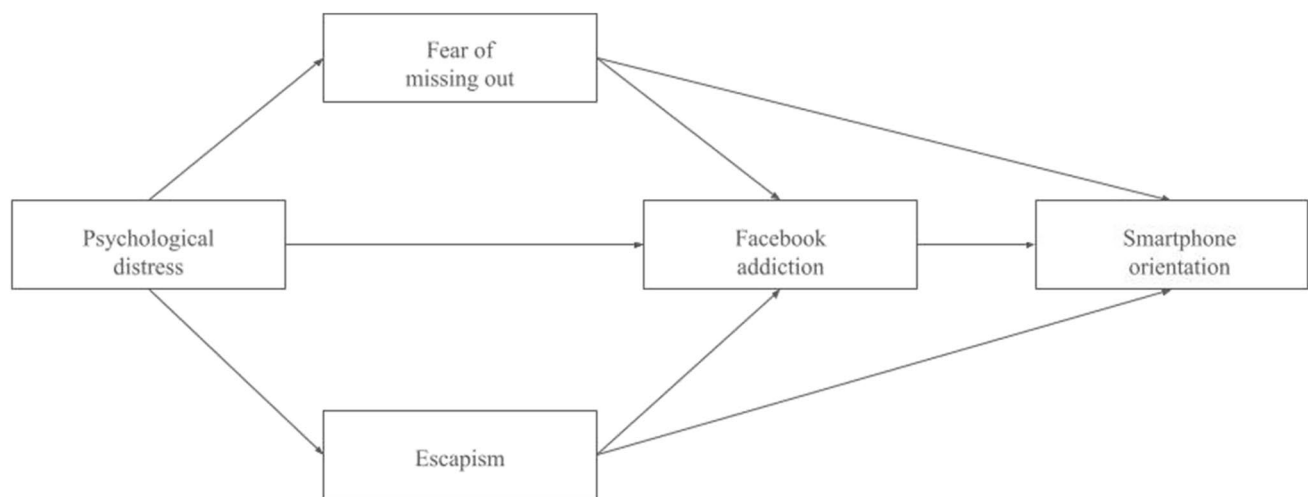


Fig. 1 Conceptual and tested model

active. The component model of addiction is biopsychosocial in nature (Griffiths 2005, 2019).

The I-PACE (Interaction of Person-Affect-Cognition-Execution) model integrates personal and temperamental factors (predispositions, persons), affective and cognitive factors (e.g., expectations, motives, coping styles), and executive factors (self-control, impulsivity, habits). The aim of such integration is to explain how specific disorders of habitual Internet use and related behaviors develop. It is worth noting that in the model, problem behaviors are defined as the result of the interaction of predispositions with reactive affective–cognitive states, as well as limitations in executive functions, which are reinforced by learning and conditioning. A newer version of the model further generalizes these assumptions to a broader spectrum of behavioral addictions (Brand et al. 2019).

Current study

Referring to the Gross model (2015), and also drawing on Griffiths' components model of addiction, we conceptualize problematic smartphone use and Facebook addiction as manifestations of a common addictive structure comprising salience, mood modification, tolerance, withdrawal, conflict, and relapse (Griffiths 2005, 2019). Whereas Facebook addiction captures a platform-specific syndromic pattern that may depend on various factors, smartphone use reflects the executive behaviors through which such patterns may emerge. The I-PACE (Interaction of Person-Affect-Cognition-Execution) model specifies a process linking two layers: distal predispositions and psychopathology shape proximal affective–cognitive responses, which in turn foster addictions in platform-specific form (Brand et al. 2019) and execution behaviors (frequent/

reactive smartphone use). Prior work has associated stress, FoMO, escapism, and problematic use of smartphones or platforms (e.g., Elhai et al. 2017; Andreassen et al. 2012); however, to our knowledge, no study has tested a serial pathway from stress, through FoMO/escapism, to BFAS and subsequently to smartphone use within a single integrated model. Accordingly, we propose the following research hypotheses:

- H1. Higher levels of psychological distress predict higher FoMO (Akyol et al. 2021; Elhai et al. 2020; Thomée 2018), and predict higher escapism (Akyol et al. 2021; Elhai et al. 2020; Gabbiadini et al. 2021).
- H2. FoMO and escapism positively predict Facebook addiction (Dempsey et al. 2019; Uram and Skalski 2022; Young et al. 2017).
- H3. FoMO and escapism mediate the association of psychological distress on Facebook addiction (Akyol et al. 2021; Soraci et al. 2026; Uram and Skalski-Bednarz 2024).
- H4. FoMO and escapism positively predict smartphone orientation (Soraci et al. 2026).
- H5. Facebook addiction positively predicts smartphone orientation (Khoury et al. 2019) (Fig. 1).

Materials and methods

Participants

Analyses were conducted on $n = 480$ complete cases ($M = 20.84$, $SD = 2.52$, range = 18–33). The sample was 86.3% female ($n = 414$), 11.7% male ($n = 56$), and 2.1% who preferred not to say ($n = 10$). Regarding

residence, 47.1% lived in cities with > 500,000 inhabitants ($n = 226$), 25.8% in rural areas ($n = 124$), 19.6% in cities of 50,000–100,000 ($n = 94$), 5.0% in 100,000–250,000 ($n = 24$), and 2.5% in 250,000–500,000 ($n = 12$). In terms of education, 93.3% reported secondary education ($n = 448$), 5.0% higher ($n = 24$), 1.3% vocational ($n = 6$), and 0.4% primary ($n = 2$). For marital status, 55.4% identified as single ($n = 266$), 40.0% were in informal relationships ($n = 192$), and 4.6% in formal relationships ($n = 22$). With respect to employment, 58.3% were students ($n = 280$), 40.0% were studying and employed ($n = 192$), 1.3% worked on civil contracts/part-time ($n = 6$), and 0.4% were unemployed ($n = 2$). For daily social media use, 29.2% reported 3 h ($n = 140$), 25.0% 5+ h ($n = 120$), 24.2% 4 h ($n = 116$), 12.9% 2 h ($n = 62$), 5.4% 1 h ($n = 26$), and 3.3% < 1 h ($n = 16$). As for the number of social media friends, 28.3% reported 150–250 ($n = 136$), 27.9% 50–150 ($n = 134$), 20.0% 250–500 ($n = 96$), 17.9% > 500 ($n = 86$), and 5.8% ≤ 50 ($n = 28$). Finally, for formal religious affiliation, 84.6% identified as Roman Catholic ($n = 406$); 10.4% reported unsure/undisclosed ($n = 50$); 1.3% left the item blank ($n = 6$); and 3.8% selected other/none (Greek Catholic, Protestant/Christian, or no affiliation; $n = 18$).

Sample size calculation

Prior to data collection, an a priori power analysis was conducted using G*Power 3.1.9 (Faul et al. 2009). The minimum required sample size was estimated for a multiple linear regression model, assuming a small effect size (Cohen's $f^2 = 0.05$), $\alpha = 0.05$, and a statistical power of 0.95. Although a power of 0.80 is the conventional benchmark in the behavioral sciences (Cohen 1988), methodological research indicates that studies planned at this level remain vulnerable to type II errors and have contributed to a broader problem of underpowered, non-replicable findings in psychological research (Maxwell 2004). Given that small effect sizes are common in models involving multiple, often weakly correlated psychological constructs, and that failing to detect a true small effect can undermine theory development as much as a false positive, a more conservative power level of 0.95 was adopted to minimize this risk. The analysis indicated that a minimum sample of $N = 458$ participants was required. This regression-based calculation was used as an approximate framework for determining the target sample size, because the hypothesized path model comprised regression-based relationships among observed variables. The hypotheses were subsequently tested using path analysis within the structural equation modeling framework.

Procedure

The study was conducted in spring 2024 (from March to May) among Polish Internet users. It adhered to the tenets of the Declaration of Helsinki (Goodyear et al. 2007) and to national standards for research involving human participants. The research procedure was positively reviewed by the Ethics Committee of the Institute of Psychology, Polish Academy of Sciences. Data were collected via a dedicated Facebook page created for the study, which facilitated recruitment through a snowball sampling strategy. The page contained links to the study questionnaires developed in Google Forms. Participants were informed about the study's aims and procedures, data confidentiality, and their right to withdraw at any time without providing a reason. Only individuals who provided informed consent were permitted to proceed to the questionnaire. Eligibility required having an account on at least one social media platform.

Measures

The **Smartphone Orientation Scale (SOS)** by Roberts and David 2022 ($\alpha = 0.82$), in the Polish version by Czerski et al. (2024) ($\alpha = 0.82$), was used to measure individuals' habitual and affective orientation toward their smartphones, reflecting the extent to which the device occupies a central role in daily life. The tool was developed based on Griffith's model of addiction components (absorption/withdrawal, conflict, mood modification, tolerance/relapse) and shortened to eight items (two from each component). SOS consists of eight statements rated on a 7-point Likert scale, where 1 means "definitely not" and 7 means "definitely yes." The internal consistency of the scale in this study was $\alpha = 0.82$. Sample item: "It's hard for me to turn off my smartphone."

The **Escapism Social Media Scale (ESMS)**, developed by Hirschman (1983), modified by Wu and Holsapple (2014) and Gao et al. (2017) ($\alpha = 0.76$), and translated into Polish by Uram and Skalski-Bednarsz (2024) ($\alpha = 0.91$), was used to measure escape into the virtual world of social media. The scale consists of four statements, and the respondents answer using a 7-point scale, where 1 represents "strongly disagree," and 7 represents "strongly agree." The higher the score on the scale, the greater the desire to escape into the world of social media. The internal consistency of the scale in this study was $\alpha = 0.86$. Sample item: "*This SNS [social networking site] helps me escape from the world of reality.*"

The **Bergen Facebook Addiction Scale (BFAS)** by Andreassen et al. (2012) ($\alpha = 0.83$) was used to measure Facebook addiction. The Polish version was developed by Charzyńska and Gózdź (2014) ($\alpha = 0.84$). The BFAS consists of six test items, each corresponding to one of the six criteria for addiction: 1 = domination, 2 = tolerance, 3 = mood change,

4=relapse, 5=withdrawal symptoms, and 6=conflict. The respondent's task is to determine, using a 5-point scale, the extent to which each of the six statements applies to their situation, where 1 represents "very rarely," and 5 represents "very often." Sample item: "How often during the last year have you felt the urge to use Facebook more and more" or "used Facebook to forget about personal problems?" The reliability coefficient of the scale in this study was $\alpha=0.90$.

Fear of missing out (FoMO) was measured using the scale by Przybylski et al. (2013) ($\alpha=0.90$), named the Fear Of Missing Out Scale (FoMoS) in the Polish version developed by Jupowicz-Ginalska et al. (2020) ($\alpha=0.89$). This scale consists of 10 statements that the respondent answers using a 5-point scale, where 1 represents "generally not true" and 5 represents "completely true." The scale's reliability in this study was $\alpha=0.83$. Sample item: "I get worried when I find out my friends are having fun without me."

The **Depression Anxiety Stress Scale-21** (DASS-21), developed by Lovibond and Lovibond (1995) (Depression $\alpha=0.91$; Anxiety $\alpha=0.84$; Stress $\alpha=0.90$), was used to measure depression, stress, and anxiety. The Polish version was developed by Makara-Studzinska et al. (2022) (general result of $\alpha=0.93$). The scale consists of three subscales: Depression (e.g., "I felt that I had nothing to look forward to"), Stress (e.g., "I found it hard to wind down"), and Anxiety (e.g., "I felt I was close to panic"). It consists of 21 questions (7 questions for each subscale), and the person being tested answers using a 0–3 scale, where 0 means "did not apply to me at all" and 3 means "applied to me very much or most of the time." The high subscale score suggests an increased risk of the phenomenon it measures. For the purposes of this study, subscales were not considered separately, but as a whole. The internal consistency of the scale in this study was $\alpha=0.93$.

The **sociodemographic** questionnaire contained questions about age, gender, place of residence, education, marital status, and occupation.

Results

Analytical strategy

Data analysis was performed using SPSS Statistics version 29 (George and Mallery 2024) and Amos version 29 (Shek and Yu 2014). The Kolmogorov–Smirnov test was utilized to assess normality of variable distributions, while Levene's test verified homogeneity of variance, justifying the use of parametric tests (O'Neill and Mathews 2002). Pearson correlation analysis and structural equation modeling were used to verify hypotheses. Confirmatory factor analysis (CFA), with maximum likelihood (ML) estimation, was used to test the theoretical models. Hu and Bentler's (1999) criteria assessed model fit. The chi-squared statistic (χ^2) was used to evaluate the sample and implied covariance matrices; however, this statistic strongly depends on sample size and provides too conservative an evaluation of model fit (Rao 2002). The comparative fit index (CFI) and goodness of fit index (GFI) were used to assess model fit relative to the baseline model in which all variables are uncorrelated, with values above 0.95 indicating good fit and values above 0.90 considered acceptable. The root mean square error of approximation (RMSEA) was also examined. Ideally, these values should be less than 0.05, but values below 0.08 are acceptable (Byrne 2016). Pearson's correlation analysis was used to determine the relationships between variables.

Descriptive statistics, internal consistency, and inter-correlations among composites ($n=480$) were analyzed. Reliability was adequate to excellent (α , DASS-21 = 0.935, FoMoS = 0.832, ESMS = 0.861, SOS = 0.824, BFAS = 0.902). DASS-21 correlated positively with SOS ($r=0.33$, $p<0.001$) and BFAS ($r=0.27$, $p<0.001$). Both FoMoS and ESMS were associated with higher SOS (FoMoS, $r=0.49$, $p<0.001$; ESMS, $r=0.38$, $p<0.001$), and SOS was strongly related to BFAS ($r=0.42$, $p<0.001$) (Table 1).

Table 1 Descriptive statistics

Variable	k	α	M	SD	1	2	3	4	5
1. DASS-21	21	0.935	1.30	0.64					
2. FoMoS	10	0.832	2.63	0.75	0.49***				
3. ESMS	4	0.861	3.86	1.46	0.38***	0.26***			
4. SOS	8	0.824	3.57	1.09	0.33***	0.49***	0.38***		
5. BFAS	6	0.902	1.80	0.87	0.27***	0.49***	0.22***	0.42***	

$N=480$. Pearson correlations are reported below the diagonal. α =Cronbach's alpha. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. SOS=Smartphone Orientation Scale. ESMS=Escapism Social Media Scale. BFAS=Bergen Facebook Addiction Scale. DASS-21=Depression Anxiety Stress Scale-21. k =number of items

Model 1: Baseline (including the direct psychological distress, DASS-21 to Facebook addiction, BFAS path)

A structural equation model was estimated with psychological distress as a predictor, FoMO (FoMoS) and escapism (ESMS) as parallel mediators, and Facebook addiction (BFAS) and smartphone orientation (SOS) as outcomes. The model demonstrated good fit, $\chi^2(2)=4.32$, $p=0.115$, $\chi^2/\text{df}=2.16$, RMSEA = 0.049, 90% confidence interval (CI) [0.000, 0.114], root mean square residual (RMR) = 1.21, GFI = 0.99, adjusted GFI (AGFI) = 0.97, parsimony GFI (PGFI) = 0.13, normed fit index (NFI) = 0.99, incremental fit index (IFI) = 0.99, CFI = 0.99, Akaike information criterion (AIC) = 30.32, Bayesian information criterion (BIC) = 84.58.

Psychological distress (DASS-21) significantly predicted both mediators, increasing FoMO (FoMoS) ($B=0.27$, $\beta=0.49$, $p<0.001$) and escapism (ESMS) ($B=0.17$, $\beta=0.38$, $p<0.001$). In turn, both FoMO (FoMoS) ($B=0.32$, $\beta=0.46$, $p<0.001$) and escapism (ESMS) ($B=0.08$, $\beta=0.09$, $p<0.05$) were positively associated with BFAS. Regarding smartphone orientation, FoMO (FoMoS) ($B=0.37$, $\beta=0.32$, $p<0.001$), escapism (ESMS) ($B=0.38$, $\beta=0.26$, $p<0.001$), and BFAS ($B=0.36$, $\beta=0.21$, $p<0.001$) all showed independent positive contributions (Fig. 2).

The total effect of distress on BFAS was positive but not statistically significant ($B=0.11$, $\beta=0.27$, ns). By contrast, the total effect of psychological distress (DASS-21) on smartphone orientation (SOS) was significant ($B=0.20$, $\beta=0.31$, $p<0.05$). When FoMO (FoMoS) and escapism (ESMS) were included as mediators, the direct effects of psychological distress (DASS-21) on both BFAS ($B=0.01$, $\beta=0.01$, ns) and smartphone orientation (SOS) ($B=0.00$,

$\beta=0.00$, ns) became nonsignificant. The indirect effects were significant: psychological distress (DASS-21) predicted BFAS indirectly via FoMO (FoMoS) and escapism (ESMS) ($B=0.10$, $\beta=0.26$, $p<0.05$), and smartphone orientation indirectly via FoMO (FoMoS), escapism (ESMS), and BFAS ($B=0.20$, $\beta=0.31$, $p<0.05$).

Taken together, these findings indicate full mediation. Psychological distress (DASS-21) did not exert direct effects on BFAS or smartphone orientation (SOS) once mediators were accounted for. Instead, the influence of psychological distress (DASS-21) operated entirely through FoMO (FoMoS) and escapism (ESMS), with FoMO (FoMoS) emerging as the stronger mediator and escapism (ESMS) contributing a smaller but significant effect.

Alternative models

Alternative Model a (without psychological distress; DASS-21 to Facebook addiction, BFAS)

Removing the nonsignificant DASS-21, (Table 2) BFAS path did not change the pattern of effects on the remaining paths and improved parsimony and fit indices: $\chi^2(3)=4.39$, $p=0.222$; $\chi^2/\text{df}=1.46$; RMSEA = 0.031 [0.000, 0.089]; RMR = 0.74; GFI = 0.99; AGFI = 0.98; PGFI = 0.20; NFI = 0.99; IFI = 0.99; CFI = 0.99; AIC = 28.39; BIC = 78.48 (Fig. 3).

Alternative Model b (with psychological distress; DASS-21 to smartphone orientation, SOS)

Introducing the DASS-21 to SOS path did not yield a significant effect ($\beta=0.016$, $p=0.591$) and did not improve fit relative to the baseline: $\chi^2(2)=4.10$, $p=0.129$; $\chi^2/\text{df}=2.05$;

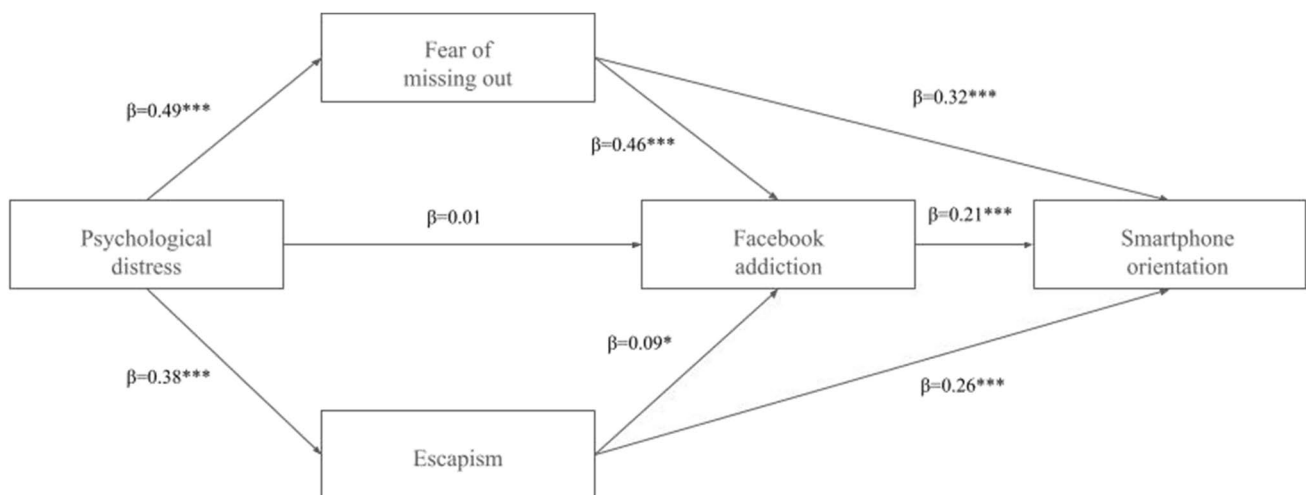


Fig. 2 Results of the baseline model

RMSEA = 0.047 [0.000, 0.112]; RMR = 1.10; GFI = 0.99; AGFI = 0.97; PGFI = 0.13; NFI = 0.99; IFI = 0.99; CFI = 0.99; AIC = 30.10; BIC = 84.36.

RMSEA = 0.079 [0.010, 0.167]; RMR = 1.09; GFI = 0.99; AGFI = 0.95; PGFI = 0.07; NFI = 0.99; IFI = 0.99; CFI = 0.99; AIC = 32.03; BIC = 90.46.

Alternative Model c (both paths: psychological distress, DASS-21 to Facebook addiction, BFAS and psychological distress, DASS-21 to smartphone orientation, SOS)

The variant including both paths (Table 2) produced the weakest fit indices: $\chi^2(1) = 4.02$, $p = 0.045$; $\chi^2/df = 4.02$;

Model comparison and selection

Comparisons of AIC/BIC and RMSEA indicate that Alternative a provides the best fit (lowest AIC/BIC; lowest RMSEA). A nested comparison of the baseline model versus Alternative a confirmed that removing the DASS and BFAS path does not degrade fit ($\Delta\chi^2(1) = 0.07$, $p = 0.79$),

Table 2 Regression weights in tested models

Model	β	SE	B	CR	p
Model baseline					
Psychological Distress (DASS-21) → FoMO (FoMoS)	.486	.022	.272	12.175	***
Psychological Distress (DASS-21) → Escapism (ESMS)	.380	.018	.165	9.005	***
FoMO (FoMoS) → Facebook addiction (BFAS)	.463	.031	.320	10.202	***
Escapism (ESMS) → Facebook addiction (BFAS)	.093	.038	.082	2.163	.031
Psychological Distress (DASS-21) → Facebook addiction (BFAS)	.013	.019	.005	.261	.794
Facebook addiction (BFAS) → Smartphone orientation (SOS)	.214	.071	.356	4.983	***
FoMO (FoMoS) → Smartphone orientation (SOS)	.320	.049	.366	7.428	***
Escapism (ESMS) → Smartphone orientation (SOS)	.258	.056	.381	6.749	***
Model a					
Psychological Distress (DASS-21) → FoMO	.486	.022	.272	12.175	***
Psychological Distress (DASS-21) → Escapism (ESMS)	.380	.018	.165	9.005	***
Escapism (ESMS) → Facebook addiction (BFAS)	.096	.036	.086	2.383	.017
FoMO (FoMoS) → Facebook addiction (BFAS)	.469	.028	.323	11.602	***
Facebook addiction (BFAS) → Smartphone orientation (SOS)	.214	.071	.356	4.983	***
FoMO (FoMoS) → Smartphone orientation (SOS)	.320	.049	.366	7.429	***
Escapism (ESMS) → Smartphone orientation (SOS)	.258	.056	.381	6.750	***
Model b					
Psychological Distress (DASS-21) → FoMO	.486	.022	.272	12.175	***
Psychological Distress (DASS-21) → Escapism (ESMS)	.380	.018	.165	9.005	***
FoMO (FoMoS) → Facebook addiction (BFAS)	.469	.028	.323	11.602	***
Escapism (ESMS) → Facebook addiction (BFAS)	.096	.036	.086	2.383	.017
Facebook addiction (BFAS) → Smartphone orientation (SOS)	.214	.071	.355	4.978	***
FoMO (FoMoS) → Smartphone orientation (SOS)	.309	.054	.355	6.553	***
Escapism (ESMS) → Smartphone orientation (SOS)	.251	.060	.371	6.194	***
Psychological Distress (DASS-21) → Smartphone orientation (SOS)	.024	.029	.016	.537	.591
Model c					
Psychological Distress (DASS-21) → FoMO	.486	.022	.272	12.175	***
Psychological Distress (DASS-21) → Escapism (ESMS)	.380	.018	.165	9.005	***
FoMO (FoMoS) → Facebook addiction (BFAS)	.463	.031	.320	10.202	***
Escapism (ESMS) → Facebook addiction (BFAS)	.093	.038	.082	2.163	.031
Psychological Distress (DASS-21) → Facebook addiction (BFAS)	.013	.019	.005	.261	.794
Facebook addiction (BFAS) → Smartphone orientation (SOS)	.214	.071	.355	4.977	***
FoMO (FoMoS) → Smartphone orientation (SOS)	.309	.054	.355	6.567	***
Escapism (ESMS) → Smartphone orientation (SOS)	.251	.060	.371	6.197	***
Psychological Distress (DASS-21) → Smartphone orientation (SOS)	.024	.029	.016	.537	.591

β standardized regression coefficient, B unstandardized regression coefficient, SE standard error of B, CR critical ratio

and the direct paths from psychological distress (DASS-21) to Facebook addiction (BFAS) and to smartphone orientation (SOS) remain nonsignificant.

Discussion

The objective of this study was to test the research hypotheses assessing whether psychological distress affects Facebook addiction and smartphone orientation indirectly via FoMO and escapism. Results from the first (baseline) model showed that psychological distress does not directly predict Facebook addiction ($\beta = 0.01$, ns), but it significantly increases FoMO and escapism. In turn, FoMO and escapism positively predict Facebook addiction. Regarding smartphone orientation, three variables make independent and significant contributions: fear of missing out, escapism, and Facebook addiction.

Our results align with an emotion-regulation account: elevated distress overloads regulatory resources, prompting individuals to adopt two short-term, nonadaptive routes: attentional hypervigilance to social cues (FoMO) and avoidance-oriented response modulation (escapism). These routes increase cue salience, deliver immediate (negatively reinforced) relief, and, through learning, consolidate platform-level symptoms of Facebook addiction and device-level habits of smartphone orientation. This explains why psychological distress showed no direct paths to Facebook addiction and smartphone orientation while exerting robust indirect effects through fear of missing out and, to a lesser extent, escapism, in line with the I-PACE Person, Affect/Cognition, and Execution sequence and the mood-modification, salience, and withdrawal components of Griffiths' model.

The tested baseline model indicated that a higher level of psychological symptoms is associated with heightened social vigilance and fear of missing out on information, as well as a greater tendency to regulate mood through escape into social media. This pattern supports the proposed research hypotheses (H1). Accordingly, distress, understood as a "background vulnerability" (a distal factor), promotes two psychological strategies: (a) social hypervigilance (FoMO), that is, continuous scanning and readiness for social signals (Akyol et al. 2021; Elhai et al. 2020; Thomée 2018); and (b) mood regulation through escape (escapism), that is, seeking rapid relief in digital stimuli (Akyol et al. 2021; Elhai et al. 2020; Gabbiadini et al. 2021).

Moreover, the results showed that FoMO strongly amplifies platform addiction symptoms (H2) (Dempsey et al. 2019; Uram and Skalski 2022) and robustly predicts device-level habits (H4) (Soraci et al. 2026). Thus, FoMO increases salience (the elevated priority of online cues), raises checking

frequency, and heightens susceptibility to withdrawal-like symptoms (anxiety when access is restricted). Consequently, it strongly drives both platform-related symptoms (e.g., Facebook addiction) and device-level habits (smartphone orientation) (Li et al. 2022). Psychologically, this reflects a "fear of losing something important" that sustains the checking loop (Przybylski et al. 2013).

Similar, albeit weaker, effects were observed for escapism (Akyol et al. 2021). The tested model confirmed a positive association between escapism and Facebook addiction (H2) (Young et al. 2017; Akyol et al. 2021). This suggests activation of the mood modification component (Griffiths 2005): escaping into social media content is linked to immediate relief (negative reinforcement). In turn, this consolidates a cognitive pattern that motivates reaching for the phone when feeling unwell, thereby strengthening both BFAS and SOS (Young et al. 2017). Although weaker than the FoMO effect, the association is consistent.

The model also indicated that platform-related symptoms translate into device-level habits (H5) (Khouri et al. 2019). Thus, components typical of addiction generalize to various operational tiers of the device, such as more frequent unlocks and the consolidation of cue–response patterns, thereby increasing an individual's propensity toward a smartphone-oriented style (Griffiths 2005, 2019).

Finally, the findings provide convergent evidence that the association between psychological distress and digital outcomes is indirect: primarily through FoMO and, to a lesser extent, through escapism (H3) (Akyol et al. 2021; Soraci et al. 2026; Uram and Skalski-Bednarski 2024). Full mediation finds empirical support and is theoretically consonant with the frameworks considered (Griffiths' components model/I-PACE). Central to this mechanism is FoMO—a high-leverage target for intervention that links mental health with platform symptoms and device behaviors (Griffiths 2019; Brand et al. 2019).

Alternative models

Analyses of alternative models revealed that the full-mediation specification, denoted as Model a—that is, without a direct path from psychological distress to Facebook addiction—exhibited the best fit and greater parsimony than the baseline model and variants that added paths from distress to BFAS or to the smartphone outcome (SOS). It is also noteworthy that the direct effects of distress (to BFAS, and to the smartphone outcome) were nonsignificant, and a nested-model test confirmed no deterioration in fit after their removal. Accordingly, among the models tested, we consider Model a optimal and corroborative of the full-mediation specification.

The results align with the Person-Affect-Cognition to Execution sequence, consistent with the theoretical premises of Griffiths' components model and the I-PACE framework (Griffiths 2019; Brand et al. 2019). They support accounts in

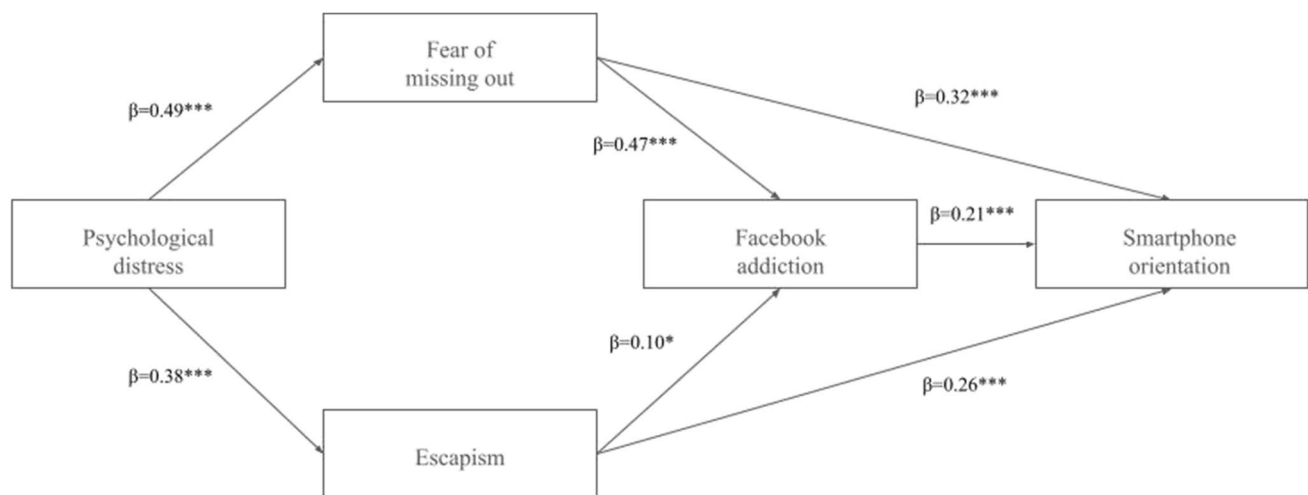


Fig. 3 Results for alternative Model a

which psychological symptoms influence digital behaviors through cognitive-motivational intermediaries. In this view, FoMO functions as a socio-attentional “hub” linking distress with the platform-level outcome (Facebook addiction) and the device-level behavior (smartphone orientation/use) (Griffiths 2005). FoMO occupies the central node, integrating components of salience (heightened priority of online cues) and withdrawal (discomfort in the absence of access). Escapism (mood modification) reinforces use via negative reinforcement (relief), explaining additional variance in both outcomes, albeit more weakly than FoMO (Griffiths 2019). At the same time, Facebook addiction, as a platform-specific syndrome, contributes independently to smartphone orientation/use, adding a habit-generalization component from platform to device, which suggests the following cascade: motives/cognitions to platform symptoms to device habits (Brand et al. 2019; Griffiths 2005, 2019).

Limitations and future directions

Our study is affected by certain limitations. First, the sample was relatively young and dominated by females, which substantially constrains the generalizability of the findings. Accordingly, all inferences are most applicable to the age group examined here. Second, the study employed a cross-sectional design, precluding causal inference. We therefore recommend that future research adopt experimental designs or longitudinal approaches (e.g., manipulating notification intensity or implementing digital hygiene). Future studies should also draw on samples with greater social diversity (gender, age, and intensity of media use). Moreover, subsequent research should assess whether the results obtained for Facebook addiction generalize to other social media platforms. It should be emphasized that although the term

Facebook addiction is widely used in the scholarly literature, it has not yet been officially included in diagnostic manuals (e.g., DSM-5-TR) and is therefore more often conceptualized as problematic Facebook use (Marino et al. 2018). It would also be valuable to evaluate interventions aimed at reducing the fear of missing out (FoMO), such as notification hygiene, increased tolerance for missing social information, and addressing beliefs about constant connectivity, and to promote alternative emotion-regulation strategies (rather than screen-based escapism). Such approaches are likely to most effectively attenuate both the severity of Facebook-related addictive patterns and overall smartphone use. From a digital environment design perspective, it is worth testing features that minimize FoMO triggers (e.g., batching or delaying notifications, reducing saliency-boosting cues) (Skalski-Bednarsz et al. 2026).

Despite these limitations, to our knowledge, this is the first study to provide coherent evidence that the association between psychological distress and digital outcomes is indirect, primarily via FoMO and, to a lesser extent, via escapism. A mediation model is both empirically superior and theoretically consistent with Griffiths’ components model (Griffiths 2005) and the I-PACE model proposed by Brand et al. (2019). FoMO emerges as the central mechanism, a high-leverage target for intervention linking mental health with platform-related symptoms and device-level behaviors.

Conclusion

The present findings demonstrate that psychological distress does not directly predict Facebook addiction or smartphone orientation but exerts its influence entirely through maladaptive emotion-regulation pathways, most notably FoMO

and, to a lesser extent, escapism. FoMO emerged as the central mechanism, linking distress to both platform-specific symptoms and device-level habits, underscoring its pivotal role in the development of problematic digital behaviors. These results highlight the practical importance of targeting FoMO in prevention and intervention strategies. For example, there is a need for strategies that reduce notification salience, promote tolerance for missed social information, and foster healthier offline coping strategies, as such approaches may effectively weaken the distress–addiction pathway and mitigate broader smartphone overuse. However, given the young, predominantly female and student-based convenience sample, caution should be used in generalizing the findings to broader populations.

Author contributions Conceptualization: Patrycja Uram and Sebastian Skalski-Bednarz; methodology: Patrycja Uram and Sebastian Skalski-Bednarz; validation and interpretation: Patrycja Uram, Sebastian Skalski-Bednarz, Paolo Soraci, Attila Szabo, and Janusz Surzykiewicz; formal analysis: Patrycja Uram; investigation: Patrycja Uram; resources: Patrycja Uram; data curation: Patrycja Uram and Sebastian Skalski-Bednarz; writing—original draft preparation: Patrycja Uram; writing—review and editing: Patrycja Uram, Sebastian Skalski-Bednarz, Paolo Soraci, Attila Szabo, and Janusz Surzykiewicz. All authors read and approved the final manuscript. Contribution shares: Patrycja Uram (50%), Sebastian Skalski-Bednarz (15%), Paolo Soraci (15%), Attila Szabo (10%), and Janusz Surzykiewicz (10%).

Funding No funding was received for conducting this study.

Data availability The data are available from the corresponding author upon reasonable request.

Code availability Not applicable.

Declarations

Ethics approval All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This study was approved by the Committee for Ethics in Scientific Research of the Institute of Psychology, Polish Academy of Sciences: 04/3/2021.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication Not applicable.

Declaration of generative AI in scientific writing During the preparation of this manuscript, the authors used generative artificial intelligence tools to improve language and grammar. The authors reviewed and edited the output and take full responsibility for the content of the manuscript.

Competing interests The authors declare that they have no competing interests.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

- Akyol NA, Ergin DA, Krettmann AK, Essau CA (2021) Is the relationship between problematic mobile phone use and mental health problems mediated by fear of missing out and escapism? *Addict Behav Rep* 14:100384. <https://doi.org/10.1016/j.abrep.2021.100384>
- Andreassen CS, Torsheim T, Brunborg GS, Pallesen S (2012) Development of a Facebook addiction scale. *Psychol Rep* 110:501–517. <https://doi.org/10.2466/02.09.18.PR0.110.2.501-517>
- Baumeister RF (1990) Suicide as escape from self. *Psychol Rev* 97:90–113. <https://doi.org/10.1037/0033-295X.97.1.90>
- Brand M, Wegmann E, Stark R, Müller A, Wölfling K, Robbins TW, Potenza MN (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. *Neurosci Biobehav Rev* 104:1–10. <https://doi.org/10.1016/j.neubiorev.2019.06.032>
- Byrne BM (2016) Structural equation modeling with AMOS: basic concepts, applications, and programming, 3rd edn. Routledge. <https://doi.org/10.4324/9781315757421>
- Charzyńska E, Gózdź J (2014) W sieci uzależnienia. Polska adaptacja Skali Uzależnienia od Facebooka (the Bergen Facebook Addiction Scale) C.S. Andreassen, T. Torsheim, G.S. Brunborg i S. Pallesen. *Chowanna* 42:163–185. <https://doi.org/10.31261/CHOWANNA.2014.42.10>
- Cohen J (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Lawrence Erlbaum Associates, Hillsdale, NJ
- Czerski WM, Zbrozczyk D, Ziębakowska-Cecot K (2024) Polish adaptation and validation of the smartphone orientation scale (SOS). *J Mod Sci* 58:264–285. <https://doi.org/10.13166/jms/192286>
- DataReportal (2025) Digital 2025: Global overview report. We Are Social & Meltwater. <https://datareportal.com/reports/digital-2025-global-overview>. Accessed 14 Aug 2026
- De Araujo MH, Reinhard N (2019) Substituting computers for mobile phones? An analysis of the effect of device divide on digital skills in Brazil. In: *Lect Notes Comput Sci*, pp 142–154. https://doi.org/10.1007/978-3-030-27397-2_12
- Dempsey AE, O'Brien KD, Tiarniyu MF, Elhai JD (2019) Fear of missing out (FoMO) and rumination mediate relations between social anxiety and problematic Facebook use. *Addict Behav Rep* 9:100150. <https://doi.org/10.1016/j.abrep.2018.100150>

- Elhai JD, Dvorak RD, Levine JC, Hall BJ (2017) Problematic smartphone use: a conceptual overview and systematic review of relations with anxiety and depression psychopathology. *J Affect Disord* 207:251–259. <https://doi.org/10.1016/j.jad.2016.08.030>
- Elhai JD, Gallinari EF, Rozgonjuk D, Yang H (2020) Depression, anxiety and fear of missing out as correlates of social, non-social and problematic smartphone use. *Addict Behav* 105:106335. <https://doi.org/10.1016/j.addbeh.2020.106335>
- Fabris MA, Marengo D, Longobardi C, Settanni M (2020) Investigating the links between fear of missing out, social media addiction, and emotional symptoms in adolescence: the role of stress associated with neglect and negative reactions on social media. *Addict Behav* 106:106364. <https://doi.org/10.1016/j.addbeh.2020.106364>
- Faul F, Erdfelder E, Buchner A, Lang AG (2009) Statistical power analyses using G* Power 3.1: tests for correlation and regression analyses. *Behav Res Methods* 41:1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Folkman S (1984) Personal control and stress and coping processes: a theoretical analysis. *J Pers Soc Psychol* 46:839. <https://doi.org/10.1037/0022-3514.46.4.839>
- Fox J, Moreland JJ (2015) The dark side of social networking sites: an exploration of the relational and psychological stressors associated with Facebook use and affordances. *Comput Human Behav* 45:168–176. <https://doi.org/10.1016/j.chb.2014.11.083>
- Gabbiadini A, Baldissarri C, Durante F, Valtorta RR, De Rosa M, Gallucci M (2021) Loneliness, escapism, and identification with media characters: an exploration of the psychological factors underlying binge-watching tendency. *Front Psychol* 12:785970. <https://doi.org/10.3389/fpsyg.2021.785970>
- Gao W, Liu Z, Li J (2017) How does social presence influence SNS addiction? A belongingness theory perspective. *Comput Human Behav* 77:347–355. <https://doi.org/10.1016/j.chb.2017.09.002>
- George D, Mallery P (2024) IBM SPSS statistics 29 step by step: a simple guide and reference, 18th edn. Routledge. <https://doi.org/10.4324/9781032622156>
- Goodyear MD, Krlęza-Jeric K, Lemmens T (2007) The declaration of Helsinki. *BMJ* 335:624–625. <https://doi.org/10.1136/bmj.39339.610000.BE>
- Gratz KL, Roemer L (2004) Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. *J Psychopathol Behav Assess* 26:41–54. <https://doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Griffiths M (2005) A ‘components’ model of addiction within a biopsychosocial framework. *J Subst Use* 10:191–197. <https://doi.org/10.1080/14659890500114359>
- Griffiths MD (2019) The evolution of the ‘components model of addiction’ and the need for a confirmatory approach in conceptualizing behavioral addictions. *Düşünen Adam: J Psychiat Neurol Sci* 32:179–184. <https://doi.org/10.14744/DAJPNS.2019.00027>
- Gross JJ (2015) The extended process model of emotion regulation: elaborations, applications, and future directions. *Psychol Inq* 26:130–137. <https://doi.org/10.1080/1047840X.2015.989751>
- Hagström D, Kaldo V (2014) Escapism among players of MMORPGs—conceptual clarification, its relation to mental health factors, and development of a new measure. *Cyberpsychol Behav Soc Netw* 17:19–25. <https://doi.org/10.1089/cyber.2012.0222>
- Hirschman EC (1983) Predictors of self-projection, fantasy fulfillment, and escapism. *J Soc Psychol* 120:63–76. <https://doi.org/10.1080/00224545.1983.9712011>
- Hu LT, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling* 6:1–55. <https://doi.org/10.1080/10705519909540118>
- Huțul TD, Mațcu-Zaharia M, Huțul A, Karner-Huțuleac A (2025) The mediating role of commercial FOMO between adolescents’ need to belong and psychological distress: advertising implications on mental health. *Psychol Rep*. <https://doi.org/10.1177/00332941241310983>
- Jupowicz-Ginalska A, Kisilowska M, Baran T, Wysocki A, Jasiewicz J (2020) Fear of missing out scale—a nationwide representative CAWI survey in Poland. *Cent Eur J Commun* 13:313–332. [https://doi.org/10.51480/1899-5101.13.3\(27\).1](https://doi.org/10.51480/1899-5101.13.3(27).1)
- Kawata K, Okubo T, Iwamoto K et al (2023) The impact of a mobile app-based corporate sleep health improvement program on productivity: validation through a randomized controlled trial. *PLoS ONE* 18:e0295158. <https://doi.org/10.1371/journal.pone.0295158>
- Khan A, McLeod G, Hidajat T, Edwards EJ (2023) Excessive smartphone use is associated with depression, anxiety, stress, and sleep quality of Australian adults. *J Med Syst* 47:109. <https://doi.org/10.1007/s10916-023-02005-3>
- Khoury JM, Neves MDCLD, Roque MAV, Freitas AACD, da Costa MR, Garcia FD (2019) Smartphone and Facebook addictions share common risk and prognostic factors in a sample of undergraduate students. *Trends Psychiatry Psychother* 41:358–368. <https://doi.org/10.1590/2237-6089-2018-0069>
- Lazarus RS, Folkman S (1984) Stress, appraisal, and coping. Springer Publishing Company
- Li L, Niu Z, Mei S, Griffiths MD (2022) A network analysis approach to the relationship between fear of missing out (FoMO), smartphone addiction, and social networking site use among a sample of Chinese university students. *Comput Human Behav* 128:107086. <https://doi.org/10.1016/j.chb.2021.107086>
- Lovibond PF, Lovibond SH (1995) The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther* 33:335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Makara-Studzinska M, Załuski M, Adamczyk K, Tyburski E (2022) Polish version of the Depression Anxiety Stress Scale (DASS-42)—adaptation and normalization. *Psychiatr Pol*. <https://doi.org/10.12740/PP/OnlineFirst/153064>
- Marino C, Gini G, Vieno A, Spada MM (2018) The associations between problematic Facebook use, psychological distress and well-being among adolescents and young adults: a systematic review and meta-analysis. *J Affect Disord* 226:274–281. <https://doi.org/10.1016/j.jad.2017.10.007>
- Maxwell SE (2004) The persistence of underpowered studies in psychological research: causes, consequences, and remedies. *Psychol Methods* 9:147–163. <https://doi.org/10.1037/1082-989X.9.2.147>
- Melodia F, Canale N, Griffiths MD (2020) The role of avoidance coping and escape motives in problematic online gaming: a systematic literature review. *Int J Ment Health Addict* 20:996–1022. <https://doi.org/10.1007/s11469-020-00422-w>
- O’Neill ME, Mathews KL (2002) Levene tests of homogeneity of variance for general block and treatment designs. *Biometrics* 58:216–224. <https://doi.org/10.1111/j.0006-341X.2002.00216.x>
- Ohno S (2016) Internet escapism and addiction among Japanese senior high school students. *Int J Cult Ment Health* 9:399–406. <https://doi.org/10.1080/17542863.2016.1226911>
- Panova T, Carbonell X (2018) Is smartphone addiction really an addiction? *J Behav Addict* 7:252–259. <https://doi.org/10.1556/2006.7.2018.49>
- Price M, Legrand AC, Brier ZMF, van Stolk-Cooke K, Peck K, Dodds PS, Danforth CM, Adams ZW (2022) Doomscrolling during COVID-19: the negative association between daily social and traditional media consumption and mental health symptoms during

- the COVID-19 pandemic. *Psychol Trauma* 14:1338–1346. <https://doi.org/10.1037/tra0001202>
- Przybylski AK, Murayama K, DeHaan CR, Gladwell V (2013) Motivational, emotional, and behavioral correlates of fear of missing out. *Comput Human Behav* 29:1841–1848. <https://doi.org/10.1016/j.chb.2013.02.014>
- Rao CR (2002) Karl Pearson chi-square test: the dawn of statistical inference. In: Huber-Carol C, Balakrishnan N, Nikulin MS, Mesbah M (eds) *Goodness-of-fit tests and model validity*. Birkhäuser, pp 9–24. https://doi.org/10.1007/978-1-4612-0103-8_2
- Ridner SH (2004) Psychological distress: concept analysis. *J Adv Nurs* 45:536–545. <https://doi.org/10.1046/j.1365-2648.2003.02938.x>
- Roberts JA, David ME (2022) Me, my smartphone, and I: development of the smartphone orientation scale (SOS). *Int J Hum Comput Interact* 38:1267–1275. <https://doi.org/10.1080/10447318.2021.1990521>
- Servidio R (2023) Fear of missing out and self-esteem as mediators of the relationship between maximization and problematic smartphone use. *Curr Psychol* 42:232–242. <https://doi.org/10.1007/s12144-020-01341-8>
- Servidio R, Sinatra M, Griffiths MD, Monacis L (2021) Social comparison orientation and fear of missing out as mediators between self-concept clarity and problematic smartphone use. *Addict Behav* 122:107014. <https://doi.org/10.1016/j.addbeh.2021.107014>
- Sha P, Sariyska R, Riedl R, Lachmann B, Montag C (2019) Linking internet communication and smartphone use disorder by taking a closer look at the Facebook and WhatsApp applications. *Addict Behav Rep* 9:100148. <https://doi.org/10.1016/j.abrep.2018.100148>
- Shek DT, Yu L (2014) Confirmatory factor analysis using AMOS: a demonstration. *Int J Disabil Hum Dev* 13:191–204. <https://doi.org/10.1515/ijdh-2014-0305>
- Skalski-Bednarz SB, Toussaint LL, Uram P, Atroszko P (2026) Still logged in? Self-forgiveness is linked to lower fear of missing out (FoMO) only at lower levels. *Educational and Developmental Psychologist*:1–13. <https://doi.org/10.1080/20590776.2026.2693487>
- Sohn SY, Rees P, Wildridge B, Kalk NJ, Carter B (2019) Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry* 19:356. <https://doi.org/10.1186/s12888-019-2350-x>
- Soraci P, Demetrovics Z, Bevan N et al (2026) FoMO and psychological distress mediate the relationship between life satisfaction, problematic smartphone use, and problematic social media use. *Int J Ment Health Addict* 24:918–947. <https://doi.org/10.1007/s11469-024-01432-8>
- Stenseng F, Falch-Madsen J, Hygen BW (2021) Are there two types of escapism? Exploring a dualistic model of escapism in digital gaming and online streaming. *Psychol Pop Media* 10:319–329. <https://doi.org/10.1037/ppm0000339>
- Thomée S (2018) Mobile phone use and mental health. A review of the research that takes a psychological perspective on exposure. *Int J Environ Res Public Health* 15:2692. <https://doi.org/10.3390/ijerph15122692>
- Uram P, Skalski S (2022) Still logged in? The link between Facebook addiction, FoMO, self-esteem, life satisfaction and loneliness in social media users. *Psychol Rep* 125:218–231. <https://doi.org/10.1177/0033294120980970>
- Uram P, Skalski-Bednarz SB (2024) Social media escapism in Poland: adaptation of a measure and its relationship with thought suppression and mental health. *Psychol Rep*. <https://doi.org/10.1177/00332941241269552>
- Wacks Y, Weinstein AM (2021) Excessive smartphone use is associated with health problems in adolescents and young adults. *Front Psychiatry* 12:669042. <https://doi.org/10.3389/fpsy.2021.669042>
- Wu J, Holsapple C (2014) Imaginal and emotional experiences in pleasure-oriented IT usage: a hedonic consumption perspective. *Inf Manag* 51:80–92. <https://doi.org/10.1016/j.im.2013.09.003>
- Young NL, Kuss DJ, Griffiths MD, Howard CJ (2017) Passive Facebook use, Facebook addiction, and associations with escapism: an experimental vignette study. *Comput Human Behav* 71:24–31. <https://doi.org/10.1016/j.chb.2017.01.039>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.