



Social media-induced fear of missing out (FoMO) and social media fatigue: The role of narcissism, comparison and disclosure

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ARTICLE INFO

Keywords:

Time cost
Fear of missing out
Social media fatigue
Narcissism
Social comparison
Self-disclosure

ABSTRACT

The pervasiveness of social media platforms (SMP) has resulted in users experiencing feelings associated with the phenomena of fear of missing out (FoMO) and social media fatigue. However, little is known about how these phenomena relate to and influence the psychological state of SMP users. This is a significant gap as recent literature has emphasized the importance of examining the correlates of both these phenomena. The current study addresses this gap by examining the stimuli of FoMO and its influence on users' experienced fatigue through a novel pathway that investigates the effect of narcissism (admiration and rivalry) on SMP behaviors of self-disclosure and social comparison. We collected data through a cross-sectional survey on *Prolific Academic* from 305 adult SMP users in the United States that were analyzed through structural equation modeling. The results show that FoMO is stimulated by time cost and anxiety. FoMO also positively influences users' adoption of narcissistic admiration and rivalry processes, which influence SMP behaviors differently. Interestingly, we found that only social comparison positively influenced fatigue. The findings raise significant implications for theory and practice, particularly for managing negative emotional states while using SMPs and promoting a tempered use of these platforms.

1. Introduction

Social media fatigue, as a negative consequence of using social media platforms (SMPs), has drawn substantial attention in recent years due to its connotations for promulgating temporary or permanent breaks or the cessation of social media use (Fan, Jiang, Deng, Dong, & Lin, 2020; Liu & He, 2021; Tandon, Dhir, Talwar et al., 2021). Referred to as a subjective feeling of tiredness and burnout resulting from the use of SMP (Ravindran, Yeow Kuan, & Hoe Lian, 2014), social media fatigue (hereafter, fatigue) has also been linked to the constraints placed on users' cognitive processing abilities or, put differently, their inability to cope with the information and communications originating from SMPs. However, there is little knowledge of fatigue's antecedents (Dhir, Kaur, Chen, &

Pallesen, 2019; Islam, Laato, Talukder, & Sutinen, 2020); this represents a significant gap in the literature since it limits the preemptive measures that could be developed to avoid users' experience of fatigue. Recent studies suggest that fatigue, which is a dark side of social media (DoSM) phenomenon (Kaur, Islam, Tandon, & Dhir, 2021), may be associated with other DoSM aspects, such as Fear of Missing Out (FoMO) (Bright & Logan, 2018; Dhir et al., 2019; Tandon, Dhir, Talwar et al., 2021) and social media stalking (Tandon, Dhir, Talwar et al., 2021).

FoMO has been extensively studied under the DoSM aegis and found to be associated with various problematic behaviors, such as compulsive social media use (Dhir, Yossatorn, Kaur, & Chen, 2018; Tandon, Kaur, Dhir, & Mäntymäki, 2020), phubbing (Tandon, Dhir, Talwar, Kaur, and Mäntymäki, 2022) and online social comparisons (Reer, Tang, &

Abbreviations: FoMO, Fear of Missing Out; SMP, Social Media Platforms; DoSM, Dark side of Social Media; SOBC, Stimulus-Organism-Behavior-Consequence; SEM, Structural Equation Modelling.

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<https://doi.org/10.1016/j.jbusres.2023.113693>

Received 17 September 2021; Received in revised form 15 January 2023; Accepted 18 January 2023

Available online 2 February 2023

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Quandt, 2019). Scholars have suggested that FoMO can induce users to stay continuously connected to the SMP that they use to preclude the feeling of anxiety or apprehensiveness about missing the experiences that their peers enjoy (Przybylski, Murayama, DeHaan, & Gladwell, 2013) and perhaps share online (Tandon, Dhir, Almugren, AlNemer, and Mäntymäki, 2021; Tandon et al., 2022). Thus, on experiencing FoMO, users may engage in a continuous active or passive form of information exchange on SMPs (Elhai, Yang, & Montag, 2020; Tomczyk & Selmanagic-Lizde, 2018), even during times allocated to other activities such as sleep hygiene (Tandon et al., 2020); scholarly pursuit (Alt, 2017), or completion of work tasks (Appel, Krisch, Stein, & Weber, 2019; Tandon et al., 2022).

Intuitively, such intensive FoMO-driven social media use can culminate in users' experience of fatigue. Yet, prior research on the association between FoMO and fatigue is divided. Some scholars determine that there is no statistically significant association (Dhir et al., 2018; Malik, Dhir, Kaur, & Johri, 2021), and others find a positive and significant association between the two (Tandon, Dhir, Talwar et al., 2021). Such inconsistencies present the second research gap motivating this study since it points to the need for further investigations into how FoMO associates with fatigue.

One possible reason for the divergences in findings of how social media use-related variables, like FoMO, result in fatigue is the limited knowledge of its antecedents and consequences – the third gap in the DoSM literature (Elhai et al., 2020; Tandon, Dhir, Almugren et al., 2021). It is possible that FoMO may be associated with fatigue through intervening variables related to individual differences, for example, personality traits like narcissism. SMPs are thought to present an ideal environment for traits like narcissism to emerge and influence user behavior. However, little is known about the link between the various facets of narcissism, FoMO, and users' experiences of DoSM phenomena, like fatigue. Indeed, several scholars (Blachnio & Przepiórka, 2018; Jordan, Nevicka, & Sedikides, 2021; Miller, Back, Lynam, & Wright, 2021; Scott, Boyle, Czerniawska, & Courtney, 2018) have called for more attention to be paid to the emotional and behavioral correlates of narcissism, particularly in the context of SMP environments. We believe that narcissism-related behaviors, particularly the strategies that individuals adopt to promote themselves on SMPs – admiration and rivalry (Back et al., 2013) – influence how FoMO translates into specific use behavior that results in their experience of fatigue.

Simultaneously, we investigate why social media users may experience FoMO itself, since few studies have focused on understanding its antecedents (Tandon, Dhir, Almugren et al., 2021). Prior studies have indicated that individuals with diminished psychological states – for example, those experiencing anxiety or concerns about providing social support to others (Elhai, Levine, Dvorak, & Hall, 2016; Sultan, 2021) – may be more likely to experience FoMO. Nevertheless, there is an evident scarcity of research that tests how such states act as stimuli for an individual's experience of FoMO, which is yet another gap in existing knowledge. It is critical that it be addressed since a plethora of studies indicate a link between FoMO and SMP users' experience of problems in their personal and professional lives (Tandon, Dhir, Almugren et al., 2021). Our study addresses these gaps mentioned by addressing the following research questions (RQs).

RQ1. Do time cost and anxiety positively correlate with FoMO as stimuli?

RQ2. How do the relationships between FoMO and narcissism (admiration and rivalry) relate to SMP use behavior in terms of social comparison and self-disclosure?

RQ3. Do social comparison and self-disclosure positively correlate with fatigue?

Our study thus investigates a new pathway and considers how users' situational stimuli (time cost, anxiety) and individual differences (narcissistic admiration and rivalry) affect SMP experiences of FoMO and fatigue. We collected data from 305 SMP users based in the United

States and employed structural equation modeling (SEM) to test the hypothesized associations, which were grounded in the stimulus-organism-behavior-consequence (SOBC) framework. The results make a significant contribution to the current knowledge on FoMO and fatigue specifically and, in general, add value to the existing literature on the DoSM. Additionally, we add to the limited literature examining the effect of narcissism in the context of SMPs by focusing attention on the lesser investigated aspects of admiration and rivalry strategies through which individuals alleviate narcissistic tendencies. Our findings advance theoretical knowledge of DoSM by focusing on a new pathway that connects FoMO with fatigue. We also raise implications for SMP operators to implement strategies that promote optimal SMP use aimed at precluding its adverse effects among users and protect a valuable channel for other businesses' marketing-related communications with their consumers.

The manuscript is structured such that the theory and conceptual framework of the study are discussed in Section 2, the hypotheses are set out in Section 3 and the methodology in Section 4. We present the results of the statistical analysis in Section 5 and discuss these in relation to the individual hypotheses in Section 6. We conclude the study in Section 7, presenting a summary of the overall results for each RQ, the implications and limitations of the work, and possible directions for advancing our research.

2. Theoretical backdrop

The SOBC framework (Davis & Luthans, 1980) makes clear that there are many aspects of a situation (S) that can influence an individual's (or organism's, O) internal processes and state. Such internal states (O) have the potential to subsequently influence the individual's behavioral responses (B) and elicit specific consequences (C). This framework is suitable for our study as it acknowledges the complexities of the human psyche and the mechanisms that distinguish between individual-level behaviors and consequences. It is an extension of the existing stimulus-organism-response (S-O-R) framework used prolifically in past studies to understand the effect of contextual and individual factors on SMP use behavior and its detrimental consequences (Jabeen, Tandon, Azad, Islam, & Pereira, 2023; Luqman, Cao, Ali, Masood, & Yu, 2017; Whelan, Islam, & Brooks, 2020). Furthermore, the framework allows us to consider multiple overt (e.g., time cost) and covert (e.g., narcissism) factors while explaining DoSM and other SMP behaviors.

We hold the studies of Whelan et al. (2020) and Jabeen et al. (2023) as “conversants” (Huff, 1998) and extend their research by considering novel factors (stimuli and organism) that could explain users' experience of FoMO translating into fatigue. In our framework (see Fig. 1), we include time cost (situational) and anxiety (individual) as stimuli (S) for FoMO. In terms of the organismic state (O), we consider FoMO and two newer concepts allied to narcissism (admiration and rivalry); these are distinct processes that individuals can undertake while responding to external factors or internal emotions that threaten their perceived social standing and approbation. Further, we propose to study how these narcissism-related processes affect SMP user behaviors (B) with regard to online social comparison (hereafter, social comparison) and self-disclosure. Lastly, we conceptualize fatigue as the consequence of the stated behaviors. The concepts are discussed in detail in the following sections, along with our arguments for the expected associations.

3. Hypothesized relationships

3.1. Stimuli-organism

3.1.1. Time cost – FOMO

Multiple studies have investigated the associations between the intensity of use, expended time on SMPs, and detrimental cognitive consequences experienced by users (O'Day & Heimberg, 2021), such as depression (Park, 2022) and daily stress (Brailovskaia, Rohmann,

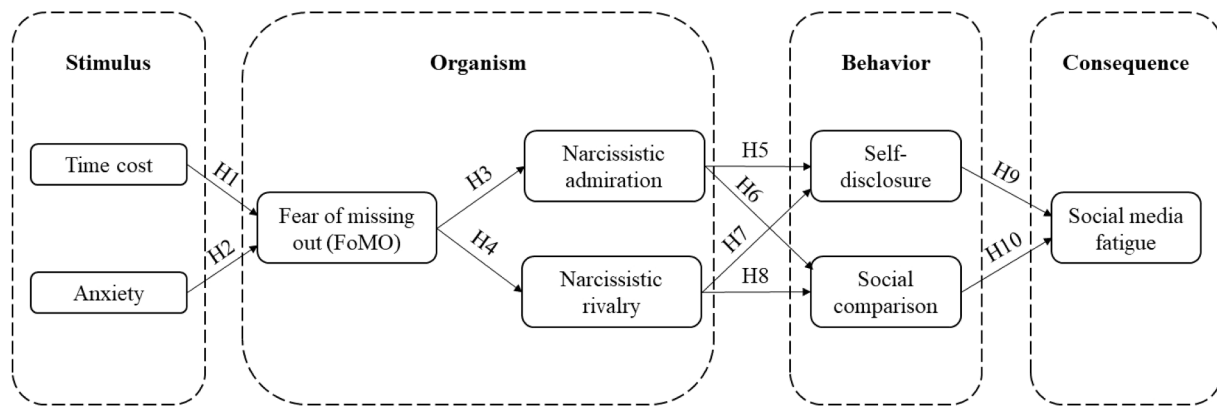


Fig. 1. Conceptual framework.

Bierhoff, Schillack, and Margraf, 2019). However, the results of prior research have been heterogeneous and inconsistent as such usage is often contingent on users' motivations and needs (Park, 2022). This indicates that problematic SMP usage and subsequent experiences are influenced by "pattern-of-use" rather than "absolute-use" indicators like the duration of a use session (Smith, 2022, p. 10). To investigate one aspect of such usage patterns, we focus on explicating the role of time cost as a stimulus in promoting users' experience of FoMO.

We conceptualize time cost as the users' perception of the energy they expect to expend in collating, processing, and responding to SMP communication and information. It aligns with Maier, Laumer, Eckhardt, and Weitzel (2015) concept of subjective social support norm, which refers to users' perceptions about the expectations of some form of reaction to the shared information by others. While such perceived norms about reciprocity and social support have been discussed in the prior literature in terms of causing SMP addiction (Brailovskaia, Rohmann et al., 2019; Sultan, 2021), little research has focused on investigating its effect on other SMP-driven phenomena such as FoMO or fatigue. We argue that users' expectations that they will expend significant time and energy in reciprocating the communication generated in their SMP groups may lead them to experience anxiety, that is, fear of missing pertinent information.

While our contention is primarily intuitive, and there is no *a priori* evidence for a direct relationship between such time cost and FoMO, prior studies offer some support for the relationship as FoMO has previously been determined to be associated with SMP use and intensity. For instance, Roberts and David (2020) found a positive association between social media intensity and FoMO, whereas Franchina and Abele (2018) found a similar association between FoMO and the depth of SMP use. As these studies indicate an association between FoMO and a user's level of engagement with SMPs, we extend the extant literature by examining whether time cost (as a reflection of users' degree of expected SMP involvement) influences FoMO. We believe that users who are persistent in their intense use of SMPs (Orosz, Tóth-Király, & Bóthe, 2016) and seek high levels of social bonds on these platforms; are likely to experience high levels of FoMO (Sultan, 2021) in their quest to establish a sense of relatedness, as suggested by the self-determination theory. Subsequently, users who expect to spend high energy and time processing SMP-related information may also experience stronger FoMO since they would endeavor to avoid missing any opportunity that reinforces their relatedness needs. Hence, we postulate,

H1. Time cost is positively correlated with FoMO.

3.1.2. Anxiety – FoMO

Anxiety is a prevailing human condition exacerbated by harmful environmental stimulants such as crime, violence, or natural disasters (Clark & Beck, 2010). However, anxiety is also commonly associated with everyday life pressures, demands, and stresses (Clark & Beck,

2010). Barlow (2002) explains that anxiety is a subjective experience linked to nervousness, panic, fear, and worry. The seminal literature describes anxiety as an emotional response that invokes an unpleasant feeling triggered by fear (Beck, Emery, & Greenberg, 2005). Furthermore, anxiety manifests at a physiological and cognitive level that subjectively predicts different responses (Clark & Beck, 2010).

Multiple scholars have investigated the various issues related to anxiety and technology use. Lepp, Barkley, and Karpinski (2014) found that compulsive smartphone users were more likely to experience anxiety than their non-compulsive peers. This finding was also confirmed by Elhai et al. (2016), who found that problematic smartphone use was significantly (positively) correlated to anxiety and FoMO. Scholars have also suggested that individuals with an anxious state of mind might subscribe to more than one social media platform (Primack et al., 2017; Vannucci, Flannery, & Ohannessian, 2017). Indeed, prior literature has provided overwhelming evidence of an association between FoMO and anxiety, although most of the literature has found an indirect or mediation relationship between them (e.g., see Holte & Ferraro, 2020; Tandon, Dhir, Almugren et al., 2021). We add to the literature by examining anxiety as an antecedent to FoMO and, in line with the existing research, expect a positive association. Hence, we hypothesize that,

H2. Anxiety is positively correlated with FoMO.

3.2. Organism – Behavior

3.2.1. FoMO – Narcissism (Admiration & Rivalry)

One particular personality trait that has drawn particular attention in recent years with regard to SMP use is narcissism (Carusi, 2020; Casale & Fioravanti, 2018; A. Zhang & Rau, 2020). Scholars have suggested that SMP environments are ideal for narcissists to fulfill their needs, for example, for admiration (Casale & Banchi, 2020). For instance, Andreassen, Pallesen, and Griffiths (2017) suggested that SMPs allow narcissists to exhibit their successes and garner social recognition through likes and appreciative comments from their online social groups. Similarly, Casale and Fioravanti (2018) speculated that narcissists might use SMPs to fulfill their needs for belongingness and social recognition. Such speculation has resulted in increasing research directed at understanding the processes and pathways through which narcissism affects various aspects of SMP use (Błachnio & Przepiorka, 2018), such as problematic usage patterns (Hawk, van den Eijnden, van Lissa, & ter Bogt, 2019) and DoSM phenomena, like social media addiction (Brailovskaia, Margraf, & Köllner, 2019; Casale & Banchi, 2020). Studies have focused on both grandiose (covert) and vulnerable (overt) forms of narcissism to determine that these forms result in different behavioral patterns and exhibit slightly different traits (Casale & Fioravanti, 2018; Ozimek, Bierhoff, & Hanke, 2018).

Recent meta-analyses (Gnambs & Appel, 2018; McCain & Campbell, 2018) have shown that grandiose narcissism may have a more

prominent association with SMP use than vulnerable narcissism (Casale & Banchi, 2020), and we thus focus on explicating its role. However, scholars have also suggested that grandiose narcissism is not a unitary construct (Back et al., 2013; Mota et al., 2022). Instead, it comprises agentic and antagonist modalities – narcissistic admiration and rivalry – that reflect two different processes or strategies through which narcissists fulfill their needs. Narcissistic admiration reflects a self-promotion strategy wherein narcissists may display charm, stateliness, and other behaviors that showcase their uniqueness and evoke social admiration (Kirk, Peck, Hart, & Sedikides, 2022). On the contrary, individuals who echo narcissistic rivalry adopt a self-defensive stance wherein their behaviors reflect aggression and a bid for supremacy while making others feel more devalued or degraded (Kirk et al., 2022; Mota et al., 2022).

A narcissist's leveraging of these processes seems to be influenced by status-related perceptions of the self (Mota et al., 2022) and various emotions (Lange, Crusius, & Hagemeyer, 2016). This influence would reflect significant interpersonal differences in the processes' evocation and, subsequently, also differing responses (Jordan et al., 2021). Hence, it is imperative to understand the nuances of narcissistic admiration and rivalry processes in SMP environs, as these platforms create multiple situational factors that could affect an individual narcissistic user's adoption of either process (Back et al., 2013).

We argue that FoMO may be an SMP-related situational factor that could affect a user's narcissistic processes and, consequently, their usage behavior. While FoMO has been studied in consideration of some personality traits, for example, the Big Five (Tandon, Dhir, Almugren et al., 2021), and has been posited to share an association with narcissism (Elhai et al., 2020), there has been limited research on their association. For instance, Servidio, Griffiths, & Demetrovics (2021) found FoMO to have a positive association with narcissism and mediate its association with problematic smartphone use.

However, while scholars (Elhai et al., 2020; Servidio et al., 2021) indicate that narcissism may be an antecedent to FoMO, we argue that FoMO is a factor that would determine how narcissists react and respond to SMP-related communication and information. We contend that due to their need to prove their grandiosity, narcissists (compared to others) may be motivated to review the entire range of information available to them on SMPs and experience FoMO in attempting to display their superiority. Such FoMO may result from their perception that missing any pertinent information or SMP update may curtail their chances of reinforcing their popularity through SMP activities and therefore, represent a "threat" to their perceived influence.

Upon facing FoMO as a threat, narcissists may either increase their self-promotion (admiration) or adopt a defensive stance by behaving more aggressively on SMPs (rivalry), for example, by engaging in more frequent posts. Either response would significantly influence their activities and use behavior on SMPs. We believe investigating the association between FoMO, narcissistic admiration, and rivalry could reveal deep insights into the psychological processes that govern SMP usage leading to DoSM phenomena. Hence, while there is, to our knowledge, no prior evidence of these associations, based on the above discussion, we postulate a positive association between FoMO and these two aspects of grandiose narcissism through the following hypotheses.

H3. FoMO is positively correlated with narcissistic admiration.

H4. FoMO is positively correlated with narcissistic rivalry.

3.2.2. Narcissism (admiration & rivalry), social comparison, self-disclosure

Scholars have previously studied narcissism and established that individuals with strong narcissistic tendencies have a higher proclivity toward self-disclosure. For instance, Menon (2022) found a strong positive correlation between posting story updates and narcissism across multiple SMPs. Similarly, Scott et al. (2018) determined that narcissism significantly influenced the frequency of posting photographs on Facebook. Aligning with such scholars, we contend that both narcissistic rivalry and admiration would prompt SMP users to disclose more

information about their online activities to make others feel devalued or to show off own achievements. Such behavior would allow individuals to fulfill their narcissistic need to obtain social recognition (admiration) and avoid any perceived social failure (rivalry) (e.g., see Back et al., 2013).

Similarly, scholars contend that managing image and social comparisons is essential for individuals with narcissistic tendencies (Bogart, Benotsch, & Pavlovic, 2004; Lange et al., 2016; Wang, 2019). While the relationship between narcissism and social comparison is less studied in SMP environments (Burnell, Ackerman, Meter, Ehrenreich, & Underwood, 2020), the literature indicates that a significant relationship exists between the two. For instance, Lange et al. (2016) found that individuals prone to behave narcissistically, whether through admiration or rivalry strategies, tend to engage in social comparisons and experience envy. Burnell et al. (2020) also established narcissism's different facets to be associated with envy, which could result in an individual's engagement in social comparison. Another recent study, by Kong, Tang, Zhang, Sun, and Zhang (2020) found narcissism to be associated with social comparison and addictive use, although in the context of mobile phones.

These studies suggest that individuals driven by narcissism would tend to engage in social comparison to support their perceived self-worth and recognition. We believe that a perceived failure in this regard would prompt such individuals to engage in further social comparison to identify avenues for improving their self-promotion and image. To the best of our knowledge, no study has yet examined how narcissistic admiration and rivalry relate to social comparison. Nevertheless, we leverage the extant knowledge to intuitively propose that these variables would share a positive association because adopting either strategy (admiration or rivalry) would require individuals to review the available SMP information shared by others before shaping SMP posts to promote their own superiority.

To summarize, we expect positive relationships between narcissism, social comparison, and self-disclosure, as both admiration and rivalry strategies would involve higher SMP usage and self-promotion behavior, albeit perhaps with different outcomes (as suggested by prior scholars; Kirk et al., 2022). In our study, we expect the outcome differentiation to be reflected in the strength of the association between admiration and rivalry with social comparison and self-disclosure. Further, as scholars posit narcissistic admiration to be more representative of "grandiosity and agency" (Leniarska & Zajenkowski, 2022, p. 2), we expect a stronger correlation of admiration with self-disclosure than with social comparison. However, since rivalry requires a more defensive approach, we expect that narcissistic rivalry would have a stronger relationship with social comparison – users adopting this approach may have to engage in additional comparison to ensure that their stance (i.e., on SMPs) is suited to defending against a general loss of influence and social admiration. Hence, based on the above discussion, we propose,

H5. Narcissistic admiration is positively correlated with self-disclosure.

H6. Narcissistic admiration is positively correlated with social comparison.

H7. Narcissistic rivalry is positively correlated with self-disclosure.

H8. Narcissistic rivalry is positively correlated with social comparison.

3.3. Behavior – Consequence

3.3.1. Self-disclosure – social media fatigue

Self-disclosure is one of the primary motivators driving social media use (Ellison, Steinfield, & Lampe, 2007). Nguyen, Bin, and Campbell (2012) found that online self-disclosure was not necessarily higher than offline self-disclosure. However, other studies have indicated that the willingness to disclose personal information was more likely to occur in an online setting than in person (Bargh, McKenna, & Fitzsimons, 2002; Bruss & Hill, 2010; Ellison et al., 2007). Self-disclosure holds many

benefits for an individual, for example, being more content with relationships (Chen, 2017; Rains, Brunner, & Oman, 2016; Wang, Burke, & Kraut, 2016), receiving increased levels of “online social capital bonding, online social capital bridging, and more social support in off-line contexts” (Trepte et al., 2013, p. 4). It can be an outlet (Ma, Hancock, & Naaman, 2016), especially as a guilt reliever (Levontin & Yom-Tov, 2017).

Due to these perceivably derived benefits, social media users might partake in continued online self-disclosure that increases their SMP activity; this has been shown to be a significant predictor of fatigue (Cao & Sun, 2018; Dhir et al., 2019). Furthermore, increased self-disclosure can lead to increased levels of social overload, such as numerous requests for assistance via social network platforms, which has been shown to predict fatigue (Cao & Sun, 2018; Maier et al., 2015). Based on the above discussion, we hypothesized the following:

H9. Self-disclosure positively correlates with social media fatigue.

3.3.2. Social comparison – Social media fatigue

Several negative consequences are associated with social comparison. White, Langer, Yariv, and Welch (2006) reported that frequent social comparison could lead to feelings like envy, guilt, regret, and defensiveness. These findings were supported by Lee (2014), who found that social comparison can hurt an individual's well-being. These negative feelings could be the consequences of either upwards or downward comparison (Vogel, Rose, Roberts, & Eckles, 2014). Lup, Trub, and Rosenthal (2015) study on Instagram use showed that social comparison indirectly predicted depressive symptoms. Additionally, the number of strangers followed significantly moderated the associations of Instagram use with social comparison. Weinstein (2017) found that those who downwardly compared themselves with their peers had significantly worse affective well-being due to more negative emotions being elicited. However, Cramer, Song, and Drent (2016) contradicted the earlier findings of White et al. (2006) by stating that individuals with lower self-esteem more often took part in social comparison.

Several scholars have reported that users engaging in social comparisons experienced fatigue as a consequence (Cramer et al., 2016; Kaur et al., 2021). Such comparison-related fatigue could find its origin in a range of motivations, such as self-improvement, self-enhancement, and self-destruction (Cramer et al., 2016). Furthermore, Thelwall and Vis (2017, p. 705) explained that individuals often disassociated from social media posts that portrayed them “in an unattractive light, with an undesired social group or doing an activity that others might disapprove of.” They further discuss that the constant concerns associated with potential unflattering or problematic social media postings could induce fatigue. Furthermore, the negative feelings experienced from social comparison could also cause other feelings associated with fatigue, such as tiredness, annoyance, anger, loss of interest, or reduced need or motivation to use SMPs and social networks (Ravindran et al., 2014). Therefore, it is possible that social comparison could lead SMP users to experience increased levels of fatigue, as was also determined by Kaur et al. (2021). Based on the above discussion, we hypothesized the following:

H10. Social comparison positively correlates with social media fatigue.

4. Methodology

4.1. Measures and data collection

To test our conceptual model, we employed the cross-sectional survey approach. Data were collected from SMP users based in the United States through *Prolific Academic*, which has been used extensively by past scholars (e.g., see Tandon, Dhir, Talwar et al., 2021; Tandon et al., 2022). We considered the United States an appropriate context owing to the high number of active SMP users in the economy (Statista, 2020) and

also recent reports (Auxier, 2020) that recognize that DoSM phenomena and the adverse effects of SMP use are becoming increasingly common among users in the United States.

We received 311 responses; of these, six were deleted due to incompleteness, and 305 were retained as valid for further analysis. Approximately 56.7% of the respondents were male, 56.1% were aged between 25 and 35 years, and 51.5% used SMPs for one to three hours per day on average (see Table 1). We also examined the questionnaires for non-response bias by comparing the demographic differences between the first and last 25% of responses and the differences between the valid and the discarded responses, as recommended by Xu and Luo (2020). The t-tests results revealed no significant differences, confirming that non-response bias was not a concern for the present study.

To ensure content validity, we drew upon validated scales used previously to measure the study variables in our questionnaire (see Table 2), which were anchored on a five-point Likert-type scale. We drew upon the opinions of two academic experts from the fields of information sciences and psychology to ensure the appropriateness of the items. These experts suggested minor changes to the phrasing of three items which were implemented. Next, we conducted a pilot test to ensure the face validity of the questionnaire (n = 24, 50% female, based in the United States) through *Prolific* as well. The pilot confirmed that the questionnaire and items were clear to respondents, and this final questionnaire was used in the final survey.

4.2. Analytical approach

We employed SEM to test the proposed conceptual framework and followed the standard two-step approach of confirmatory factor analysis (CFA) followed by structural path analysis in SPSS AMOS, as recommended by Anderson and Gerbing (1988). Our choice to use SEM as the analytical approach is based on the prior literature that has extensively used this method to investigate SMP behavior and DoSM (Kaur et al., 2021; Malik et al., 2021; Tandon et al., 2022).

5. Results

5.1. Common method bias

Since the data for antecedents and outcomes were collected from the same respondents, we exercised caution and tested for common method

Table 1
Demographic profile.

Socio-demographic profile		Frequency	Percentage
Age	25–30 years	99	32.5%
	31–35 years	72	23.6%
	36–40 years	64	21%
	41–45 years	46	15.1%
	46–50 years	23	7.5%
	51–55 years	1	0.3%
Gender	Male	173	56.7%
	Female	132	43.3%
Educational qualification	Completed high school	69	22.6%
	Completed/ pursuing professional/vocational school	15	4.9%
	Completed/ pursuing bachelors	158	51.8%
	Completed/ pursuing Masters	48	15.7%
	Completed/ pursuing doctorate	15	4.9%
	Average time spent on social media per day		
	Up to 30 min	22	7.2%
	Anytime between 31 min to 1 h	56	18.4%
	1–3 h	157	51.5%
	3–5 h	55	18%
	>5–7 h	15	4.9%

Table 2
Study measures, items and factor loadings.

Variables	Measurement items	N = 305	
		CFA	SEM
Time cost (TC) (Zhang, He, & Peng, 2022)	TC1. It takes a lot of energy to browse my friends' social media posts	0.89	0.89
	TC2. It takes a lot of energy for me to process the social media information that my friends share	0.93	0.92
	TC3. It takes a lot of my energy to care about the friends I have on social media	0.81	0.81
	TC4. It takes a lot of energy to filter and screen the social media information that I see	0.78	0.78
	ANX1: I worry about what others say about me	0.92	0.91
Anxiety (ANX) (Dhir et al., 2018)	ANX2: I worry that others don't like me	0.97	0.96
	ANX3: I'm afraid that others will not like me	0.96	0.96
	ANX4: I worry about what others think of me	0.94	0.94
	ANX5: I feel that others make fun of me	0.77	0.77
	FOMO2. I fear my friends have more rewarding experiences than me on social media	0.64	0.62
Fear of missing out (FoMO) (Tandon, Dhir, Talwar et al., 2021; Tandon et al., 2022)	FOMO3. I get worried when I find out my friends are having fun without me on social media	0.82	0.82
	FOMO4. I get anxious when I don't know what my friends are up to on social media	0.79	0.79
	FOMO5. It bothers me when I miss an opportunity to meet up/interact with friends on social media	0.78	0.77
	FOMO6. It bothers me if I am not updated about the latest issues being discussed on online platforms	0.75	0.74
	NA1. I deserve to be seen as a great personality	0.72	0.78
Narcissistic admiration (NA) (Back et al., 2013; Seidman, Roberts, & Zeigler-Hill, 2019)	NA2. I show others how special I am	0.80	0.86
	NA4. I am a very special person which makes me strong	0.78	0.77
	NA5. Most of the time I am able to draw people's attention	0.76	0.66
	NA6. I manage to be the center of attention	0.72	0.61
	NR1. I secretly take pleasure in the failure of my rivals	0.86	0.86
Narcissistic rivalry (NR) (Back et al., 2013; Seidman et al., 2019)	NR2. I want others to fail	0.91	0.91
	NR3. I enjoy it when another person is inferior to me	0.82	0.82
	SC1. When I am on social media, I tend to compare myself with others	0.91	0.90
Social comparison (SC) (Tandon, Dhir, Talwar et al., 2021)	SC2. When I am on social media, I always pay attention to how I do things compared with others	0.87	0.87
	SC3. When I am on social media, I often check how I am doing socially compared with others	0.88	0.88
	SC4. When I am on social media, I often compare my own accomplishments with others	0.94	0.94
	SC5. When I am on social media, I often compare how others handle the same problems that I am facing and/or handling	0.85	0.85
	SC6. When I am on social media, I compare my situation in life with that of others	0.94	0.94
Self-disclosure (SD) (Dhir, Talwar, Kaur, Budhiraja, & Islam, 2021)	SD1. My social media profile tells a lot about me	0.79	0.79
	SD2. I reveal a lot of information about me on social media	0.88	0.89
		0.82	0.82

Table 2 (continued)

Variables	Measurement items	N = 305	
		CFA	SEM
Social media fatigue (SMF) (Kaur et al., 2021)	SD3. I don't mind putting personal information on social media		
	SD4. I have a detailed profile on social media	0.83	0.83
	SMF1. The amount of information available on social media makes me tense.	0.69	0.68
	SMF2. Due to using social media, I feel rather mentally exhausted.	0.90	0.89
	SMF3. After a session of using social media, I feel really fatigued.	0.90	0.89
	SMF4. I find it difficult to relax after continually using social media.	0.90	0.90
	SMF5. Due to social media use, I feel exhausted.	0.93	0.92

Note. Factor loadings measurement model (CFA), Factor loadings structural model (SEM).

bias (CMB), which presents a potential threat in single-informant surveys like this one (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The Harman single-factor test, as proposed by Podsakoff et al. (2003), was used to test for CMB. The extracted CMB value was 31.73%. Since no single factor accounted for the majority of the variance in the items, it was confirmed that CMB was not a serious threat in the present study.

5.2. Assessment of measurement model

We examined the output of the measurement model to assess the reliability, convergent validity, and discriminant validity of the eight latent variables. The factor loadings (given in Table 2) were mostly adequate and within the recommended thresholds (Hair, Black, Babin, Anderson, & Tatham, 2006). Convergent validity was confirmed first by the fact that all item loadings toward respective measures were higher than 0.50 (Anderson & Gerbing, 1988) (Table 2) and second by the composite reliability (CR) value of all constructs exceeding 0.70 (Fornell & Larcker, 1981). In the third instance, it was confirmed by the value of the average variance extracted (AVE) exceeding 0.50 (Fornell & Larcker, 1981) (Table 3). The discriminant validity was confirmed first by the correlation among the measures being <0.80 (Campbell & Fiske, 1959); and second by the correlation value for the pairs of measures being less than the square root of the corresponding AVE (Fornell & Larcker, 1981) (Table 3). The model fit indices were also in consonance with the recommended values ($\chi^2/df = 2.05$, $CFI = 0.94$, $TLI = 0.93$, $RMSEA = 0.06$).

5.2.1. Structural path analysis

We analysed the hypothesized paths for the structural model using SPSS AMOS using the bootstrapping method to estimate the path coefficients and their significance levels. A summary of the results is presented in Fig. 2 and Table 4. The fit indices of the structural model of $\chi^2/df = 2.00$, $CFI = 0.93$, $TLI = 0.92$, $RMSEA = 0.06$ were in line with the recommended values (Hair et al., 2010). The structural model analysis suggests that the proposed variables explained 39.7%, 7.9%, 6%, 8.2%, 2.6%, and 10% of the variance in FoMO, social comparison, self-disclosure, narcissistic rivalry, narcissistic admiration, and fatigue, respectively.

The results show that time cost ($\beta = 0.27$, $p < .001$) and anxiety ($\beta = 0.55$, $p < .001$) positively influenced FoMO. Furthermore, FoMO was positively correlated with narcissistic admiration ($\beta = 0.16$, $p < .05$) and narcissistic rivalry ($\beta = 0.29$, $p < .001$). Additionally, narcissistic admiration was positively correlated with self-disclosure ($\beta = 0.24$, $p < .001$) and social comparison ($\beta = 0.12$, $p < .01$). In contrast, narcissistic rivalry was found to be correlated with social comparison ($\beta = 0.14$, $p < .01$) but not with self-disclosure ($\beta = -0.04$, $p > .05$). Finally, social

Table 3

Mean standard deviation, convergent and discriminant validity.

	Mean	Std. D.	CR	AVE	MSV	ASV	SC	TC	ANX	FoMO	NA	NR	SD	SMF
SC	2.62	1.19	0.96	0.80	0.50	0.17	0.90							
TC	2.20	1.07	0.92	0.73	0.48	0.10	0.11	0.85						
ANX	2.55	1.26	0.96	0.83	0.50	0.15	0.71	0.20	0.91					
FoMO	1.95	0.91	0.87	0.58	0.40	0.18	0.63	0.37	0.60	0.76				
NA	2.57	0.95	0.87	0.57	0.06	0.02	0.05	0.07	-0.11	0.12	0.76			
NR	1.80	1.01	0.90	0.74	0.08	0.03	0.27	0.09	0.20	0.29	0.12	0.86		
SD	2.18	0.96	0.90	0.69	0.08	0.02	0.28	-0.7	0.09	0.15	0.25	-0.02	0.83	
SMF	2.20	1.10	0.94	0.75	0.48	0.14	0.35	0.70	0.3	0.48	0.06	0.12	-0.002	0.87

Note. TC = Time cost ANX = Anxiety; FoMO = Fear of missing out; NA = Narcissistic admiration; NR = Narcissistic rivalry; SC = Social comparison; SD = Self-disclosure; SMF = Social media fatigue; CR = Composite reliability; AVE = Average variance extracted; MSV = Maximum shared variance; ASV = Average shared squared variance.

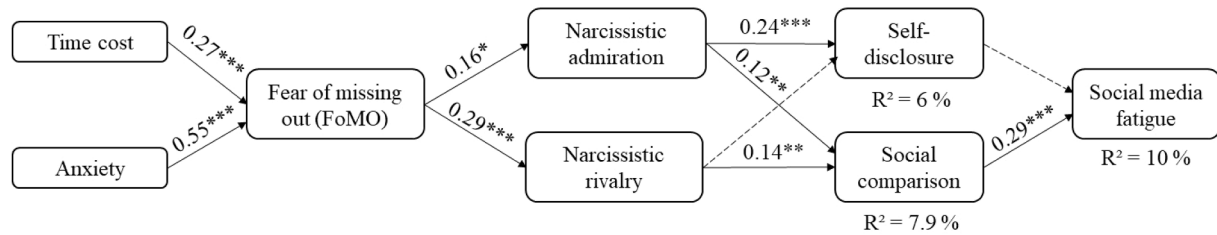


Fig. 2. Results of structural model. Note: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, dashed arrows indicated hypotheses not supported by the analysis.

Table 4

Results of hypothesis testing (N = 305).

Hypothesis	Path	β	p	Accepted
H1	TC → FoMO	0.27	<0.001	Yes
H2	ANX → FoMO	0.55	<0.001	Yes
H3	FoMO → NA	0.16	<0.05	Yes
H4	FoMO → NR	0.29	<0.001	Yes
H5	NA → SD	0.24	<0.001	Yes
H6	NA → SC	0.12	<0.01	Yes
H7	NR → SD	-0.04	>0.05	No
H8	NR → SC	0.14	<0.01	Yes
H9	SD → SMF	-0.04	> 0.05	No
H10	SC → SMF	0.29	<0.001	Yes

Note. TC = Time cost ANX = Anxiety, FoMO = Fear of missing out, NA = Narcissistic admiration, NR = Narcissistic rivalry, SC = Social comparison, SD = Self-disclosure, SMF = Social media fatigue.

comparison was reported to be correlated with social media fatigue ($\beta = 0.29$, $p < .001$) but not self-disclosure ($\beta = -0.04$, $p > .05$). Hence, hypotheses H1–H6, H8, and H10 stand supported while H7 and H9 are rejected.

6. Discussion

The analysis supported eight of the ten proposed hypotheses providing exciting insights into the pathways connecting situational stimuli with an individual's internal (organismic) states, cumulatively resulting in SMP behaviors with negative consequences, in the case of this study, fatigue.

We found both stimuli – time cost (H1) and anxiety (H2) – to be positively associated with FoMO, offering new insight into the situational and personal antecedents of FoMO as a phenomenon. Consistent with earlier studies, our results show that personal and non-SMP-related anxiety drives FoMO (e.g., Holte & Ferraro, 2020; Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017). However, users' concerns about the amount of energy and time spent on processing SMP communication also increase their FoMO. The analysis establishes that SMP users have become significantly concerned about the cost of participating in SMP activities and providing support to others on these platforms. It hints

that such concerns may be reinforced and exacerbate FoMO when they arise in conjunction with personal anxiety, revealing the types of concerns preceding FoMO as a viable area of future inquiry.

We also found support for H3 and H4 since FoMO was positively correlated with narcissistic admiration and rivalry. This is a significant finding as the association between FoMO and narcissism has remained severely under-investigated in prior literature despite scholars' contention of a possible association between the them (Elhai et al., 2020; Servidio et al., 2021). Our results suggest that FoMO may induce narcissism and prompt SMP users to an ideal version of themselves by engaging in a self-promotional or self-defensive stance. This finding may also be related to the cultural connotations of the study's context – that is the United States, wherein individualism is a core cultural trait.

The respondents' attempts to maintain their individualistic states may make them prone to letting their SMP-related anxiety (i.e., FoMO) influence their narcissistic tendencies. Hence, these respondents may engage in every attempt to promote themselves on SMPs by highlighting their achievements, which may sometimes be at the cost of others' feeling devalued. This could explain the relationship between the organismic state of narcissism and behavior noted in the results. However, in the absence of a priori evidence, significantly more research is needed before any conclusions can be drawn. Interestingly, we found narcissistic admiration to be positively correlated with both self-disclosure (H5) and social comparison (H6), whereas rivalry was only significantly associated with the latter (H8). These are critical and revealing insights into psychological processes that dictate individuals' SMP behavior and reveal that SMP environments may, perhaps, have sinister repercussions for users' psychological states and well-being. The results confirm that both admiration and rivalry strategies adopted by individuals in the face of narcissism induce them to engage in higher social comparison on SMPs. This aligns with scholars' previous contentions about narcissism being significantly associated with the tendency to engage in social comparison (Lange et al., 2016; Wang, 2019). Further, our finding – that SMP users who adopt admiring and self-promotional behavior in response to FoMO may have a strong tendency to self-disclose information and engage in social comparison – is in agreement with limited prior research. The existing research indicates that narcissism, particularly the desire for social admiration and recognition, is a critical driving force behind users' frequency and

intensity of SMP behavior (Menon, 2022; Scott et al., 2018).

The findings for narcissism's associations reveal a critical link between FoMO, SMP behavior (and fatigue), adding substantial knowledge to the extant DoSM literature regarding how individual states and stimuli for self-advancement and promotion could translate into negative and psychologically detrimental experiences. There is some support for these findings from prior studies (Miller et al., 2021), suggesting that grandiose and vulnerable narcissists share core traits and can adopt agentic as well as antagonistic stances in response to any perceived threats to their ego (Ferriday, Vartanian, & Mandel, 2011; Hawk et al., 2019), particularly public ones. In our case, such perceived threat is related to FoMO.

Our results find some support in the theory of compensatory internet use (Karddefelt-Winther, 2014), which posits that individuals engage in SMP use to alleviate any negative emotions or states of mind. Considering FoMO as a threat and a negative emotional state that perturbs individuals' narcissistic tendencies could explain why FoMO-driven admiration and rivalry strengthen social comparison and to some extent, self-disclosure on SMPs. However, the insignificant association between rivalry and self-disclosure (H7) was an unexpected yet fascinating finding. It suggests that individuals who adopt this strategy may have a sense of vulnerability wherein their defensive stance to protect their sense of self and avoid any perceived social failure may lead these individuals to curtail their self-disclosures on SMPs.

Finally, we found that only social comparison culminated in SMP users' experience of fatigue (H10), whereas self-disclosure was found to be an insignificant antecedent of fatigue (H9). It is not surprising that social comparison was determined to cause SMP users to experience fatigue, as recent work identified similar associations (Kaur et al., 2021; Malik et al., 2021). We align with the findings of Kaur et al. (2021) and emphasize that as social comparison requires users to be continually scanning and processing SMP content, they could become cognitively and, perhaps even emotionally, overloaded with information and communication, as is also suggested by the limited capacity model (Lang, 2000).

Our findings for H10 contradict the majority of existing studies, which determined self-disclosure on SMPs to be significantly associated with fatigue (Cao & Sun, 2018; Dhir et al., 2019). Although unanticipated, our results find some support in Kaur et al. (2021), who also found an insignificant association between self-disclosure and fatigue to indicate that, over time, disclosure has become a core aspect of SMP use that users have come to expect as routine. This could be a reason for the insignificant association and suggests that perhaps it is time to take a contemporary look at the antecedents of fatigue with respect to SMP affordances and activities.

7. Conclusions

Given the extensive use of SMPs among the global populace and how deeply entrenched they have become in users' lives, it is imperative that scholars investigate how, why, and the extent to which these platforms are capacitated to improve or harm users' psychological well-being. In the United States alone, estimations place the number of active SMP users at over 220 million (Statista, 2020), underscoring the criticality of undertaking such investigations; the results and interventions developed could assist millions of individuals who struggle with the detrimental aftermaths of SMP usage, that is, the DoSM phenomena.

We advance knowledge on DoSM, particularly regarding the phenomena of fatigue and FoMO, by raising and answering three RQs and elucidating a novel pathway through which individual stimuli translate into SMP users' experience of fatigue. Analyzing data collected from 305 US-based SMP users through a cross-sectional survey on *Prolific*, we established (i) time cost and anxiety as stimuli that promote FoMO, (ii) FoMO as a driver of narcissism, wherein its effect led users to adopt admiration and rivalry as strategies or processes that differentially determined their SMP usage behavior, and (iii) social comparison as a

critical factor (use behavior) that results in users' experiencing fatigue. As discussed in subsequent sections, our results provide insights that are beneficial for advancing both theory and practice.

7.1. Theoretical implications

The results of our study have three key implications for advancing theoretical knowledge on DoSM phenomena and SMP users' well-being. First, to the best of our knowledge, this is the first study of the associations between FoMO, narcissistic admiration, and rivalry, revealing new mechanisms through which SMP usage influences the psychological processes of its users. This substantial contribution indicates the need to conduct more nuanced investigations into other psychological constructs that could be affected by SMP usage and DoSM phenomena, resulting in decreased individual well-being. For instance, future studies could investigate how SMP users' light triad of personality (Kaufman, Yaden, Hyde, & Tsukayama, 2019) interacts with FoMO and personal stimuli to influence their DoSM experiences and usage behavior.

Second, we extend the extant knowledge on FoMO and fatigue by determining the antecedents and consequences of both phenomena and revealing a new pathway that explains how such DoSM phenomena exhibit an amplification effect wherein one phenomenon reinforces the emergence of the other. We answer the calls of multiple researchers (Anaraky, Freeman, Aragon, Knijnenburg, & Tallapragada, 2019; Jabeen, Tandon, Azad, Islam, & Pereira, 2023; Sands, Campbell, Ferraro, & Mavrommatis, 2020; Sheldon, Rauschnabel, & Honeycutt, 2019) to study DoSM and the harmful effect SMP use can have on the individual psyche, and well-being more generally.

Third, the findings imply the need to expand the scope of investigations into FoMO's and fatigue's antecedents. Given the rapidly rising recognition of DoSM as a phenomenon of interest among academicians, it is critical to extend research in this field by incorporating foundational theories and perspectives from the domains of psychology and sociology. Adopting perspectives such as Heidegger's "shared-world" (Qi, Monod, Fang, & Deng, 2018) could reveal a more in-depth and nuanced view of how SMPs shape individual and societal behaviors. To this end, we urge scholars to conduct phenomenological and qualitative research to explicate more contemporary outlooks on SMP usage and DoSM.

7.2. Practical implications

The study offers four critical implications for SMP operators, other businesses, and clinical therapists. First, the study reveals that FoMO is a complex phenomenon that may stem from psychological and well-being issues and may further exacerbate adverse outcomes, leading to fatigue. Prior research has documented that fatigue could lead to discontinuity in using SMPs (Cao & Sun, 2018; Luqman et al., 2017; S. Zhang, Zhao, Lu, & Yang, 2016). This discontinuation can have negative implications for not just SMP operators but also other businesses that use these platforms as a critical channel to interact with existing and prospective customers. The present study's findings raise a red flag for SMP operators, businesses and advertisers who pivot their strategies for social media on the satiation of the users' FoMO. This is being done without realizing that such an approach could backfire in the medium-long term, by leading to fatigue and a consequent discontinuity in or cessation of use.

Second, the present study highlights the criticality of FoMO and its implications in terms of heightened narcissism, the negative feelings arising from social comparison, and the inadvertent disclosure of too much personal information. Overall, all of these lead to fatigue, even though through different mechanisms and pathways. This vicious cycle of SMP use indicates the need for intervention by SMP operators who want to encourage usage and avoid discontinuity. The threat has increased to a much higher level with the integration of smart devices, such as virtual assistants, tablets, and smartwatches (Dogan, 2019;

Tandon et al., 2022). Therefore, we suggest that the SMP operators develop an integrated strategy for inculcating the habit of tempered SMP use and the knowledge of how to exercise caution while doing so. This could be achieved by providing for example, about screen-time warnings, and notifications focusing on well-being (e.g., by taking breaks from too much exposure), and night-time usage features.

Third, the findings offer valuable input for therapy and clinical interventions for preventing or coping with DoSM and associated adverse effects of SMP use. We bring together real-life issues of time cost and anxiety with DoSM phenomena like FoMO and fatigue to encourage therapists and mental health professionals to assist individuals who are turning to formal channels to cope with the harmful effects of SMP use. Such usage has also been linked to SMP addiction and diminished life satisfaction, and it thus is imperative for therapists to develop robust interventions and solutions to assist afflicted users. Additionally, the findings suggest the need for therapists to actively join mainstream discussions to inform and educate the general populace about the severe detriments to individuals that can result from unabated and unchecked SMP use. For this, therapists could work with SMP operators, and mass media outlets to initiate preemptive awareness campaigns and disseminate knowledge about possible interventions, as well as remedial counseling that can aid users to effectively self-regulate their SMP use.

7.3. Limitations and possible future work

Despite our attempts to conduct a robust study, we were limited by specific constraints that readers should consider while interpreting our findings. First, we did not focus on any specific SMP platform and considered social media an umbrella term. Since different SMPs have varied affordances and cater to different gratifications and needs of their users, future scholars should expand our study to examine specific platforms like Instagram, Twitter and Snapchat.

Second, our sample consisted of adult SMP users whose psychological states would differ from those of older (Pera, Quinton, & Baima, 2020) and adolescent (Beyens, Frison, & Eggermont, 2016) SMP users. Further, we did not specifically relegate our study to include clinically diagnosed (narcissistic) respondents, which could have affected our results but instead focused on developing a general understanding of the tested associations. We suggest that future researchers collect data from the different strata of SMP users to arrive at more generalizable inferences.

Third, we tested the direct paths between the constructs of interest in the proposed model. Future research could strengthen our contribution by testing the indirect paths, such as the mediating role of self-disclosure in the association of narcissistic admiration and rivalry with fatigue. Furthermore, socio-demographic constructs such as social status, educational background, ethnicity, and income level could also be modeled as moderating variables.

Fourth, our study is limited to a single cultural and geographic context (that of the United States), and in the future, cross-cultural and multi-national studies could be undertaken to develop a more nuanced understanding of the associations; cultural factors could also be a viable moderator in future studies. Additionally, to address the limitations arising from our use of a single wave, cross-sectional survey, future research could leverage (i) experiment-based studies to measure the behavioral manifestations of SMP users, (ii) pre and post-intervention studies to test the efficacy of the proposed interventions to temper the DoSM and deviant SMP usage behavior, and (iii) comparative and replication studies to confirm the robustness of our proposed model.

Lastly, future research could also investigate FoMO in relation to, for example, promotional offers, sales of products or services, making professional or social connections, notifications about shared content, and online news sharing. Such investigations may allow scholars to broaden the understanding of FoMO as a pervasive influence in an individual's daily life. Future research could also investigate other antecedents of FoMO.

CRedit authorship contribution statement

Fauzia Jabeen: Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Anushree Tandon:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Juthamon Sithipolvanichgul:** Writing – review & editing, Validation, Methodology, Conceptualization. **Shalini Srivastava:** Writing – review & editing, Methodology, Data curation, Conceptualization. **Amandeep Dhir:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization.

Declaration of Competing Interest

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

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