ORIGINAL RESEARCH

Differential Effects of Active Social Media Use on General Trait and Online-Specific State-FoMO: Moderating Effects of Passive Social Media Use

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Purpose: Given the prevalence of the fear of missing out (FoMO) phenomenon and the limitations regarding understanding the relationship between social media use and FoMO, this research examines the links that bind different types of social media usage to different aspects of FoMO.

Methods: In the scope of this research, a structural equation modeling was developed to investigate the intricate connections that exist between active social media use (ASMU), passive social media use (PSMU), online-specific state-FoMO, and general trait-FoMO. Data were obtained from 394 Chinese university students (65% female) with experience in social media who completed the Active Social Media Use Scale, Passive Social Media Use Scale, and the Chinese Trait-State Fear of Missing Out Scale.

Results: Bivariate correlations analysis revealed that ASMU was significantly related with state-FoMO but not significantly related with trait-FoMO. Structural equation modeling revealed that ASMU had a significant direct negative predictive effect on trait-FoMO while positive association with trait-FoMO through the indirect effect of State-FoMO, illustrating that ASMU had a suppressing effect on trait-FoMO via state-FoMO. PSMU significantly moderated the direct effect of ASMU on trait-FoMO, and the direct effect was only significant at low levels of PSMU.

Conclusion: This study revealed whether and how social media use is linked to FoMO. Social media may not always increase FoMO, because positive, active social media interactions are conducive to the alleviation of trait-FoMO. However, it is significant to note that active interactions may also predict higher state-FoMO, so moderate social media use needs to be encouraged. In addition, a reduction in passive, non-communicative information browsing would be conducive to the alleviation of trait-FoMO by ASMU.

Keywords: fear of missing out, online-specific state-FoMO, general trait-FoMO, suppression effects, moderation effects, active social media use, passive social media use

Introduction

Over the past few years, the phenomenon of fear of missing out (FoMO) has received increasing scientific attention. The characteristics of FoMO include a fear of missing out on others' pleasurable experiences, a strong motivation to know the movements of others, and frequent checking of mobile phones.[1] An increasing corpus of research has indicated that the FoMO is prevalent in both online and offline settings and is linked to multiple negative consequences (see,[2] for a review). Individuals with high FoMO levels are more at risk for problem behaviors such as mobile phone addiction,[3] problematic social media,[4] and phubbing (snubbing a social partner by using the phone).[5] FoMO has also been related to internalized problems in individuals, such as disturbed sleep,[6] dissatisfaction with life,[7] diminished well-being,[8] anxiety,[9] and depression.[10] Therefore, understanding the psychological mechanisms that create FoMO has become a significant focus of researchers who are interested in digital health.

The link between social media and the FoMO is one of the most discussed topics by researchers.[1,2] Social media has become an essential instrument among the general public, especially young people, to socialize and entertain themselves in the digital era. A nationwide (n=5118) survey showed that 99.39% of Chinese college students use social media daily,

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and 74.69% spend more than 4 hours daily.[11] This survey additionally revealed that WeChat (95.75%) is the most popular social media platform among Chinese college students, followed by QQ (72.25%), TikTok (65.57%), and Sina Weibo (35.91%). Increasingly research has shown that the use of social media increases the FoMO.[12–15] However, the limitation of these studies is that evaluating overall levels of social media use or FoMO, does not sufficiently reveal the essential link between the two.[16]

First, as the research progressed, two main categories of social media activity have been identified: active social media use (ASMU) and passive social media use (PSMU).[17] ASMU is defined as activities that promote direct communication with others, including behaviors such as posting, sharing links, commenting on updates, and initiating chats with friends.[17] PSMU refers to behaviors that lack communicative interaction, such as merely browsing information.[17] The research illustrated that PSMU explains the negative consequences of using social media, such as depression,[18] decreased subjective well-being,[19] harmful social comparisons,[20] and FoMO.[21] Instead, ASMU explains the beneficial effects of social media, such as satisfaction with life,[22] reduced loneliness,[23] and more social support.[24] There are some studies on PSMU and FoMO.[15,21,25] However, little attention has been paid to ASMU and FoMO, and only one study showed that active WeChat interactions reduced FoMO via reduced upward social comparison.[26] Therefore, the relationship between ASMU and FoMO is the concern of this study.

Secondly, FoMO has also been conceptualized a two-dimensional construct, which consists general trait-FoMO and online-specific state-FoMO.[16] Triat-FoMO and state-FoMO are both closely related and distinctly different. Some studies have shown that trait-FoMO is more influenced by individual psychological factors,[27,28] while state-FoMO is more related to social media use behavior.[29,30] So, what are the effects of ASMU on trait- and state-FoMO? In addition, according to the active-passive social media use model,[17,31] individuals do not show only ASMU or only PSMU; both can exist simultaneously, and the psychological impact of ASMU depends on PSMU.[31] Hence, whether the level of PSMU impacts the relationship between ASMU and the two types of FoMO is also an urgent question. Therefore, it is necessary to explore the complex relationship between the two types of social media use and the two types of FoMO. This approach has the potential to illuminate the full scope of social media's effect on FoMO and provide more specific recommendations for how to counteract the phenomenon in practice.

In this study, we integrate ASMU, PSMU, trait-FoMO, and state-FoMO into a model that including both indirect and moderating effects to explore their possible interrelationships. Below, we first introduce the trait-state fear of missing out theory, with emphasis on the distinction between trait-FoMO and state-FoMO, as this will be key to understanding the main idea of this article. We then propose some possible hypotheses for the relationships based on the theories, and findings of related studies.

Literature Review and Hypotheses
Trait-State Fear of Missing Out Theory

FoMO was originally conceptualized as a dispositional trait, and defined as a generalized anxiety brought on by worry that one is missing out on others' pleasurable experiences.[32] Recently, FoMO was considered to have both trait-FoMO and state-FoMO forms.[27] General trait-FoMO is defined in a manner compatible with Przybylski et al.[32] State-FoMO, also known as online-specific FoMO, refers to an unsteady cognitive bias that appears during online activities like social media use.[27] Conceptually, trait-FoMO is a cognitive propensity that exhibits a jealous state of mind[33] as well as a psychological need deficit,[27] whereas state-FoMO is considered less psychological problems than trait-FoMO. The results of several recent studies showed that anxiety and depression were significantly positively associated with trait-FoMO, but not with state-FoMO;[5,27] the levels of mental health negatively predicted trait-FoMO, but did not predict state-FoMO.[28] Furthermore, state-FoMO was shown more associated with social media use behavior than trait-FoMO.[29,30]

In addition, it should be noted that trait-FoMO, demonstrates some stability while also being influenced by situational and interpersonal factors, similar to other characteristics that are relatively stable, such as self-esteem.[27,32] In fact, empirical studies have demonstrated that the satisfaction of psychological needs is associated with lower trait-FoMO.[32,34]

Buglass et al[12] found that self-esteem predicted a decrease in trait-FoMO six months later. Other studies have found high social support to be associated with lower trait-FoMO.[35,36]

ASMU, Trait-FoMO, and State-FoMO

In the previous formulation, the contrasts between trait-FoMO and state-FoMO were highlighted because it is possible that they have different connections with the ASMU. We hypothesized that, as positive social behavior, ASMU promotes good interpersonal relationships and can be beneficial for trait-FoMO alleviation. On the other hand, as social media use behavior, frequent use may trigger state-FoMO, which in turn has a facilitating effect on trait-FoMO. In conclusion, we would like to emphasize that ASMU may be a double-edged sword. ASMU has positive effects but also generates some negative social media-related perceptions in the process of use, which may also have negative effects on the psychological state of individuals.

ASMU may be associated with reduced trait-FoMO. Firstly, ASMU behaviors are positive ways to connect with others online, are thought to maintain positive relationships between individuals and acquaintances, and to acquire social support.[17] Evidence from both longitudinal and experimental studies supports this idea. Deters and Mehl[37] found that experimentally induced status update activity increased individuals' sense of closeness to their friends. Online self-disclosure behavior was found to positively predict friendship quality six months later.[38] And Manago et al[39] used a diary survey method to find that time spent communicating with friends online predicted adolescents' friend closeness. Several other studies have demonstrated the longitudinal effects of ASMU on social support.[40,41]

Secondly, Przybylski et al[32] suggested that interpersonal factors can determine trait-FoMO. Previous research has demonstrated that good interpersonal relationships and higher friend support are protective factors for trait-FoMO.[35,36,42] Hence, it can be inferred that ASMU may be associated with a reduction in trait-FoMO. In addition, ASMU is shown to be linked to satisfied need to belong,[43] reduced loneliness and depression,[41] and increased life satisfaction and self-esteem.[44] These positive psychological experiences may lead to less worry about others having rewarding experiences than oneself.[28,32]

ASMU may be associated not only with decreased trait-FoMO, but also with increased state-FoMO. State-FoMO is a social media-related cognitive bias,[27,28] is triggered by frequent social media use. Media effects theories suggest that media use behavior has a substantial impact on media-related cognitions.[45,46] Although ASMU is a positive behavior that serves multiple psychosocial functions, the essential property of social media may nevertheless trigger state-FoMO. First, because of the technological advances in online socialization,[47] individuals can start online conversations and receive updates at any time. This property of social media can increase connections and sharing but also increase awareness of missed activities.[27] Second, online socialization is characterized by asynchronicity.[47] This may be a positive feature in that it gives the social media user time to choose appropriate responses and to avoid interpersonal damage from making inappropriate responses.[48] However, asynchronous communication may increase an individuals' anxiety while waiting for the other party to respond.[49] This may prompt the user to check social media more often to alleviate the anxiety of missing messages,[50] which is a typical expression of state-FoMO.[27] Thus, frequent ASMU is associated with an increase in state-FoMO, further increasing trait-FoMO. Given these considerations, we proposed that:

Hypothesis 1. ASMU predicts lower trait FOMO (H1),

Hypothesis 2. And this relation is mediated by higher state FOMO (H2).

ASMU, PSMU, Trait-FoMO, and State-FoMO

As mentioned earlier, the psychological effects of an individual's ASMU may differ depending on the level of their PSMU.[17,31] Hence, PSMU may influence the relationship between ASMU and trait-FoMO as well as state-FoMO.

Cross-sectional studies demonstrate a positive correlation between PSMU and trait-FoMO.[15,51] One longitudinal study of university students showed that PSMU was associated with trait-FoMO eight month later.[21] Researchers have argued that PSMU increases trait-FoMO mainly because of frequent upward social comparisons[4,52] that generate negative self-perceptions or feelings such as "others are happier than I am".[53] Numerous research additionally indicated

that PSMU is associated with a higher frequency of social comparisons.[15,20,26,54] Thus, individuals may reduce their trait-FoMO by actively connecting, but if they also spend time engaged in PSMU, they could make more upward social comparisons and experience jealousy[18] and anxiety,[15] thus increasing their trait-FoMO. The longitudinal effect of PSMU on state-FoMO was also confirmed.[25] Therefore, the positive correlation between ASMU and state-FoMO may be strengthened by PSMU. In addition, although an interaction between ASMU and PSMU in predicting FoMO has not been tested in empirical studies, prior work revealed that upward social comparison weakened the association between social media communication and loneliness,[55] which provides indirect evidence that PSMU may moderate the relationship between ASMU and trait-FoMO as well as state-FoMO. Given this analysis, the present study proposes that:

Hypothesis 3 The association between ASMU and trait-FoMO is moderated by PSMU; this relation is stronger at lower levels of PSMU.

Hypothesis 4. The association between ASMU and state-FoMO is moderated by PSMU; this relation is stronger at higher levels of PSMU.

Present Study

The purpose of this research was to gain more knowledge for understanding the connection between engaging in activities on social media and experiencing FoMO. Based on the active-passive model of social media use and the concept of trait-state dimensions of FoMO, we constructed and tested a structural equation model of the mechanisms and moderators of the associations among ASMU, PSMU, trait-FoMO, and state-FoMO. See Figure 1. The research addressed three questions: (1) Does ASMU inhibit trait-FoMO formation while increased state-FoMO? (2) Does PSMU weakened the inhibitory effect of ASMU on trait-FoMO? (3) Does PSMU strengthen the possibility of ASMU increasing state-FoMO. Answering these questions will contribute to comprehending better how social media affects FoMO.

Materials and Methods

Participants

The data were collected in Mid-October 2021. A total of 431 college students with more than one year of experience using social media were selected for the study by convenience sampling. The students were from three colleges and universities in Jiangxi Province, China. Questionnaires were completed online. After eliminating invalid questionnaires (very short completion time or inconsistent responses), there were 394 participants whose data were included in the analyses. Of these participants, 138 (35.0%) were males and 256 (65.0%) were females, ranging in age from 18 to 25 years (M=20.16; SD=1.32). On average, 40 participants (10.0%) used social media for less than 1 hour per day, 89 (22.6%) for 1–2 hours, 66 (16.8%) for 2–3 hours, 53 (13.5%) for 3–4 hours, 61 (15.5%) for 4–5 hours, and 85 (21.6%) for more than 5 hours.
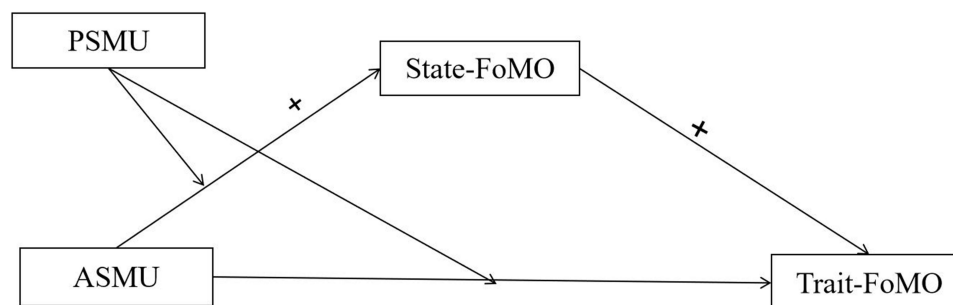

Figure 1 Proposed research model.
Abbreviations: FoMO, Fear of Missing Out; ASMU, Active Social Media Use; PSMU, Passive Social Media Use.

Procedure

We first contacted all the class teachers to obtain their consent. The survey was conducted in the classroom, using an online anonymous questionnaire link (a Chinese survey website: www.wjx.cn). Graduate students in applied psychology clarified the purpose of the survey, emphasizing the principles of careful completion, voluntariness, and confidentiality. The anonymous questionnaires were completed within 15 minutes. Each participant volunteered to participate in this study. This study was conducted under the ethical standards set forth in the 2013 Helsinki Declaration.

Measures

Active and Passive Social Media Use

The Surveillance Use Scale[56] was used to measure the levels of ASMU and PSMU. The scale consists of eight questions, the first four of which measure ASMU (e.g "actively contacting friends"), and the last four of which measure PSMU (e.g "read status updates from friends"). Liu et al[20] revised the Chinese version of the scale with good fit indices and good construct validity. The scale employs a Likert scale with 5 points, with 1 representing "never" and 5 representing "frequent". Higher scores indicate higher ASMU or PSMU. Our sample's Cronbach's alpha for the ASMU and PSMU subscales was 0.71 and 0.81, respectively. The average variance extracted (AVE) for the ASMU and PSMU was 0.42 and 0.55, respectively.

Trait-State Fear of Missing Out

This study used the Chinese version of the Trait-State Fear of Missing Out Scale. The scale was originally developed by Wegmann et al[27] and was translated and revised by Li et al.[30] The scale consists of 12 items on Trait-FoMO (e.g "I am afraid that other people have more exciting experiences than I do") and State-FoMO (e.g "I keep checking my smartphone so I wouldn't miss anything"). The two subscales consist of 5 and 7 items, respectively. Participants used a Likert scale that ranged from 1 (totally disagree) to 5 (totally agree) points to score each item. Scores that are higher suggest a higher presence of FoMO. Our sample's Cronbach's alpha was 0.84 for the trait-FoMO scale and 0.86 for the state-FoMO scale. The AVE for the trait-FoMO and state-FoMO was 0.50 and 0.42, respectively.

Covariates

The control variables included average daily social media use (hours), gender, and age, as these factors have been shown to be significantly associated with FoMO.[14,32,57]

Data Analysis

Because the data were gathered through self-reporting, we first checked common method bias using Harman's single-factor test. The first factor explained 29.3% of the variance, indicating that common method bias was not a serious issue.[58] Next, descriptive statistics and correlations were generated in SPSS 21.0. AMOS 23.0 was used to test the hypothesized model, in the following steps: (1) tested the measurement model using confirmatory factor analysis (CFA), oblique CFA for all latent variables in the model, using AMOS 23.0, showed an acceptable fit[59] (χ^2/df = 3.033, p=0.000, CFI = 0.907, TLI =0.901, SRMR =0.079, RMSEA =0.072, [90% CI: 0.065, 0.079]), allowing further SEM analysis.(2) Constructed and tested a structural equation model of the relationships among the independent and dependent variables. We used the factorial approach to parcel[60] the three latent variables of ASMU and trait- and state-FoMO into two indicators, respectively. After centering the ASMU and PSMU indicators, the interaction term indicators for ASMU and PSMU were constructed.[61] With the addition of the control variable (time spent on social media), the model included four latent and 10 observed variables. (3) Used the bias-corrected nonparametric percentile bootstrap method (2000 draws) to test mediating and moderating effects.

Using Cronbach's alpha coefficient to figure out how reliable a scale is, where >0.70 implies the reliability is good.[62] If the AVE is more than 0.36, the convergent validity is acceptable, and if it is greater than 0.5, it is ideal.[63] In this research, we used the maximum likelihood (ML) method to process the models, and the model fit was evaluated based on the size of the following indices: comparative fit index (CFI), Tucker Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardized root mean square residual (SRMR). According to Kenny's[59] suggestions,

CFI, TLI>0.9 indicates that the model and data attain an acceptable fit, and >0.95 indicates an ideal fit. The RMSEA should report 90% confidence intervals (CI), an ideal range with a lower limit close to 0 and an upper limit below 0.1, and SRMR < 0.08 is considered a good fit.

Results

Correlation Between Variables and Descriptive Analysis

Table 1 presents the means, standard deviations and correlation matrix of all observed variables. ASMU was not significantly correlated with trait-FoMO, but was positively correlated with state-FoMO and PSMU. PSMU was positively associated with both trait-FoMO and state-FoMO. Gender and age were not significantly associated with any primary variables, and therefore these two factors were not controlled for in the hypothesis testing. Daily social media use time was significantly and positively associated with state-FoMO, therefore, it will be controlled for in the hypothesis testing.

Structural Model Testing

First, it is important to note that even though the correlation between ASMU and trait-FoMO was not significant, the existence of a "suppressing effect" cannot be ruled out.[64,65] It is possible for the total effect to be suppressed and its absolute value to be lower than expected if the sign of the indirect effect is the opposite of that of the direct effect.[64,65] State-FoMO is positively correlated with trait FoMO and ASMU, which provides a possibility that state-FoMO plays a suppressing role between ASMU and trait FoMO. Therefore, the following structural equation model test will be further considered.

Controlling for daily social media use time, the SEM analysis demonstrated that the proposed research model fit the data well:[59] χ^2/df =1.491, p=0.064, CFI=0.993, TLI=0.987, SRMR=0.021, RMSEA=0.035, [90% CI: 0.000, 0.059].

The associations among variables in the structural model are reported as standardized values and are shown in Figure 2. Confidence intervals are considered significant when they do not contain zero. First, ASMU significantly positively predicted state-FoMO (β=0.19, p<0.05, 95% confidence interval [CI] [0.029, 0.354]), and state-FoMO significantly positively predicted trait-FoMO (β=0.63, p<0.01, 95% CI [0.505, 0.735]). H2 were supported. Interestingly, in the correlational analysis the association between ASMU and trait FoMO was positive and non-significant (r=0.08, p>0.05), but in support of H1, in the structural model ASMU significantly negatively predicted trait-FoMO (β=−0.19, p<0.01, 95% CI [−0.313, −0.070]). This demonstrates that state-FoMO suppressed the relation between ASMU and trait-FoMO.[57,64,65] In addition, consistent with H3, the interaction of ASMU and PSMU (estimated by standardization) significantly predicted trait-FoMO (β=0.12, p<0.05, 95% CI [0.035, 0.206]). Nonetheless, there was no significant predictive effect of the interaction on state-FoMO (β=0.07, p>0.05, 95% CI [−0.052, 0.202]), and therefore H4 was not supported.

In order to more clearly explain the interaction between ASMU and PSMU on trait-FoMO, the PSMU scores were separated into two groups: high level (one standard deviation above the mean) and low level (one standard deviation below the mean), and using simple slopes test to examine the effect of ASMU on Trait-FoMO at the two levels of PSMU. Figure 3 shows

Table 1 |Descriptive Statistics and Interrelations Among All of the Observed Variables

	M	SD	I	2	3	4	5	6	7
I ASMU	2.57	0.62	I						
2 State-FoMO	2.67	0.72	0.26***	I					
3 Trait-FoMO	2.65	0.74	0.08	0.56***	I				
4 PSMU	3.03	0.76	0.45***	0.27***	0.16**	I			
5 Gender	1.65	0.48	0.06	−0.07	0.01	0.03	I		
6 Age	20.16	1.32	−0.01	−0.02	−0.03	0.01	−0.07	I	
7 Daily SMU Time	3.66	1.70	0.20***	0.11*	0.07	0.16**	0.16**	0.04	I

Notes: N=394, *p<0.05, **p<0.01, ***p<0.001, male="I", female="2"; Daily SMU Time= daily social media use time (hours per day), is measured in six categories: less than I hour, I–2 hours, 2–3 hours, 3–4 hours, 4–5 hours, more than 5 hours.
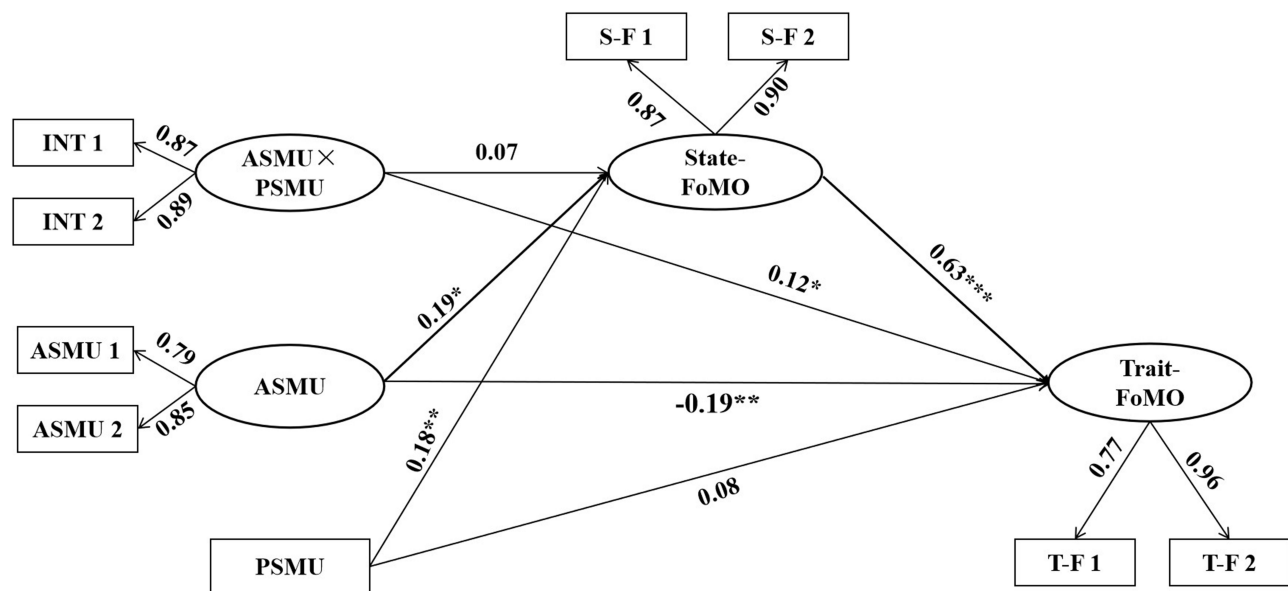
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Figure 2 Final standardized parameter values of the mode. N=394, *p<0.05, **p<0.01, ***p<0.001. For brevity, the control variables are not shown.
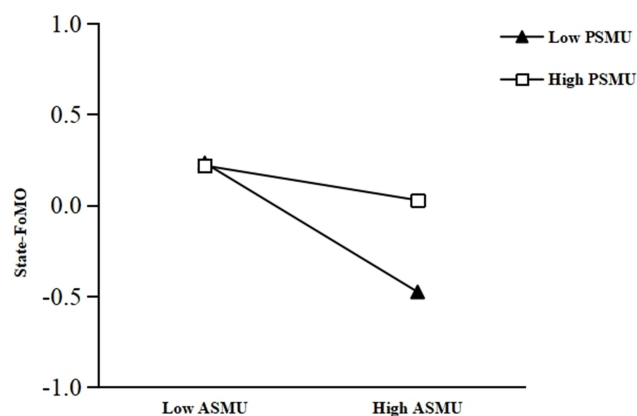

Figure 3 PSMU moderated the relationship between ASMU and trait-FoMO.

the results. At a low level of PSMU, ASMU was found to have a statistically significant predictive effect on the trait-FoMO. (β=−0.31, p<0.01, 95% CI [−0.493, −0.148]) but not at a high level of PSMU (β=−0.07, p>0.05, 95% CI [−0.191, 0.039]).

Discussion

It has been assumed that social media use increases FoMO.[12,13] However, this explanation may be inadequate. Consistent with our hypotheses, the results suggested that using social media could lead to an increase in FoMO but also reduce some aspects of FoMO. This more complex understanding was possible because we made a distinction between active and passive social media use, as well as between trait and state FoMO.We used structural equation modeling to find that ASMU was associated with lower trait-FoMO, but this association was suppressed by state-FoMO. PSMU moderated the direct effect of ASMU on trait-FoMO, with the effect being significant in low-PSMU individuals but not in high-PSMU persons. The current research demonstrated ASMU's dual-edged effects on FoMO, which manifests as a decrease in trait-FoMO and an increase in state-FoMO.

ASMU and Trait-FoMO:Suppressing Effect of State-FoMO

Contrary to our expectations, the bivariate correlations showed no significant association between ASMU and trait-FoMO. Pang[26] also found that active WeChat interaction was not correlated with trait-FoMO, and was confused by the

unexpected result. According to some scholars,[64,65] this condition is possibly to be a case of suppressing effect, where the main effect is suppressed. Further structural equation modeling results revealed that ASMU significantly and negatively predicted trait-FoMO, and also positively predicted trait-FoMO through the indirect effect of state-FoMO. Indirect and direct effects have opposite signs, indicating a suppressing effect. It follows that ASMU has a positive predictive effect on trait FoMO, but this relationship is suppressed by state-FoMO. This would explain why ASMU failed to predict trait-FoMO.

Previous studies have demonstrated the positive effects of ASMU in reducing negative psychological states and emotions.[22,24,66] Our results suggest that ASMU have an overall positive role in reducing trait-FoMO. The current study provides further evidence of ASMU's positive effects that were reported in these other studies. Engaging in ASMU, such as chatting with friends and commenting on friends' updates, is thought to facilitate the establishment, maintenance, and expansion of social relationships and to increase individuals' sense of connectedness with others.[39,67] Moreover, online self-representation, such as updating one's status and sharing images, promote access to individual social support.[23,24,68] These behaviors can also improve friendship quality,[38] and reduce the occurrence of upward social comparisons.[26] Consequently, active social media communication may reduce maladaptive cognitive tendencies such as "I am unpopular and others have more pleasurable experiences than I do".[15,28] This reduction may occur because active social media use can provide social support and good interpersonal relationships.

In contrast, ASMU positively predicted trait-FoMO through the indirect effect of state-FoMO, suggesting that ASMU can exacerbate trait-FoMO by increasing state-FoMO. The results support the media effects theories,[45,46] which posit that individual media use is an important factor influencing media-related cognitions. Because social media socialization is not limited by time and space, and the channels of communication between people are always open,[47,69] there is a likelihood that some individuals will worry about missing messages.[27,49] Because of the asynchronous nature of social media,[47] we cannot be sure that when we start a session or post a message, we will get a response right away. Sending messages to others for some purpose and then waiting for spontaneous replies can make users pay more attention on social media.[49] This may lead to the behavior of frequently checking social media to prevent missing messages.[49,50] This effect may, in the long run, also lead to general anxiety at the prospect of missing out on online and offline social activities.[27] Furthermore, in line with Röttinger et al,[28] it was shown that state-FoMO is a perception associated with social media use in particular, whereas trait-FoMO may contains more context-independent social comparisons.[4] This study also responds well to Elhai et al's[1] call for a distinction between trait and state-FoMO and to their suggestion that more research is necessary to explore these links.

The above findings provide a different perspective for understanding the relationship between social media use and FoMO on the one hand. Social media may not always increase FoMO, because positive, active social media interactions are conducive to alleviating trait-FoMO. On the other hand, the suppressing effect of state-FoMO may also be used to explain the inconsistent results of ASMU with other psychological consequences (eg, loneliness),[70] which requires to be looked into more in future research.

Moderating Effect of PSMU

Conceptually, researchers have argued that a complex relationship exists between ASMU and PSMU, with the effects produced by one being influenced by the other.[17,31] Therefore, the present study also explored whether the degree of individual PSMU moderated the relationship between ASMU and trait- and state-FoMO. Most previous studies have only examined the separate effects of ASMU or PSMU. This is the first study to test the interaction between ASMU and PSMU in predicting FoMO.

Consistent with our assumption, the level of PSMU moderated the direct predictive effect of ASMU on trait-FoMO. Specifically, This association was not significant in the high PSMU group but was in the low PSMU group. Individuals with high PSMU may have a less clear understanding of themselves compared with individuals with low passive use.[20] They may be more prone to jealousy and upward social comparison,[15,18] leading to more concern about missing out on others' exciting experiences documented on social media.[4] In addition, individuals with high PSMU tend to have more more negative affective experiences, such as loneliness,[71] stress,[51] and anxiety,[54] all of which may weaken the attenuating effect of ASMU behaviors on trait-FoMO.

Inconsistent with our hypothesis, PSMU did not moderate the relationship between ASMU and state-FoMO, suggesting that frequent information browsing and interactive social media use may both trigger transient feelings of concern about missing information. The results once again support the trait-state model of FoMO.[27] They also support the media effect theories,[45] which states that state-FoMO is significantly influenced by the characteristics of social media use itself, regardless of whether the use is positive or negative. Therefore, reducing state-FoMO by changing social media's functional design could be an effective approach in reducing the negative effects of social media use, and researchers are working in this direction.[72]

Theoretical and Practical Implications

Our findings deepen and expand our understanding of the mechanisms underlying the influence of social media on FoMO. Few research have focused on the relationship between specific social media use behaviors and types of FoMO. This paper investigated the complex association between social media use and FoMO based on the trait-state model of FoMO and the active-passive model of social media use. Structural equation modeling documented suppressing (state-FoMO) and moderating (PSMU) effects, and these results may explain why and when ASMU fails to predict trait FoMO. Furthermore, this study's demonstration of an inverse relationship between ASMU and trait- and state-FoMO. Consistent with Wegmann et al,[27] the result suggests that FoMO is a psychological variable with a multidimensional structure. And it provides new and powerful evidence of the value of distinguishing trait- and state-FoMO. However, it also suggests that ASMU is a double-edged sword. ASMU is a positive behavior, but on the other hand it may generate negative cognitions due to the essential nature of social media.

This research also has practical implications for social media use and FoMO interventions. First, ASMU was associated with lower trait-FoMO; therefore, engagement in ASMU behaviors should be encouraged. Second, considering the suppressing effect of state-FoMO, college students are advised not to place too much importance on timely responses and to minimize social media checking out frequency. Social media companies should also be called upon to design features that are helpful in reducing state-FoMO. In this context, Alutaybi et al[72] developed a FoMO reduction method that includes technical elements, which is a method worthy of our consideration. Finally, the study found that high PSMU can attenuate the positive effect of ASMU in reducing trait-FoMO, and therefore, interventions that focus on promoting ASMU should also focus on reducing PSMU.

Limitations and Future Research Directions

Despite the strengths of this study, there are several limitations to be addressed in future research. First, a cross-sectional study is a methodological limitation because it cannot document causality. Therefore, future research could employ longitudinal or experimental designs to validate the current findings. Secondly, this study did not distinguish between the active use of different social media platforms. However, a meta-analytic study showed that different types of social media use were differently related to FoMO.[14] Therefore, future studies could further examine the results of this study across different social media platforms. Thirdly, the extent of ASMU and PSMU was measured using self-report. Our measures of ASMU and PSMU have been used in the vast majority of studies to date, but obtaining objective information about the extent of use would increase the validity of the results.

Conclusion

In summary, the current work provides additional details for understanding the relationship between social media and FoMO. It provides evidence that ASMU has different effects on different aspects of FoMO. On the one hand, ASMU is conductive to the alleviation of trait-FoMO. However, it is significant to note that ASMU may also predict higher state-FoMO, which increase the potential for experiencing trait-FoMO. In addition, PSMU weakens the negative predictive effect of ASMU on trait-FoMO. Therefore, a reduction in passive, non-communicative information browsing would be conducive to the alleviation of trait-FoMO by ASMU. These results suggest that an in-depth study of specific social media use patterns and different types of FoMO should be a focus of future digital media research.

Data Sharing Statement

The data provided are available at the request from the corresponding author.

Ethics Statement

This study was conducted under the ethical standards set forth in the 2013 Helsinki Declaration. The study was approved by the Ethics Committee of Hunan University of Chinese Medicine. All of the study participants gave informed consent. Because our study was completely anonymous, we did not require participants to sign a written informed consent form. After providing information about the study, we asked on questionnaire, "Do you agree to participate in the study?" All participants voluntarily selected "yes".

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Disclosure

The authors declare no conflicts of interest in this work.

References

1. Elhai JD, Yang H, Montag C. Fear of missing out (FOMO): overview theoretical underpinnings and literature review on relations with severity of negative affectivity and problematic technology use. *Braz J Psychiatry*. 2021;43:203–209. doi:10.1590/1516-4446-2020-0870
2. Tandon A, Dhir A, Almugren I, AlNemer GN, Mäntymäki M. Fear of missing out (FoMO) among social media users: a systematic literature review synthesis and framework for future research. *Internet Res*. 2021;31:782–821. doi:10.1108/intr-11-2019-0455
3. Wegmann E, Brandtner A, Brand M. Perceived strain due to COVID-19-related restrictions mediates the effect of social needs and fear of missing out on the risk of a problematic use of social networks. *Front Psychiatry*. 2021;12:623099. doi:10.3389/fpsyt.2021.623099
4. Servidio R, Sinatra M, Griffiths MD, Monacis L. Social comparison orientation and fear of missing out as mediators between self-concept clarity and problematic smartphone use. *Addict Behav*. 2021;122:107014. doi:10.1016/j.addbeh.2021.107014
5. Balta S, Emirtekin E, Kircaburun K, Griffiths MD. Neuroticism trait fear of missing out and phubbing: the mediating role of state fear of missing out and problematic Instagram use. *Int J Ment Health Addict*. 2020;18:628–639. doi:10.1007/s11469-018-9959-8
6. Li L, Griffiths MD, Mei S, Niu Z. Fear of missing out and smartphone addiction mediates the relationship between positive and negative affect and sleep quality among Chinese university students. *Front Psychiatry*. 2020;11:877. doi:10.3389/fpsyt.2020.00877
7. Bakioğlu F, Deniz M, Griffiths MD, Pakpour AH. Adaptation and validation of the online-fear of missing out inventory into Turkish and the association with social media addiction smartphone addiction and life satisfaction. *BMC Psychol*. 2022;10:1–10. doi:10.1186/s40359-022-00856-y
8. Gugushvili N, Täht K, Rozgonjuk D, Raudlam M, Ruiter R, Verduyn P. Two dimensions of problematic smartphone use mediate the relationship between fear of missing out and emotional well-being. *Cyberpsychology*. 2020;14:Article 3. doi:10.5817/CP2020-2-3
9. Milyavskaya M, Saffran M, Hope N, Koestner R. Fear of missing out: prevalence dynamics and consequences of experiencing FOMO. *Motiv Emot*. 2018;42:725–737. doi:10.1007/s11031-018-9683-5
10. Park HJ. Impact of Facebook usage intensity on fear of missing out and depression: moderated mediating effect of Facebook usage behaviour. *Telemat Inform*. 2022;74:101878. doi:10.1016/j.tele.2022.101878
11. Chen S, Bi RX, Wang JL. Enjoy "life, work and study encyclopedia", beware of "time killers" and "privacy traps", young and old users of social media "surf" and "control the water" China Youth Daily; 2022. Available from: http://news.cyol.com/gb/articles/2022-11/25/content_7JedaIeKz.html. Accessed April 19, 2023.
12. Buglass SL, Binder JF, Betts LR, Underwood JDM. Motivators of online vulnerability: the impact of social network site use and FOMO. *Comput Hum Behav*. 2017;66:248–255. doi:10.1016/j.chb.2016.09.055
13. Bloemen N, De Coninck D. Social media and fear of missing out in adolescents: the role of family characteristics. *Soc Media Soc*. 2020;6:205630512096551. doi:10.1177/2056305120965517
14. Zhang YL, Li S, Yu GL. The relationship between social media use and fear of missing out: a meta-analysis. *Acta Psychol Sin*. 2021;55:273–290. doi:10.3724/sp.j.1041.2021.00273
15. Burnell K, George MJ, Vollet JW, Ehrenreich SE, Underwood MK. Passive social networking site use and well-being: the mediating roles of social comparison and the fear of missing out. *Cyberpsychology*. 2019;13:1–14. doi:10.5817/cp2019-3-5

16. Chai HY, Niu GF, Chu XW, Wei Q, Song YH, Sun XJ. Fear of missing out: what have I missed again? *Adv Psychol Sci.* 2018;26:527–537. doi:10.3724/SP.J.1042.2018.00527

17. Verduyn P, Ybarra O, Résibois M, Jonides J, Kross E. Do social network sites enhance or undermine subjective well-being? A critical review. *Soc Issues Policy Rev.* 2017;11:274–302. doi:10.1111/sipr.12033

18. Wang HZ, Yang TT, Gaskin J, Wang JL. The longitudinal association between passive social networking site usage and depressive symptoms: the mediating role of envy and moderating role of life satisfaction. *J Soc Clin Psychol.* 2019;38:181–199. doi:10.1521/jscp.2019.38.3.181

19. Liu C, Yang D, Han Z. How do passive social networking services use and its antecedents affect users' continuance intention? An empirical study of WeChat use. *Psychol Res Behav Manag.* 2022;15:3191–3203. doi:10.2147/PRBM.S373959

20. Liu QQ, Niu GF, Fan CY, Zhou ZK. Passive use of social network site and its relationships with self-esteem and self-concept clarity: a moderated mediation analysis. *Acta Psychol Sin.* 2017;49:60–71. doi:10.3724/sp.j.1041.2017.00060

21. Zhang YL, Li S, Yu GL. Fear of missing out and passive social networking site use among college students: a two wave longitudinal study. *Psychol Sci.* 2021;44:377–383. doi:10.16719/j.cnki.1671-6981.20210217

22. Lian SL, Sun XJ, Yang XJ, Zhou ZK. The effect of adolescents' active social networking site use on life satisfaction: the sequential mediating roles of positive feedback and relational certainty. *Curr Psychol.* 2020;39:2087–2095. doi:10.1007/s12144-018-9882-y

23. Lin S, Liu D, Niu G, Longobardi C. Active social network sites use and loneliness: the mediating role of social support and self-esteem. *Curr Psychol.* 2022;41:1279–1286. doi:10.1007/s12144-020-00658-8

24. Frison E, Bastin M, Bijttebier P, Eggermont S. Helpful or harmful? The different relationships between private Facebook interactions and adolescents' depressive symptoms. *Media Psychol.* 2019;22:244–272. doi:10.1080/15213269.2018.1429933

25. Ma L. Cross-lagged analysis of passive social network site use and fear of missing out in college students. *Chin J School Health.* 2020;41:70–72. doi:10.16835/j.cnki.1000-9817.2020.01.019

26. Pang H. Unraveling the influence of passive and active WeChat interactions on upward social comparison and negative psychological consequences among university students. *Telemat Inform.* 2021;57:101510. doi:10.1016/j.tele.2020.101510

27. Wegmann E, Oberst U, Stodt B, Brand M. Online-specific fear of missing out and Internet-use expectancies contribute to symptoms of Internet-communication disorder. *Addict Behav Rep.* 2017;5:33–42. doi:10.1016/j.abrep.2017.04.001

28. Röttinger D, Bischof G, Brandt D, et al. Dispositional and online-specific Fear of Missing Out are associated with the development of IUD symptoms in different internet applications. *J Behav Addict.* 2021;10:747–758. doi:10.1556/2006.2021.00042

29. Xiao MM, Liu AS. Revision of the Chinese version of trait-state fear of missing out. *Chin J Clin Psychol.* 2019;27:268–272. doi:10.16128/j.cnki.1005-3611.2019.02.011

30. Li L, Griffiths MD, Niu Z, Mei S. The trait-state fear of missing out scale: validity reliability and measurement invariance in a Chinese sample of university students. *J Affect Disord.* 2020;274:711–718. doi:10.1016/j.jad.2020.05.103

31. Verduyn P, Gugushvili N, Kross E. Do social networking sites influence well-being? The extended active-passive model. *Curr Dir Psychol Sci.* 2022;31:62–68. doi:10.1177/09637214211053637

32. Przybylski AK, Murayama K, DeHaan CR, Gladwell V. Motivational emotional and behavioral correlates of fear of missing out. *Comput Hum Behav.* 2013;29:1841–1848. doi:10.1016/j.chb.2013.02.014

33. Yin L, Wang P, Nie J, Guo J, Feng J, Lei L. Social networking sites addiction and FoMO: the mediating role of envy and the moderating role of need to belong. *Curr Psychol.* 2021;40(8):3879–3887. doi:10.1007/s12144-019-00344-4

34. Xie X, Wang Y, Wang P, Zhao F, Lei L. Basic psychological needs satisfaction and fear of missing out: friend support moderated the mediating effect of individual relative deprivation. *Psychiatry Res.* 2018;268:223–228. doi:10.1016/j.psychres.2018.07.025

35. Dou F, Li Q, Li X, Li Q, Wang M. Impact of perceived social support on fear of missing out (FoMO): amoderated mediation model. *Curr Psychol.* 2021;1–22. doi:10.1007/s12144-021-01404-4

36. Song HY, Kim JH. Smartphone use type fear of missing out social support and smartphone screen time among adolescents in Korea: interactive effects. *Front Public Health.* 2022;10:822741. doi:10.3389/fpubh.2022.822741

37. Deters FG, Mehl MR. Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Soc Psychol Pers Sci.* 2013;4(5):579–586. doi:10.1177/1948550612469233

38. Valkenburg PM, Peter J. The effects of instant messaging on the quality of adolescents' existing friendships: a longitudinal study. *J Commun.* 2009;59:79–97. doi:10.1111/j.1460-2466.2008.01405.x

39. Manago AM, Brown G, Lawley KA, Anderson G. Adolescents' daily face-to-face and computer-mediated communication: associations with autonomy and closeness to parents and friends. *Devel Psychol.* 2020;56(1):153–164. doi:10.1037/dev0000851

40. Utz S, Breuer J. The relationship between use of social network sites online social support and well-being: results from a six-wave longitudinal study. *J Media Psychol.* 2017;29:115–125. doi:10.1027/1864-1105/a000222

41. Frison E, Eggermont S. Toward an integrated and differential approach to the relationships between loneliness different types of Facebook use and adolescents' depressed mood. *Commun Res.* 2020;47:70–728. doi:10.1177/0093650215617506

42. Gul H, Firat S, Sertcelik M, Gul A, Gurel Y, Kilic BG. Effects of psychiatric symptoms age and gender on fear of missing out (FoMO) and problematic smartphone use: a path analysis with clinical-based adolescent sample. *Indian J Psychiatry.* 2022;64:289–294. doi:10.4103/indianjp-sychiatry.indianjpsychiatry_34_21

43. Iannone NE, McCarty MK, Branch SE, Kelly JR. Connecting in the Twitterverse: using Twitter to satisfy unmet belonging needs. *J Soc Psychol.* 2018;158:491–495. doi:10.1080/00224545.2017.1385445

44. Marengo D, Montag C, Sindermann C, Elhai JD, Settanni M. Examining the links between active Facebook use received likes self-esteem and happiness: a study using objective social media data. *Telemat Inform.* 2021;58:101523. doi:10.1016/j.tele.2020.101523

45. Kim SS. The integrative framework of technology use: an extension and test. *MIS Q.* 2009;33:513–537. doi:10.2307/20650307

46. Valkenburg PM, Peter J, Walther JB. Media effects: theory and research. *Annu Rev Psychol.* 2016;67:315–338. doi:10.1146/annurev-psych-122414-033608

47. Zhou ZK, Liu QX. Cyber-psychology: the reconstruction of behavior. *Chin Soc Sci Rev.* 2016;55–67 + 126–127. Available from https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2016&filename=ZSKP201603005&uniplatform=NZKPT&v=YONrG_vI0vfTDQt2xZv0MdwQu2gkd581o2WVikekL_-xyTen8Ty8ZG-LpTK6yuwv.

48. Valkenburg PM, Peter J. Online communication among adolescents: an integrated model of its attraction opportunities and risks. *J Adolesc Health*. 2011;48:121–127. doi:10.1016/j.jadohealth.2010.08.020

49. Alutaybi A, Arden-Close E, McAlaney J, Stefanidis A, Phalp K, Ali R. How can social networks design trigger fear of missing out? 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC); 2019; Bari, Italy. doi:10.1109/smc.2019.8914672.

50. Alutaybi A, McAlaney J, Arden-Close E, Stefanidis A, Phalp K, Ali R. Fear of missing out (FoMO) as really lived: five classifications and one ecology. The 6th International Conference on Behavioral, Economic, and Socio-Cultural Computing.; Beijing, China. doi:10.1109/besc48373.2019.8963027.

51. Li J, Ma L. The effect of the passive use of social networking sites on college students' fear of missing out: the role of perceived stress and optimism. *Psychol Sci*. 2019;42:949–955. doi:10.16719/j.cnki.1671-6981.20190426

52. Verduyn P, Gugushvili N, Massar K, Täht K, Kross E. Social comparison on social networking sites. *Curr Opin Psychol*. 2020;36:32–37. doi:10.1016/j.copsyc.2020.04.002

53. Sloman L, Gilbert P, Hasey G. Evolved mechanisms in depression: the role and interaction of attachment and social rank in depression. *J Affect Disord*. 2003;74:107–121. doi:10.1016/s0165-0327(02)00116-7

54. Thorisdottir IE, Sigurvinsdottir R, Asgeirsdottir BB, Allegrante JP, Sigfusdottir ID. Active and passive social media use and symptoms of anxiety and depressed mood among Icelandic adolescents. *Cyberpsychol Behav Soc Netw*. 2019;22:535–542. doi:10.1089/cyber.2019.0079

55. Yang CC. Instagram use loneliness and social comparison orientation: interact and browse on social media but don't compare. *Cyberpsychol Behav Soc Netw*. 2016;19:703–708. doi:10.1089/cyber.2016.0201

56. Tandoc EC, Ferrucci P, Duffy M. Facebook use envy and depression among college students: is facebooking depressing? *Comput Hum Behav*. 2015;43:139–146. doi:10.1016/j.chb.2014.10.053

57. Chai HY, Niu GF, Lian SL, Chu XW, Liu S, Sun XJ. Why social network site use fails to promote well-being? The roles of social overload and fear of missing out. *Comput Hum Behav*. 2019;100:85–92. doi:10.1016/j.chb.2019.05.005

58. Podsakoff PM, MacKenzie SB, Podsakoff NP. Sources of method bias in social science research and recommendations on how to control it. *Annu Rev Psychol*. 2012;63:539–569. doi:10.1146/annurev-psych-120710-100452

59. Kenny DA. Measuring model fit. Available from: http://davidakenny.net/cm/fit.htm. Accessed January 2, 2023.

60. Matsunaga M. Item parceling in structural equation modeling: a primer. *Commun Methods Meas*. 2008;2:260–293. doi:10.1080/19312450802458935

61. Wu Y, Wen ZL, Tai HK, Marsh HW. Appropriate standardized estimates of latent interaction models without the mean structure. *Acta Psychol Sin*. 2011;43:1219–1228.

62. McDonald RP. *Test Theory: A Unified Treatment*. New York: Psychology Press; 2013. doi:10.4324/9781410601087

63. Chin WW. Issues and opinion on structural equation modeling. *MIS Quart*. 1998;22:7–16.

64. Ludlow L, Klein K. Suppressor variables: the difference between "is" versus "Acting As". *J Stat Educ*. 2014;22:1–28. doi:10.1080/10691898.2014.11889703

65. MacKinnon DP, Lamp SJ. A unification of mediator, confounder, and collider effects. *Prev Sci*. 2021;22:1185–1193. doi:10.1007/s11121-021-01268-x

66. Choi J. Do Facebook and Instagram differ in their influence on life satisfaction? A study of college men and women in South Korea. *Cyberpsychology*. 2022;16:Article 2. doi:10.5817/cp2022-1-2

67. Xie W. Social network site use mobile personal talk and social capital among teenagers. *Comput Hum Behav*. 2014;41:228–235. doi:10.1016/j.chb.2014.09.042

68. Pang H. Examining associations between university students' mobile social media use online self-presentation social support and sense of belonging. *Aslib J Inf Manag*. 2020;72:321–338. doi:10.1108/AJIM-08-2019-0202

69. Kuss DJ, Griffiths MD. Social networking sites and addiction: ten lessons learned. *Int J Environ Res Public Health*. 2017;14:311. doi:10.3390/ijerph14030311

70. Zhang L, Li C, Zhou T, Li Q, Gu C. Social networking site use and loneliness: a meta-analysis. *J Psychol*. 2022;156:492–511. doi:10.1080/00223980.2022.2101420

71. Zhang X, Lin JY, Zhang JJ. Relationship between passive use of social network site and loneliness and its chain mediation. *Chin J Clin Psychol*. 2020;28:63–66. doi:10.16128/j.cnki.1005-3611.2020.01.015

72. Alutaybi A, Al-Thani D, McAlaney J, Ali R. Combating fear of missing out (FoMO) on social media: the fomo-r method. *Int J Environ Res Public Health*. 2020;17:6128. doi:10.3390/ijerph17176128