Antecedents and outcomes of social media fatigue

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Abstract

Purpose – This study aims to explore which of four chosen factors (i.e. *privacy concerns*, *FoMO*, *self-disclosure* and *time cost*) induce a feeling of strain among Facebook users in terms of *social media fatigue* (SMF), and if this occurs, whether it further influences such outcomes as *discontinuance of usage* (*DoU*) and *interaction engagement decrement* (*IED*).

Design/methodology/approach – Through an online structured questionnaire, empirical data were gathered to verify the research model, based on the stressor-strain-outcome (SSO) framework. The SEM technique was employed for assessing the hypothesized relationships.

Findings – The findings show that *privacy concerns* and *time cost* are strong antecedents of SMF and contribute significantly to its occurrence; while *FoMO* and *self-disclosure* do not exhibit any significant influence. Moreover, SMF positively and significantly affects *DoU* and *IED*.

Practical implications – This study enhances the existing body of knowledge on SMF and it can help: (1) individuals to be aware of risks and adjust their activities in balance with their well-being, and (2) social media (SM) managers to develop unique strategies to address the specific needs of SM users.

Originality/value – This research contributes to the limited literature on SMF by (1) introducing the concept of *IED* – as a consequence of SMF, and (2) creating measurement scales for *IED*.

Keywords Social media fatigue, Facebook, Structural equation modelling, SSO framework

Paper type Research paper

1. Introduction

Social media (henceforth SM for short) platforms, including Facebook, Instagram, Twitter and others, allow people to interact and communicate easily with one another, and as a result, the number of SM users has expanded rapidly over the last few years. Easy access to social interactions at any convenient time, the desire to know the social activities of friends and the need for information are essential but not the sole factors which encourage the use of SM (Quan-Haase and Young, 2010; Kietzmann *et al.*, 2011). Other aspects, such as media enjoyment, entertainment, speed and efficiency to obtain information, as well as a habit or even addiction, have been identified as additional drivers of SM usage (Al-Menayes, 2015; Chung *et al.*, 2019; Griffiths and Kuss, 2017). These factors, being strong incentives, mean that users very often remain online with no break, resulting in various subjective problems regarding their well-being. Some studies point to the existence of the concept of social media fatigue (SMF) (Malik *et al.*, 2020; Dhir *et al.*, 2019; Bright *et al.*, 2015; Xie and Tsai, 2021; Fan *et al.*, 2020). Users of SM are experiencing SMF to an increasing extent, resulting in their diminished enthusiasm for SM (Zhang *et al.*, 2016). More and more users state that they are beginning to reduce and even abandon their use of SM. SMF appears when users become overwhelmed with information or other stimuli, which may cause uncomfortable feelings and an increasing tendency for users to retreat from SM participation. Zhang *et al.* (2016) define SMF as negative emotional reactions to

social network activities, including tiredness, boredom, burnout, indifference and lower interest. Due to SMF, people might limit their interactions and even stop using SM temporarily or permanently, as well as switch to other alternative platforms (Zhang *et al.*, 2020; Fan *et al.*, 2020; Xie and Tsai, 2021; Shokouhyar *et al.*, 2018).

The prior studies on SMF consequences have mainly focussed on academic performance decrement (Dhir *et al.*, 2019; Malik *et al.*, 2020), depression and anxiety (Lin *et al.*, 2016; Dhir *et al.*, 2018), emotional stress (Pang, 2021) and intentions to discontinue the use of a SM platform (Zhang *et al.*, 2016; Xie and Tsai, 2021).

According to Malik *et al.* (2020), our understanding of the SMF phenomenon is limited to the correlation between SMF and the behavior of SM users. However, this problem is broader and very important because SMF is associated with broad negative consequences not only for the users but also for the providers of SM platforms.

A literature review on SMF reveals four critical research gaps that limit our current understanding of SMF. Firstly, little is known about the causes of SMF (Dhir *et al.*, 2019; Islam *et al.*, 2020; Jabeen *et al.*, 2023) and this limits the preventive measures that can be developed to avoid user fatigue. Secondly, the discovered inconsistencies in the literature constitute a research gap motivating this study, as they indicate the need for further research on the antecedents and outcomes of SMF. Thirdly, there is a lack of examining the consequence of SMF, expressed by the construct we called *interaction engagement decrement*. Fourthly, we found a total lack of empirical studies in a Polish cultural setting. Revealing the factors contributing to the formation of SMF and identifying the behavioral effects resulting from SMF in the Polish context will not only fill this research gap but may also be important material for researchers to compare the results through the lens of the cultural context. Thus, the present study findings will significantly complement the body of emerging literature.

To address the gaps mentioned above, this study aims to answer the following research questions:

RQ1. Are people with high SMF prone to decrease the level of their interaction engagement on SM?

RQ2. Do antecedents (i.e. *privacy concerns*, *FoMO*, *self-disclosure* and *time cost*) evoke SMF in Polish settings?

RQ3. Are uncovered relationships between these drivers and SMF consistent across scientific research?

According to Zheng and Ling (2021), more empirical studies are needed in different cultural settings due to which the cultural diversity perspective will develop the current knowledge of the SMF phenomenon. In addition, it will provide an opportunity for comparing SM users' usage patterns in different regions of the world. Having the above in mind, this study examines the relationship between chosen antecedents (i.e. *privacy concerns*, *fear of missing out*, *self-disclosure*, *time cost*), outcomes (i.e. *discontinuance of usage*, *interaction engagement decrement*), and *SMF* (as a strain) to verify whether SMF and its drivers from prior studies are consistent across Polish context. We theorized the relationships between these constructs based on previous studies, e.g. (Bright *et al.*, 2015; Zhang *et al.*, 2016, 2020; Dhir *et al.*, 2018; Malik *et al.*, 2020) and subsequently, the research model was formulated. To achieve the goals of this research, we based the study on the stressor-strain-outcome (SSO) theoretical framework. An online survey was used to collect research data, and these data were then analyzed by employing structural equation modeling to assess the hypothesized relationships.

Nowadays, this is an important topic because the ongoing Covid-19 pandemic has caused people to spend much more time in front of computer screens, e.g. fulfilling online learning tasks (Al-Kumaim *et al.*, 2021) or remote work, which also increases stress (Sandoval-Reyes *et al.*, 2021). In addition, people also use SM as an information source during the pandemic

times and they willingly share news as well as personal experiences with one another across the world. The seeking of new content (exploration) increases SMF (Islam *et al.*, 2020), and results in both cyberchondria and information overload (Farooq *et al.*, 2020). Therefore, the knowledge regarding drivers of SMF and its consequences, from empirical studies is valuable as it can be used to help SM managers and providers create effective strategies to prevent SMF and to keep users active.

This study contributes to the limited literature regarding SMF by (1) extending the SSO framework into the Polish Facebook context, (2) revealing inconsistencies in the literature regarding SM triggers, (3) introducing the concept of IED - *interaction engagement decrement* – as a result of SMF and (4) creating measurement scales for IED. Moreover, the study findings may aid SM managers and online experts in formulating strategies for functionality modification and user engagement.

The rest of the paper is organized as follows. In the next section, the relevant literature is reviewed, the key concepts involved in the research model and the hypotheses are developed. Section 3 presents the conceptual model, the data used in the analysis and the methodology employed. In sections 4 and 5, the results, and a discussion are presented, respectively. Section 6 provides the theoretical and practical implications of this study. Finally, the conclusions and study limitations are offered.

2. Concepts and background

A review of previous research on SMF (see: Table 1) suggests that this phenomenon is increasingly gaining academic attention. Significantly, an increasing number of studies on this topic focus on emerging economies such as China, India and Pakistan (Zhang *et al.*, 2016, 2020b; Dhir *et al.*, 2018; Cao *et al.*, 2018; Dai *et al.*, 2020; Fan *et al.*, 2020; Xie and Tsai, 2021). On the other hand, almost no studies from European countries were identified.

The latest studies cover various SM platforms (Facebook, Qzone, Instagram, etc.) or messaging apps (WeChat, Weibo) and are based on various frameworks (SSO – the stressor-strain-outcome model, SOR – the stimulus-organism-response paradigm, SCT – the social cognitive theory model) to understand SMF. The studies were based on data from surveys with varied statistical analyses, which favored structural equation modeling and regression analysis.

Many stimuli can influence unfavorable strain concerning psychological well-being and evoke SMF. Prior literature has examined various determinants of SMF, including privacy concerns (Bright *et al.*, 2015; Dhir *et al.*, 2019; Adhikari and Panda, 2019; Fan *et al.*, 2020), information overload (Zhang *et al.*, 2016, 2020; Xie and Tsai, 2021; Whelan *et al.*, 2020) or intensity of use (Whelan *et al.*, 2020; Malik *et al.*, 2020). Moreover, prior studies also revealed the possible implications of experiencing SMF. These include different health problems, e.g. depression, anxiety (Lin *et al.*, 2016; Dhir *et al.*, 2018; Cao *et al.*, 2018), and temporary usage retreat or usage cessation (Zhang *et al.*, 2016; Adhikari and Panda, 2019; Xie and Tsai, 2021). Such modes of behavior from users translate into reduced profits for companies and service operators (Dhir *et al.*, 2018; Malik *et al.*, 2020).

This study aims to expand on and complement the existing literature on the suggested antecedents and outcomes of SMF in the form of the concepts and hypotheses described below.

2.1 Social media fatigue

SM fatigue is a complex concept, having no single definition, and scholars have defined it in various ways. For example, Lee *et al.* (2016) termed social media fatigue as "a subjective and self-evaluated feeling of tiredness from social media usage". In turn, Bright *et al.* (2015) identified this phenomenon as "social media users' aptitude to slow down social media usage when they feel overwhelmed with too many pieces of content, too many friends and contacts, too many sites, and too much time consumed keeping up with these contacts".

Author/s	Platform	Sample	Antecedents	Outcomes	Findings
Bright *et al.* (2015)	Facebook	747 users in the US with ages ranging from 18 to 49	SM confidence (SMC), SM self-efficacy (SMSE), SM helpfulness (SMH), privacy concerns (PC)	–	SMC → SMF PC → SMF
Zhang *et al.* (2016)	Qzone	525 users in China with ages ranging from under 18 to over 35	Information overload (IO), Social overload (SO), System features overload (SFO), Dissatisfaction (D)	Discontinuous usage intention (DUI)	IO → SMF SO → SMF SFO → SMF SMF → DUI D → DUI
Dhir *et al.* (2018)	Facebook	Two datasets: 1,554 and 1,144 students in India aged 12–18 years	Compulsive SNS use (CU), Fear of Missing Out (FoMO)	Depression (D) Anxiety (A)	CU → SMF SMF → D SMF → A
Shokouhyar *et al.* (2018)	Instagram	163 Instagram users in several universities situated in Tehran (Iran)	Information overload (IO), System feature overload (SFO), Social overload (SO)	Short breaks (SB), Controlled activities (CA), Switch to other platforms (SoP)	IO → SMF SFO → SMF SMF → SB SMF → CA SMF → SoP
Cao *et al.* (2018)	social media in general	305 college students from Pakistan	SM Attachment (SMA), Cyberbullying Victimization (CV), Depression (DEP), Anxiety (ANXY), Moral disengagement (MD)	–	SMA → CV SMA → DEP SMA → ANXY CV → DEP CV → ANXY CV → SMF DEP → SMF ANXY → SMF SMAxMD* → CV *MD is a moderator
Sanz-Blas *et al.* (2019)	Instagram	342 active Instagram users from Spain aged over 18	Overuse (O), Intrastress (I), Addiction (A)	–	O → A O → SMF A → SMF A → I
Dhir *et al.* (2019)	Facebook and WhatsApp	1,552 social media users* aged 13 to 18 *SNS=Social Networking Site *MIM = Mobile Instant Messaging	Privacy concerns (PC), Self-Disclosure (SD), Parental Encouragement (PE), Parental worry (PW), Parental Monitoring (PM), Parental Permission (PP)	Academic performance decrement (APD)	SNS PC → SMF SD → SMF PW → SMF SMF → APD MIM PC → SMF SD → SMF PW → SMF PM → SMF SMF → APD
Adhikari and Panda (2019)	Facebook, Twitter, both or others	306 Indian social networking users from 18 to 51 years of age	Self-efficacy (SE), Usefulness (U), Privacy concerns (PC), Ease-of-use (EoU)	Discontinuous usage intentions (DUI)	U → SMF PC → SMF EoU → SMF SMF → DUI (*continued*)

Table 1.
Social media fatigue
(SMF) related research

Author/s	Platform	Sample	Antecedents	Outcomes	Findings
Fan *et al.* (2020)	WeChat	331 respondents from China	Self-esteem (SE), Role conflict (RC), Privacy concerns (PC)	Control activities (CA), Short breaks (SB) Suspend usage (SU)	RC → PC RC → SMF PC → SMF PC → CA SMF → SB SMF → SU SMF → CA
Malik *et al.* (2020)	WhatsApp	Two datasets: 1,398 and 472 students from India	Privacy concerns (PC), Social comparison (SC), Self-Disclosure (SD), Intensity of use (IMU), Fear of Missing Out (FoMO)	Academic performance decrement (APD)	SC → SMF SD → SMF IMU → SMF SMF → APD
Xie and Tsai (2021)	Weibo	328 respondents from China	Advertising interference (AI), Rumor dissemination (RD), Information equivocality (IE), Perceived information overload (PIO)	Discontinuous Intentions (DI)	AI → SMF RD → SMF IE → SMF AI → PIO RD → PIO IE → PIO PIO → SMF PIO → DI SMF → DI
Whelan *et al.* (2020)	social media in general	280 students of an Irish university	Boredom proneness (BP), Information Overload (IO), Communication Overload (CO), SM Use Intensity (UI)	–	BP → SMF BP → IO BP → CO IO → SMF CO → SMF UI*→ IOxSMF * UI is a moderator
Zhang *et al.* (2020a)	WeChat	352 respondents from China aged between 20–50 years	Information Overload (IO), Compulsive use (CU), Fear of Missing Out (FoMO), Time cost (TC), Privacy concerns (PRI), Intrinsic motivation (IM), Extrinsic motivation (EM), SM fatigue intention (IN)	SM fatigue behavior (BE)	CU → IN IN → BE INxEM → BE INxIM → BE IO → IN PRI → IN TC → IN

Table 1.

Author/s	Platform	Sample	Antecedents	Outcomes	Findings
Dai *et al.* (2020)	WeChat	254 students from China aged 18–35 years	Perceived information overload (PIO), Frustration (FRU), Dissatisfaction (DST)	Information avoidance intention (IAI)	PIO → SMF PIO → FRU PIO → DST FRU → SMF FRU → DST SMF → DST SMF → IAI FRU → IAI DST → IAI
Pang (2021)	WeChat	566 WeChat users in mainland China	Compulsive use (CU), Information Overload (IO)	Emotional stress (ES), Social anxiety (SA)	IO → SMF SMF → ES SMF → SA
Teng *et al.* (2021)	WeChat	452 respondents from China	System function overload (SFO), Information overload (IO), Social overload (SO), Privacy concern (PC)	Negative usage behavior (NUB)	SFO → IO IO → SMF SO → SMF PC → SMF SMF → NUB
Al-Shatti *et al.* (2022)	Instagram	Two datasets: (n = 480 from Kuwait and n = 299 from the UK)	Impression management Concern (IMC) Gender (G)	Unethical behavior (UB)	IMC → G (only in Kuwait) IMC → SMF SMF → UB
Pradhan (2022)	Facebook	309 respondents from India	Fear of missing out (FoMO) Use intensity (FBI) Compulsive use (CU) Social overload (SO)	Depression (DEP) Discontinuous use intention (DUI)	FOMO → CU CU → SMF SMF → DEP SMF → DUI CU → SO

Source(s): Author's own work

Table 1.

According to Ravindran *et al.* (2014), SMF is a subjective, multidimensional user experience encompassing negative feelings such as tiredness, annoyance, anger, disappointment, etc. These emerging negative emotions are correlated with many aspects of SM use and interactions. Huge amounts of information may lead to information overload and evoke stress, frustration, dissatisfaction and finally, fatigue (Zhang *et al.*, 2016; Dai *et al.*, 2020; Whelan *et al.*, 2020). SM fatigue means that too much information and various stimuli from SM have led to feelings of being overwhelmed (Lee *et al.*, 2016). Although users may feel overwhelmed with SM content, the intensity of their feelings and how they respond to such content may vary (Ravindran *et al.*, 2013). This is due to the fact that such feelings and responses are subjective. Moreover, each experience of SM may have a different influence on both the length and intensity of fatigue and therefore may also result in different implications of fatigue.

SM fatigue is multidimensional as the sensations involve cognitive, emotional, psychological and behavioral aspects. When SM fatigue occurs it will be reflected in three dimensions (Ravindran *et al.*, 2013):

(1) cognitive level: thinking, remembering and reasoning may be impacted when users are overly engaged or overwhelmed by responses or external demands, which is reflected in, e.g. escalating errors and mistakes or academic performance decrement,

(2) emotional and psychological perspective: negative health effects may emerge (e.g. depression, anxiety, burnout or frustration, etc.) and

(3) behavioral aspects: different human behavioral responses may occur (e.g. discontinuance of usage or interaction engagement decrement on social media).

This study aims to explore the last dimension, associated with SMF outcomes. There are several antecedents which will also be examined in the context of SMF. All of these will be discussed below.

2.2 Privacy concerns and fatigue

Nowadays, the issue of privacy online has become especially important for many users (Zhang et al., 2020a, b). Privacy concern (PC) mainly relates to users' concerns regarding data leakage when using SM. However, e.g. on Facebook, a lot of data can leak out without users being aware of it. According to Winder (2019), the data of 419m Facebook users were leaked by unsecured databases in 2019. Furthermore, the "like" button allows information to be collected regarding the internet browsing habits of individuals. Facebook users, in order to find friends on the site, can link their email to their Facebook account, in this way enabling Facebook to collect the email addresses of both users and non-users (Hill, 2017). These examples show that some data can be passed on without the explicit consent of users. Privacy awareness causes a mental burden leading to fatigue (Bright et al., 2015; Fan et al., 2020). Moreover, privacy concerns can result in distrust of SM use. Consequently, they can lead to less use of SM.

There is no clear position regarding the influence of users' privacy concerns on SMF in existing studies. The studies of Bright et al. (2015) and Fan et al. (2020) revealed that privacy concerns positively influence SMF. Whereas the study of Malik et al. (2020) showed that privacy concerns do not increase fatigue among SM users. Therefore, the following hypothesis should be tested:

H1. Respondents with high privacy concern are more prone to experience SMF.

2.3 Fear of missing out and fatigue

Fear of Missing Out (FoMO) is an overwhelming fear that arises with the awareness that one does not participate online in very rewarding experiences lived by others (Przybylski et al., 2013). The anxiety resulting from the loss of social interactions and potential experiences is perceived as a result of being disconnected from the network (Alt, 2017). The appearance of anxiety induces and intensifies behaviors that are dangerous to health, such as the compulsion to use SM platforms and remain online regardless of the consequences (Tomczyk and Selmanagic– Lizde, 2018).

Previous studies show that users with high FoMO are more prone to compulsive use of SM (Wolniewicz et al., 2018), and the emerging intensity of use is the strongest predictor of SM fatigue (Malik et al., 2020). Moreover, frequent and excessive involvement in SM will cause SM fatigue (Karapanos et al., 2016). Therefore, based on prior extended literature, the second hypothesis is that:

H2. Respondents with larger levels of FoMO are more prone to experience SMF.

2.4 Self-disclosure and fatigue

Self-disclosure (SD) shall be understood as the online sharing of one's own personal information and opinions. According to Dhir et al. (2019), it is the intentional or unintentional disclosure of personal information on SM platforms for various reasons. In prior studies, for example, a desire for self-expression and societal validation (Bazarova and Choi, 2014) or the willingness to belong to a virtual community, and a finding a companion on Facebook (Hollenbaugh and Ferris, 2014) were the crucial factors that drive online self-disclosure. Online information may be released with a clear intention of showing it to a wide audience or without (e.g. mistakes or lack of awareness of the consequences). Online self-disclosure is a

common practice among users across all SM platforms. Information spreads rapidly and reaches everywhere. Self-disclosure can have positive or negative implications. In the latter case, emotionally negative words can seriously affect users' psychological well-being, result in lower self-esteem and reduce their social support (Valkenburg *et al.*, 2006). Therefore, the next hypothesis is as follows:

H3. Respondents with a higher tendency to engage in online self-disclosure are more prone to experience SMF.

2.5 Time cost and fatigue
Nowadays, 3.96bn people use SM, which reflects more than half (51%) of the global population. The average user spends 144 min on SM sites every day, and the total number of global SM users has increased by over 10% during the last year (Digital Marketing, 2021). Taking into account the average time spent per day on SM, Facebook tops the list, with an average of 58 min, and Facebook users upload 300m photos daily and watch approximately 100 million hours of video content (Djordjevic, 2020).

The presented statistics prove that the time spent on SM is constantly growing, which requires a lot of effort from users because their management of SM costs both time and money. According to Jabeen *et al.* (2023), time cost was defined as "the users' perception of the energy they expect to expend in collating, processing and responding to SM communication and information". The *time cost* construct is very rarely present in prior studies. However, the study by Zhang *et al.* (2020) proved it is a factor triggering SMF. In turn, Zhang *et al.* (2020b) point out that SM users perceive an increasingly higher loss of time, due to the frequent use of SM, and their sense of guilt is an important factor leading to SMF. Having this in mind, we define this construct as the loss of time cost personally perceived by SM users, arising from SM use. Users' efforts to screen, filter and process massive amounts of information and the resulting time cost consciously incurred through SM use should be considered as an important factor contributing to SM fatigue. Hence, the following hypothesis:

H4. Respondents feeling a higher level of time cost are more prone to experience SM fatigue.

2.6 Discontinuance of usage and fatigue
Prior literature suggests that discontinuance of usage (DoU) is defined as a cessation of use. According to Recker (2014), it measures the intent to quit use overall in the future, and constitutes a rational decision. However, Ravindran *et al.* (2014) took into account three types of behavioral effects on SM: short breaks in activities, control activities and suspension of usage behavior. A similar approach was adopted by Fan *et al.* (2020). They also considered the same three dimensions of discontinuous usage intention.

SM fatigue may result from the intensity of social interactions among users of the community (Malik *et al.*, 2020), overloaded content available on social networks (Zhang *et al.*, 2016; Xie and Tsai, 2021) or changes to the interface in the SM platform which are unwanted or considered unnecessary (Ravindran *et al.*, 2013). The intensity of the fatigue experience could range from a mild or transient experience to a more intense one, which may eventually end in the decision of the user to quit the platform.

Previous studies have found that if users experience high-intensity fatigue, they are more likely to cease using SM platforms (Maier *et al.*, 2015a; Xie and Tsai, 2021). When users feel inconvenienced or annoyed, they tend to reduce their participation and limit their social network activities (i.e. for a certain period) to avoid SMF (Zhu and Bao, 2018). Thus, in our study, the DoU construct is defined as the permanent cessation or suspension of activity for a certain period.

According to Turel (2015), the discontinuation of usage of any technology is especially relevant in circumstances considered inconvenient and problematic by users, such as when they are stressed. In such a situation, users might intend to stop using the SM platform to avoid the stressful situation by keeping away from SM (Beaudry and Pinsonneault, 2005). And consequently, this decision of the user to quit the platform could be a danger of loss of users for SM providers. Based on the above, the next hypothesis states:

H5. Respondents with high SM fatigue are more prone to discontinue their use of SM.

2.7 Interaction engagement decrement and fatigue
Interaction is fundamental on SM platforms and involves a wide range of user activities such as: sharing and exchanging ideas, thoughts and feelings about user experiences on various topics, giving likes, publishing photos, videos, etc. This kind of interaction, enabling a social connection in the digital world, is a behavioral element of people's engagement on SM. Strong user interaction engagement means high and continuous activity on the SM platform.

According to Beaudry and Pinsonneault (2005), the emerging stress from SM use can result in attempts to exit a difficult situation to minimize its negative consequences and restore personal emotional stability. We assume that in addition to ceasing SM use (DoU construct), users could reduce their engagement in using the SM platform to protect themselves from strain, i.e. SMF. In this way, we intend to extend the existing body of SMF research by identifying *Interaction Engagement Decrement* (IED) as an adaptation strategy to SMF.

Based on the literature analysis, it can be said that the *Interaction Engagement Decrement* construct has not appeared in earlier studies. For this reason, new measuring scales have also been created for it (see: Table 2).

In this study, the *Interaction Engagement Decrement* construct is defined as decreasing user activity on the SM platform over time, involving a wide spectrum of user activities, for example: exchanging ideas, thoughts and feelings in posts, giving likes, publishing photos, videos, etc. In contrast, strong user interaction engagement means tremendous and continuous activity in the digital community space.

It is assumed that SMF could result in decreasing the intensity of social interactions among users of the SM community. In view of this, the next hypothesis is as follows:

H6. Respondents with high SM fatigue are more prone to decrease the level of their interaction engagement on SM.

3. Methodology
In this section, to describe our steps of methodology, we start with a presentation of the conceptual model of SM fatigue. Then, we present issues connected with data collection (i.e. an online questionnaire, sample, etc.). Finally, we discuss the SEM method, which was employed for assessing the hypothesized relationships. This method is a comprehensive technique for the assessment and modification of the theoretical model.

3.1 Research model
Prior SMF studies are based on various theoretical frameworks to understand SMF, including SSO – the stressor-strain-outcome model, SOR – the stimulus-organism-response paradigm, SCT – the social cognitive theory model, LCM – the limited capacity model, and TTSC – the transactional theory of stress and coping. The present study utilizes the stressor-strain-outcome (SSO) framework (see: Koeske and Koeske, 1993) to explain how some negative manifestations, i.e. stressors (such as *privacy concerns*, *FoMO*, *self-disclosure* and *time cost*), can lead to other negative symptoms, such as *SMF*, and finally evoke some

Construct	Measurement items	Source of scale
Privacy concerns (PC)	*PC1:* I worry about my privacy on Facebook *PC2:* I believe that my personal information can easily be used by the marketing personnel of Facebook *PC3:* I have a cautious attitude to the disclosure of personal and private information on Facebook *PC4:* I am concerned about the possible misuse of information that I submit to Facebook *PC5:* I am concerned that anyone can find my private information on Facebook	Bright *et al.* (2015) Dinev and Hart (2006)
Fear of missing out (FoMO)	*FoMO1:* I fear others have more rewarding experiences than me *FoMO2:* I get anxious when I do not know what my friends are doing *FoMO3:* When I am on vacation, I check what my friends are doing at the time *FoMO4:* I worry when I find out that my friends are having fun without me *FoMO5:* It is important to me that I understand the jokes that are popular among my friends	Przybylski *et al.* (2013)
Self-Disclosure (SD)	*SD1:* I have a detailed profile on Facebook *SD2:* My Facebook profile says a lot about me *SD3:* I disclose a lot of information about myself on Facebook	Chen (2013) Krasnova *et al.* (2009)
Time cost (TC)	*TC1:* Browsing my friends' posts takes up a lot of my energy and time *TC2:* Constantly following my friends' information takes up too much of my energy and time *TC3:* Caring about my Facebook friends takes up a lot of my energy and time *TC4:* Filtering and screening information takes up a lot of my energy and time	Maier *et al.* (2015)
Social Media Fatigue (SMF)	*SMF1:* When using Facebook, I often feel too tired to perform other tasks well *SMF2:* I feel indifferent about reminders or alerts about new things from Facebook *SMF3:* I am likely to receive too much information when I am using Facebook *SMF4:* I am often overwhelmed by the amount of information available on Facebook	Karasek (1979) Bright *et al.* (2015)
Discontinuance of usage (DoU)	*DoU1:* In the future, I will use Facebook far less than today *DoU2:* I will sometimes have a long break from Facebook and return to it later *DoU3:* I will deactivate my Facebook account	Maier *et al.* (2015) Ravindran *et al.* (2014)
Interaction engagement decrement (IED)	*IED1:* I do not like to get involved in Facebook community discussions *IED2:* I am increasingly unwilling to contact like-minded people on Facebook *IED3:* I do not feel like participating actively in discussions on Facebook *IED4:* I increasingly rarely exchange ideas with other people on Facebook *IED5:* I am less and less involved in activities on Facebook	Author's own

Note(s): All measurements were made using five-point Likert-type scales
Source(s): Author's own work

Table 2.
Measures of constructs

negative outcomes. The SSO model was chosen in this study because it is suitable and assists in exploring the stressors leading to SMF and in establishing causal relationships because of links between stressors and outcomes. Based on the literature review, it can be said that the SSO framework has been an effective tool for examining stress-related problems and their consequences (see: Table 1). The application of the SSO model enables the penetration of explanations which are essential for understanding the antecedents and outcomes of SMF.

Through the literature review, the conceptual model presented in Figure 1 was developed.

The proposed research model shows the hypothesized relationships that are, to the best of our knowledge, understudied in the extant literature. The research model, based on the SSO framework, offers six hypotheses about the research topic. Within the SSO framework, stressors refer to environmental stimuli which are perceived and interpreted by an individual as problematic and disruptive. In the current study's conceptual model, the stressors are various stimuli represented by SM usage behavior, namely, online *privacy concerns*, *FoMO*, *self-disclosure* and *time cost*. These four constructs for the stressor were selected based on relatively recent research on SMF. Their selection was motivated by the subjective experience and knowledge of the researcher. Strain refers to the psychological outcomes of stress for individuals and, in the research model, is evidenced by *SM fatigue*. The strain is a mediator between stressors and outcomes. Finally, *DoU* and *IED* on SM are the outcomes of strain, which comes down to a behavioral response to a stressful situation. Discussed above constructs were chosen for the study after a thorough analysis of the literature. For example, the first one (DoU) has appeared in a few studies, i.e. Zhang *et al.* (2016) for the Qzone platform or Xie and Tsai, 2021 for the Weibo platform – but we want to test it for Facebook. In contrast, another construct (IED) does not exist in the literature. Since it is believed that SMF could result in the dropping intensity of social interactions among SM users, it was decided to create and include this variable in the study.

The procedure to develop and verify the design for the newly proposed concept of *Interaction engagement decrement* (IED) is described in Sub-section 3.1.1. Whereas measures of all constructs for the study were presented in Sub-section 3.1.2. They create a base for the main survey to gather empirical evidence for the proposed research model.
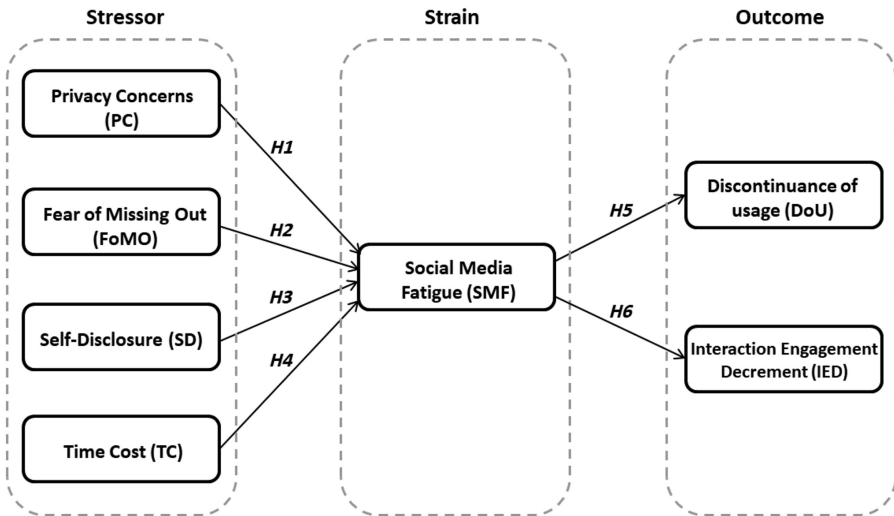

Figure 1.
Conceptual model of SM fatigue

Source(s): Author's own work

3.1.1 Stages of the construct's development. The methodology for creating the construct – IED and its measuring scales was conducted according to the method of Brzozowska-Woś (2020) in the following stages, namely:

(1) Exploratory phase (qualitative approach)

- *Semi-structured individual interviews* were conducted (Respondents were mainly students, n = 11; Saunders *et al.* (2016) suggest between 5 and 25 participants as a sample size recommendation for individual semi-structured interviews - thus, this is fulfilled; Purposeful sampling; It was also assumed that data collection should be terminated when saturation is reached, i.e. no more new insights or information are obtained; The primary criterion for selecting people for the interviews was the use of Facebook).

- *Analysis of the semi-structured individual interviews* (The interviews after the analysis were used to obtain information on the main factors causing IED of Facebook users.)

- *Creation of research questions to measure the new construct* (According to Furr (2011), it was analyzed whether the factors fit the construct and whether their wording is correct in terms of clarity, brevity, readability, validity or redundancy; The final list of factors, which was then subjected to quantitative research in the confirmation phase, see Table 2).

(2) Confirmation phase (quantitative approach)

- *Online questionnaire* (A cross-sectional survey was decided, and an online survey using the Google Forms service was chosen as the method of data collection; Respondents could only be people who use Facebook; A pilot study was conducted initially to test the survey instrument – there were no comments to improve it).

- *Data analysis – construct validity and reliability* (During the analyses, IBM SPSS Statistics 26 software was used; Construct reliability analysis and exploratory factor analysis (EFA) were conducted; Scale reliability was checked by calculating Cronbach's alpha coefficients – all alpha coefficients were greater than the acceptable scale reliability criterion of 0.7; Confirmatory factor analysis (CFA) was conducted using Mplus 8 software and ML estimator; All factor loadings exceeded the value of 0.6, which means that there is convergent validity for the constructs (Hair *et al.*, 2010); Discriminant validity was confirmed. The AVE values obtained were higher than the recommended level of 0.5).

- *Nomological validity of the scale* (IBM SPSS Statistics 26 and Mplus 8 software were used; Re-validation of the scale and assessment of nomological validity was conducted to see how the scale behaves in relation to other variables; To assess the nomological validity and applicability of the scale, it was used as a higher-order variable in the model to examine the relationship between the dimensions forming the IED construct and other constructs theoretically related to it (Churchill, 1995)).

The use of mixed methods was intended to strengthen this study by counterbalancing the limitations of both quantitative and qualitative studies (Creswell and Clark, 2017). A qualitative approach was used to identify factors to be identified and assigned to the newly developed IED scale. According to Creswell and Clark (2017), qualitative methods

provide a lot of detailed data, even with a small number of people participating in the survey. Without the outcomes of the qualitative interviews, finding the right measures of the IED construct would be difficult. It is therefore essential to start a project with qualitative exploratory research to discover helpful content. In this study, the findings from individual interviews helped to generate questions for measuring the IED construct (Table 2). In other words, the exploration phase allowed for the development of the scale measurement items. On the other hand, the quantitative approach was used to study the conceptual framework (to test and confirm the developed measurement scale), which was established on the basis of semi-structured individual interviews (Venkatesh *et al.*, 2013). According to Scandura and Williams (2000), a mixed research method defined in this way supports the theory and helps to develop stronger conclusions. For this reason, to verify the results obtained in the exploratory phase, in the confirmation phase, it was decided to use a survey conducted with the use of an online questionnaire. The use of mixed methods to study the same phenomenon allows for a closer knowledge of the truth, maximizing the validity and increasing the reliability of the study (Patton, 1999).

3.1.2 Measures of constructs. The seven constructs of the developed research model are measured using Likert-type scales, drawn from pre-validated measures, where possible (Table 2).

There were 29 items. All of them were measured on five-point Likert scales which ranged from strongly disagree to strongly agree. Respondents typically expressed their level of agreement to a statement in one of five ways: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree.

Measures of constructs provided in Table 2 were created by adapting and modifying the prior scales to suit the Facebook context and their validity and reliability (how well the scale measures the concept) have been demonstrated in prior studies indicated in the table. However, one construct, i.e. *Interaction engagement decrement* required the creation of measurement items specifically for this study. This task was done successfully because the reliability (Cronbach's alpha and CR) of these items was 0.86 and 0.87, respectively. Thus, this shows the internal consistency of this novel scale (Clark and Watson, 1995; Hair *et al.*, 2010). Moreover, during a confirmatory factor analysis (see Sub-section 4.1), we assess the contribution of each scale item as well as incorporate how well the scale measures the concepts (reliability).

3.2 Sample and data collection

An online questionnaire provided in English was used to gather empirical data from SM users. The online survey was created using the Google Forms service, and the data were collected in January/February 2021.

The environment chosen for the study consisted of a Facebook community. Facebook was chosen mainly due to its popularity, the volume of users and very broad reach. Facebook has a worldwide total of 2.74 billion active users every month (Facebook Investor Relations, 2020). According to the latest available statistics, in January 2021, 69.63% of the social network market share was owned by Facebook (GlobalStats, 2021). For many years, it has been the undisputed leader among SM platforms and this platform provides both an attractive and unique venue to study: (1) various business issues, e.g. through sentiment analysis from users' posts (Baj-Rogowska, 2017; Baj-Rogowska, 2020a), and (2) many social phenomena, i.e. SM fatigue (Bright *et al.*, 2015; Cramer *et al.*, 2016; Adhikari and Panda, 2019; Dhir *et al.*, 2018, 2019).

Data were collected using a random sampling strategy, to allow the representativeness of the sample. The only criterion for taking part in the survey was the use of Facebook (including Messenger). This study applied a snowball sampling strategy to convey the questionnaire to the target audience. To begin with, the web link of the questionnaire was sent to the author's friends on Facebook, as well as being provided to teachers and students at a few universities

in Poland. All of them were asked to invite their friends who were Facebook users to participate in the survey, and so on. During the procedure, no one was offered any incentive to take part in this study. Participation in the survey was confidential and anonymous.

At first, a pilot study was conducted, in which 12 students were invited to participate in the study. The survey was pre-tested on this small group to verify the credibility of the questionnaire regarding the clarity of the questions and whether this tool gathered the necessary information without omitting any essential aspects.

Ineligible responses (including any with omissions and those with identical answers for all questions) were discarded. 444 valid questionnaires were finally obtained.

The survey included six headline questions to describe the respondent profile (gender, age, education, occupation, length of use and average time spent on Facebook) and seven latent variables (each of which was in a separate section of the questionnaire). A demographic analysis of the sample is presented in Table 3.

There were 274 (61.7%) female and 170 (38.3%) male respondents. The most numerous group were respondents aged 18–25 (72.5%) and the smallest were those aged over 55 (3.2%). The largest group of the sample were students (68.9%).

Variable	Category	Frequency	Percentage (%)
Gender	Female	274	61.7
	Male	170	38.3
Age	<18	20	4.5
	>18 and ≤ 25	322	72.5
	>25 and ≤ 35	35	7.9
	>35 and ≤ 45	27	6.1
	>45 and ≤ 55	26	5.9
	>55	14	3.2
Education	Junior school	2	0.5
	High school	79	17.8
	College/ university	302	68
	Post-graduate	61	13.7
Occupation	Student	306	68.9
	Working	122	27.5
	Unemployed	3	0.7
	Others	13	2.9
Length of use of Facebook	<1 year	4	0.9
	>1 and ≤ 3 years	20	4.5
	>3 and ≤ 6 years	83	18.7
	>6 and ≤ 9 years	211	47.5
	>9 years	126	28.4
What is the average time you spend on Facebook each day?	Less than 15 min	60	13.5
	15–30 min	119	26.8
	30 min to 1 h	129	29.1
	1–2 h	74	16.7
	2–3 h	34	7.7
	Over 3 h	28	6.3

Source(s): Author's own work

Table 3.
Demographic characteristics of respondents

SM was originally associated with just the younger generations, but now, all generations tend to use SM in their daily routines. Almost one-third of respondents (29.1%) spend on average between 30 min and 1 h on Facebook each day. Only a small group of respondents (6.3%) spend an average of over 3 h daily on Facebook.

3.3 Method of data analysis
The gathered data were empirically used to verify the proposed conceptual research model. Hypothesized relationships were assessed using the structural equation modeling (SEM) technique. This technique allows the statistical presentation of the causal structure of phenomena, where: (1) several variables can be analyzed concurrently, and (2) the analyzed variables can be latent, meaning that they are not directly measured (Baj-Rogowska, 2020b).

The basic stages, which are usually taken to perform SEM modeling are shown in Figure 2.

The SEM procedure is based on the indicator variables and conceptual hypothesized model of SM fatigue (Figure 1). We follow the stages (presented in Figure 2) which are described below:

Stage 1: Exploratory Factor Analysis (EFA) is usually performed as a preliminary stage needed for analyzing the latent constructs and providing a preliminary insight into the relationships between the measured variables and the corresponding latent factors.

Stage 2: Confirmatory Factor Analysis (CFA) is performed for the confirmation of the factor structures based on the EFA and in compliance with some theoretical knowledge. In other words, during CFA, the conceptual model is firstly defined due to some theory, and then the CFA statistics investigates how well the theoretical specification of the factors reflects the real data. The outcome of CFA is connected to the measurement part of the SEM model, which gives the loadings of the indicator variables on corresponding latent factors.

Stage 3: In the SEM stage, the measurement part and structural part of the SEM model are derived, which able us to all the estimated interrelations between the examined variables. The important benefit of SEM modeling is also the ability to test and evaluate the models which contain a set of theoretical hypotheses.

Stage 4: The quality of model fit to the real data is tested using the calculation of model fit indices. In case they indicate the poor model's fit values, some additional modifications to the model should be done. The type of indices and the most important fit indices and their acceptable threshold values are discussed in detail in (Dragan and Topolšek, 2014).

The SEM procedure provides the most efficient technique for a series of separate multiple regression equations estimated simultaneously. It is based on two basic components: (1) the structural model (is the path model) which relates to the dependencies between latent variables, and (2) the measurement model which describes the value of observable variables (indicators).
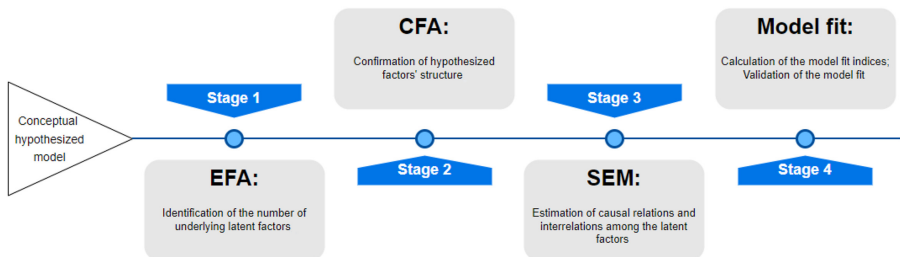

Figure 2.
main steps of the modeling

Source(s): Author's own work

The statistical methods used to empirically verify the validity and reliability include variance analysis and — first and foremost — Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). CFA begins with a theoretical model; otherwise, the approach is regarded as exploratory. These two approaches, in practice, complement each other. EFA is based on an initial model, similar to the process in CFA, and if the model assumptions are not supported by empirical verification, they are normally modified to gain a better fit. The value of many indicators (χ^2, statistics, TLI, Standardized RMR, RMSEA, etc.) should be measured to obtain the model assessment. Only by adopting such an approach can a decision be taken as to whether the model fits well enough or is insufficient.

The internal reliability of a scale is usually verified by computing Cronbach's alpha coefficient. According to Hair *et al.* (2010), the agreed minimum lower level for Cronbach's alpha coefficient is the value 0.70. Confirmatory factor analysis confirms (or rejects) the previously proposed hypotheses which specify dependencies between individual constructs and sets of items. Furthermore, it is also used to determine the suitability of measurement scales, regarding their validity and reliability. The approach for determining the validity of the model involves proving that the proposed model fits the data, and the statistical significance of factor loadings (statistical value $|t| > 1.96$).

Fornell and Larcker (1981) put forward the simplified approach of average variance extracted (AVE) to confirm the validity, which is computed based on the value of the estimated parameters of the model. AVE uses a value from the interval [0; 1]. If AVE >0.5, meaning that over 50% of the item's variability is explained by the variability of the latent construct, then validity is assumed to be confirmed.

There is a lot of software for structural equation modeling. We apply SPSS and Amos - its Add-on, which enables the design of the SEM model in a completely graphical framework.

4. Results

Using SPSS, complete data (444 records) were submitted for the exploratory factor analysis (EFA). This kind of analysis helps to determine the correlations between the observed variables and their underlying factors, and the extent of these correlations. The obtained KMO (Kaiser–Meyer–Olkin) measure of sampling adequacy = 0.836 is a good fit and indicates relatively compact patterns of correlations, therefore the factor analysis should generate distinct and reliable factors (Charles and Kumar, 2014). Bartlett's test (p-value = 0.000) was statistically significant. Cronbach's alpha was also used to assess the initial reliability of the measures. The values of Cronbach's alpha for each scale were above 0.70, which shows the internal consistency of each scale.

A path analysis was performed using AMOS software to verify the structural model regarding relationships among variables. According to the recommended procedure of Anderson and Gerbing (1988), a two-stage analytical approach was employed: the first stage consisted of using confirmatory factor analysis (CFA) to test the measurement model for reliability and validity. Next, in the second stage, the structural model was estimated using structural equation modeling to answer the research hypotheses.

4.1 Confirmatory factor analysis (CFA)

The CFA model, within the SEM framework, represents what has been referred to as a measurement model. CFA tested if the presumed model was confirmed by the empirical data. The obtained data were examined for reliability and validity by employing the confirmatory factor analysis. Convergent validity was confirmed in three ways: (1) all item loadings toward respective measures were higher than 0.50 (Anderson and Gerbing, 1988), (2) the composite reliability (CR) value of all constructs exceeded 0.70 (Clark and Watson, 1995; Fornell and

Larcker, 1981) and (3) the value of the average variance extracted (AVE) exceeded 0.50 (Fornell and Larcker, 1981). The discriminant validity was confirmed by the fact that the square roots of all the AVE scores are significantly greater than any of the other correlation coefficients among all considered constructs in this study (Fornell and Larcker, 1981). The summary of the results is shown in Table 4. As suggested by Hair *et al.* (2010), the model fit indices were also in consonance with the recommended values (χ^2/df = 2.27, CFI = 0.93, TLI = 0.91, RMSEA = 0.054).

We also conducted the heterotrait-monotrait ratio of correlations (HTMT) analysis (Henseler *et al.*, 2015) to confirm the validity and reliability of the adopted scales in the current study (Table 5). HTMT is a measure of similarity between latent variables. If the HTMT value is visibly smaller than one, discriminant validity can be regarded as established.

The data were normally distributed because the absolute value of kurtosis and skewness for measurement items was under the threshold limit of 8 and 3, respectively. Moreover, a chi-square Q-Q plot was created to examine the dataset. It revealed the points in the Q-Q plot are approximately on the line which once again confirmed that the data are normally distributed. Due to this, is possible to conduct the SEM procedure.

4.2 Structural equation modeling (SEM)

The AMOS software was used to compute the path structure of the conceptual model. Since the data were normally distributed, we applied the estimation method - the normal theory maximum likelihood (ML), which requires the correct model and normal data as assumptions. Thus, the research model was verified by the usage of a maximum-likelihood estimation (MLE) based on the multivariate normality of observable variables. The applied approach took all paths into account at the same time, which is a strength of structural equation

Factor	Alpha	CR	AVE	PC	FoMO	SD	TC	SMF	DoU	IED
PC	0.73	0.74	0.52	*0.72*						
FoMO	0.72	0.73	0.51	0.03	*0.71*					
SD	0.88	0.71	0.54	0.37	0.34	*0.73*				
TC	0.86	0.79	0.55	0.15	0.47	0.39	*0.74*			
SMF	0.72	0.71	0.52	0.29	0.08	0.17	0.41	*0.72*		
DoU	0.71	0.73	0.51	0.42	0.07	0.04	0.22	0.36	*0.71*	
IED	0.86	0.87	0.64	0.27	0.06	0.28	0.04	0.13	0.35	*0.80*

Note(s): Chi-square (467) = 1060.578; CFI = 0.93; TLI = 0.91; RMSEA = 0.054 (90% CI = 0.049–0.058); n = 444
Values in italics along with the diagonal show the square root of the average variance extracted (AVE)
Source(s): Author's own work

Table 4. Discriminant validity

Factor	PC	FoMO	SD	TC	SMF	DoU	IED
PC							
FoMO	0.11						
SD	0.13	0.12					
TC	0.05	0.16	0.13				
SMF	0.10	0.28	0.06	0.14			
DoU	0.15	0.25	0.01	0.08	0.13		
IED	0.09	0.20	0.09	0.01	0.04	0.12	

Source(s): Author's own work

Table 5. Results of the HTMT analysis

modeling. The t-student statistics were obtained, which allowed support for each hypothesis formulated in this study. The fit indices of the structural model of χ^2/df = 2.7, CFI = 0.93, TLI = 0.91, RMSEA = 0.06 were in line with the recommended values (Hair *et al.*, 2010). Standardized RMR = 0.0732 is a good fit as it should be <0.08. The Beta index shows the values of parameters among the constructs which represent regression coefficients. The results are presented in Table 6.

The obtained results show that *privacy concerns* (β = 0.27, p < 0.001) and time cost (β = 0.38, p < 0.001) positively influenced SMF. Additionally, SMF was positively correlated with DoU (β = 0.41, p < 0.001) and IED (β = 0.16, p < 0.01). The final path model of the study is presented in Figure 3. Most hypotheses, except for H2 (*FoMO → SMF*) and H3 (*SD → SMF*), were corroborated by the study results.

As presented in Table 5, and finally in Figure 2, not all assumed relationships between the constructs in this study are statistically significant ($p \leq 0.05$). Thus, hypotheses H2 and H3 were rejected.

Structural path	Beta	*t*-value	*p*-value	Test result
H1. PC → SMF	0.27	0.203	0.001	Supported
H2. FoMO → SMF	−0.143	−0.138	0.050	Rejected
H3. SD → SMF	0.04	0.028	0.442	Rejected
H4. TC → SMF	0.38	0.289	0.001	Supported
H5. SMF → DoU	0.41	0.477	0.001	Supported
H6. SMF → IED	0.16	0.249	0.007	Supported

Note(s): Chi-square (486) = 1355.396; CFI = 0.93; TLI = 0.91; RMSEA = 0.064 (90% CI = 0.060–0.068); n = 444
Source(s): Author's own work

Table 6.
Parameter estimates for causal paths
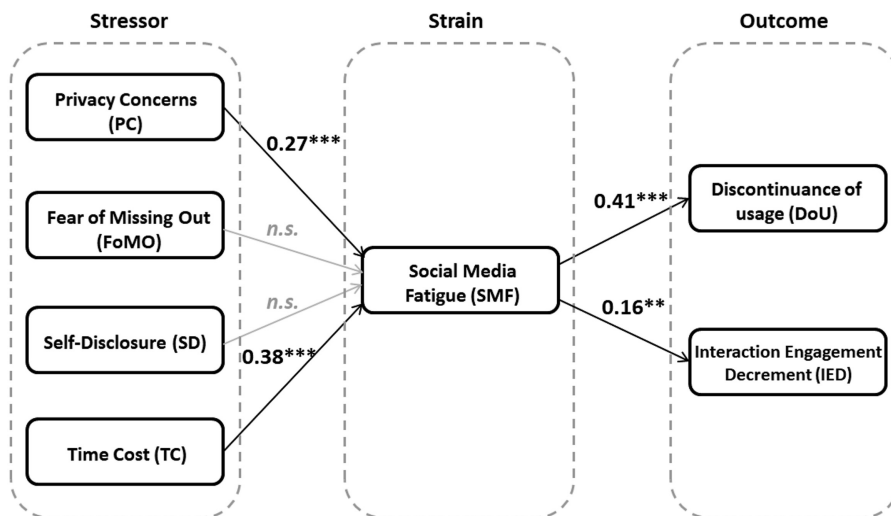
Note(s): n.s. - not statistically significant; **p < 0.01; ***p < 0.001
Source(s): Author's own work

Figure 3.
Model with the path structure estimation

5. Discussion

The test of the measurement model resulted in a good fit between the data and the proposed measurement model. For example, the value of the comparative fit index (CFI) was 0.93; CMIN/df = 2.271; TLI = 0.91; RMSEA = 0.054. According to Browne and Cudeck (1992), an RMSEA value of 0.05 represents a close fit, whereas a value of up to 0.08 indicates a reasonable fit.

To examine the internal reliability of the model, Cronbach's alphas and the composite reliability (CR) were inspected. The CR values and Cronbach's alphas for all variables were above the recommended level of 0.7 (Akkucuk, 2014; Zarantonello and Pauwels-Delassus, 2015). Such results confirmed the acceptability of the internal consistency of the applied scales, with composite reliability ranging from 0.7 to 0.9.

By examining the values of average variance extracted (AVE), convergent validity was also evaluated. AVE measures the amount of variance for specified indicators that account for the latent construct. Higher values of AVE occur when the indicators truly represent the latent construct. According to the guidelines, the variance extracted value for a construct should be greater than 0.50 (Sobh, 2010; Charles and Kumar, 2014; Zarantonello and Pauwels-Delassus, 2015). The obtained variance extracted values ranging from 0.51 to 0.64 meet the recommended levels. This means sufficient convergent validity exists for all the measures. Together with strong Cronbach's alphas, this is evidence enough of the internal consistency of the measurements.

On such a foundation, the purpose of the study may be accomplished. The current study aims to examine the antecedents and outcomes of SMF regarding the use of the immensely popular SM platform Facebook. The essential findings of the study are summarized as follows. The research revealed that respondents (1) with high **privacy concerns** (H1) on SM and (2) feeling a higher level of **time cost** (H4) **are more prone to experience SMF.** Thus, *privacy concerns* and *time cost* constitute antecedents of SM fatigue. On the other hand, this study exposed *DoU* (H5) and *IED* (H6) as outcomes of the SMF phenomenon. In other words, **respondents with high SM fatigue are more prone to** (1) **discontinue use** of SM or (2) **decrease the level of their interaction engagement** on SM.

Discussing the results in more detail, this study declares several important findings. First of all, the results herein are consistent with those of the majority of relevant studies analyzing users' privacy concerns and time cost, which influence SMF (Bright *et al.*, 2015; Fan *et al.*, 2020; Dhir *et al.*, 2019; Adhikari and Panda, 2019; Zhang *et al.*, 2020) and finally cause a decline in the use of SM (Fan *et al.*, 2020). Although DoU was considered by Fan *et al.* (2020) in three dimensions (short break, control activities and suspension of usage) we obtained similar results.

Secondly, in prior studies, *DoU*, as an outcome of SM fatigue, was examined and proved in the single-dimension (as a relationship between variables, i.e. *SM fatigue - > DoU*) (Zhang *et al.*, 2016; Adhikari and Panda, 2019; Lin *et al.*, 2020; Xie and Tsai, 2021) or multi-dimensional perspective (Fan *et al.*, 2020; Kang *et al.*, 2020). According to Ravindran *et al.* (2014), when users feel fatigued by SM, they are likely to adapt their reactions to suppress the unpleasant situation and/or free themselves from the emergence of discomfort. Thus, this study focused on the SMF behavioral responses of users, and explored this from two perspectives, one of which is *DoU*, referring to users quitting the usage of SM, and the other of which is *IED*, involving the behavior of users gradually reducing SM engagement. It is important to emphasize that the *IED* construct was never included in the prior literature. This study confirmed that respondents with high SM fatigue will be willing to decrease the level of their interaction engagement ($\beta = 0.16$, *p*-value < 0.001) or discontinue use ($\beta = 0.41$, *p*-value < 0.01) regarding SM (RQ1). Thus, being fatigued by SM will lead to the user avoiding SM, and, with a high degree of probability, it can be assumed that to calm boredom, individuals will certainly turn to find a different stimulus. This could be important knowledge for SM

providers who should take care of SM users in order not to lose them. Previous studies (Dhir *et al.*, 2018; Gao *et al.*, 2018) have shown that users who are strongly engaged in SM are emotionally fixed to SM. When they are unable to use SM, this causes many negative emotions (e.g. stress, anxiety, exasperation, etc.). As they have a deep emotional connection with SM and have a vast number of friends on SM they very often unsuccessfully reduce engagement or decide to quit the SM platform (Kankanhalli *et al.*, 2005). Hence, a high level of involvement in SM can be a factor in weakening the influence of discontinued usage.

Thirdly, remarkably and unexpectedly, this study showed no effect of the relationship between FoMO and self-disclosure on SMF. Previous studies have shown (see Table 7) that self-disclosure (Dhir *et al.*, 2019) evokes SM fatigue; however, our study does not support such a relationship (H3). It is in line with the findings of Jabeen *et al.* (2023) and Kaur *et al.* (2021), where self-disclosure was found to be an insignificant antecedent of SMF. A similar situation applies to the effect of FoMO on SM fatigue (H2). Prior studies, for example (Malik *et al.*, 2020; Zhang *et al.*, 2020) find no such relationship (similar to this study), whereas the research of Bright and Logan (2018) and Tandon *et al.* (2021) confirmed that SMF is positively, and significantly related to FoMO. In other words, studies in Eastern countries do not identify such a relationship, while those in Western ones do. Thus, it can be presumed here that the study's findings may depend on the cultural context of SM use. This conclusion points to the potential direction of future research. As prior studies revealed, most often, social information overload and social privacy (Kang *et al.*, 2020) can be considered strong triggers of SMF, depression and anxiety (Lin *et al.*, 2016; Dhir *et al.*, 2018). This leads to the conclusion that SMF is evoked by strong negative emotions coming from, i.e. undesirable user content or the loss of privacy and time. Thus, SM fatigue will be caused by factors (antecedents) that are associated with strong negative emotions among SM users.

A comparison of our study's results (against the background of the literature) in terms of chosen antecedents as SMF triggers are shown in Table 7. These analyses were narrowed down to only the group of stressors in the SSO model because they caused the most inconsistencies in the findings of prior studies.

Given that SMF is a complex and incompletely examined phenomenon, involving a wide range of potential drivers, it should be explored in many contexts and theoretical frameworks. Our findings and the comparison analysis with results from prior research point out that there are many inconsistencies regarding SMF triggers (RQ3). Therefore, scholars should join theories from the fields of psychology, consumer behavior, information systems science, etc. to create a comprehensive framework to categorize the drivers of SMF, incorporating factors of a cultural context, completed by a set of factors related to a given country (i.e. including national characteristics such as distrust, dissatisfaction, complaining, pessimism, etc.). This is an area that calls for wider exploration in future research.

More empirical studies in various cultural settings will yield the possibility to compare people's SM usage ways in different regions of the world, thus developing the current knowledge of the SMF phenomenon.

We raised and answered three RQs through six hypotheses to enhance the understanding of the antecedents and outcomes of SMF. To sum up, in the Polish context of SM use, our findings showed that *privacy concerns* and *time cost* are strong antecedents of SMF and contribute significantly to its occurrence. Whereas *FoMO* and *self-disclosure* do not exhibit any significant influence (RQ2). Moreover, SMF positively and significantly affects the occurrence of *DoU* and *IED*.

In light of the above evidence, our study brought some new information. First, although antecedents such as *privacy concerns*, *FoMO*, *self-disclosure* and *time cost* have been previously investigated in the context of SMF, scholars achieved different results. In our opinion, these inconclusive research results on SMF-inducing antecedents can be explained by the cultural context. These earlier studies focused on the US, China and India. In contrast,

Antecedent→ SMF	Test result	Platform	Location	Author/s
PC → SMF	true	Facebook	The United States	Bright *et al.* (2015)
		Facebook and WhatsApp	lack of data	Dhir *et al.* (2019)
		Facebook, Twitter	India	Adhikari and Panda (2019)
		WeChat	China	Fan *et al.* (2020)
		WeChat	China	Zhang *et al.* (2020)
		SM platforms users	The United States	Kaur *et al.* (2021)
		Facebook	*Poland*	*Our study*
PC → SMF	false	WhatsApp	India	Malik *et al.* (2020)
FoMO → SMF	true	SM platforms users	the UK	Tandon *et al.* (2021)
		SM platforms users	The United States	Bright and Logan (2018)
FoMO → SMF	false	Facebook	North India	Dhir *et al.* (2018)
		WeChat	China	Zhang *et al.* (2020)
		Instagram and Snapchat	lack of data	Hattingh *et al.* (2022)
		WhatsApp	India	Malik *et al.* (2020)
		Facebook	*Poland*	*Our study*
SD → SMF	true	Facebook and WhatsApp	lack of data	Dhir *et al.* (2019)
		WhatsApp	India	Malik *et al.* (2020)
SD → SMF	false	SM platforms users	The United States	Kaur *et al.* (2021)
		SM platforms users	The United States	Jabeen *et al.* (2023)
		Facebook	*Poland*	*Our study*
TC → SMF	true	WeChat	China	Zhang *et al.* (2020)
		Facebook	*Poland*	*Our study*

Source(s): Author's own work

our study covers the Central European context, which is completely lacking from the literature, thus this study fills that gap. Furthermore, our thesis on the influence of cultural settings on SMF triggers may be a call to develop research in other locations around the world. Secondly, this study revealed that time cost is a strong antecedent of SMF and it contributes significantly to SMF occurrence and appears very rarely in studies. This factor is overlooked in the existing literature. Therefore, it should be a focus of attention for other scholars. Finally, our results showed that SMF positively and significantly affects *DoU* and *IED* (RQ1). The present study, therefore, extends the examined consequences of SMF – particularly in terms of SM interaction intensity.

6. Implications
This study is meaningful in that it makes a few important theoretical and practical contributions. They are discussed in the following sub-sections.

6.1 Theoretical implications
From a *theoretical* perspective, first of all, the proposed SSO framework is empirically verified and extended in this paper. The findings demonstrate that privacy concerns and time costs

regarding aspects of SM can cause fatigue, which, in turn, indirectly influences users' intentions to withdraw from SM use in two dimensions. Users are willing to discontinue SM usage ($\beta = 0.41$) more often than to decrease the level of their interaction engagement ($\beta = 0.16$) on SM. However, this research proved that both of these consequences are the result of SM fatigue.

Secondly, this study introduced the concept of IED as a consequence of SM fatigue. In prior literature, the existence of this construct has been not found. The important theoretical contribution is the creation of measurement scales for the construct IED and testing them in this study with good results. To confirm the validity of these items, a confirmatory analysis was employed, which confirmed their usefulness. Consequently, this study extended the prior existing knowledge on the possible antecedents and outcomes of SMF.

Thirdly, our study proved that the relationship between certain chosen drivers and SMF is not consistent across scientific research. The examined stressors of the SSO model across empirical research on Polish users of Facebook showed that some findings are different from the conclusions of prior studies. Possible explanations for such differences might result from differences in (1) the tested SM platforms, and (2) the national cultures between Poland and other countries. Certainly, it should be examined in future research.

Fourthly, our research model may serve as a baseline for other interested scholars who intend to examine related variables and further explore the consequences arising from SMF in different cultural settings. Scholars could use the present study findings as a source to compare and develop their further research on SM fatigue. Our results contribute to the emerging body of research that examines factors connected with the SMF phenomenon.

6.2 Practical implications

In turn, the *practical* contribution of this study is that an understanding of the antecedents and outcomes of users' SM fatigue can help: (1) **individuals** to be aware of risks and adjust their activities in balance with their well-being, (2) **SM managers** to develop unique strategies to address the specific needs of SM users and (3) **social scientists and educators**.

From the user's perspective, an understanding of the stressors causing SMF could help them to (1) more consciously manage their time spent on SM, (2) raise awareness of the potential risks, and thus (3) avoid or reduce problems connected with SMF. An important initiative from users should be suggesting and reporting identified privacy gaps to SM providers. Moreover, knowing the factors that cause SMF (especially privacy-related), users should initiate SM discussions aimed at formulating rules for the ethical and safe use of SM platforms. Such an informal set of rules could limit the emergence of many negative incidents (e.g. spreading of fake news concerning selected users, cyberstalking and/or trolling) which strongly can be privacy-invasive for SM users. Eliminating at least part of such activities would reduce the generation of many unnecessary negative emotions contributed to SMF, and would ultimately mitigate the consequences of SMF and ensure the greater well-being of all users.

From the SM providers' point of view, they can redesign and develop their existing platforms by creating simple interfaces which allow users quick and clear access to information about how they are handling sensitive user data to mitigate user concerns related to online privacy. It is an important issue because high privacy concerns are strong antecedents of SMF. The present study revealed that respondents with high SM fatigue will be willing to decrease the level of their interaction engagement or discontinue the usage of SM. How strong SM fatigue was generated during SM usage, influences the users' behavior, and consequently, it reflects their approach to the services of providers. Due to this, thoughtful changes made by providers can not only keep users from leaving but can actually generate more interest in the platform.

In turn, from the last group's perspective (i.e. social scientists and educators), knowledge of the stressors causing SMF could help create educational and awareness campaigns to (1) raise the users' perception of potential privacy vulnerabilities (2) build conscious management of time spent on SM and (3) educate users, particularly the elderly who are more prone to privacy violations.

7. Conclusion
This study could serve as a source to compare the antecedents and outcomes of fatigue in terms of various SM platforms. Moreover, the study contributes to the emerging branch of literature in the area of social sciences on the psychological well-being of online users. The results from the current study expand our actual outlook on SMF, which, if left unchecked, can turn into an illness causing a wide range of problems for SM users and SM providers as well.

7.1 Study limitations and future work
Although this study states the above conclusions, and provides theoretical and practical contributions, its immanent limitations and opportunities for future research must be mentioned. Firstly, this study focuses on a discussion of the interactions between the stressors, strains and outcomes of users without full consideration of the impact of additional socio-demographic factors on SMF, i.e. gender, age, social environment or educational background. A more detailed and extended approach would make it possible to improve the perspective of the generalizability of the findings. Since prior studies have shown that SM usage may differ across age groups (Throuvala *et al.*, 2019; Reer *et al.*, 2019; Tandon *et al.*, 2021), we encourage scholars to examine the moderating influence of socio-demographic factors, especially gender and age, for the explored relationships.

Secondly, the current study only focuses on one, yet very popular, SM platform, i.e. Facebook. For that reason, the findings might be constrained and not applicable to other SM platforms. In view of the variety of widely used SM platforms, such as Instagram, Twitter, You Tube, etc. the potential antecedents and outcomes of SMF may vary according to the features of each SM platform. Thus, to test this and increase the generalizability of the findings, future studies may collect data for other SM platforms, such as Twitter, Snapchat, Instagram, BeeReal and WhatsApp. Hence, we encourage scholars to verify the results of this study through other SM platforms.

Thirdly, it should be recognized that a certain limitation of our methodological approach is that it is a snowball sampling-driven study with a predominant student sample. Since this technique does not select units for inclusion in the sample based on random selection (unlike probability sampling), it is impossible to determine the possible sampling error and make generalizations from the sample to the population (Sharma, 2017). However, there was no other way of accessing the sample, thus making snowball sampling the only viable choice of sampling strategy. Leighton *et al.* (2021) demonstrated that data collection using snowball sampling via SM is an effective and efficient method to recruit study participants. They claim that this technique of sampling made possible an increased sample size and decreased time to completion. Moreover, the demographic limitation of the sample selected for this study could influence the results. Approximately 70% of the respondents selected were students. Using a more diverse sample might also produce distinct results.

In future research, firstly, we plan to replicate this model by analyzing users of different SM platforms (e.g. Twitter, Instagram, etc.) separately to check the repeatability of the findings. Secondly, extensions of this work in the future should consider other antecedents that evoke SM fatigue (e.g. the intensity of SM usage, technology accessibility, network size and social, information or communication overload) and a more extensive set of responses to this phenomenon. Thirdly, it would be worth organizing an international study that aims to compare

the results through the context of cultural SM use. Finally, in future studies, we would like to examine age and gender moderate the linkage between chosen antecedents and SMF.

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