

Digital Dependency and Security Risk: Investigating the Connections Between Fear of Missing Out, Problematic Social Media Use, and Vulnerability Perceptions

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Abstract

This study aims to investigate the connections between fear of missing out (FoMO), problematic social media use (PSMU), and perceptions of vulnerability, comparing these dynamics across UK and Arab samples. We explore whether these cyber behaviors are driven by inherent traits or influenced by personal intentions of usage and perceptions of risk. This will help focus countermeasures, such as prioritizing whether to adapt the design to personal factors or improve risk perception. Data were collected through a cross-sectional survey design with 642 participants, 314 from the UK and 328 from the Arab region. The study measured how FoMO and PSMU, including demographic factors, age, and gender, influence individuals' susceptibility to cyber threats, focusing on three key questions: the Likelihood of being targeted by a scam, the Likelihood of a successful scam, and the Encounter of a scam. The results reveal significant associations between FoMO, PSMU, and perceptions of vulnerability, with notable cultural differences. In the UK sample, FoMO and PSMU were strong predictors of the Likelihood of being targeted by a scam, and PSMU is the predictor of the Encounter of a scam, suggesting that higher level FoMO and PSMU are linked to greater online vulnerability. However, in the Arab sample, while FoMO was positively associated with the Likelihood of a successful scam, PSMU did not significantly predict the Likelihood of a successful scam. This discrepancy indicates that cultural or contextual factors may influence the relationship between FoMO, PSMU, and vulnerability perceptions differently across regions. The findings underscore the importance of considering cultural context when addressing digital behavior and cybersecurity vulnerabilities. Future research should explore how varying forms of social media engagement and cultural factors impact these relationships to develop more effective, culturally tailored interventions.

Keywords Security attitude · Fear of missing out · Social media disorder · Perceptions of vulnerability · Scam · Cultural differences

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Introduction

Social media are Internet-based platforms that enable users to interact and self-present, either in real-time or asynchronously, with broad or narrow audiences, deriving value from user-generated content and the perception of interaction with others (Carr & Hayes, 2015). In this digital era, social media has significantly impacted daily life, transforming how people interact and view their surroundings. Today's most popular social media, or social networking sites, listed in order of popularity, include Facebook, YouTube, WhatsApp, Instagram, TikTok, and WeChat (Shopify, 2024; Vora, 2024). Individuals use social media for various motivations, driven by each platform's unique capabilities, which encourage personal information sharing and have a reach that cannot be overlooked (Smith, 2013). While social media has enhanced connections and facilitated continuous interactions across time and space, it has also introduced new negative consequences (Alrobai et al., 2016b). Nowadays, social media applications are widely used, and recent studies discuss the addiction problems resulting from their overuse (Çam, 2012; Gómez Galán et al., 2020). Concerns have arisen about the compulsive or problematic use of social media, frequently referred to as "social media addiction" or "social media disorder" (Allahverdi, 2022; van den Eijnden et al., 2016), though this terminology has been subject to criticism (Carbonell & Panova, 2017). A study has shown that Facebook addiction, in particular, is linked to negative mental health outcomes such as depression and loneliness, as well as increased active and passive social media usage, with social comparison further exacerbating these effects (Casingcasing et al., 2023). Excessive use is often highlighted, with issues such as poor sleep quality, mental over-occupation, and difficulty in controlling usage being frequently reported (C. Andreassen et al., 2012).

Social media provides constant updates about friends' activities, events, and lifestyles, making users feel like they are missing out on exciting or important experiences (Abel et al., 2016). Users often share highlights of their lives on social media, which can create a skewed perception of others' experiences, leading to comparisons and a heightened sense of fear of missing out. Fear of missing out (FoMO) is a psychological phenomenon characterized by a pervasive apprehension that others might be having rewarding experiences from which one is absent (Przybylski et al., 2013). This fear is often exacerbated by social media and digital communication, where individuals are constantly exposed to curated highlights of others' lives. FoMO can lead to compulsive checking behaviors and a sense of inadequacy or anxiety when individuals perceive themselves as missing out on desirable events or opportunities (Gupta & Sharma, 2021). Research suggests that social media design and usage can amplify FoMO, with platforms using design elements to extend user engagement by leveraging this psychological process (Alutaybi et al., 2020; Montag et al., 2019). Increased feelings of FoMO can contribute to problematic social media use (PSMU), driving some individuals toward excessive engagement to stay connected and maintain control of their online presence and interactions (Fioravanti et al., 2021).

Although FoMO often leads to increased social media engagement, it does not inherently signify problematic use. For instance, a study by Ocklenburg shows that individuals with high levels of FoMO may check social media frequently but may not always exhibit the compulsive patterns characteristic of PSMU (Ocklenburg, 2021). Furthermore, a longitudinal study by Wegmann found that while FoMO contributes to problematic use, other factors, such as emotional problems or individual predispositions, mediate the relationship between core characteristics and problematic Internet use, aligning with the notion that not everyone with high FoMO will necessarily develop PSMU (Wegmann et al., 2017).

Problematic social media use (PSMU) refers to excessive engagement with social media that results in negative consequences in various aspects of daily life (Casale, 2020). PSMU has been extensively studied for its impact on decreased subjective well-being, depression, and loneliness (Hussain & Griffiths, 2018; Kross et al., 2021; Marttila et al., 2021b). However, relatively few studies specifically explore the relationship between PSMU and individuals' perceptions of their vulnerability to cyber threats. Cybercrime victimization can be seen as part of the broader concept of perception of vulnerability, as individuals' fears or experiences of being targeted often shape their sense of vulnerability to such crimes. Research suggests that as social media use becomes more widespread, PSMU emerges as a behavioral pattern that predicts an increased risk of cybercrime victimization (Marttila et al., 2021a). Jain and Agrawal (Jain & Agrawal, 2021) found that excessive social media use heightens the risk of online victimization, particularly cyberbullying. Research also found that social media use exposes individuals to increased risks of involvement in cyberbullying and more aggressive online behaviors (Craig et al., 2020). Additionally, research indicates that problematic social media use is associated with increased peer aggression and victimization, underscoring a continuity of maladjustment problems between offline and online contexts in adolescence (Martínez-Ferrer et al., 2018). Furthermore, PSMU is positively associated with exposure to online victimization (Longobardi et al., 2020). The global accessibility of information shared on social networks also heightens the risk of cyber-attacks from hackers (Romansky, 2014). Despite these findings, a notable gap exists in the literature regarding how PSMU influences the Likelihood of being targeted by scams, the success rates of these scams, and overall susceptibility to fraudulent schemes.

In the realm of cybercrime and cybersecurity, FoMO has been linked to risky online behaviors. Research indicates that individuals with high levels of FoMO are more likely to spend time on social networking sites and engage in potentially dangerous online activities, such as clicking on suspicious links or downloading unverified applications, driven by the fear of missing out on exclusive content or social validation (Jd et al., 2021). FoMO has been understood as a socially driven phenomenon where individuals seek more rewarding social experiences online (Riordan et al., 2021). Furthermore, individuals with higher levels of FoMO may exhibit a higher exposure to online vulnerability (Buglass et al., 2017).

Researchers investigating the constructs of FoMO, PSMU, and online risk have found variations related to age and

gender. For instance, one study found that males showed significantly greater levels of both FoMO and problematic social media use than females (Brailovskaia et al., 2023). However, another large-scale study reported no gender differences in FoMO experience (Rozgonjuk et al., 2021). Additionally, other research has shown that females tend to exhibit higher levels of addiction to social media, which is associated with increased FoMO (Su et al., 2020). Rozgonjuk et al. (Rozgonjuk et al., 2021) found that younger participants had higher FoMO scores, whereas another study reported no age-related differences in overall FoMO levels (Christopher et al., 2020). Additionally, another research proved that older and male participants were less likely to be cybercrime targets (Marttila et al., 2021a). Fatokun et al. (Fatokun et al., 2019) found that older students (above 30) reported higher perceived vulnerability compared to younger students, who were more familiar with cyber threats but perhaps less cautious. This suggests that older individuals may feel more vulnerable to cyber threats but also believe more strongly in their ability to respond effectively. The increased perception of vulnerability may extend to the cybersecurity realm, where older adults feel more susceptible to online threats (McConatha et al., 2021). Another study suggests that women display more cautious behaviors, possibly due to higher perceived risks (Fatokun et al., 2019). These findings indicate the need for further research to understand how age and gender influence experiences with FoMO and PSMU and perception of vulnerability.

Most research has increasingly highlighted the harmful effects of problematic social media use (PSMU) on well-being (Kross et al., 2021), yet little attention has been given to how compulsive social media use influences perceptions of vulnerability to online risks, fraud, and scams. Given that social media is deeply embedded in daily life, understanding the psychological mechanisms contributing to online risk perception is essential. One key factor influencing PSMU is fear of missing out (FoMO), which can drive compulsive engagement with social media, increasing exposure to potential online threats. Research by Fioravanti et al. (Fioravanti et al., 2021) suggests a strong correlation between FoMO and PSMU, indicating that individuals with high FoMO are more likely to develop compulsive social media behaviors. Additionally, Buglass et al. (Buglass et al., 2017) found that FoMO-driven social media engagement often leads to self-promotional behaviors aimed at reducing social inadequacy, which may inadvertently increase vulnerability to online manipulation and fraud. Given these associations, we hypothesize that "higher levels of FoMO will be positively associated with increased PSMU and that increased PSMU will be linked to heightened perceptions of vulnerability." Furthermore, PSMU may act as a mediator in this relationship, amplifying the effect of FoMO on perceived vulnerability. This aligns with prior findings that excessive social media engagement can reduce risk awareness, making individuals more susceptible to cyber threats (cyberpractices, 2023). By examining these interconnections, this study aims to provide insights into how psychological factors shape perceptions of online risk, ultimately informing interventions to mitigate cyber vulnerability in compulsive social media users.

Given the increasing reliance on social media across diverse cultural contexts, it is important to understand whether these psychological and behavioral tendencies vary across cultures. Individuals from collectivist cultures (e.g., Arab societies) may experience heightened social pressure and interconnectedness, which could amplify both FoMO and the perceived risks of online engagement compared to individualist cultures (e.g., the UK). Most existing research focuses on WEIRD contexts (Western, Educated, Industrialized, Rich, and Democratic) and assumes that findings from these populations can be generalized to others (Henrich et al., 2010). However, research shows that in individualistic societies, people tend to define themselves by personal attributes such as independence and achievements, whereas individuals in collectivist cultures tend to view themselves through social roles and connections (Ma & Schoeneman, 1997). These cultural differences have significantly impacted decision-making processes, suggesting that findings from one cultural group may not be universally applicable (Henrich et al., 2010). Furthermore, many studies investigating perceptions of vulnerability have concentrated on a single cultural context. To address this gap, our study conducts a comparative analysis of cultural influences, specifically examining the UK and Arab populations, which exhibit distinct cultural traits according to Hofstede (Hofstede, 1984). This comparative approach will help develop a more personalized and culturally sensitive understanding of FoMO, PSMU, and perceptions of vulnerability, thereby enhancing insights into cybersecurity behaviors.

This study aims to address the following research question for both the UK and Arab samples:

- 1. To what extent do age, gender, FoMO, PSMU, and vulnerability perceptions relate to each other?
- 2. Can FoMO and PSMU predict vulnerability perceptions?
- 3. Does PSMU mediate the relationship between FoMO and vulnerability perceptions?



*Note. Visual abstract

Research Method

Our study is part of a larger research design that examines various factors influencing cybersecurity attitudes and behaviors. Participants in the study interacted with a male software developer who asked for their assistance with a new app, and they rated their willingness to install the app as well as their trust in the developer, despite potential security risks. Only those participants who perceived some level of risk in installing the app were included in the analysis. A key aspect of our study involved incorporating FOMO, PSMU, and perceptions of vulnerability, making it a focused element within the broader investigation of these factors. All the scales and questions in both Arabic and English versions can be found at the Open Science Framework (OSF) link provided in the "Data Availability" section.

Participant and Procedure

Participants for this study were recruited from the Arab Gulf Cooperation Council (GCC) and the UK through TGM Research (https://tgmresearch.com/), a company specializing in data collection for research. These two cultural contexts were chosen for their contrasting moral principles and societal values, providing a diverse landscape for comparative analysis (Hofstede, 1984). The survey was designed and administered using SurveyMonkey (http://www.surveymonkey.com), a platform for creating and managing questionnaires. Before administering the survey, the research team engaged in an iterative process to ensure the clarity of the study questions. Initially formulated in English, the study underwent translation into Arabic. Two team members conducted the initial translation, followed by a thorough review by two additional members to ensure linguistic accuracy and fidelity. Subsequently, a pilot test was conducted with a small group of participants to ascertain the survey's clarity and eliminate ambiguity or unclear language.

Eligibility criteria for survey participation included being over 18 years old, being born and currently residing in either the GCC (Saudi Arabia, Qatar, Bahrain, Kuwait, Oman, and the UAE) or the UK (England, Scotland, Wales, and Northern Ireland), and self-identifying with the cultural norms and practices of either the Arab GCC or the UK. All participants provided informed consent and were allowed to withdraw from the survey at any time. Attention checks were embedded in the survey to maintain data quality, and those who failed more than two attention checks or completed the survey too quickly were excluded from the analysis. Participants who completed the survey were provided with compensation. Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the last author's institution. Participants who identified as non-binary were excluded from both the Arab and UK datasets due to the small sample size. Additionally, participants aged 60 and above were excluded from the analysis due to an uneven distribution across samples. Although we received responses from older individuals in the UK, we restricted the age range to 18-60 years to account for the difficulty of recruiting Arabs over 60, as they comprise only about 7% of the population in many Arab countries (Benamer, 2014). The final dataset comprised 642 participants, with 314 from the UK and 328 from the Arab, including both gender males and females.

Measures

Demographic Measure

Participants were required to provide information on their age and gender. Age was recorded as a continuous variable in years, while gender was reported in an open text field. Both fields were compulsory to complete.

Fear of Missing Out (FoMO)

To assess the concept of FoMO, a definition was introduced to participants in both its original English version for the UK sample and a translated Arabic version for the Arab sample, following the established back-translation method (Brislin, 1970). The definition stated: "FoMO, the fear of missing out, refers to the fear of not being able to know what is happening (whether on social media or in real-world) and participate in it and taking opportunities." Then, the participants were requested to rate their agreement or disagreement with the following statement: "I experience FoMO regarding what is happening on social media." Responses were recorded using a 10-point Likert scale, ranging from "1 = strongly disagree" to "10 = strongly agree," with higher scores reflecting a more pronounced fear of missing out.

Problematic Social Media Use (PSMU)

Problematic social media use was assessed using both the original English version and a translated Arabic version of the Social Media Disorder scale (van den Eijnden et al., 2016). For the present study, the Arabic version of the scale was created

using the recommended back-translation method (Brislin, 1970). The Social Media Disorder scale includes nine items aligned, and the example of the item consists of "... regularly found that you can't think of anything else but the moment that you will be able to use social media again?". Participants evaluated each item on a 5-point Likert scale, ranging from "1 = never" to 5 = always". The PSMU score was obtained by summing the responses, with higher scores reflecting a higher level of social media disorder. The scale has shown good internal consistency with Cronbach's alpha ranging from α = 0.76 to α = 0.82. In our study, Cronbach's alpha was α = 0.87 for the UK sample and α = 0.84 for the Arab sample.

Perception of Vulnerability

In this study, the vulnerability indicator was developed using custom-designed questions to assess participants' perceptions of vulnerability. These questions were created to capture individuals' experiences and assessments of their vulnerability, as no standardized scale fully addresses these perceptions. The three questions we used to gauge vulnerability are as follows: The first question is, "Have you ever encountered or been a target of a scam/fraud/hacking incident?" The responses are scored as yes = 1, maybe = 2, and no = 3. The second question is, "How likely do you think you might be targeted by scams, fraud, or hacking incidents on social media?" with answers on a six-point Likert scale (very unlikely = 1 to very likely = 6). The third question is, "How likely is it that one of the scams, fraud, or hacking attacks targeting you will succeed?" also on a six-point Likert scale (very unlikely = 1 to very likely = 6). These questions do not form a standardized scale for measuring perceptions of vulnerability. Instead, they provide a broader insight into an individual's perception of vulnerability by capturing various dimensions of how people perceive and assess their susceptibility to cyber threats. After gathering the data, we converted the first question, "Have you ever encountered or been a target of a scam/fraud/hacking incident," to a binary format where "no" represents "0" and both "maybe and yes" represent "1." We created variables for these three questions: Encounter of a scam, Likelihood of being targeted by a scam, and Likelihood of a successful scam. In this study, the Arabic version of the scale was developed using the recommended back-translation method (Brislin, 1970).

Data Analysis

The analysis was conducted for both UK and Arab participant samples using JASP software version 0.18.3 (https://jasp-stats.org/). Descriptive statistics were computed for all the variables. Skewness and kurtosis of all the variables in both samples fell within the range of +2 to -2, indicating

approximately normal distribution (Curran et al., 1996). The choice of the statistical test is justified by the central limit theorem (CLT) (Kwak & Kim, 2017), which indicates that with sample sizes larger than 30, the sample means will approximate a normal distribution, making parametric tests appropriate. The independent t-test was used to analyze gender-related differences for all variables except the Encounter of a scam due to its categorical nature. When the assumption of equality of variances (assessed using Levene's test) was violated, Welch's t-test was used instead. For the Encounter of a scam, a chi-square test shows gender differences. A point-biserial correlation was utilized for gender and the Encounter of a scam, while Pearson's correlations were employed for the other variables. While our data is ordinal, the large sample size permits parametric tests. Typically designed for interval data, parametric tests are robust and can be appropriately applied to ordinal data, mainly when the sample size is large (Norman, 2010). Regression analysis was performed to examine if FOMO and PSMU could predict the perception of vulnerability. The residuals'

Table 1 Participant demographics

	Variables	UK, <i>N</i> = 314	Arab, <i>N</i> = 328
Gender	Male	131 (41.72)	185 (56.40)
(%)	Female	183 (58.28)	143 (43.59)
Age	M (SD)	37.79 (12.16)	35.59 (10.08)
	Range	18–59	18–57

assumption of normality and homoscedasticity were met as indicated by the residual's histogram and the Q-Q plot. The collinearity statistics showed no multicollinearity among the variables. The VIF values were <2, and the Tolerance values were > 0.2. Durbin–Watson value was between 1 and 3, suggesting the independence of predictors. Outlier was identified as standardized residuals exceeding ± 3 standard deviations in the UK sample and removed from the relevant regression analysis. Subsequently, mediation analysis, involving 1000 bootstrapping resamples, was conducted to examine the mediating effect of PSMU on the relationship between FoMO and perception of vulnerability. All the values for assumption checks for both UK and Arab samples can be found at the Open Science Framework (OSF) link provided in the "Data Availability" section.

Results

Sample Characteristics

The demographic characteristics of participants from both the UK and Arab samples are described in Table 1.

An independent *t*-test analysis was conducted to examine gender differences within the UK and Arab samples, as well as to compare differences between the UK and Arab groups themselves. The result revealed no significant gender differences in the UK sample (Table 2). However, in the Arab sample, significant gender differences were observed in

 Table 2
 Independent t-test results of gender-related differences in both UK and Arab sample

	UK				Arab	Differences between two sample			
	Total sample M (SD)	Male M (SD)	Female M (SD)	Gender dif- ferences	Total sample M (SD)	Male M (SD)	Female M (SD)	Gender dif- ferences	Total sample M(SD)
FoMO	4.01 (2.69)	3.86 (2.69)	4.12 (2.69)	t (312) = 0.84, p = 0.401, d = 0.09	5.40 (2.51)	5.36 (2.54)	5.46 (2.47)	t (326) = 0.33, p = 0.741, d = 0.04	<i>t</i> (631.51) =6.79, <i>p</i> < 0.001 , <i>d</i> = 0.54*
PSMU	16.83 (5.78)	16.31 (5.98)	17.19 (5.62)	t (312) = 1.35, p = 0.178, d = 0.15	22.74 (6.73)	21.49 (6.34)	24.37 (6.89)	t (326) = 3.92, p < 0.001 , d= 0.44	<i>t</i> (632.59) =11.98, <i>p</i> < 0.001 , <i>d</i> = 0.94*
Likelihood of being targeted by a scam	3.93 (1.17)	4.02 (1.17)	3.87 (1.16)	t (312) = - 1.06, p= 0.292, d= -0.12	4.25 (1.28)	4.41 (1.25)	4.03 (1.29)	t (267) = - 2.45, p = 0.015 , d = -0.30	t (547.26) = 3.13, p = 0.002 , d = 0.26*
Likelihood of a suc- cessful scam	3.02 (1.24)	2.92 (1.10)	3.09 (2.92)	t (312) = 1.16, p = 0.248, d = 0.13	4.03 (1.25)	4.16 (1.22)	3.86 (1.27)	t (326) = - 2.15, p = 0.032 , d = -0.24	<i>t</i> (640) = 10.28, <i>p</i> < 0.001 , <i>d</i> = 0.81

*Welch's t-test

Table 3Chi-square test ofindependence to comparedifferences between genders forthe encounter of a scam withinthe UK and Arab sample

	UK					Arab		Differe betwee sample	ences en two			
	Total n (%)	Male <i>n</i> (%)	Female n (%)	$X^{2}(1)$	р	Total n (%)	Male <i>n</i> (%)	Female n (%)	$X^{2}(1)$	р	$\overline{X^2(1)}$	р
No	179 (47.99)	70 (39.11)	109 (60.89)	1.17	0.279	194 (52.01)	103 (53.03)	91 (46.91)	2.12	0.146	0.30	0.583
Yes	135 (50.19)	6 (45.19)	74 (54.82)			134 (49.81)	82 (61.19)	52 (38.81)				

PSMU, the Likelihood of being targeted by a scam, and the Likelihood of a successful scam. Females displayed higher levels of PSMU than males. Conversely, males exhibited higher levels of the Likelihood of being targeted by a scam than females. Similarly, males demonstrated higher levels of the Likelihood of a successful scam than females.

Cultural differences were evident across all examined variables. The Arab sample exhibited significantly higher levels of FoMO, PSMU, Likelihood of being targeted by a scam, and Likelihood of a successful scam than the UK sample.

The chi-square analysis was performed for the encounter of a scam because of the categorical nature of this variable to show the differences between males and females. This analysis revealed non-significant differences between genders for both the UK and Arab samples (Table 3).

Correlation Analysis

Pearson's correlation analysis was conducted for both the UK and Arab samples, examining the relationships between FoMO, PSMU, perception of vulnerability variables, age, and gender. This analysis revealed a significant positive association between FoMO and PSMU in both the UK and Arab samples (Table 4).

In the UK sample, PSMU shows a consistent positive association with the encounter of a scam, the Likelihood of being targeted by a scam, and the Likelihood of a successful scam. FoMO is also positively associated with the Likelihood of being targeted by a scam. In contrast, the Arab sample presents a different pattern, where PSMU does not significantly relate to these outcomes, but FoMO is positively associated with the Likelihood of a successful scam. These differences suggest cultural variations in how FoMO and PSMU impact vulnerability perceptions to scams.

Age and gender reveal divergent associations across the two samples. In the UK, both PSMU and FoMO are negatively associated with age, indicating younger individuals may be more vulnerable to scams. However, no significant associations are observed between the gender and the other variables. In the Arab sample, PSMU is also negatively associated with age, but age positively correlates with both the Likelihood of being targeted by a scam and the Likelihood of a successful scam. Additionally, in the Arab sample, gender is positively associated with PSMU and negatively associated with the Likelihood of being targeted by a scam and the Likelihood of a successful scam.

Regression Analysis

Logistic Regression

We tested whether FoMO, PSMU, age, and gender could predict the encounter of a scam. A logistic regression analysis was conducted to examine this relationship, given the categorical nature of the outcome variable, "Encounter of a scam." The results of the statistics showed a significant overall model performance in the UK sample (Table 5). The McFadden's R^2 explained 5% of the variance in the Encounter of a scam.

The results demonstrated that PSMU and age are significant predictors of the Encounter of a scam in the UK sample. For each one-unit increase in PSMU, the odds of the Encounter of a scam increased by 9%, indicating a slight positive relationship between PSMU and the Encounter of a scam. This is a relatively small effect, suggesting that while there is a statistically significant relationship, the practical or real-world impact is limited.

The analysis indicated that age was also a significant predictor. For each additional year of age, the odds of the Encounter of a scam increased by 2%. Although the effect size is small, it suggests that older individuals have slightly higher odds of the Encounter of a scam than younger individuals.

Multiple Linear Regression

A multiple linear regression analysis was performed to assess whether FoMO, PSMU, age, and gender can predict the Likelihood of being targeted by a scam and the Likelihood of a successful scam. The results revealed FoMO and PSMU were the significant predictors of the Likelihood of being targeted by a scam in the UK sample (Table 6).

	UK					Arab				
	FoMO	PSMU	Encounter of a scam	Likelihood of being targeted by a scam	Likelihood of a successful scam	FoMO	PSMU	Encounter of a scam	Likelihood of being targeted by a scam	Likelihood of a successful scam
PSMU	0.53^{***}	I				0.36**'	1			
Encounter of a scam ^a	0.11	0.21^{***}	I			0.08	0.03	I		
Likelihood of being targeted by a scam	0.18^{**}	0.20^{***}	0.23^{***}	I		0.09	0.03	0.25^{***}	I	
Likelihood of a successful scam	0.10	0.19^{***}	0.09	0.35^{***}	I	0.15^{**}	0.09	0.19^{***}	0.52^{***}	
Age	-0.30^{***}	-0.37^{***}	0.03	- 0.01	0.05	- 0.02	-0.14^{*}	0.09	0.19^{**}	0.17^{**}
Gender ^a	0.05	0.08	- 0.06	- 0.06	0.07	0.02	0.21^{***}	- 0.08	-0.15*	-0.12^{*}

Conversely, in the Arab sample, age emerged as the sole significant predictor of the Likelihood of being targeted by a scam.

Regarding the Likelihood of a successful scam, PSMU and age were significant predictors in the UK sample. In contrast, in the Arab sample, FoMO and age were significant predictors of the Likelihood of a successful scam.

Mediating Impact of PSMU

The mediation analysis was conducted to examine the mediating effect of PSMU in the relationship between FoMO and perceptions of vulnerability variables. These variables were included as covariates in the analysis to account for the potential impact of age and gender. For the UK sample, the mediation model results showed a significant total effect of FoMO on the Encounter of a scam ($\beta = 0.128$, SE = 0.059, p = 0.029) but a non-significant direct impact of FoMO on the Encounter of a scam ($\beta = 0.014$, SE = 0.065, p = 0.824). The indirect impact of FoMO through PSMU was significant $(\beta = 0.114, SE = 0.033, p < 0.001)$. These results indicate that PSMU fully mediates the relationship between FoMO and the Encounter of a scam in the UK sample (Fig. 1). However, in the Arab sample, none of the total, direct, and indirect effects were significant, suggesting no mediation effect of PSMU on the relationship between FoMO and the Encounter of a scam.

For the UK sample, the mediation model results showed a significant total effect of FoMO on the Likelihood of being targeted by a scam ($\beta = 0.200$, SE = 0.058, p < 0.001), but a non-significant direct effect of FoMO on the Likelihood of being targeted by a scam ($\beta = 0.110$, SE = 0.065, p = 0.065). The indirect impact of FoMO through PSMU was significant ($\beta = 0.080$, SE = 0.032, p = 0.011). These results indicate that PSMU fully mediates the relationship between FoMO and the Likelihood of being targeted by a scam in the UK sample (Fig. 2). However, in the Arab sample, none of the total, direct, and indirect effects were significant, suggesting no mediation effect of PSMU on the relationship between FoMO and the Likelihood of being targeted by a scam.

For the UK sample, the mediation model results showed a significant total effect of FoMO on the Likelihood of a successful scam ($\beta = 0.128$, SE = 0.059, p = 0.029), but a non-significant direct impact of FoMO on the Likelihood of a successful scam ($\beta = 0.023$, SE = 0.065, p = 0.725). The indirect impact of FoMO through PSMU was significant ($\beta = 0.105$, SE = 0.032, p = 0.001). These results indicate that PSMU fully mediates the relationship between FoMO and the Likelihood of a successful scam in the UK sample (Fig. 3). However, in the Arab sample, the mediation model results showed a significant total impact of FoMO on the Likelihood of a successful scam ($\beta = 0.155$, SE = 0.054, p = 0.004) and a significant direct impact of FoMO on the Table 5Logistic regressionanalysis of Encounter of a scamwith FoMO, PSMU, age, andgender in the UK and Arabsample

Predictor	UK					Arab					
	β	SE	z	Odds ratio	р	β	SE	z	Odds ratio	р	
	$X^2 = 19.$	$X^2 = 19.69, R^2_{McF} = 0.05, p < 0.001$					$X^2 = 6.59, R^2_{\text{McF}} = 0.02, p = 0.159$				
FoMO	0.03	0.05	0.24	1.01	0.829	0.15	0.05	1.23	1.06	0.220	
PSMU	0.53	0.03	3.58	1.09	< 0.001	0.07	0.02	0.58	1.01	0.561	
Age	0.26	0.01	2.03	1.02	0.043	0.17	0.01	1.39	1.02	0.163	
^a Gender	- 0.31	0.24	- 1.27	0.74	0.201	- 0.29	0.24	- 1.18	0.75	0.236	

^amale, 0; female, 1

Odds ratio: Compares the odds of an event occurring in each category of a predictor variable relative to the reference category, assuming all other variables remain constant

Table 6Linear regressionanalysis of the Likelihood ofbeing targeted by a scam andthe Likelihood of a successfulscam with FoMO, PSMU, age,and gender in the UK and Arabsample

Models	Outcome	Predictor	UK			Arab		
			β	t	р	β	t	р
1	Likelihood of being		$R^2 = 0.09, F(0.001)$	4307) = 7.	10, <i>p</i> <	$R^2 = 0.06, F(4)$ p < 0.01	1264) = 3.	96,
	targeted by a	FoMO	0.14	2.16	0.032	0.09	1.39	0.163
	scam	PSMU	0.21	3.23	0.001	0.03	0.40	0.689
		Age	0.12	1.97	0.050	0.16	2.65	0.009
		aGender		- 1.43	0.153		- 1.83	0.069
2	Likelihood of a successful		$R^2 = 0.06, F(0.01)$	(4309) = 4.	74, <i>p</i> <	$R^2 = 0.07, F (4)$ p < 0.001	(323) = 5.	65,
	scam	FoMO	0.02	0.35	0.727	0.12	2.09	0.038
		PSMU	0.23	3.42	< 0.001	0.09	1.61	0.109
		Age	0.14	2.40	0.017	0.16	2.80	0.005
		^a Gender		1.06	0.291		- 1.76	0.079

^amale, 0; female, 1

Fig. 1 Mediation model between FoMO and the Encounter of a scam through PSMU: (c) total effect and (c') direct effect. p < 0.05; p < 0.01; p < 0.001



Indirect: UK: $\beta = 0.114^{***}$; Arab: $\beta = 0.013$

Likelihood of a successful scam ($\beta = 0.121$, SE = 0.057, p = 0.036). The indirect effect of FoMO through PSMU was insignificant ($\beta = 0.034$, SE = 0.022, p = 0.114). These

results indicate that in the Arab sample, the relationship between FoMO and the Likelihood of a successful scam is not mediated by PSMU. **Fig. 2** Mediation model between FoMO and the Likelihood of being targeted by a scam through PSMU: (c) total effect and (c') direct effect. *p <0.05; **p < 0.01; ***p < 0.001



Indirect: UK: $\beta = 0.080^*$; Arab: $\beta = 0.010$



Indirect: UK: $\beta = 0.105^{**}$; Arab: $\beta = 0.034$

Discussion

To gain a deeper understanding of the underlying factors contributing to perceptions of vulnerability, this study investigated the role of FoMO and PSMU in determining the perceptions of vulnerability and the mediating effect of PSMU on the relationship between FoMO and perception of vulnerability.

A significant difference was observed in the descriptive statistics for the variables examined in this study, with all variables showing higher levels in the Arab sample compared to the UK sample. Specifically, the Arab sample exhibited higher levels of fear of missing out (FoMO) than the UK sample, which may reflect underlying cultural differences. This finding is consistent with Hofstede Insights' Uncertainty Avoidance index (Hofstede Insights, 2023), which shows higher scores in the Arab sample compared to the UK, indicating a closer association between Uncertainty Avoidance and FoMO. Moreover, the Arab sample demonstrated higher levels of problematic social media use (PSMU) than the UK sample. In collectivist cultures, such as those in the Arab region, there is a strong emphasis on social bonds and community involvement (Penn, 2021). This emphasis can lead to more intensive social media use to maintain and strengthen these connections, potentially increasing the risk of PSMU. Notably, research indicates that the cultural value placed on individuality common in more individualistic societies



may have a stronger influence on behavior than adherence to group norms (Shin et al., 2013), potentially explaining why the UK sample might show different patterns of behavior compared to the Arab sample. Additionally, the Arab sample showed higher levels of Likelihood of being targeted by scams and the success of scams compared to the UK sample, which is consistent with the cultural dimension of Uncertainty Avoidance (Hofstede Insights, 2023). Cultures with high Uncertainty Avoidance often exhibit heightened sensitivity to ambiguity and potential risks, leading individuals to perceive themselves as more vulnerable to threats and uncertainties.

Additionally, there are no significant gender-related differences in the UK sample for any of the variables in this study. The lack of gender differences might be attributed to cultural and societal norms in the UK that promote gender equality and similar educational and professional opportunities for both genders, leading to comparable perceptions in these areas (Fetterolf, 2019). However, in the Arab sample, there are significant gender-related observed for PSMU, the Likelihood of being targeted by a scam, and the Likelihood of a successful scam. Our study found that Arab females are more likely to use problematic social media than males, which is consistent with the literature findings (Su et al., 2020). However, our results showed that Arab females are less likely to be targeted by scams or fraud, which contradicts the findings in the existing literature (Marttila et al., 2021a). These findings highlight the complex interplay between cultural and gender-related factors in shaping behaviors to problematic social media use and perceptions of vulnerability, underscoring the importance of considering cultural context in understanding these dynamics.

The correlation analysis provides valuable insights into the relationships between FoMO, PSMU, and perception of vulnerability variables within the UK and Arab samples. The result highlighting a strong positive association between FoMO and PSMU in both UK and Arab suggests that individuals with higher levels of FoMO are more likely to engage in problematic social media use. This finding aligns with previous research indicating that FoMO can drive excessive social media engagement as individuals seek to avoid missing out on online activities and updates (Dadiotis & Roussos, 2024; Fioravanti et al., 2021). For the UK sample, the results indicate a significant relationship between PSMU and the perceptions of vulnerability variables indicating that individuals with higher levels of PSMU are more likely to encounter scams, be targeted by scams, and experience successful scams. These associations suggest that problematic social media users may be more vulnerable to online threats due to their increased online presence and potentially risky online behaviors. FoMO and PSMU, while closely related, are distinct concepts, as supported by existing research. For example, a study by Przybylski et al. found that individuals with higher levels of FoMO tend to engage more frequently with social media to mitigate their fear of missing out on social interactions (Przybylski et al., 2013). However, other studies, such as those by Elhai et al. show that PSMU is more strongly associated with psychological outcomes like anxiety, depression, and lower life satisfaction (Elhai et al., 2017). This indicates that while FoMO may fuel the desire to remain connected, PSMU refers to the long-term, habitual overuse that results in adverse mental health outcomes.

In contrast, the Arab sample did not show significant associations between PSMU and perception of vulnerability, suggesting that other factors might mitigate the risk of scams in this population. Interestingly, a positive association between FoMO and the Likelihood of a successful scam in the Arab sample indicates that while FoMO may not increase exposure to scams, it could make individuals more susceptible to falling victim when targeted (Brayden Lindrea, 2024; Küçükkarakurt, 2023). This highlights a potential cultural difference in how FoMO influences online vulnerability.

The correlation analysis also revealed that age plays a critical role in these relationships, particularly in the UK sample, where both FoMO and PSMU negatively correlated with age. This suggests that younger individuals are more prone to experiencing FoMO and engaging in PSMU (C. S. Andreassen et al., 2016; Rozgonjuk et al., 2021), making them more vulnerable to scams (Marttila et al., 2021a). In the Arab sample, age was positively associated with the Likelihood of being targeted by and encountering scams, indicating that older individuals may face different online risks (McConatha et al., 2021). Gender differences were also notable, particularly in the Arab sample, where gender positively correlated with PSMU (Brailovskaia et al., 2023) and negatively correlated with the likelihood of being targeted by and falling victim to scams. These findings suggest that in this cultural context, women may engage more in problematic social media use but may also be less likely to be targeted or fall victim to scams, perhaps due to different online behaviors or risk perceptions compared to men.

The logistic regression analysis provides insight into the predictors of scam encounters within the UK sample. The model revealed that PSMU significantly increases the Encounter of a scam. Specifically, each one-unit increase in PSMU was associated with increased odds of the Encounter of a scam. This finding underscores the potential vulnerability of individuals with higher levels of social media dependency, likely due to increased exposure to online content where scams are prevalent (Marttila et al., 2021a). Age was also a significant predictor of scam encounters, with each additional year of age slightly increasing the odds of encountering a scam by 2%. This suggests that older individuals might be more susceptible to scams due to greater online activity and potential cognitive decline (Boyle et al., 2019). The finding revealed that none of the predictors (FoMO, PSMU, age, and gender) were significant in predicting the Encounter of a scam in the Arab sample. It indicates a potential cultural or contextual difference between the UK and Arab samples, where the significant predictors in the UK sample do not have the same influence in the Arab sample.

In the UK sample, the multiple linear analysis revealed that both FoMO and PSMU significantly predicted the Likelihood of being targeted by a scam. Specifically, higher levels of FoMO and PSMU were associated with a greater Likelihood of being targeted by a scam, suggesting that individuals who experience higher levels of FoMO and engage in problematic social media use may be more susceptible to scam attempts. This finding aligns with previous research, indicating that individuals who are more dependent on social media and fear missing out may be more susceptible to phishing, scams, or online threats (Küçükkarakurt, 2023). Regarding the Likelihood of a successful scam, PSMU and age were significant predictors in the UK sample. This result implies that individuals with higher levels of PSMU and older individuals are more likely to fall victim to a scam (Age UK, 2019; Marttila et al., 2021a). In contrast, in the Arab sample, age was the only significant predictor for the Likelihood of being targeted by a scam, suggesting that older individuals in the Arab sample are more likely to be targeted, aligned with the previous study (Robinson & Edwards, 2024). For the Likelihood of a successful scam in the Arab sample, both FoMO and age were significant predictors. This indicates that, similar to the UK sample, older individuals and those with higher levels of FoMO are more likely to fall victim to scams. These findings highlight the importance of considering cultural context and individual differences when assessing vulnerability to online scams.

In the UK sample, PSMU fully mediated the relationship between FoMO and the three scam-related outcomes: the Encounter of a scam, the Likelihood of being targeted by a scam, and the Likelihood of a successful scam. This suggests that individuals with higher FoMO are more likely to experience these vulnerabilities (Institute of Data, 2023), but this relationship is driven by their PSMU (Küçükkarakurt, 2023). The mediation effect highlights that the influence of FoMO on scam vulnerability operates through PSMU, indicating that problematic social media use amplifies the risks associated with FoMO (Dadiotis & Roussos, 2024). Conversely, in the Arab sample, no mediation effect of PSMU was found for the Encounter of a scam or the Likelihood of being targeted by a scam. This indicates that PSMU does not play a significant role in linking FoMO with these scam vulnerabilities in this cultural context. However, for the Likelihood of a successful scam, FoMO had a direct effect, with no mediation by PSMU. This suggests that in the Arab sample, FoMO alone is a strong predictor of scam success, independent of PSMU. These findings underscore the cultural differences in how FoMO and PSMU interact to influence scam vulnerability.

The findings of this study offer several important implications for understanding and addressing digital dependency and insecurity. First, the significant role of FoMO and PSMU in shaping perceptions of vulnerability highlights the need for targeted interventions to mitigate the risks associated with excessive social media use. Educational programs and awareness campaigns should emphasize the potential dangers of high FoMO and PSMU, particularly in cultures where these factors are more pronounced. A key policy implication of this finding is the importance of digital literacy programs that focus on fostering critical decision-making skills online, especially in the context of cybersecurity and social media use. These programs should empower individuals to assess potential risks, identify manipulative tactics, and make informed decisions to safeguard their digital well-being. Instilling critical literacy would be more effective if delivered not only via a knowledge transfer program but through innovative techniques, such as attitudinal inoculation, which encourages individuals to question their own assumptions about their cyber behavior and decision-making and develop countermeasures, as shown in the previous study by AlShakhsi et al. and Cemiloglu et al. (AlShakhsi et al., 2024; Cemiloglu et al., 2023). Additionally, the observed cultural differences between the UK and Arab samples suggest that interventions must be culturally sensitive (Bhatti-Sinclair, 2015), as the predictors and mechanisms influencing scam vulnerability vary across contexts. Tailoring prevention strategies to specific cultural and demographic characteristics can enhance their effectiveness. Policy efforts, whether by governments or technology providers, should consider the unique challenges posed by different cultural attitudes toward technology, family structures, and online behaviors.

The mediation role of PSMU in the UK context underscores the importance of addressing problematic social media behaviors as a critical strategy in reducing vulnerability to online threats. Interventions should focus on providing individuals with tools and techniques to manage excessive social media use and mitigate its negative psychological effects. Such tools should not only focus on regulating users but also on providing alternatives and adapting the design to support healthy choices and instill better critical thinking (Alrobai et al., 2016a; Cham et al., 2019). At the same time, the direct effect of FoMO in the Arab sample suggests that efforts should also focus on managing FoMO itself. Public health campaigns could incorporate coping strategies for FoMO, such as mindfulness practices and digital detox initiatives, to promote healthier engagement with social media (Alutaybi et al., 2020). These policy implications stress the importance of a nuanced approach to digital security that considers both individual psychological factors and cultural contexts. By integrating these insights into comprehensive digital literacy and intervention programs, we can work toward promoting safer and healthier online behavior for diverse populations.

Acknowledging the study's limitations is essential for a balanced interpretation of the results. A limitation of this study is the use of custom-designed questions to measure the perception of vulnerability, which may not fully capture the complexity of individuals' perceptions across different contexts. The three questions employed focused on the encounter of a scam, the likelihood of being targeted by a scam, and the likelihood of a successful scam were designed to provide a broad understanding of vulnerability but do not constitute a standardized, validated scale for measuring perceptions of vulnerability. While these questions offer valuable insights into individuals' self-reported perceptions and experiences with cyber threats, they may not encompass the full range of factors influencing vulnerability. As such, while our study provided initial evidence, future research can develop more sophisticated and nuanced measures to capture the multi-faceted nature of these behaviors. Moreover, selfreported data may introduce bias, and the cross-sectional design limits causal inferences. The focus on UK and Arab samples restricts generalizability, while reliance on quantitative methods may overlook nuanced experiences. Additionally, the rapid evolution of social media may impact the long-term relevance of the findings.

To address potential biases in survey research and enhance the quality of our data and findings, we implemented several measures. First, we ensured anonymity and confidentiality to encourage honest responses, reducing social desirability bias. Second, we used the back-translation method (Brislin, 1970) to ensure linguistic and cultural equivalence in the Arabic and English versions of the survey, minimizing misinterpretation. Third, we randomized question order where possible to prevent response biases such as primacy or recency effects. Additionally, participants were informed that there were no right or wrong answers, which helped reduce demand characteristics. To further improve data quality, we conducted a pilot study to refine survey items based on participant feedback, ensuring clarity and comprehensibility across diverse cultural contexts. Beyond these precautions, we also implemented methodological safeguards throughout data collection. Participants had the freedom to withdraw at any time, reducing response pressure. We used validated scales and assessed their internal reliability to confirm measurement consistency. To minimize sampling bias, we followed prior research recommendations for sample size and emphasized diverse survey dissemination across different demographic and geographic groups. This was done through the company that collected the data, where we clearly stated these requirements. We also utilized multiple attention checks to ensure respondents were paying attention, excluding those who failed to answer correctly. Additionally, we removed respondents who completed the survey too quickly. Additionally, comparing findings between the UK and Arab populations provided cross-cultural validation, increasing confidence in the results.

Conclusion

This study examines the intricate relationships between fear of missing out (FoMO), problematic social media use (PSMU), and perceptions of vulnerability across UK and Arab samples. The findings underscore the significant role those digital behaviors, influenced by FoMO and PSMU, play in shaping individuals' susceptibility to cyber threats. While both psychological constructs were associated with heightened perceptions of vulnerability, the strength and nature of these associations varied between the two cultural contexts. Notably, the study reveals that while FoMO and PSMU contribute to the Likelihood of being targeted by scams and falling victim to them, these predictors were not significant in explaining the actual encounters with scams within the Arab sample. This highlights the complexity of scam-related outcomes and suggests that cultural factors, possibly unmeasured in this study, may play a critical role. The research emphasizes the need for a nuanced understanding of how psychological and cultural factors influence digital vulnerability. It also calls attention to the potential for developing targeted interventions that address the psychological underpinnings of digital dependency and vulnerability.

Future studies could be expanded by analyzing different types of scams (e.g., phishing, romance scams, phone scams), providing greater specificity for targeted prevention and intervention strategies, and offering a deeper understanding of the psychological and behavioral vulnerabilities that each scam exploits. Another area to explore in future research is the role of personal factors such as personality traits (e.g., extraversion, neuroticism), risk-taking attitudes, and locus of control in influencing FoMO, PSMU, and vulnerability perceptions. For instance, individuals who score high in extraversion may engage more frequently with social media platforms (Bowden-Green et al., 2020) and, consequently, increasing their susceptibility to scams. On the other hand, a study shows that neuroticism is significantly associated with PSMU and FoMO (Alshakhsi et al., 2023), which suggests individuals higher in neuroticism may perceive themselves as more vulnerable to online threats, amplifying feelings of anxiety or caution in their online behaviors.

Additionally, individuals with a high propensity for risk-taking might experience heightened vulnerability to scams and fraud due to their tendency to underestimate online threats (Norris et al., 2019). Similarly, a strong internal locus of control may buffer individuals against feelings of vulnerability, as they believe they have control over their online behaviors and security (Granier, 2024). Understanding how these individual characteristics interact with cultural and contextual factors, such as societal norms or media exposure, could provide deeper insights into the psychological underpinnings of digital dependency and vulnerability. Exploring these personal factors may also help to tailor interventions more effectively, as certain individuals may be more susceptible to specific types of scams or online risks based on their personality and attitudes. Such research could lead to more personalized intervention strategies and enhance our understanding of the complex interplay between personal traits and digital behaviors. Additionally, the cultural differences observed between the UK and Arab samples underscore the need for more extensive cross-cultural studies to inform culturally sensitive interventions. Given these established links, future research should examine how these personal factors simultaneously shape FoMO, PSMU, and vulnerability perceptions within a unified research framework using the same participant sample. This approach would allow for a more holistic understanding of their combined influence and provide stronger empirical grounds for developing targeted intervention strategies.

Author Contribution The study was designed and supervised by RA, MB, AE, and KK. It was conceptualized by RA, MB, AY, and TS. Data curation was handled by RA, MB and AN. Statistical analysis was designed by TS, AY, and RA and performed by TS and AY, with AY supervising the analysis and contributing to methodology, discussion, and literature. The initial draft, including the literature search and theoretical framework, was prepared by TS and subsequently reviewed and revised by AY, MB, KK, JD, AE, AN, and RA.

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Data Availability The dataset associated with this work has been uploaded along with the supplementary materials for this article at the following Open Science Framework link: https://osf.io/d8j6q/.

Declarations

Conflict of Interest The authors declare no competing interests.

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