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Dark consequences of social media-induced fear of missing out (FoMO): Social media stalking, comparisons, and fatigue

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ABSTRACT

Research on the dark side of social media usage has explored the fear of missing out (FoMO), social media fatigue (fatigue), social media stalking (stalking), and online social comparison (social comparison) independently. Accordingly, the complex interrelationships among these phenomena have remained understudied, creating a chasm that hinders a clearer understanding of their drivers and the potential counterstrategies to mitigate the collateral damage they may cause. We attempt to bridge this gap by drawing upon the theory of social comparison and the theory of compensatory internet use to formulate a framework that hypothesizes the mechanism of interaction among these negative fallouts. The model, tested through analysis of data collected from 321 social media users from the United Kingdom (UK), takes into consideration the moderation effect of the frequency of posting social media status updates and social media envy, along with the mediation effect of social comparison and stalking. The results indicate that FoMO and social comparison are directly associated with fatigue. Furthermore, social comparison partially mediates the association of FoMO and fatigue, while social media envy negatively moderates the association of FoMO with social comparison. The results provide new insights into the dynamic interplay of these dark side manifestations of social media.

1. Introduction

With the proliferation of social media use, scholars have turned their attention to the psychosocial implications of such behaviors (Chai et al., 2019; Dhir et al., 2021; Tandon et al., 2020; 2021a, b). In particular, research in the past five years has focused on the negative phenomena associated with social media use (e.g., Dhir et al., 2019; Talwar et al., 2019, 2020a; Tandon et al., 2021b), which have been termed the dark side of social media (Dhir et al., 2021; Talwar et al., 2019; Tandon et al., 2021a, b). Some of the key manifestations examined by scholars have included the fear of missing out (FoMO, Tandon et al., 2021a), social media-induced jealousy (Tandon et al., 2021b), and social media fatigue, as well as their effects on psychosocial well-being, sleep issues, and academic performance decrement (e.g., Dhir et al., 2018, 2019; Malik et al., 2020). However, a review of the existing literature highlights that the current knowledge about the negative fallouts of social media requires deepening, especially given the implications they have for the well-being of individuals, societies, and communities.

Taking the discussion further, a closer scrutiny of the accumulated findings in this area presents three knowledge gaps in the area. First, there exists limited knowledge on social media fatigue (Bright and Logan, 2018; Dhir et al., 2018, 2019), its antecedents (Islam et al., 2020), and its correlates from amongst other social media use behaviors, such as online social comparison (Malik et al., 2020; Talwar et al., 2019). Since social media fatigue can cause individuals to cease or decrease their social media use (Dhir et al., 2018, 2019; Malik et al., 2020), we argue that this is a significant gap in theory with critical implications for practice. Second, prior studies have mainly investigated FoMO as a third variable, that is, as either a mediator (e.g., Wang et al., 2018) or moderator (e.g., Chai et al., 2019). Few studies have considered

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FoMO as an antecedent to the negative consequences of social media use (Tandon et al., 2020; 2021a), such as social media fatigue (Dhir et al., 2018), fake news sharing (Talwar et al., 2019), disruption in daily/routine activities (Appel et al., 2019), the intrusiveness of social media platforms like Facebook (Dhir et al., 2021), and problematic sleep due to social media use (Tandon et al., 2020). Given that FoMO may be a key factor driving individuals to use social media, we contend that the limited understanding of FoMO represents a gap in research that is imperative to address. Third, research has indicated that the association of FoMO with other dark side of social media phenomena may be mediated and/or moderated by other variables, including compulsive social media use (Dhir et al., 2018) and individual emotions (James et al., 2017). However, the role of such mediating and moderating variables has seldom been investigated in the prior literature (Yin et al., 2019), thereby yielding only a superficial understanding of these confounding mechanisms. We assert that this knowledge gap about these additional effects limits individuals, mentors, and professionals' abilities to apply or suggest suitable coping strategies to mitigate the adverse effects of social media use; therefore, it demands immediate research attention.

The present study proposes to address these research gaps by focusing, firstly, on the role of FoMO as an antecedent of social media fatigue (fatigue hereafter), which is related to the information, communication, and technology overloads resulting from an individual's interactions on social media (Dhir et al., 2019; Malik et al., 2020; Talwar et al., 2019). This is in concordance with recent studies that have noted that fatigue is subjective and may be related to other adverse issues associated with social media use, such as FoMO (Bright and Logan, 2018; Malik et al., 2020). Despite this, limited research has focused on how the information gathered and processed by social media users driven by FoMO influences their experienced fatigue. For example, few scholars have examined whether social media users experience fatigue from participating in online social comparisons (hereafter referred to as social comparisons; Malik et al., 2020), especially if the users are motivated to frequently use social media due to FoMO.

Another novel issue that is drawing attention in the mainstream media is individuals' inclination toward passively but persistently reviewing social media content shared by other users (Dhir et al., 2021). This behavior seems to be a passive form of cyberstalking (Dhir et al., 2021; Kaur et al., 2020a). We thus refer to this inclination as "social media stalking" (Kaur et al., 2020a). While limited studies on cyberstalking have suggested that individuals coping with such stalking behavior can experience a sense of fatigue (Begotti and Maran, 2019), to the best of our knowledge, the association between social media stalking and social media fatigue has not been tested in prior research. With this in mind, we propose to examine social media stalking (referred to as stalking hereafter), as well. Furthermore, studies have suggested that social media users' negative behaviors may be linked to their propensity toward engaging in social comparison on such platforms (Holmgren and Coyne, 2017). While prior research has established a link between social comparison and fatigue (Malik et al., 2020), what is less known is the mechanism through which social comparison translates into fatigue and its association with other phenomena related to the dark side of social media. We address this gap in the knowledge by exploring whether individuals driven by FoMO engage in social comparison and subsequently experience fatigue. Furthermore, we also explore whether social comparison is also associated with users' tendency to engage in stalking, which is, to the best of our knowledge, an uninvestigated aspect in the literature. We thus explore the associations among these four variables of FoMO, fatigue, stalking, and social comparison to investigate the nuanced and dynamic interplay of these integral dark side of social media phenomena that create a significant negative impact on individual well-being. We contend that a concurrent examination of these phenomena can elicit deeper insights into the mechanism of effect that connects them and produces such adverse consequences, e.g., fatigue, for an individual social media user. In sum, our study addresses the following three research questions (**RQ**s):

RQ1. How are FoMO, social comparison, and stalking associated with fatigue?

RQ2. How do social comparison and stalking mediate the association of FoMO and fatigue?

RQ3. How do individual usage behavior (frequency of posting social media status updates) and emotions (social media envy) moderate the associations of FoMO with social comparison, stalking, and fatigue?

Our conceptual model embodying these research questions is based on the theoretical propositions of two theories—the Theory of Compensatory Internet Use (TCIU; Kardefelt-Winther, 2014) and Social Comparison Theory (SCT; Festinger, 1954)—which were used to ground the research framework. TCIU has been previously utilized to study the problematic use of social media (Tandon et al., 2020) and the devices used to access it, such as smartphones (Elhai et al., 2020). SCT has also been used to understand individuals' motives for comparing themselves with others on social media as well as to investigate the association of social comparison with problematic social media use behavior (Holmgren and Coyne, 2017) and/or indicators of diminished well-being, such as depression (Faranda and Roberts, 2019). We tested the research questions and the proposed associations by analyzing data collected from 321 young adult social media users from the United Kingdom (UK).

By answering these **RQs**, our study contributes to the literature in four ways. First, the adoption of dual theoretical lenses allows us to examine the focal phenomena from a new perspective. The novelty of our perspective rests in considering stalking and social comparison as compensatory acts that an individual affected by FoMO may engage in. Moreover, we utilize SCT to understand how FoMO may act as a motive for users to engage in social comparison on social media. This is a significant contribution, as the extant research has raised the need to combine existing theories or develop new ones to examine social media-related consumer behavior (Dhir et al., 2021). Second, by investigating the associations among FoMO, online social comparison, social media stalking, and fatigue, we examine the mechanisms that connect the contemporary key aspects or "building blocks" of the dark side of social media (Talwar et al., 2020a). The identification of such mechanisms is a limited aspect of the prior literature and thus significantly contributes to theory. Third, by explicating the roles of online social comparison and stalking as mediators, we add to existing knowledge on the pathways through which FoMO can lead to the development of fatigue. Since fatigue has been linked to possible discontinuance of social media use, this finding contributes to the literature by generating insights into how an individual's social media-related emotions and experiences, i.e., FoMO, can translate into fatigue. Finally, our study suggests that an "amplification effect" may exist for the dark side of social media, wherein one negative aspect of social media use may exacerbate other negative aspects, thereby creating a domino effect. This is a critical contribution to the current knowledge that validates the contention of prior researchers that the dark side of social media and other negative phenomena associated with social media use can create a deleterious feedback loop with a cumulative, harmful effect on the individual.

The rest of the manuscript is structured as follows. Section Two provides a brief overview of TCIU and SCT—the theoretical foundations of our study. Next, Section Three discusses the hypothesized research framework and associations. Section Four details the research approach and methodology, while Section Five reports the results of the analysis. Section Six includes a brief discussion of the results, and Section Seven presents the concluding remarks, implications, and limitations.

2. Theoretical foundation

2.1. Theory of compensatory internet use

TCIU is a contemporary theory that has been used extensively in the context of social media (Elhai et al., 2017, 2020; Tandon et al., 2020)

and is posited to be an extension of the Uses and Gratifications Theory (UGT). The novelty of TCIU is its particular focus on psychopathology as motivators of problematic internet or social media use (Elhai et al., 2017). TCIU contends that individuals may be motivated to overuse technology (e.g., social media) to cope with or compensate for a perceived lack of social needs being met (Wang et al., 2018) as well as negative emotions or stressors related to their life circumstances (Wolniewicz et al., 2018). We leverage TCIU to theorize that individuals who experience FoMO, which is a sense of anxiety and, thus, a form of negative emotion (Tandon et al., 2021a), would be motivated to increase their social media use to cope with and compensate for it. We intuitively propose that such individuals would compulsively engage in following others' social media profiles, i.e., engage in stalking. They may also be prone to comparing events in their own lives with the profiles they visit (i.e., engage in social comparison) to avoid FoMO by ensuring participation in important events shared by their social group members. Such excessive FoMO-driven exposure to social media and the information incumbent in it may increase these individuals' propensity to experience fatigue (see Section 3). Our contention is in line with prior studies that posit that individuals may be more inclined to use social forms of technology (e.g., smartphones and social media) to cope with perceived feelings of negativity (Tandon et al., 2020) and unmet social needs (Wang et al., 2018; Wolniewicz et al., 2018). Furthermore, studies have shown that apart from FoMO, other dark sides of social media phenomena, such as problematic sleep due to social media use (Tandon et al., 2020), may also be explained through the lens of TCIU. Thus we consider TCIU an appropriate theory to ground the theoretical framework of our study.

However, the explicit focus of TCIU on psychopathology and negative emotions as a precursor of behaviors related to problematic social media and technology use alone is also considered a weakness by some scholars (e.g., Wolniewicz et al., 2018). This can be attributed to the fact that prior studies have shown that digital social interaction and behaviors like social comparison with a positively oriented motive like self-improvement (Latif et al., 2021; Cramer et al., 2016) can often translate into negative experiences like fatigue as well (e.g., Malik et al., 2020). Thus, we believe that TCIU offers a constrained perspective and would not offer a comprehensive outlook toward the study of the proposed associations, especially fatigue. We, therefore, complement TCIU with SCT to consider the association among FoMO, social comparison, and fatigue.

2.2. Social comparison theory

SCT (Festinger, 1954) suggests that individuals are inclined to self-evaluate their beliefs and/or abilities by engaging in comparisons with other persons present in their social environment (Greenwood, 2017). Furthermore, SCT posits that individuals may engage in two forms of social comparisons—upward and downward—depending upon their motivation. According to Talwar et al. (2019), the form of comparison that an individual engages in, is contingent upon their level of motivation. For example, a highly motivated individual would seek self-improvement and engage in upward social comparison (Cramer et al., 2016). In the context of social media, prior studies have suggested that users of platforms like Facebook may be inclined to believe that other users are in relatively better positions than they are and engage in upward social comparison (e.g., Latif et al., 2021). We adopt a similar perspective and utilize SCT to examine the association of social comparison in its upward form with FoMO, stalking, and fatigue. Our use of SCT addresses the contention of past research that there is limited knowledge of the emotional states, i.e., either positive or negative emotions, which result from an individual's engagement in social comparison (e.g., Cramer et al., 2016).

Next, we present our arguments for testing the correlations among the examined phenomena in Section Three. In discussing each hypothesis, we have invoked the pertinent theory to explain our rationale for testing the association, along with a brief overview of the prior literature.

3. Research model and hypotheses

Our study examines the associations among four contemporary phenomena: FoMO, social comparison, stalking, and fatigue (Table 1). We have chosen to study these particular phenomena for two reasons: (a) their associations with the dark side of social media and the resulting implications for users' psychosocial well-being; and (b) the prior research has focused more on examining these manifestations in a piecemeal manner, leaving a more realistic aspect of their complex interactions—which can exacerbate the negative fallout—largely under-explored.

Our study examines whether and how FoMO, social comparison, and stalking are directly associated with fatigue. We also examine (a) the mediating roles of stalking and social comparison in the association between FoMO and fatigue as well as (b) the moderating roles of social media envy and frequency of posting social media status updates (referred to as the frequency of status updates) on the association of FoMO with fatigue, stalking, and social comparison. The associations are examined while controlling for the socio-demographic characteristics of age and gender. The proposed conceptual model is presented in Fig. 1.

3.1. FoMO and social media fatigue

FoMO has attracted significant scholarly attention (Dhir et al., 2018) and has previously been studied in the context of social media use (Tandon et al., 2020, 2021a; Whelan et al., 2020). The existing research has suggested that individuals' experience of FoMO can lead them to engage in more persistent and deliberate interactions with others that are part of their online social groups (Dhir et al., 2018; Tandon et al., 2021a), which can be a prelude to developing the tendency to engage in compulsive social media use (Beyens et al., 2016). Moreover, prior studies have indicated that compulsive use of social media, especially due to FoMO, can lead individuals to experience fatigue (Bright and Logan, 2018). Dhir et al. (2018) found FoMO to be associated with fatigue, although this association was weak. In contrast, Bright and Logan (2018) found FoMO to be strongly associated with fatigue in the context of social media advertising. Similarly, Tugtekin et al. (2020) found that FoMO was strongly associated with social networking fatigue. Furthermore, Whelan et al. (2020) reported that FoMO significantly influenced communication and information overloads, which are inherently related to the concept of fatigue.

According to Zhou (2019), FoMO could cause users of WeChat (a popular social media mobile app) to maintain a permanent state of being online. In line with this finding, we also believe that FoMO acts as a trigger or stressor that induces individuals to maintain a persistent connection with social media. Our supposition is supported by the tenets of TCIU, which suggests that certain stressors or negative emotions trigger excessive or problematic social media use.

While prior findings have offered inconsistent information about the association between FoMO and fatigue, the literature indicates that a relationship between the two variables does exist. Taking the debate forward, we posit that if users continually stay connected to social media due to FoMO, they will inevitably experience a perceived overload of information or communication cues due to the activities that they engage in, which then leads to their experience of fatigue. Thus, we propose the following hypothesis:

H1. FoMO is positively associated with social media fatigue.

3.2. FoMO and social media stalking

Studies have posited that increasing or excessive time spent on social media leads individuals to monitor and gather information about others' activities on these platforms (Fuchs and Trottier, 2015), albeit without

Table 1
Description of study variables.

Variable	Description	Adapted from
Fear of missing out	Experience of apprehension and concern by social media users that they may be disconnected or absent from an experience received and/or enjoyed by others, such as peers, family, or friends.	Przybylski et al. (2013); Tandon et al. (2021a)
Social media stalking	Voyeuristic tendency of users to engage in persistent monitoring of others' social media profiles and shared content to gather information without any malicious intent. We theorize this variable to reflect two aspects of an individual's desire: (a) to stay updated on what others are doing and (b) to monitor and/or gather information about others' social media lives and shared content.	Dhir et al. (2021); Lyndon et al. (2011); Mäntymäki and Islam (2016); Stiff (2019)
Online social comparison	The tendency of users to experience negative feelings while engaging in an increased comparison of themselves vis-a-vis others during social media use.	Cramer et al. (2016); Talwar et al. (2019)
Social media fatigue	Self-regulated and unpleasant feelings or mental exhaustion experienced by users due to technology use and information and/or communication overloads resulting from interactions on social media.	Dhir et al. (2018, 2019)
Social media envy	Envy may be malicious (i.e., oriented negatively or threateningly towards others, such as negative gossip) or benign (i.e., oriented as a challenge for self-improvement by enhancing one's own perceived advantages). We conceptualize social media envy as an unpleasant feeling experienced by an individual that is characterized by a mix of negative emotions, including pain, resentment, and inferiority, due to comparisons with another person(s) among their social media groups whose social media posts or updates suggest that they possess something that the individual desires but does not yet have.	Latif et al. (2021); Lin et al. (2018)
Frequency of posting social media status updates	Status updates are short messages that individuals can post on their own homepage (i.e., profile page) and newsfeed that are visible to others (Facebook users), contingent on the individual's privacy settings. We theorize the frequency of social media status updates to be the number of times that a user updates their Facebook status in a period ranging from daily up to one month.	Lin et al. (2018); Deters & Mehl (2013)

malicious intent regarding the use of such information. The absence of malicious intent sets this passive act of monitoring and information gathering apart from traditional cyberstalking behavior, which has been referred to as social media surveillance (Fuchs and Trottier, 2015) and "Facebook stalking" (Lyndon et al., 2011) in the context of monitoring ex-partners on social media. This phenomenon of social media stalking (Dhir et al., 2021) is a relatively newer behavior associated with the dark side of social media that is gaining increasing attention in the mainstream media (Dhir et al., 2021; Kaur et al., 2020a).

Doster (2013) suggested that social media users are often motivated by the desire to observe others' lives and information, which we consider to be the basis of stalking in our theorization. Furthermore, Stiff (2019) found that Facebook surveillance encompasses an element of tracking that relates to a recreational way of checking other users' profiles to gather information that may be driven by their need to satisfy voyeuristic tendencies. Fioravanti and Casale (2020), meanwhile, suggested that individuals who like to monitor others' information often spend more time on social media and that such behavior can be associated with addictive tendencies. For example, Dhir et al. (2021) determined a significant positive association between stalking and compulsive usage of social media. Some scholars have also posited that social media use promotes incidences of social surveillance to avoid FoMO (Buglass et al., 2017). For example, Lim (2019) suggested that individuals who have a high desire to avoid the feeling of social exclusion (i.e., FoMO) may be more inclined to use Facebook for surveillance. Although to the best of our knowledge, there is no existing a priori evidence for this association, we believe that the literature indicates that social media users who experience FoMO may also engage in stalking. Since TCIU suggests that individuals may engage in higher social media use to compensate for their unfulfilled social needs and negative emotions, we posit that the anxiety about missing updates from their virtual social groups (i.e., FoMO) would act as a stressor for users and influence them to actively seek updates concerning the lives of others. We intuitively argue that to alleviate and compensate for FoMO, social media users would monitor information about the social media activities of their peers, i.e., stalking. Thus, we hypothesize the following:

H2. FoMO is positively associated with social media stalking.

3.3. FoMO and online social comparison

Deviance in social media use (e.g., excessive, compulsive, or problematic use) has been linked to social comparison (Holmgren and Coyne, 2017). Scholars have argued that the negative effects of social media use may be contingent upon users' tendency to compare themselves with perceived superior others (i.e., upward social comparison) (Frampton and Fox, 2018; Holmgren and Coyne, 2017). Prior studies on social comparison support this argument. For example, Verduyn et al. (2020) observed that social media provides users with abundant opportunities to view others' information. Since most users tend to portray a more positive image of themselves on social media (e.g., by posting filtered photos), it is likely that users would engage in a more upward form of comparison (Verduyn et al., 2020).

The tenets of SCT and the prior literature suggest that social comparison can be driven by different motivations (Song et al., 2019). Moreover, the affective outcome of social comparison may be contingent upon an individual's personality and the context or situation in which they engage in such comparison (Rosenthal-von der Pütten et al., 2019). This suggests that FoMO, which is posited to drive an individual's compulsive use of social media (Tandon et al., 2020), may also be linked to the inclination to engage in social comparison. In essence, we draw on SCT to propose that FoMO would act as a distinct motivator in the context of social media environments and induce individuals to engage in social comparisons with others whom they perceive to be living a better life. We further contend that it is likely for users who experience FoMO to also have more opportunities to engage in upward social comparison, thereby leading them to experience negative emotions.

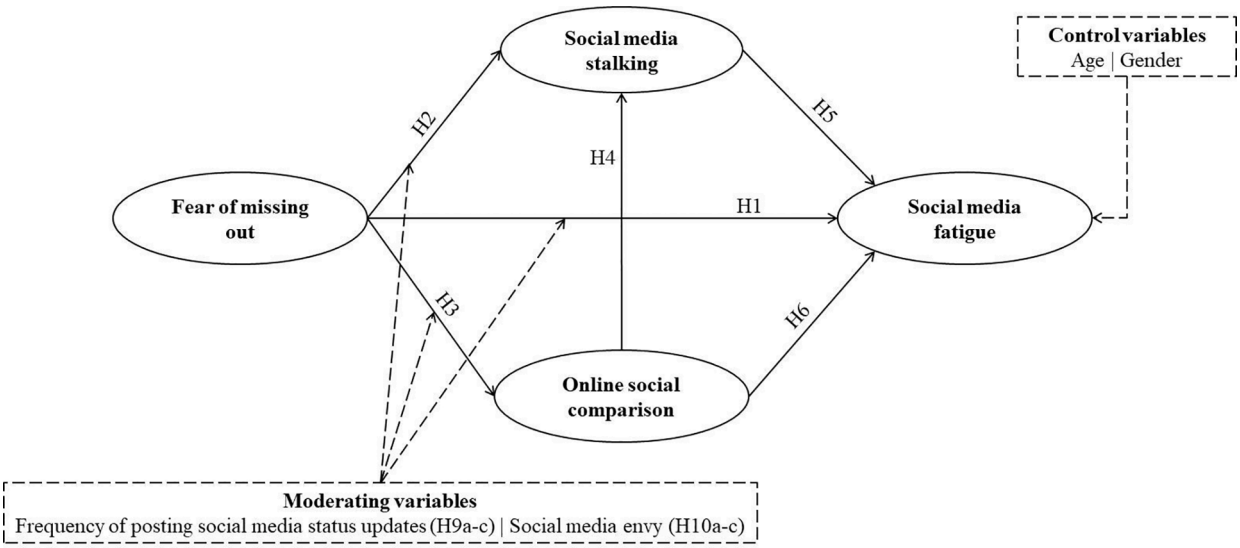

Fig. 1. Conceptual model.

Thus, the following hypothesis is proposed:

H3. FoMO is positively associated with online social comparison.

3.4. Online social comparison and social media stalking

Dhir et al. (2021) found that individuals who engage in stalking can experience problematic sleep due to their use of social media during periods of sleep hygiene, which would, in turn, disturb their sleep routines. This suggests that social media users remain in touch with their online social groups regardless of their location or time of use (Fox and Moreland, 2015; Zhou, 2019). Such users are continually exposed to social media content, remain updated, and continue to gather information posted by their social media group members. This information gathering would be primarily passive in nature, which we posit as the basis of our characterization of stalking (Dhir et al., 2021), which can reflect voyeuristic tendencies (Doster, 2013; Mäntymäki and Islam, 2016) or surveillance-oriented motivations (Young et al., 2017).

We draw upon SCT to suggest that individuals engage in stalking because it gives them opportunities to seek information on peers who seem similar (i.e., suitable for comparing oneself with) and that their propensity to engage in social comparison is intrinsic, as suggested by SCT and prior scholars (Talwar et al., 2019). Thus, we argue that individuals' inherent motivation to engage in social comparison may act as a stressor due to which they may engage in stalking. We leverage the tenets of TCIU to support our argument and contend that stalking may be a coping mechanism for individuals who are stressed by their motive of engaging in social comparison.

While, to the best of our knowledge, the extant research has not examined this association, our contention is supported by the prior literature. For instance, Fox and Moreland (2015) found that individuals often compared the minutia of their social media lives, such as their number of friends, which could result in general dissatisfaction and jealousy. Moreover, research investigating the influence of social media on romantic relationships has suggested a potential association between stalking and negative social comparison. For example, Frampton and Fox (2018) and Fox and Moreland (2015) suggested that individuals in a romantic relationship can often engage in social comparison with their partners' exes by gathering digitally preserved evidence, such as pictures, which could lead them to experience retroactive jealousy and self-doubt. We accordingly draw from the literature on social media and romantic relationships to study whether any associations exist between social comparison and stalking in general. Thus, we hypothesize the following:

H4. Online social comparison is positively associated with social media stalking.

3.5. Social media stalking and social media fatigue

In a recent study, Stiff (2019) examined two dimensions related to Facebook surveillance, first for tracking others and second for investigating others. The study described tracking as the checking of profiles of social media users in a recreational manner to obtain information about them. This definition is aligned with our theorization of stalking, which encompasses two aspects: monitoring and staying updated (see Table 1). In a recent study, Dhir et al. (2021) also highlighted that social media stalking is a passive or benign form of cyberstalking, confined mainly to checking others' profiles on social media. While this behavior reflects a repeated intrusion of the perpetrators into others' social media lives, Dhir et al. (2021) maintain that such stalking may not be always be intentionally undertaken by a user but may rather be a consequence of the platform affordances. The study further argues that such stalking may create compulsive use, which has been posited by scholars to result in fatigue (Dhir et al., 2018).

Scholars have further suggested that individuals remain continuously engaged with social media to stay updated on what others are doing (Fox and Moreland, 2015), that is, to satisfy their surveillance motivation (Young et al., 2017). Mäntymäki and Islam (2016) suggested that an individual may find psychological value in obtaining private information about others through social networking sites (i.e., through voyeurism). According to the study, voyeurism can positively influence social media use and is a significant gratification derived from such behavior. Prior literature has suggested that an individual's intensity of use (Malik et al., 2020), excessive exposure to social media content, and the subsequently experienced information or communication overload can result in fatigue (e.g., Lin et al., 2020). This intuitively indicates that stalking may be related to fatigue as it entails a user's repeated exposure to others' social media information (Dhir et al., 2021).

We argue that individuals' reliance on social media, especially during the COVID-19 lockdown, has increased their propensity to engage in stalking, thereby leading to information overload, and consequently, fatigue. We leverage TCIU to suggest that stalking may, in fact, be a coping mechanism for individuals who perceive a deficit in their need for social interaction due to the imposed lockdown. Such individuals may compensate for their perceived unmet social needs by using social media excessively to gain information about how others are faring, which causes their experience of fatigue. Our supposition finds support

in recent studies. For instance, Islam et al. (2020) suggested that, during the lockdown, individuals have engaged in increased social media use to explore new content (i.e., information), which could drive fatigue. Thus, we argue that individuals who engage in stalking could experience fatigue, leading us to propose the following hypothesis:

H5. Social media stalking is positively associated with social media fatigue.

3.6. Online social comparison and social media fatigue

Social comparison has been conceptualized in terms of orientation (tendency to engage in comparison) and direction (tendency to compare oneself either more positively or negatively with others; Faranda and Roberts, 2019). Comparing oneself with others is a human tendency. In fact, Cramer et al. (2016) suggested that a significant proportion of their study respondents (approximately 70%) participated in social comparison on Facebook. Scholars are increasingly studying the impacts of this tendency on individual well-being in the context of social media (Dhir et al., 2018; Faranda and Roberts, 2019; Verduyn et al., 2020).

While SCT posits that individuals can engage in both upward and downward forms of comparison, research in the context of social media has suggested that individuals tend to engage more in negative forms of social comparison, which can lead to diminished well-being, for example, through depression (Faranda and Roberts, 2019). This could be attributed to the fact that social media platforms like Facebook provide their users with the opportunity to engage in hyper-personal communication (Song et al., 2019) and to present an idealized or optimized version of themselves (Cramer et al., 2016; Faranda and Roberts, 2019). For example, Song et al. (2019) suggested that individuals share content, such as videos and photographs, on social media to showcase positive events and to present themselves favorably, which can lead others to view a positively skewed version of their lives. We argue, on the basis of TCIU, that this skewed assessment of others' lives during an individual's social comparison process may act as a negative emotion or stressor that induces an over-engagement in social media use to alleviate this source of stress.

It may be said that the intensity and frequency of use provide social media users with greater access to others' presentations of their idealized selves, which suggests that increased comparison could be linked to fatigue. Prior studies have also indicated that social comparison has the capacity to induce fatigue. For example, Malik et al. (2020) found social comparison to be positively correlated with fatigue with respect to mobile messaging apps. In another study, Lim and Choi (2017) found that social comparison, as a source of stress stemming from the use of social media, could lead users to experience emotional exhaustion. Thus, in line with prior studies, we propose the following hypothesis:

H6. Online social comparison is positively associated with social media fatigue.

3.7. Mediating variables

The existing literature has indicated that the associations of FoMO with social media experiences and behaviors may also be influenced by other variables indirectly, in addition to supporting the proposed direct effects. However, so far, research examining such indirect or mediating influences for FoMO, such as individual relative deprivation (Xie et al., 2018) and perceived information privacy risk (Yin et al., 2015), has been limited. Furthermore, even fewer studies have examined factors that specifically mediate the association of FoMO with fatigue. For example, compulsive use was determined by Dhir et al. (2018) to mediate between FoMO and fatigue. Furthermore, Wang (2021) suggested that information overload and psychopathological states like anxiety and depression may also mediate between the two variables. Therefore, we aim to study whether, in addition to a direct association, social comparison and stalking also act as mediators for the relationship of FoMO with fatigue. We contend that this examination would add a new perspective into the interplay between the various dark side of social media phenomena and generate more nuanced insights into the underlying mechanisms by which a negative emotional state like FoMO may create a tangible consequence like fatigue.

We anticipate such mediating pathways to exist because individuals can stay continually connected with social media to alleviate FoMO (Dhir et al., 2021). During this time, they may also be innately driven to compare themselves with others, as suggested by SCT. Such comparison, particularly in its upward form, may create negative emotional states, which, when compounded by the amount of information these users process, can translate into fatigue. Thus, we believe that social comparison may mediate the association of FoMO with fatigue.

The tendency to engage in social comparison has been studied as a mediator in previous social media studies. Rozgonjuk et al. (2019) argued that individuals with the tendency to engage in social comparison (i.e., social comparison orientation) passively use social media to gather information. Their study found social comparison orientation to mediate the association between neuroticism and passive Facebook use. Similarly, Reer et al. (2019) determined that social comparison orientation mediated the association of FoMO with psychological well-being and suggested that there is a gap in understanding how comparison behaviors impact FoMO. In line with prior studies, we posit that social comparison, as a mediator, could explain the mechanism of effect through which FoMO could lead to fatigue. We thus propose the following hypothesis:

H7. Online social comparison mediates the association between FoMO and social media fatigue.

We leverage TCIU to propose that individuals may be highly motivated to engage in stalking others' social media profiles to cope with or alleviate FoMO and reassure themselves about staying continually updated on status updates and messages received, etc. We intuitively argue that the amount of information that such FoMO-driven individuals would be continually exposed to during stalking would also indirectly influence their experienced fatigue. Thus, we hypothesize that social media stalking mediates the association between FoMO and fatigue. However, we base our hypothesis on the existing cyberstalking literature that has indicated that cyberstalking mediates the association of dark personality traits (e.g., Machiavellianism) with problematic social media use (Kircaburun et al., 2018). Furthermore, Navarro et al. (2016) determined that cyberstalking was associated with internet addiction. Moreover, Dhir et al. (2021) determined a strong positive association between stalking and compulsive usage. This intuitively suggests that stalking could potentially explain the association of social media use with deviant or problematic phenomena associated with such compulsive use, including FoMO and fatigue. However, to the best of our knowledge, there is no a priori evidence for this association, as social media stalking is a nascent phenomenon (Dhir et al., 2021; Kaur et al., 2020a). Thus, we propose the following hypothesis:

H8. Social media stalking mediates the association between FoMO and social media fatigue.

We focus only on these two variables as mediators to better understand the interplay among the variables included in the proposed research framework, as past research has suggested the presence of a cyclical association between the dark side of social media phenomena (Verduyn et al., 2020). We believe that our examination of these phenomena may confirm whether such cyclical associations exist wherein one phenomenon may exacerbate an individual's experience of another.

3.8. Moderating variables

Individual motives (Satici and Uysal, 2015), use behaviors (e.g., the frequency of posting updates on social media; Fioravanti and Casale, 2020), and metacognitions (Marino et al., 2016) influence problematic social media use behaviors. For example, Reich et al. (2018) suggested that posting a social media status was linked to perceived threats in terms of self-esteem and belongingness. Cramer et al. (2016),

meanwhile, determined that individuals' affective responses differed according to their motives for social comparison, which themselves were contingent upon the individuals' self-esteem. Kircaburun et al. (2020) found that specific motives, such as presenting oneself to appear more popular and passing the time, could induce problematic social media use, which has, in turn, been linked to diminished well-being (Hussain and Griffiths, 2019). We contend that the expectations and frequency of a user's social media content creation and/or sharing could influence the dark side of social media phenomena, especially FoMO, and have a diminishing effect on well-being as well. Thus, we examine the moderation effect of social media envy and the frequency of posting status updates on the associations of FoMO with fatigue, social comparison, and stalking.

3.8.1. Frequency of posting social media status updates

Status updates allow social media users to create content and communicate with others through light or heavy dialogs (Deters and Mehl, 2013; Fioravanti and Casale, 2020). Fioravanti and Casale (2020) considered posting status updates to be an aspect of active use-online self-presentation that is correlated with social media addiction. According to Deters and Mehl (2013), posting status updates on social media can affect individuals' perceived social connection with others. This, in turn, can conceivably lessen the loneliness that such individuals may experience (Deters and Mehl, 2013; Tokunaga and Quick, 2018). Thus, the frequency of posting status updates may help individuals compensate for the negative emotion (loneliness), as suggested by TCIU. In fact, the frequency of statuses that a user posts on social media can be used to understand their psychological states (Tokunaga and Quick, 2018). Since the phenomena we are studying also relate to deficiencies in social media users' psychological states (e.g., FoMO is linked to the need to belong), we believe that it would be beneficial to explore whether the frequency of status updates has any moderating effect on the examined associations. Thus, the following hypothesis is proposed:

H9 The frequency of social media status updates moderates the association of FoMO with (a) social media fatigue, (b) social media stalking, and (c) online social comparison such that the effect is stronger for individuals who post status updates more frequently.

3.8.2. Social media envy

Prior studies have explored the role of envy in influencing social media behavior and explicated its link to the dark side of social media phenomena (e.g., FoMO; Varga, 2016). For instance, Latif et al. (2021) found envy (both malicious and benign) to be significantly associated with social comparison. Similarly, Yin et al. (2019) found envy to mediate the association between social media addiction and FoMO. In addition, Tromholt (2016) suggested that individuals with medium-high levels of envy would experience more benefits from quitting Facebook in terms of their well-being. This indicates that the envy induced by social media use may influence the experience and level of fatigue that a social media user experiences. We examine the moderating role of envy and test the following hypothesis:

H10 Social media envy would moderate the association of FoMO with (a) social media fatigue, (b) social media stalking, and (c) online social comparison such that the effect is stronger for individuals who have higher envy.

3.9. Control variables

Previous scholars have employed demographic controls to understand problematic behaviors in the context of social media (Dhir et al., 2021; Przybylski et al., 2013). The existing research has indicated that age (Dhir et al., 2021; Reer et al., 2019; Yin et al., 2015) and gender (Dhir et al., 2021; Kircaburun et al., 2018; Przybylski et al., 2013) could affect FoMO and social media use behavior. Thus, we included age and gender as control variables for fatigue.

4. Method and materials

4.1. Study measures

We adapted pre-validated scales to develop the questionnaire. The scale items and sources of the adapted scales are detailed in Table 2. Social media envy was measured by adapting nine items from pre-

Table 2
Study measures and factor loadings for the measurement and structural model.

Study Measures	Measurement items	CFA	SEM
Social Media Stalking (Dhir et al., 2021)	I usually check others' social media profiles to see what they're up to	.82	.82
	I try to monitor others through their social media profiles	.77	.77
	I spend the majority of my time on social media looking at others' profiles	.66	.66
	If my friends are going out, I usually check their social media to see what they're up to	.74	.74
	I collect a lot of information about my social media connections' activities and friendships from looking at their social media accounts	.65	.65
	I try to keep track of some of my connections' activities through their social media updates	.69	.69
Online Social Comparison (Gibbons and Buunk, 1999; Steers et al., 2014; Reer et al., 2019; Latif et al., 2021)	When I am on social media, I tend to compare myself with others	.91	.91
	When I am on social media, I always pay attention to how I do things compared with others	.76	.78
	When I am on social media, I often check how I am doing socially compared with others	.81	.81
	When I am on social media, I often compare my own accomplishments with others	.89	.89
	When I am on social media, I compare my situation in life with that of others	.89	.89
Fear of Missing Out (Przybylski et al., 2013)	I fear others have more rewarding experiences than me on social media	.84	.84
	I fear my friends have more rewarding experiences than me on social media	.86	.85
	I get worried when I find out my friends are having fun without me on social media	.76	.76
	I get anxious when I don't know what my friends are up to on social media	.66	.67
	It bothers me when I miss an opportunity to meet up/ interact with friends on social media	.66	.66
Social Media Fatigue (Dhir et al., 2018; Islam et al., 2020; Whelan et al., 2020)	I am frequently overwhelmed by the amount of information available on social media	.70	.70
	I find it difficult to relax after continually using social media	.80	.80
	After a session of using social media, I feel really fatigued	.83	.83
	Due to using social media, I feel rather mentally exhausted	.87	.87
	After using social media, it takes effort to concentrate in my spare time	.72	.71
	During social media use, I often feel too fatigued to perform other tasks well	.77	.77

Note: SEM refers to structural model factor loadings, and CFA refers to measurement model factor loadings.

existing scales used by Charoensukmongkol (2018) and Tandoc et al. (2015). Sample items include "I don't like my friends to look better than me on social media" and "I generally feel inferior to others on social media". The frequency of posting status updates was also measured through a single question: "How frequently do you tend to post status updates on social media?" (adapted from Lin et al., 2018). The items were measured on a five-point Likert scale that recorded responses from 1 (strongly disagree) to 5 (strongly agree).

Following prior studies (Dhir et al., 2021; Talwar et al., 2020a), the items were tested for face and content validity via a panel of four experts (professors) from the fields of information systems science and marketing. The experts suggested minor modifications in the wording of the items, which were then incorporated. The survey instrument was also piloted among 15 social media users representing the target sample to assess the clarity and face validity of the items. The pilot study confirmed that the items were clear, relevant, and valid for further use.

4.2. Data collection

A total of 324 social media users were recruited from *Prolific Academic* through a survey created on Google Forms. The data was collected from the UK as reports have called for more research into understanding how social media impacts the mental health and well-being of social media users in that geography (Royal Society for Public Health and Young Health Movement, 2017). The participants were informed about the purely academic nature of the study and assured of the anonymity of their responses. The respondents chose to answer the questions voluntarily, and financial compensation was offered for their responses. Three responses were deleted during the data cleaning process due to missing or incomplete responses, meaning that 321 complete responses were taken forward for data analysis through structural equation modeling (SEM).

4.3. Participant profiles

Of the respondents, 55.4% were female. The participants were aged between 18 and 25 years. We focused attention on this age group, as prior studies have suggested that young adults may be more vulnerable to experiencing negative effects stemming from problematic social media use (Marino et al., 2016; Zhou, 2019). Moreover, reports have shown that social media use in the UK is highly prevalent in users aged 16 to 24 years (Johnson, 2020; Royal Society for Public Health and Young Health Movement, 2017).

4.4. Data analysis methods

SEM was performed with AMOS Graphics 26 to analyze the data and study the proposed relationships between the variables. Mediation and moderation were tested using the Hayes PROCESS macro. The chosen methodological approach is aligned with previous studies in this field (Dhir et al., 2021; Kaur et al., 2020b; Talwar et al., 2020a, b), as well as in the overarching field of business and management research (Rialti et al., 2019). The objective was to understand the influence of FoMO, stalking, and social comparison on fatigue. Since the hypotheses were strongly grounded in theory, and as the data met the requirements for multivariate analysis (i.e., sufficiently large sample size, normal distribution, and absence of multicollinearity), the use of SEM was appropriate in this context, as discussed by recent studies (Talwar et al., 2020b; Kaur et al., 2020b). The validity and reliability of the adopted scale and items for the current context were determined via confirmatory factor analysis (CFA) (Kline, 2015) and heterotrait–monotrait (HTMT) analysis (Henseler et al., 2015).

5. Results

5.1. Normality and common method bias

Prior to the CFA, the data were examined for normality and multicollinearity. To examine the effect of multicollinearity, variance inflation factors (VIF) and tolerance values were assessed. The VIF values were found to be below 5, and the tolerance values were above 0.10, confirming the absence of multicollinearity effects in the data. The data were normally distributed, and the skewness and kurtosis values were within the prescribed threshold values.

Since all constructs of the study measures were measured with the use of self-reported items, Harman's (1976) single factor test was applied to test for any possible influence of standard method bias and the subsequent measurement errors it may cause. The single factor accounted for less than 50% of the variance (i.e., 40.94%), which suggests that common method bias was not a significant issue in the current study (Podsakoff et al., 2003). We also utilized the approach of including a common marker variable (blue attitude) in line with prior studies (e.g., Bhutto et al., 2021) to further identify common method bias-related issues (Lindell and Whitney, 2001). The analysis showed that the marker variable did not share a high correlation with the principal constructs, thereby indicating an absence of common method bias.

5.2. Reliability and validity (Measurement model)

The results suggest (Table 2) that the scale items loaded satisfactorily onto each construct, as the individual values of each scale item were higher than the recommended threshold value of 0.6 (Hair et al., 2006). The CFA model showed a good model fit (χ^2/df =2.33, CFI = 0.94, TLI = 0.93, RMSEA = 0.07).

The results met the standard threshold values of 0.5 for average variance extracted (AVE) and 0.70 for composite reliability (CR), as proposed by Hair et al. (2011) (Table 3). The study measures were considered reliable because the CR values for each measure were above 0.70 (Hair et al., 2011). Similarly, the study measures met the criteria for determining discriminant validity as the correlation value was less than the square root of the AVE for each study measure in any given pair. Individual values crossed the threshold value of 0.50 and surpassed the associated Maximum Shared Variance (MSV) and Average Shared Variance (ASV), as recommended by Fornell and Larcker (1981). Furthermore, HTMT analysis showed that all of the correlations among the different study variables were less than the recommended threshold value of 0.85 (Table 4), thus confirming discriminant validity (Henseler et al., 2015).

5.3. Control variables

The model was controlled for the potential confounding effect of age and gender, and the results show that both age ($\beta = -0.16$*) and gender ($\beta = 0.23$***) have a significant confounding effect on fatigue.

5.4. Structural model

Following the CFA, path analysis was conducted to test the overall model fit and the proposed hypotheses. The results of the hypotheses testing showed that the model had a good fit ($\chi^2/df = 2.42$, CFI = 0.93, TLI = 0.92, RMSEA = 0.07) compared with the baseline fit indices for this model. The generated R^2 values reflected the predictability of the proposed research model, while the path coefficients indicated the validity of each hypothesis (Table 5). Five hypotheses were supported: H1 ($\beta = 0.27$**), H2 ($\beta = 0.39$***), H3 ($\beta = 0.72$***), H4 ($\beta = 0.42$***), and H6 ($\beta = 0.18$*), but H5 ($\beta = 0.06$) was unsupported (see Fig. 2 and Table 5). Additionally, the research model explained 55.5% of the variance in stalking, 51.5% of the variance in social comparison and 30.7% of the variance in fatigue.

Table 3
Results of the validity and reliability analysis.

	Mean	SD	CR	AVE	MSV	ASV	FOMO	SMS	SMF	OSC
FOMO	2.29	1.04	0.87	0.58	0.51	0.40	**0.76**			
SMS	2.63	0.98	0.87	0.53	0.48	0.38	0.68	**0.73**		
SMF	2.54	1.03	0.90	0.61	0.22	0.21	0.46	0.42	**0.78**	
OSC	3.00	1.17	0.93	0.73	0.51	0.41	0.72	0.70	0.47	**0.86**

Note: Online social comparison (OSC), Social media stalking (SMS), Fear of missing out (FoMO), Social media fatigue (SMF), Composite Reliability (CR), Average variance extracted (AVE), Maximum shared variance (MSV), Average shared variance (ASV), Mean (M), Standard deviation (SD), the bold diagonal values represent respective square roots of AVE, and the off-diagonal values represent inter-construct correlations.

Table 4
HTMT analysis.

	SMS	SMF	OSC	FOMO
SMS				
SMF	0.42			
OSC	0.72	0.47		
FOMO	0.70	0.47	0.72	

Note: Online social comparison (OSC), Social media stalking (SMS), Fear of missing out (FoMO), Social media fatigue (SMF).

Table 5
Results of hypotheses testing.

Hypothesis	Path	β	Significance	Support
H1	FoMO → SMF	0.27	<0.01	Yes
H2	FoMO →SMS	0.39	<0.001	Yes
H3	FoMO → OSC	0.72	<0.001	Yes
H4	OSC → SMS	0.42	<0.001	Yes
H5	SMS → SMF	0.06	> 0.05	No
H6	OSC → SMF	0.18	<0.05	Yes

Note: Online social comparison (OSC), Social media stalking (SMS), Fear of missing out (FoMO), Social media fatigue (SMF).

5.5. Mediation analysis

The mediation analysis was conducted using Model 4 in the PROCESS macro, and the results were obtained by bootstrapping 5000 times. The analysis intended to examine the mediating influence of stalking and social comparison. The results showed that social comparison also partially mediated the association of FoMO with fatigue and stalking. Tables 6 and 7 presented the details about the direct, indirect, and total effects with regard to mediation.

5.6. Moderation analysis

The moderation analysis was conducted using Model 1 in the PROCESS macro. As in the case of mediation, moderation was performed by bootstrapping 5000 times. The results showed that the frequency of status updates did not moderate any associations (H9a-c), and social media envy only negatively moderated the association of FoMO with comparison (H9c). The results further showed that social media envy did not moderate the relation of FoMO with fatigue (H9a) and stalking (H10b). Furthermore, we observed that the relationship between FoMO and social comparison was less strong for individuals with a higher degree of reported social media envy (Fig. 3). The details can be found in Table 8 and Fig. 3.

6. Discussion

The results provide support for five hypotheses testing the direct effects (**H1–H4 and H6**). The direct effect of stalking on fatigue (**H5**), however, was not supported by the analysis. In addition, social comparison had a partial mediation effect on the association of FoMO with fatigue (**H7**). Our findings also confirmed that social media envy negatively moderated the associations of FoMO with social comparison (**H10c**). Furthermore, the results indicate that gender and age had a confounding effect on fatigue. The results shed light on the complex

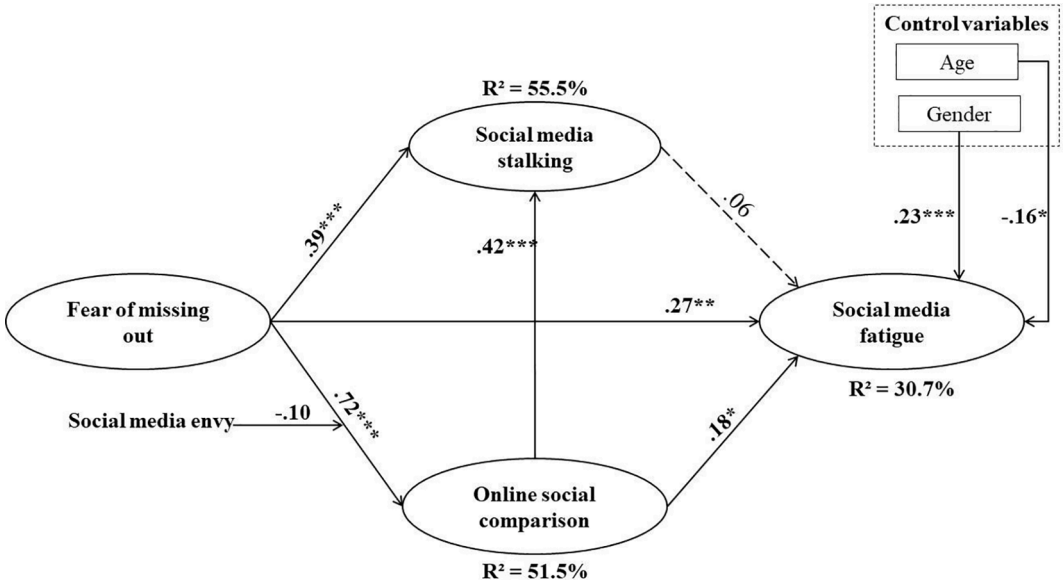

Fig. 2. Results of hypotheses testing.
Note: The figure shows the significant moderation paths only; the dashed arrow denotes a non-significant relationship, '***' = significance level <0.001, '**' = significance level <0.01, and '*' = significance level <0.05.

Table 6
Results of mediation analysis.

FoMO → SMS/OSC → SMF						
	β	*se*	*t*	*p*	LLCI	ULCI
FoMO → SMS	.56	.04	13.73	.00	.4795	.6399
FoMO → OSC	.73	.05	15.38	.00	.6378	.8249
FoMO → SMF	.20	.07	2.97	.00	.0682	.3369
SMS → SMF	.11	.07	1.45	.15	−0.0382	.2509
OSC → SMF	.21	.06	3.31	.00	.0844	.3322
Total effect of FoMO → SMF	.41	.05	8.24	.00	.3155	.5133
FoMO → OSC → SMS						
	β	*se*	*t*	*p*	LLCI	ULCI
FoMO → OSC	.73	.05	15.38	.00	.6378	.8249
FoMO → SMS	.31	.05	6.20	.00	.2084	.4021
OSC → SMS	.35	.04	7.92	.00	.2616	.4344
Total effect of FoMO → SMS	.56	.04	13.73	.00	.4795	.6399
OSC → SMS → SMF						
	β	*se*	*t*	*p*	LLCI	ULCI
OSC → SMS	.53	.04	14.94	.00	.4564	.5949
OSC → SMF	.29	.06	5.01	.00	.1753	.4018
SMS → SMF	.18	.07	2.53	.01	.0397	.3161
Total effect of OSC → SMF	.38	.04	8.58	.00	.2945	.4696

Note: Online Social Comparison (OSC), Social media stalking (SMS), Fear of Missing Out (FoMO), Social Media Fatigue (SMF).

Table 7
Indirect effects between dependent and independent variable.

	Effect	se	LLCI	ULCI
FoMO → SMS →SMF	.06	.04	−0.0195	.1399
FoMO → OSC → SMF	.15	.05	.0560	.2387
FoMO → OSC → SMS	.25	.04	.1778	.3315
OSC → SMS → SMF	.09	.04	.0233	.1655

relationships among FoMO, fatigue, social comparison, and stalking, which manifest as the dark side of social media, as well as the association of individual behavior and motives with these phenomena.

Firstly, the results confirm that FoMO has a significant association with fatigue, social comparison, and stalking, as proposed through **H1–H3**. The support for **H1-H3** implies that social media users who fear that their friends and acquaintances have comparatively more rewarding experiences on social media, suffer from a constant sense of anxiety if they are not aware of what their friends are up to on social media. In addition, they are more likely to feel frequently overwhelmed and tense due to the large amount of information available on social media. Such users exhibiting FoMO are also more likely to spend the majority of their time checking and monitoring the social media profiles of others to see what they are up to. In addition, social media users with a high level of FoMO are also likely to show more tendencies to compare themselves with others on social media in terms of social standing, accomplishment, and situation in life.

All in all, the support for **H1** to **H3** is aligned with those of prior research linking FoMO to other negative consequences of problematic social media use and the dark side of social media. For instance, Malik et al. (2020) reported that FoMO predicted fatigue resulting from the use of mobile messaging apps like WhatsApp. Our findings regarding the association between FoMO and stalking support those of prior studies which contend that individuals can spend more time recreationally gathering information on others' profiles by browsing or following shared social media content (Fioravanti and Casale, 2020; Stiff, 2019). In fact, our results confirm that FoMO may act as a motivator (Doster, 2013) and cause social media users to spend more time engaging in passive surveillance (i.e., media stalking). The significant association of FoMO with social comparison supports the findings of Buglass et al. (2017), who found users were more vulnerable to the negative effects on their well-being because of the way they interact on social media platforms.

In addition, the results of the statistical analysis supported **H4**, confirming a significant positive association between stalking and social comparison. This finding indicates that users engage in social comparisons even when passively monitoring other social media users and recreationally browsing through the content shared by others, as posited by Fox and Moreland (2015). To elaborate further, the social media users who spend the majority of their time looking at others' profiles, tracking the activities of their friends, and generally collecting more information about their social media connections will exhibit a higher propensity to compare various aspects of their lives with others.

In addition, **H5** was not supported by the results, indicating that stalking is not significantly associated with fatigue. While this is a

Table 8
Results of moderation analysis.

Frequency of posting social media status updates						
	β	*t*	*p*	LLCI	ULCI	Moderation?
FoMO → SMF	−0.01	−0.13	.90	−0.0945	.0829	No
FoMO → SMS	−0.01	−0.32	.75	−0.0790	.0566	No
FoMO → OSC	−0.03	−0.71	.48	−0.1124	.0528	No
Social media envy						
	β	*t*	*p*	LLCI	ULCI	Moderation?
FoMO → SMF	−0.04	−0.75	.46	−0.1318	.0594	No
FoMO → SMS	−0.01	−0.28	.78	−0.0897	.0673	No
FoMO → OSC	−0.10	−2.64	.01	−0.1820	−0.0266	Yes

Note: Online social comparison (OSC), Social media stalking (SMS), Fear of missing out (FoMO), Social media fatigue (SMF).

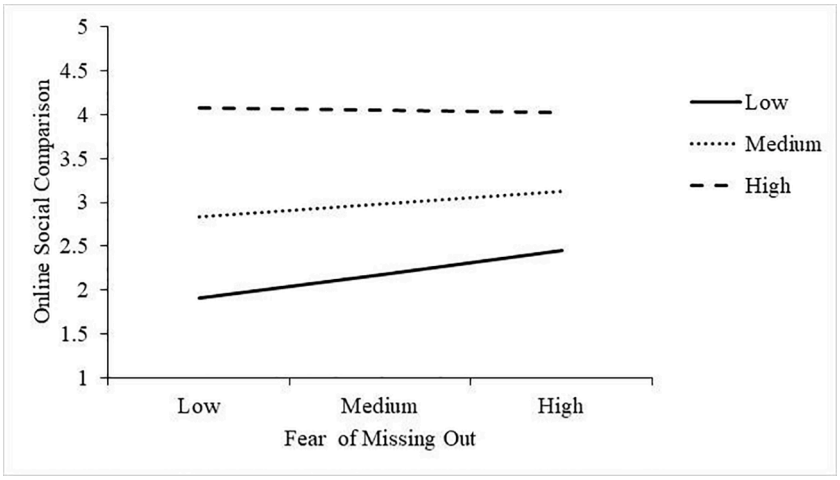

Fig. 3. Moderating effect of social media envy on the association between FoMO and social comparison.

surprising finding, we attribute this to the fact that stalking may be a way to stave off FoMO and the associated frustration at not being able to keep up with what their friends are up to (Wiesner, 2017). Thus, engaging in stalking may act like a coping or relief mechanism, which does not translate into fatigue. However, this may be a context-specific finding, and more research is needed before this finding can be generalized. Furthermore, we found support for **H6**, confirming that social comparison is significantly associated with fatigue. The findings are aligned with the studies of Talwar et al. (2019) and Malik et al. (2020), which also found social comparison to be an antecedent of fatigue. This outcome implies that social media users who tend to engage in comparison while browsing others' social media profiles to know about their activities may experience negative feelings or become tense and overwhelmed by the available information. This is an important finding that indicates that social comparison can result in negative consequences, such as fatigue.

Evaluating the complete picture, i.e., the positive association of FoMO with stalking and social comparison, and the positive association of social comparison with fatigue, we can claim that our findings concur with prior studies positing that the association of social media use, online behaviors, and negative effects with well-being may be cyclical in nature (Buglass et al., 2017; Verduyn et al., 2020). Thereby, we contend that there may be an "*amplification effect*" that causes a social media user experiencing a negative phenomenon like FoMO to be more prone to experiencing higher forms of other deviant phenomena associated with the dark side of social media, such as fatigue and stalking.

The mediation analyses conducted to examine **H7** and **H8** revealed a partial mediation effect of social comparison on the association of FoMO with fatigue, thus confirming support for **H7**. Our findings are in line with previous studies, which observed the tendency to engage in social comparison (Reer et al., 2019; Steers et al., 2014) mediated the associations among social media use-related phenomena. The results imply that the total effect of FoMO on fatigue is spread across both the direct association and the intervening mechanism of social comparison, which represents the activities that social media users engage in as well as the tendencies (or motivations) driving their usage. This finding extends our understanding of the mechanisms or pathways through which FoMO leads to fatigue. Since social comparison has received limited attention in the context of fatigue, more research is required before this finding can be generalized.

The study results indicate that stalking has no mediating effect on the examined associations, thereby revealing a lack of statistical support for **H8**. This finding is not entirely unexpected since the concept of social media stalking is nascent, and not much is known about how the passive monitoring of others' profiles may influence a social media user's experience. We posit that this finding is a significant contribution to the literature and attribute it to the possibility that passive stalking of others' profiles may be a routinized and recreational activity. It may also be possible that users habituated to engaging in routine passive stalking may be less prone to experiencing fatigue as a result. Yet, it may also be possible that this is a context-specific finding (i.e., confined to the investigated sample), and these associations need to be tested further to establish a more generalizable understanding.

The results reveal support for only one of the hypotheses proposing the moderation effect of the frequency of status updates (**H9a–c**) and social media envy (**H10a-c**) on the association of FoMO with fatigue, stalking, and social comparison. Herein, no moderating effect of frequency of status updates was found (i.e., **H9a-c** were unsupported). This is an unexpected result, as we anticipated that individuals who post or share content more frequently would experience higher fatigue correlated with FoMO, and the findings might be specific to the UK context. A potential reason for this finding could be that social media use is highly prevalent in the UK, with an average daily social media use of 110 min through any device (Johnson, 2020). We venture to rationalize that on account of such frequent use, users may have become inured to posting frequent status updates, and therefore may not be affected by the frequency of their own posts (i.e., shared content). However, further study of these associations is required before any generalizations can be made.

Next, **H10a-b,** examining the moderation effect of social media envy on the association of FoMO with fatigue and stalking, remains statistically unsupported. The absence of a significant moderation effect of social media envy for the association between FoMO and fatigue (**H10a)** is a surprising finding since negative emotions and envy have been previously linked to negative outcomes, such as depression (Tandoc et al., 2015) and decreased well-being (Zhou and Zhang, 2019) in the context of social media use. We attribute this unexpected finding to the context-specificity of the sample, in line with prior studies which indicate that the concept of envy may evolve across different social media settings (Wu and Srite, 2021). Furthermore, a potential reason why social media envy had no moderating effect on the association of FoMO with stalking (**H10b**) could be that social media stalking is passive in nature and primarily considered by scholars to be recreational. Thus, individuals who engage in such stalking may not be prone to experience envy due to passively reviewing the content shared by others on social media. However, to the best of our knowledge, there is no a priori evidence for these associations (i.e., **H10a-b**), and further research is required before we can draw any conclusions.

In comparison, the results confirm the negative moderation effect of social media envy on the association of FoMO and social comparison, thereby disconfirming **H10c.** The results suggest that the association of FoMO with social comparison is lower for individuals with higher reported social media envy than for those with low social media envy. This is an unexpected finding as we anticipated a positive moderating effect on this association. We believe that this negative moderation effect may be attributed to the fact that those individuals, who experience higher levels of envy while browsing through social media platforms, may be anxious about missing potential likes or social rewards (Rosenthal-von der Pütten et al., 2019) for their posts in comparison with others' shared content. Subsequently, these individuals may tend to engage in less FoMO-driven social media use and social comparison to avoid this anxiety. However, due to the paucity of a priori evidence for this association, more research is required before any conclusions can be drawn based on our findings.

7. Conclusion

Given the increasing concerns about the pervasiveness of social media and its negative influences on the lives of digital netizens, our study makes valuable contributions to the literature on the dark side of social media. We raised and answered three **RQs** through ten hypotheses to enhance the understanding of how FoMO, stalking, and social comparison influence fatigue. We also found evidence supporting the partial mediation effect of social comparison as well as partial support for the moderating effect of social media envy. The study findings thus offer important implications for theory and practice.

7.1. Theoretical implications

The present study makes five theoretical contributions to augment the existing literature related to the dark side of social media usage. First, the use of the dual theoretical lenses of TCIU and SCT advances a theoretical framework for examining the dark side of social media and its related deviant behaviors. We explore the pathways that better explain how social media use can become problematic and manifest itself through negative consequences, such as FoMO and fatigue. In addition to clarifying the direct associations among the study variables, our study also brings forth the more complex mechanism underlying the interaction and association between these dark side variables by confirming some of the moderation and mediation effects. Consequently, it underscores the need to go beyond the expected associations to explore the potential effect of third variables.

Second, our findings advance the current knowledge on FoMO, which has primarily been investigated as an indirect influence (e.g., a mediator) in the prior research (Beyens et al., 2016; Buglass et al., 2017). Our findings thus underscore the need to focus attention on the antecedent effect of FoMO on other deviant social media behaviors. Furthermore, our findings confirm the existence of variables that have indirect effects on the association of FoMO with the outcome variable, thereby spotlighting the need to explore other variables, such as the tendency to engage in gossip or share fake news (Talwar et al., 2019), which could mediate the association of FoMO and its consequents.

Third, our study confirms that the existence of a detrimental association of problematic social media use with well-being (psychological and physiological) is cyclical (Buglass et al., 2017). However, the possible context-specificity of these findings also implies that a more theoretically grounded and nuanced examination of the varied phenomena associated with the dark side of social media is required. Thus, the use of other seminal and contemporary theories, such as social aspects theory (Ngai et al., 2015), problem behavior theory (Jessor and Jessor, 1977), and psychodynamic perspectives on treating addictive disorders (Khantzian, 2012), could significantly advance the existing knowledge.

Fourth, our study advances knowledge about the antecedents of fatigue, which is a relatively under-investigated dark side of the social media phenomenon. Although the link between FoMO and fatigue has been posited by prior scholars (Bright and Logan, 2018; Dhir et al., 2018; Logan et al., 2018), only a limited number of studies has focused on understanding the relationship between the two (Dhir et al., 2018). Our study adds to the existing knowledge by examining this relationship and focusing attention on two phenomena (social comparison and stalking), which we posit to be driven by FoMO, wherein social comparison also enacts influence as a driver of fatigue. Furthermore, our results highlight the need to study other psychosocial phenomena, usage activities, and negative emotions related to excessive or problematic social media use as additional potential antecedents. The examination of such variables could generate a more granular understanding of how and why fatigue occurs among social media users.

Fifth and finally, our findings confirm that FoMO and social comparison are stressors that encourage individuals to engage in higher social media use, as suggested by TCIU, which subsequently induces fatigue. In further consideration of TCIU, which posits that excessive social media use can be a compensatory mechanism to cope with stressors, our findings raise the need to imperatively account for other gratifications that can act as stressors, for example, exposure to misinformation (Islam et al., 2020) and fake news sharing (Talwar et al., 2019). Moreover, we also suggest the need to focus more attention on emotions, such as subjective happiness, anger, and jealousy, as potential predictors of FoMO and fatigue. We contend that such emotions and gratifications derived from social media may also significantly influence fatigue and other dark side of social media phenomena. In particular, since emotions can be contextual stressors, studying them along with gratifications and other individual traits, like personality, could offer deeper insights into how social media causes negative consequences for its users.

7.2. Practical implications

Our study also has four significant implications for stakeholders like social media service providers, educators, and parents. First, while we found stalking, a passive use behavior, to be unrelated to fatigue in our study, our finding could be due to the context-specificity of our sample and geographic scope of study, i.e. the UK. Hence, based on prior literature we suggest the need for service providers to counter passive social media use with prompts and reminders to encourage active interactions on these platforms. For instance, users could be prompted to like or comment on recently reviewed posts or pictures. Users could also be given "well-being checks or prompts" to inform and remind them about spending excessive time (e.g., more than 2 h) on social media. Such prompts for active and balanced social media use could potentially discourage passive stalking (and the almost inherent engagement in social comparisons it produces) and instead direct users' attention toward more productive content creation or consumption activities. This would have positive connotations for service providers, as fatigue has been previously linked to potential discontinuance of usage (e.g., Logan et al., 2018).

Second, the findings imply that service providers could consider providing an individual with daily updates of recent events connected to their social media friends and other users whose profiles are frequently visited upon logging in or revisiting the platform after a prolonged period of time (e.g., after 12 h). This could reduce individuals' experience of FoMO by reducing anxiety about missing important events or updates in their digital social groups. It would also allow them to catch up with social media communication at their leisure, thereby possibly reducing the social media fatigue experienced as well.

Third, the findings imply that efforts should be made to improve the awareness of parents, educators, and the general public about the influence of phenomena related to the dark side of social media, especially factors that affect fatigue. Parents and educators should focus on encouraging young social media users (e.g., young adults and adolescents) to be mindful of their social media use and to participate in positive interactions on social media platforms. This could encourage users to avoid or disengage from negative social comparison. Such actions at the behest of parents and educators should also encourage positive motives for social media use, such as building social capital, while concurrently discouraging negative motives, such as evoking envy on the part of others.

Finally, the findings imply the need to increase general awareness about the negative effects of social media use on young adults through well-designed educational programs. This is particularly topical because, due to the COVID-19 pandemic, people have become increasingly reliant on social media for varied purposes, including self-promotion, entertainment (Islam et al., 2020), and information exchange (Naeem, 2020). For example, mindfulness- and well-being-based information could be dispensed by educators in universities (e.g., as a minor course in the curriculum). Such information may be oriented to encourage more offline interactions and to mitigate excessive social media or technology use. Our findings emphasize that educators should focus on discouraging the notion that digital likes on social media content can affect an individual's well-being or subjective happiness.

7.3. Limitations and future scope

The study is limited by some primary considerations. First, we used self-reported data collected from a single country, which limits the generalized applicability of the findings. In future studies, our framework could be replicated in different countries and socio-demographically diverse samples to obtain more generalizable insights into the examined associations. Second, the study employed a cross-sectional methodology, which makes the results vulnerable to its inherent biases. Future studies may rely on longitudinal and observational research to address such biases and study the interplay among these variables while accounting for the effect of temporality. Third, the sample was skewed toward female respondents and might be less representative of the male perspective. We encourage future scholars to study more male-dominant samples and, in particular, explore the gender-specific differences in the examined associations. Future studies could also include other potential moderating and/or mediating variables, such as social interaction anxiety, mindfulness, or dark personality traits, in the framework as well to advance the current findings.

Finally, the study was focused on exploring social media as an umbrella term and reflected the general perspective of its users. Thus, the findings may not be generalizable to specific platforms, like Twitter, Instagram, or Snapchat. Future scholars could test our framework

specifically in the context of such popular social media platforms as the prior literature has indicated cross-platform differences in the experiences of social media users (Rozgonjuk et al., 2020). Scholars might also investigate how the type of content shared on different platforms (e.g., pictures on Instagram or emojis on Snapchat) affect the users' experience. For this purpose, scholars could consider the use of randomized control trials (RCTs) and experiential design models (e.g., Huarng et al., 2020) to obtain more generalizable insights. Such method-based advances could help establish a causal relationship among the tested variables. Scholars might also test the effect of socio-demographic factors, such as education and occupation, on the associations to understand whether they influence the individual experience of the dark side of social media phenomena.

CRediT authorship contribution statement

Anushree Tandon: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Amandeep Dhir:** Conceptualization, Methodology, Writing – review & editing. **Shalini Talwar:** Conceptualization, Methodology, Writing – review & editing. **Puneet Kaur:** Conceptualization, Methodology, Writing – review & editing. **Matti Mäntymäki:** Conceptualization, Writing – review & editing, Project administration.

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