Exploring the Dimensionality of Fear of Missing Out: Associations With Related Constructs

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Abstract

A growing body of research has examined the potential effects of the Fear of Missing Out (FoMO) whereby the Fear of Missing Out Scale (FoMOs; Przybylski et al., 2013) has become the most popular measure for assessing the construct. However, there is ambiguity regarding FoMO's conceptualization and dimensionality. Employing a large representative sample (N = 2,041), this study provides direct empirical support for the conceptualization of FoMO as a second-order construct with two underlying dimensions, i.e., "pervasive apprehension" and "desire for connection", each with distinct relations with variables that have been theoretically linked with FoMO. More specifically, problematic social media use, deficits in needs satisfaction, and neuroticism are more strongly correlated with "pervasive apprehension", while social media use and extraversion are more strongly correlated with "desire for connection". As such, this study contributes to future research as it offers a new perspective on the FoMO construct by showing the importance of giving adequate consideration (statistically and conceptually) to the structure of the construct and how the two dimensions relate to other constructs of interest.

Keywords: fear of missing out; FoMO; social media; psychological need satisfaction; personality

Introduction

Social media are part of everyday life for many people throughout the world. Social media enable users to stay in contact with sizable social networks (Przybylski et al., 2013), anytime and anywhere, and the various activities taking place in those networks. The stream of activities shared on social media, might also prompt ruminative thoughts and fears in people that others are experiencing memorable events in one's absence; a phenomenon labeled as Fear of Missing Out (FoMO). Originally put forth by Przybylski et al. (2013), FoMO is defined as: "a pervasive apprehension that others might be having rewarding experiences from which one is absent, [...] characterized by the desire to stay continually connected with what others are doing" (p. 1841). By developing the 10-item Fear of Missing Out Scale (FoMOs) to assess the construct, Przybylski and colleagues were also the first to show that FoMO serves as a motivational force for social media use (2013).

FoMO has been widely studied: a search on PubMed and PsycINFO using the search term "Fear of Missing Out OR FoMO" yields more than 3,500 hits since 2013. Although research on FoMO has proliferated since Przybylski et al.'s work, there is ambiguity regarding FoMO's conceptualization and dimensionality. For example, while some

scholars conceptualize FoMO as an anxiety whereby one is compulsively concerned that one might miss an opportunity for a (socially) rewarding experience (e.g., Çoşkun & Muslu, 2019; L. Lin et al., 2021), others consider FoMO more as the desire to stay continually connected with what others are doing (e.g., Brailovskaia et al., 2021; Elhai et al., 2016). FoMO's original conceptualization, however, treats both aspects to be part of the same psychological construct (Przybylski et al., 2013, p. 1841), which is reflected in Przybylski's scale, FoMOs, which includes items reflecting the anxiety of not being involved in the activities that others are experiencing, and items reflecting the desire to stay connected. These items operationalize FoMO from two perspectives: (1) as an undesirable state that one tries to avoid, i.e., missing out on social activities, and (2) as a desirable state that one tries to approach, i.e., continuous connection.

Regardless of the unclarities about FoMO's dimensionality discussed above, FoMO has not undergone much conceptual refinement since the first definition and measure emerged. Hence, various scholars argue that the literature is in need for conceptual clarification and validation of its most frequently used measure (e.g., Tandon, Dhir, Almugren, et al., 2021; Tomczyk & Selmanagic-Lizde, 2018). The first aim of this study is to address exactly this need by assessing the construct and measurement in light of its dimensionality. Since FoMO is conceptualized as a motivational force, we argue in this paper that FoMO comprises of two dimensions, (1) "pervasive apprehension" triggered by the undesirable thoughts that one is missing out on social events; and (2) "a desire to stay continually connected with what others are doing". This assumption is inspired by the conceptual underpinnings of various human motivation theories (e.g., Elliot & Church, 1997; Higgins, 1998) that differentiate between two distinct motivations; one moving people away from undesired end states (i.e., avoidance orientation), and one moving people towards desired end-states (i.e., approach orientation; Elliot & Church, 1997). Individuals with a strong approach motivation are sensitive to (social) rewards, such as making friends, which aligns with the need for social connection. In contrast, individuals with a strong avoidance motivation aim to prevent undesirable end-states, including the possibility of being socially excluded (Rajchert & Winiewski, 2016), which aligns with "pervasive apprehension".

Examining the dimensionality of FoMO is not only important from a conceptual perspective, but also from a theoretical perspective. The structure of a construct has a decisive impact on the outcomes of substantive hypothesis testing (Koufteros et al., 2009) and thus the development of a cohesive theoretical body. The second aim of our study is therefore to examine the dimensionality of FoMO in relation to variables that have been theoretically linked with FoMO in previous studies (Fioravanti et al., 2021), especially since motivational theories predict differential relations. Research on human motivation shows that behaviors that are driven by approach or avoidance motivations yield different relations (e.g., Elliot & Sheldon, 1998; Gable, 2008). For example, Park et al. (2013) demonstrate that approach motivation is positively related to impulsiveness, whereas no such relation was found for avoidance motivation. Furthermore, avoidance motivation, and not approach motivation, was positively related to depression. Following this rationale, we will employ a more fine-grained approach and examine the dimensionality of FoMO in relation to variables that have been theoretically linked with FoMO, i.e., (1) (problematic) social media use, (2) psychological need satisfaction, and (3) personality.

Conceptualization of FoMO: Two Dimensions

When examining Przybylski et al.'s (2013) original definition, FoMO seems to comprise two components. The first defining component of FoMO, i.e., "a pervasive apprehension for missed social opportunities", taps into cognitive aspects of anxiety (e.g., worry, rumination, etc., see Elhai et al., 2021b) triggered by the thought that others might be having rewarding experiences from which one is absent. People experiencing FoMO consider this an undesirable state. The second defining component reflects "a desire to stay continuously connected with what others are doing". As a desire, this dimension taps into the feeling of wanting to have something or wishing for something to happen, in this case: continuous connection.

While some scholars acknowledge both dimensions to be defining components of FoMO (e.g., Fúster et al., 2017), others define FoMO according to the fears and worries people may have in relation to being out of touch with experiences across their extended social environment (e.g., Çoşkun & Muslu, 2019; L. Lin et al. 2021), or only emphasize the desire to be continuously in touch with what others are doing (e.g., Elhai et al., 2016). Ambiguity regarding FoMO's dimensionality is further obscured by the use of shortened scales, emphasizing the fear component of FoMO over the desire to stay continually connected component, and vice versa, even though Przybylski et al. (2013) identified both anxiety and desire to stay continually connected to be defining components of FoMO. Table 1 provides an overview of highly cited articles who used shortened scales. For example, Alt (2015)

dropped the items that reflected the urge to stay continually connected, thereby focusing on the anxiety aspect of FoMO. In contrast, Franchina et al. (2018) used only 4 out of the 10 item FoMO scale, 3 of which reflected the desire to stay continually connected.

Despite these ambiguities and the call for more clarity regarding FoMO's conceptualization and measurement (Tandon, Dhir, Almugren, et al., 2021; Wang et al., 2018), only a handful of studies have analyzed FoMO's dimensionality. Some studies performed confirmatory factor analyses (CFA) and found a good fit for a one-factor model (e.g., Can & Satici, 2019; Elhai et al., 2018). Others relied on exploratory analysis techniques to examine the conceptual structure of FoMO. Al-Menayes (2016), for example, performed an exploratory factor analysis while testing the psychometric properties of the Arabic translation of the FoMOs and found a two-dimensional structure with one factor reflecting feelings of anxiety, and a second factor reflecting a desire to stay continually connected, although not a priori expected. Likewise, Casale and Fioravanti (2020) also reported a two-factor structure as an unexpected finding of a study that was designed to test the Italian translations of the FoMO scale. Li et al. (2021) examined the Chinese translation of FoMOs. They performed an exploratory factor analysis and found a two-dimensional structure with one factor reflecting the "fear of missing novel information", and a second factor reflecting which they referred to as the "fear of missing social opportunities". The authors also conducted a confirmatory factor analysis, which confirmed these results. However, they did not compare different models in the CFA, so it is still unclear which model better explains FoMO. However, no study thus far compared a one-factor model with a two-factor model, therefore it remains unknown how FoMO should be conceptualized and measured.

To address the call for more clarity regarding FoMO's dimensional structure (Tandon, Dhir, Almugren, et al., 2021; Wang et al., 2018), our study goes beyond prior work by systematically comparing different models (i.e., one-factor model with a two-factor model), to test the following hypothesis:

H1: FoMO comprises two dimensions, one reflecting a pervasive apprehension for missed social opportunities (dimension 1: "pervasive apprehension"), and one reflecting a desire to stay continually connected with what others are doing (dimension 2: "desire for connection").

The aims of the current study are more ambitious than previous work. Instead of investigating the structure for purposes of translation (e.g., Al-Menayes, 2016; Casale & Fioravanti, 2020; Li et al., 2021), we specifically designed our study to investigate the dimensional structure by comparing a one-factor with a two-factor model. Furthermore, our study was designed to test how these dimensions relate to variables that have been previously linked with FoMO.

Table 1. *Overview Items Used of FoMOs by 12 Highly Cited Articles.*

Author, year	#Citations	#Items	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1. Alt, 2015	713	5				*Not specified which items are used*						
2. Balta et al., 2020	301	5	X	X	X	X					X	
3. Chai et al., 2019	91	5	X	X	X	X					X	
4. Dhir et al., 2018	938	3	X	X	X							
5. Fitz et al., 2019	127	6	X	X		X	X	X		X		
6. Franchina et al., 2018	423	4		X			X	X	X		X	
7. H. Liu et al., 2021	295	3	X	X	X							
8. Tandon, Dhir, Talwar, et al., 2021	99	5	X	X	X	X			X			
9. Tandon et al., 2022	88	3			X	X			X			
10. Tomczyka & Selmanagic-Lizde, 2018	153	8	X		X	X	X	X	X	X		X
11. Wegmann et al., 2017	432	5	X	X	X	X					X	
12. Yin et al., 2015	77	7			X	X	X	X	X		X	
12. Zhou, 2019	38	6				*Not specified which items are used*						

Note. For overview of the items see Table 3. Number of citations (#Citations) retrieved from Google Scholar as of 2024, January 26

Review of FoMO's Correlates

(Problematic) Social Media Use

Since the term first appeared in popular media in the 2010s, FoMO is linked with social media use. FoMO is conceptualized from a motivational perspective which can be traced back to Przybylski et al. (2013) who described FoMO as a strong motivational force for social media use. Przybylski and colleagues were the first to examine this link empirically. They argued that people high in FoMO may gravitate towards social media which offer constant opportunities to stay informed about and in contact with others. Indeed, the authors showed that FoMO was positively related to social media engagement.

Various articles have appeared since Przybylski et al.'s study, showing positive relationships between FoMO and social media use (e.g., Gori et al., 2023; Reyes et al., 2018), varying in strength from moderate to strong (for a review, see Elhai et al., 2021b). Similar findings were demonstrated for problematic social media use, i.e., an overuse of social media resulting in adverse health and functional consequences (for a review, see Elhai et al., 2021b), affecting the personal, social, and/or professional lives of the users (Bányai et al., 2017). In addition, research has demonstrated that FoMO is linked to social media self-control failure (SMSCF): "a situation in which people fail to resist the temptation to use social media (e.g., social networks such as Facebook, instant messengers such as WhatsApp, and content communities such as YouTube) while having other important obligations at hand (e.g., working or house duties)" (Du et al., 2020).

If the FoMO construct indeed consists of two dimensions, then these dimensions may yield different associations with (problematic) social media use. More specifically, "desire for connection" (vs. "pervasive apprehension"), may provide a more direct link to (problematic) social media use, as social media provide a direct means to satisfy this (impulsive) need to connect with what others are doing (Casale & Fioravanti, 2020; Przybylski et al., 2013). Initial evidence for this was provided by Casale and Fioravanti (2020), who showed that the dimension reflecting the "desire for connection" correlated more strongly with problematic social media use than the "pervasive apprehension" dimension. This is also what can be expected when taking a motivational perspective on FoMO. Indeed, the motivation to find rewarding activities and people is positively correlated with social media use and impulsive behavior (Gerson et al., 2016). This is likely because social media use has a high intrinsic value and those who score high on approach motivations will respond impulsively to instantly obtain their "reward", even at the expense of other goals. In contrast, individuals with a higher avoidance motivation are less likely to exhibit impulsive behavior (Gerson et al., 2016), and when exposed to temptations, will try to avoid the negative consequences associated with impulsive behavior, i.e., social media use, which may hinder their goal process (Leduc-Cummings et al., 2017). Based on this line of reasoning, we argue that "desire for connection" is more strongly associated with (problematic) social media use than with "pervasive apprehension".

H2a: (Problematic) social media use is more strongly associated with "desire for connection" than with "pervasive apprehension".

Psychological Need Satisfaction

FoMO was first conceptualized using Self-Determination theory (SDT; Ryan & Deci, 2002). SDT explains individual goal-directed, or agentic, behavior as motivated by three inherent psychological needs that people may seek to fulfill in relation to others (Lemay et al., 2019): (1) autonomy, reflecting the need to take initiative, make decisions and engage in behavior as desired, (2) competence, reflecting the ability to make decisions and actions effectively, (3) relatedness, reflecting the ability to establish and maintain meaningful relationships and connections with others. According to Deci and Ryan (2012): "Satisfaction of these basic needs facilitates people's autonomous motivation (i.e., acting with a sense of full endorsement and volition)" (p. 85). As explained by Przybylski et al. (2013), a situational or chronic deficiency of psychological needs satisfaction might therefore cause a state of limbo in which one experiences a higher level of anxiety, as a result of worrying over rewarding experiences that one may be missing out on. Przybylski et al.'s (2013) survey indeed showed that individuals who experienced lower need satisfaction reported higher levels of FoMO.

Although psychological need satisfaction serves as an important theoretical framework to explain FoMO, only a few papers have emerged since Przybylski et al. (2013) to formally test the relationship (Tandon, Dhir, Almugren, et al., 2021). Moreover, despite the fact that psychological need satisfaction is a multidimensional construct, in the context of research on FoMO it is typically studied as a one-dimensional construct. To our knowledge, only one

study examined psychological need satisfaction in relation to FoMO while acknowledging the multidimensional structure of the construct. This study showed that overall psychological need satisfaction was negatively correlated with FoMO. Yet, when the various psychological needs were tested separately with FoMO, not all needs revealed significant associations (Xie et al., 2018).

Moreover, because of the relational underpinnings of FoMO in its original conceptualization, the need for relatedness has received particular attention in the literature (Zhou, 2019). For instance, Elhai et al. (2021b) argued that relatedness is the driving force behind FoMO and that one uses social media to satisfy these unmet social needs. However, the literature is ambiguous regarding this association. For example, although relatedness was hypothesized to correlate with FoMO, Xie et al. (2018) found no association between the two constructs, but instead found significant correlations between FoMO and the other two psychological needs, i.e., autonomy and competence. Xie et al. (2018) explains the correlations between autonomy and competence with FoMO by their associations with proactive self-regulation, i.e., when one experiences a deficit in the need for autonomy and/or competence, one is likewise less able to enact control over one's behavior (i.e., social media use).

If FoMO consists of two dimensions, a deficit in relatedness needs may be positively related with "desire for connection", and not (or less strongly) with "pervasive apprehension". When taken together in one measure, these differential relations may obscure the role of relatedness needs in FoMO. This is supported by SDT research showing that deficits in each of the three needs are related to "a corresponding desire to obtain more of that type of experience" (Sheldon & Gunz, 2009, p. 1474). Research indeed showed that deficits in relatedness need satisfaction leads to increased levels of motivation to use Facebook (Sheldon et al., 2011). Hence, we propose:

H2b: Deficits in relatedness needs are more strongly associated with "desire for connection" than with "pervasive apprehension".

In addition, we expect that deficits in autonomy needs are positively associated with the anxiety component of FoMO, reflecting an apprehension that others might be having rewarding experiences from which one is absent. According to SDT, a lack of autonomy threatens feelings of well-being (Ryan & Deci, 2002), which can be observed by heightened levels of anxiety (Diener et al., 2011). This is confirmed by results of a meta-analysis, showing that a lack of autonomy was a strong predictor of anxiety; a finding that was consistent and robust across studies and countries (Fischer & Boer, 2011). Individuals who experience freedom on their own life course and choice, experience less anxiety. Hence, we expect the following.

H2c: Deficits in autonomy needs are more strongly associated with "pervasive apprehension" than with "desire for connection".

Simultaneously, we expect that a deficit in competence needs is positively associated with the anxiety dimension of FoMO. The need for competence reflects a need to feel effective and capable which is satisfied by optimal challenges and positive feedback (Ryan, 1995). People who report deficits in competence need satisfaction, feel incompetent to make decisions and achieve their goals. Hence, they experience a lack of control to give direction to one's own life (Ryan & Deci, 2002), making them rely more on others to effectively act on the world (Zhou, 2019). Hence, missing out on social events is a situation one tries to avoid, also because "informational events and communications provide positive feedback that supports one experience of competent engagement" (Ryan & Deci, 2002, p. 12). Hence, the possibility that one will miss out on social events is likely to instill ruminative thoughts. Therefore, we hypothesize:

H2d: Deficits in competence needs are more strongly associated with "pervasive apprehension" than with "desire for connection".

Personality

Previous studies showed that personality traits seem to contribute to FoMO (e.g., Rozgonjuk et al., 2021). Most studies report associations between FoMO and the Big-5 personality traits neuroticism (e.g., Alt & Boniel-Nissim, 2018; Rozgonjuk et al., 2021) and extraversion (e.g., Rozgonjuk et al., 2021). Neuroticism is characterized by being emotionally unstable and nervous, which is likely to be related to social anxiety and thus FoMO (Stead & Bibby, 2017). Extraversion, on the other hand, has been positively associated with social media use as well as with addictive tendencies stemming from their need to enhance social connection (Kuss & Griffiths, 2017). Similarly, this leads to the assumption that people who score high on extraversion experience more FoMO (Blackwell et al., 2017). However, studies examining the association between neuroticism, extraversion and FoMO tend to yield

conflicting results. While some studies have demonstrated positive links between neuroticism and FoMO (e.g., Blackwell et al., 2017; Stead & Bibby, 2017), others did not (Hamutoğlu et al., 2020). Moreover, while Rozgonjuk et al. (2021) showed that extraversion was negatively associated with FoMO, others did not find significant associations between these two variables (Blackwell et al., 2017; Stead & Bibby, 2017).

We argue that the mixed findings regarding personality traits and FoMO might be due to the dimensionality of the FoMO construct. By its very nature, FoMO as a pervasive apprehension is accompanied with feelings of anxiety and worries, feelings that are typically associated with neuroticism. Also, the literature on human motivations shows that there are differences in the extent to which approach-avoidance motivations correlate with the Big Five personality characteristics (e.g., Leduc-Cummings et al., 2017; Smits & De Boeck, 2006). Several studies demonstrated that neuroticism is higher amongst those who are driven by avoidance motivations (e.g., Gerson et al., 2016; Smits & De Boeck, 2006). Hence, it can be expected that neuroticism is associated with ruminative thoughts, such that one generally is more prone to anxious feelings. Indeed, research showed that individuals high on avoidance motivations are more likely to compare themselves negatively on social media and are more prone to anxious ruminations (Gerson et al., 2016). Furthermore, we assume that neuroticism is less strongly associated with the "desire for connection" dimension based on the severity of the threat which removes the individuals from the perceived danger of social comparison.

H2e: The personality trait neuroticism is more strongly associated with "pervasive apprehension" than with "desire for connection".

FoMO and the attendant desire to be continually connected to what others are doing, reflects a crave for social interaction. According to Blackwell et al. (2017), this need for social interaction is a defining characteristic of extraverted people. The personality trait extraversion was found to be positively related to both social media use and addictive behavior (Sindermann et al., 2020). Hence, by their very nature extravert people may be more susceptible to feeling "a desire for connection". This is also what can be expected based on the motivation literature, since approach motivations are seen as a central quality of extraversion (Gerson et al., 2016; Smits & De Boeck, 2006). Approach motivation is supposed to be activated by pleasure or excitement of receiving a (social) reward, such as making friends and gaining social status of affiliation. Extraverts are also more sensitive to rewards, and the behavior exhibited by this is often impulsive (Gerson et al., 2016). This suggests that extraverted people might be driven by the idea that there is a (social) reward waiting online and therefore desire to be continuously connected. Accordingly, we propose that this personality trait is more strongly associated with the "desire for connection" dimension.

H2f: The personality trait extraversion is more strongly associated with "desire for connection" than with "pervasive apprehension".

Methods

We preregistered the hypotheses, measures to be used, and analysis plan on AsPredicted. This registration as well as the survey, dataset, codes for the analyses and output files are available on the Open Science Framework (https://osf.io/qh43a/).

Participants and Procedure

To test the hypotheses, a survey was distributed among a panel of Dutch citizens, aged 18–70 years.[1] Data was collected in March 2021 by a leading professional market and opinion research institute, who provided access to the panel. To recruit participants, 10,226 panel members were invited by email to participate in the survey. Invited participants had a week to complete the questionnaire. Participation was voluntary and anonymous, and participants were guaranteed confidentiality. Study procedures were designed in accordance with the European research ethical guidelines and participants had to give their informed consent prior to participation.

In total, 2,363 respondents (23%) completed the questionnaire. Out of 2,363 respondents, 2,178 met the inclusion criterion of using social media. Of these, 137 respondents failed to correctly answer a quality check item[2], which was used to link the background variables (e.g., age) with the survey answers, and hence were excluded from the sample. The final sample consisted of 2,041 social media users, ranging in age between 18–70 years old (M = 43.5, SD = 14.98; 51.1% females; Educational level: low 17.1%, middle 54.1%, high 28.8%). Facebook (51.2%), Instagram (16.8%), and YouTube (13.1%) were listed as the most often used social networking sites, and WhatsApp (91.0%),

and Facebook Messenger (6.4%) as the most used messaging/chat service. In the analyses data were weighted to match the Dutch population profile on age, sex, social grade, region, ethnicity and working status.

Measures

Social Media Use

Participants were briefed that social media use includes both the use of social networking sites (e.g., Facebook, Instagram) and messaging/chat services (e.g., WhatsApp, Facebook Messenger). Social media use was assessed with two questions (cf. Du et al., 2018; *Reflecting on the past two months, how many minutes per day do you spend on average per day on social media?* (1 = *less than 30 minutes* (18.3%), 2 = *30–59 minutes* (25.2%), 3 = *1–2 hours* (24.4%), 4 = *2–3 hours* (15.3%), 5 = *3–4 hours* (7.6%), 6 = *more than 4 hours* (9.2%); *Reflecting on the past two months, how often on average did you use social media per day?* (1 = *less than once a day* (6.2%), 2 = *once a day* (9.6%), 3 = *2–3 times a day* (40.0%), 4 = *once an hour* (18.6%), 5 = *2–3 times an hour* (12.8%), 6 = *more than 3 times an hour* (12.9%).

Problematic Social Media Use

For assessing problematic social media use we used a translated version of the Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2016) and the social media self-control failure scale (SMSCF-scale; Du et al., 2018). BSMAS consists of six items rated on a 5-point Likert scale ranging from 1= *very rarely* to 5 = *very often* (e.g., i.e., *Felt an urge to use SM more and more? Tried to cut down on the use of SM without success*). Participants were asked to reflect on their social media experiences over the past two months. A higher score of the BSMAS indicates more problematic social media use (Bányai et al., 2017; ω = 0.88, *M* = 1.84, *SD* = 0.77).

The SMSCF-scale (Du et al., 2018) addresses how often social media users give in to social media temptations by asking *How often do you give in to a desire to use social media even though your social media use at the particular moment (1) conflicts with other goals [for example: doing things for school/study/work or other tasks], (2) makes you use your time less efficiently, and (3) makes you delay other things you want or need to do?* (1 = *almost never* to 5 = *very often*). A higher score of the SMSCF-scale indicates more problematic social media use (ω = 0.91, *M* = 2.06, *SD* = 1.01).

Fear of Missing Out (FoMO)

FoMO was assessed with the Fear of Missing Out Scale (FoMOs; Przybylski et al., 2013). The scale consists of ten statements including items such as *I fear others have more rewarding experiences than me* and *It bothers me when I miss an opportunity to meet up with friends*. The original English version of the FoMOs was translated into Dutch. A researcher translated the first draft and a bilingual expert (native Dutch-speaker fluent in English) proofread the translated scale. Minor discrepancies were resolved by consensus (see Table 3 for all items). The reliability and validity of the scale are described in later sections of this paper. Statements were answered using a five-point Likert scale that ranged from 1 = *not at all true*, to 5 = *extremely true of me*. A higher score indicates higher levels of FoMO (ω = 0.90, *M* = 2.15, *SD* = 0.75).

Deficits in Psychological Need Satisfaction

Deficits in psychological need satisfaction were assessed with the Basic Psychological Need Satisfaction Scale (La Guardia et al., 2000). This nine item scale addresses need satisfaction in interpersonal relationships by assessing three kinds of need satisfaction: (1) autonomy, (2) competence, and (3) relatedness. Participants were asked to indicate how true the statements (e.g., *I feel loved and cared about*) are to them (1= *not at all true* to 5 = *very true*). Participants' deficits in psychological need satisfaction scores were computed by reverse scoring positively worded items and subsequently averaging the responses. A high score indicates a higher level of deficits in psychological need satisfaction of the specific need measures (i.e., autonomy, competence, and relatedness; ω = 0.80, overall deficits in psychological need satisfaction *M* = 2.37, *SD* = 0.59, deficits in autonomy *M* = 2.15, *SD* = 0.74, deficits in competence need satisfaction *M* = 2.38, *SD* = 0.67, deficits in relatedness need satisfaction *M* = 2.57, *SD* = 0.71).

Personality

For assessing personality (extraversion and neuroticism), we used the Ten-Item Personality Inventory (TIPI; Gosling et al., 2003). The scale comprises 10 items, each consisting of a pair of descriptors that were scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Each dimension was represented by two items, representing either the positive (e.g., extraverted/enthusiastic) or negative pole (e.g., quiet/reserved) of the specific personality trait. Higher averaged scores indicate higher characteristics in that personality domain (neuroticism: r = .46, M = 3.32, SD = 1.25; extraversion: r = .29, M = 3.70, SD = 1.14).

Results

Testing FoMO's Dimensionality

To assess how well a two-factor structure fits the observed data we conducted, conform our preregistration, a confirmatory factor analysis using maximum likelihood on the items of FoMOs. We first examined a correlated two-factor structure. In this model, FoMO was structured into two dimensions as priori theoretically defined (Al-Menayes, 2016; Casale & Fioravanti, 2020). More specifically, we modeled the 5 items (Q1–Q4, Q6) which all reflect "the fear that others are having more rewarding experiences without the subject" on Factor 1 ("pervasive apprehension") and modeled the other 5 items (Q5, Q7–Q10), reflecting "the desire of the subject to be in contact with others", on Factor 2 ("desire for connection"). The correlated two-factor structure revealed a good fit to the data, χ^2(34) = 513.478, p < .001; CFI = .95; RMSEA = .08, 90 % CI [.08, .09]; SRMR = .04. Standardized factor loadings were sufficiently high, ranging from 0.54 to 0.85 (all significant; p < .001; see Table 3).

Secondly, we tested a second-order two factor model to determine whether a single higher order factor accounted for the interrelations between the two first-order factors. Testing this model was especially relevant since the correlated two-factor model revealed that the two dimensions were highly correlated (r = .835), which pointed at the presence of a second-order structure (Koufteros et al., 2009). The second-order model was specified using the marker method that sets the loadings equal to 1, following the guidelines of Lin (UCLA Office of Advanced Research Computing, 2021; cf. Byrne, 2013). The results demonstrated adequate model fit for the second-order two-factor model, similar to the model fit of a correlated two-factor model, χ^2(34) = 513.478, p < .001; CFI = .95; RMSEA = .08, 90% CI [0.08, 0.09]; SRMR = .04. Second-order structure can never outperform a correlated two-factor structure in terms of model fit—i.e., the fit indices can only be worse or equal to the correlated two-factor structure (Arnau & Thompson, 2000; Marsh & Hocevar, 1985). Hence, if a second-order model rivals a correlated two-factor model, the statistical literature sees a second-order model as the most prudent choice to do justice to its hierarchical structure, especially when such a structure can be supported theoretically (Koufteros et al., 2009). Both dimensions loaded strongly on the general factor (lambda = .914), attesting to the convergent validity of FoMO's theoretically proposed structure (Chin & Yao, 2014, p. 1275–1276).

The third model that we tested was the single factor solution as originally proposed by Przybylski et al. (2013). The results showed that the single factor solution performed worse than the second-order two-factor model, χ^2(35) = 946.945, p < .001; CFI = .91; RMSEA = .11, 90% CI [.11, .12]; SRMR = .06. This was confirmed by a χ^2 difference test, $\Delta\chi^2$(1) = −433.47, p < .001, as well as other difference tests of fit indices, ΔCFI = .04; ΔRMSEA = .03; ΔSRMR = .016, indicating that the second-order two-factor model represents the data more adequaily (Rieger et al., 2014). The fit statistics and average loadings for the three models are shown in Table 2 and 3.

Hence, in line with H1, FoMO can best be viewed as a second-order construct with two underlying dimensions; one dimension referred to as "pervasive apprehension" and one dimension referred to as "desire for connection".

Testing FoMO's Dimensions in Relation to its Correlates

To examine the dimensionality of FoMO in relation to its correlates (H2) we estimated bivariate correlations between the latent factor scores (see Table 4 and Figure 1). We explored the correlations between the two FoMO dimensions and a) (problematic) social media use (H2a), psychological need satisfaction (H2b, H2c, H2d), and d) personality (H2e, H2f). We performed Fisher r-to-z transformation to determine significant differences between correlations with both dimensions.

(Problematic) Social Media Use

H2a hypothesized that (problematic) social media use is more strongly associated with "desire for connection" than with "pervasive apprehension". As shown in Table 4, the correlations with both FoMO dimensions were significant for all social media measures. As expected, average time spent on social media per day (time) was more strongly associated with "desire for connection" ($r = .320$, $p < .001$), than with "pervasive apprehension" ($r = .257$, $p < .001$), as the differences in correlation strength were significant ($z = 2.195$, $p = .028$). This also holds for how often on average someone uses social media per day (frequency), which was positively correlated with "pervasive apprehension" ($r = .193$, $p < .001$), but more strongly with "desire for connection" ($r = .252$, $p < .001$). The differences between these correlations were significant at $p = .048$ ($z = 1.982$), supporting H2a.

As for problematic social media use, measured by BSMAS and the SMSCF-scale, the results also revealed positive correlations with both FoMO dimensions. BSMAS was positively correlated with "pervasive apprehension" ($r = .625$, $p < .001$) as well as with "desire for connection" ($r = .548$, $p < .001$). SMSCF was also positively correlated with both "pervasive apprehension" ($r = .528$, $p < .001$) and "desire for connection" ($r = .482$, $p < .001$). In contrast to H2a, the findings showed that BSMAS is more strongly associated with "pervasive apprehension" than with "desire for connection" ($z = -3.756$, $p < .001$), as well as SMSCF ($z = -1.972$, $p = .049$).

Table 2. *Fit Statistics for the Assessed Confirmatory Factor Models (CFA).*

	χ^2	(df)	CFI	TLI	AIC	BIC	BIC_{adj}	RMSEA [90% CI]	SRMR
Baseline	10,433.918***	45							
Single factor model	946.945***	35	.912	.887	49,505.653	49,618.077	49,554.535	.113 [.107, .119]	.055
Correlated two-factor model	513.478***	34	.954	.939	49,074.186	49,192.232	49,125.513	.083 [.077, .090]	.039
Second-order two-factor model	513.478***	34	.954	.939	49,074.186	49,192.232	49,125.513	.083 [.077, .090]	.039

Note. $N = 2{,}041$; χ^2 = Chi-square; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis Index; AIC = Akaike; BIC = Bayesian information criteria; BIC_{adj} = Sample-size adjusted BIC; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; ***$p < .001$.

Psychological Need Satisfaction

H2b hypothesized that deficits in relatedness needs are more strongly correlated with "desire for connection" than with "pervasive apprehension". However, results showed that deficits in relatedness needs were more strongly associated with "pervasive apprehension" ($r = .150$, $p < .001$) than with "desire for connection" ($r = -.064$, $p = .004$), $z = -6.871$, $p < .001$, rejecting H2b.

H2c predicted that deficits in autonomy needs are more strongly associated with "pervasive apprehension" than with "desire for connection". Study findings showed that deficits in autonomy needs are significantly correlated with both the FoMO dimensions, but indeed more strongly with "pervasive apprehension" ($r = .272$, $p < .001$) than with "desire for connection" ($r = .065$, $p = .003$), $z = 6.829$, $p < .001$, supporting H2c.

Finally, H2d predicted that deficits in competence needs are more strongly associated with "pervasive apprehension" than with "desire for connection". Results demonstrated that deficits in competence needs were only significantly associated with "pervasive apprehension" ($r = .185$, $p < .001$), and not with "desire for connection" ($r = .010$, $p = .656$), $z = 5.655$, $p < .001$, supporting H2d.

Table 3. *Factor Loading and Variances of the Tested Models (CFA).*

		Single factor model	Correlated two-factor model		Second-order two-factor model	
			Pervasive apprehension	Desire for connection	Pervasive apprehension	Desire for connection
Reliability						
Omega		0.898	0.896	0.789	0.896	0.789
Latent variables (Std.all)						
Q1	I fear others have more rewarding experiences than me.	0.818	0.844		0.844	
Q2	I fear my friends have more rewarding experiences than me.	0.821	0.851		0.851	
Q3	I get worried when I find out my friends are having fun without me.	0.820	0.821		0.821	
Q4	I get anxious when I don't know what my friends are up to.	0.762	0.756		0.756	
Q5	It is important that I understand my friends "in jokes".	0.500		0.575		0.575
Q6	Sometimes, I wonder if I spend too much time keeping up with what is going on.	0.710	0.707		0.707	
Q7	It bothers me when I miss an opportunity to meet up with friends.	0.635		0.713		0.713
Q8	When I have a good time it is important for me to share the details online (e.g., updating status).	0.461		0.537		0.537
Q9	When I miss out on a planned get-together it bothers me.	0.720		0.778		0.778
Q10	When I go on vacation, I continue to keep tabs on what my friends are doing.	0.622		0.664		0.664
			PERV~~DESI	0.835	FMO=~PERV DESI	0.914
Variances (Std.all)						
Q1	I fear others have more rewarding experiences than me.	0.331	0.287		0.287	
Q2	I fear my friends have more rewarding experiences than me.	0.326	0.277		0.277	
Q3	I get worried when I find out my friends are having fun without me.	0.328	0.326		0.326	
Q4	I get anxious when I don't know what my friends are up to.	0.419	0.429		0.429	
Q5	It is important that I understand my friends "in jokes".	0.750		0.669		0.669
Q6	Sometimes, I wonder if I spend too much time keeping up with what is going on.	0.495	0.500		0.500	
Q7	It bothers me when I miss an opportunity to meet up with friends.	0.597		0.492		0.492
Q8	When I have a good time it is important for me to share the details online (e.g., updating status).	0.788		0.712		0.712
Q9	When I miss out on a planned get-together it bothers me.	0.481		0.394		0.394
Q10	When I go on vacation, I continue to keep tabs on what my friends are doing.	0.614		0.560		0.560
					PERV 0.165	DESI 0.165

Note. N = 2,041.

Table 4. *Bivariate Correlations Latent Scores.*

	1	2	3	4	5	6	7	8	9	10	11	*z*	*p*
1. FMO	—												
2. Pervasive apprehension	.946**	—											
3. Desire for connection	.892**	.700**	—										
4. SMT	.308**	.257**	.320**	—								2.195	.028
5. SMF	.236**	.193**	.252**	.627**	—							1.982	.048
6. BSMAS	.645**	.625**	.548**	.373**	.269**	—						−3.756	.000
7. SMSCF	.553**	.528**	.482**	.415**	.349**	.703**	—					−1.972	.049
8. Deficits relatedness needs	.067**	.150**	−.064*	.013	−.040	.083**	.043	—				6.871	<.001
9. Deficits autonomy needs	.202**	.272**	.065**	.032	.006	.227**	.132**	.532**	—			6.829	<.001
10. Deficits competence needs	.122**	.185**	.010	.076**	.001	.165**	.095**	.520**	.560**	—		5.655	<.001
11. Neuroticism	.277**	.314**	.175**	.205**	.147**	.318**	.248**	.317**	.431**	.431**	—	4.730	<.001
12. Extraversion	.065**	.010	.130**	.136**	.099**	.090**	.068**	−.252**	.178**	−.152**	.036	3.854	<.001

Note. N = 2,041; FMO = FoMO's latent variable; pervasive apprehension = FoMO dimension 1; desire for connection = FoMO dimension 2; SMT = social media use time; SMF = social media use frequency; BSMAS = Bergen social media addiction scale; SMSCF = Social media self-control failure; *p < .05, **p < .01 (2-tailed); All scales are scored from 1 to 5, except the personality trait scale to assess neuroticism and extraversion, which uses a 1 to 7 scale.

Personality Traits

H2e hypothesized that neuroticism is more strongly associated with "pervasive apprehension" than with "desire for connection". As shown in Table 4, neuroticism was positively correlated both the FoMO dimension, but indeed more strongly with "pervasive apprehension" (*r* = .314, *p* < .001), than with "desire for connection" (*r* = .175, *p* < .001), *z* = 4.730, *p* < .001, supporting H2e.

We also predicted that extraversion is more strongly associated with "desire for connection" than with "pervasive apprehension" (H2f). In line with what was expected, results showed a significant and positive association between the personality trait extraversion and "desire for connection" (*r* = .130, *p* < .001), but not between extraversion and "pervasive apprehension" (*r* = .010, *p* = .665). The differences in correlation strength were significant (*z* = 3.854, *p* < .001), supporting H2f.

Discussion

Our goal was to examine FoMO's underlying dimensions and their relations with variables that have been theoretically and empirically linked with FoMO. This effort was motivated by observed inconsistencies between (a) FoMO's widely cited definition that describes FoMO as a combination of two facets, namely "a pervasive apprehension that others might be having rewarding experiences from which one is absent", and "the desire to stay continually connected with what others are doing" (Przybylski et al., 2013, p. 1841), (b) FoMO's most applied measurement scale, that treats FoMO as a single-factor construct, and (c), previous research that by chance found a two-factor structure in attempts to validate the scale for use in different languages (Al-Menayes, 2016; Casale & Fioravanti, 2020). To advance our understanding of the construct, we performed a survey amongst a large representative sample of social media users.

We hypothesized that FoMO consists of two dimensions (H1): (1) the fear that others are having more rewarding experiences without the subject ("pervasive apprehension"), and (2) the desire of the subject to be in contact with others ("desire for connection"). In line with our hypothesis, the results demonstrate that FoMO is best captured by a second-order two-factor structure (Koufteros et al., 2009). Support for the second-order structure is amplified

by the theoretical foundation of FoMO, as Przybylski et al. conceptualizes FoMO as a motivational force. Basic principles behind various theories of human motivation (e.g., Elliot & Church, 1997; Higgins, 1998) differentiate two motivational forces which show similarities with pervasive apprehension and desire for connection; (1) undesirable states that one tries to avoid, i.e., missing out on social activities, and (2) desirable states that one tries to approach, i.e., continuous connection (Elliot & Church, 1997).

Figure 1. *Overview of the Strength of the Relationships Between the Two Dimensions and the Examined Variables.*
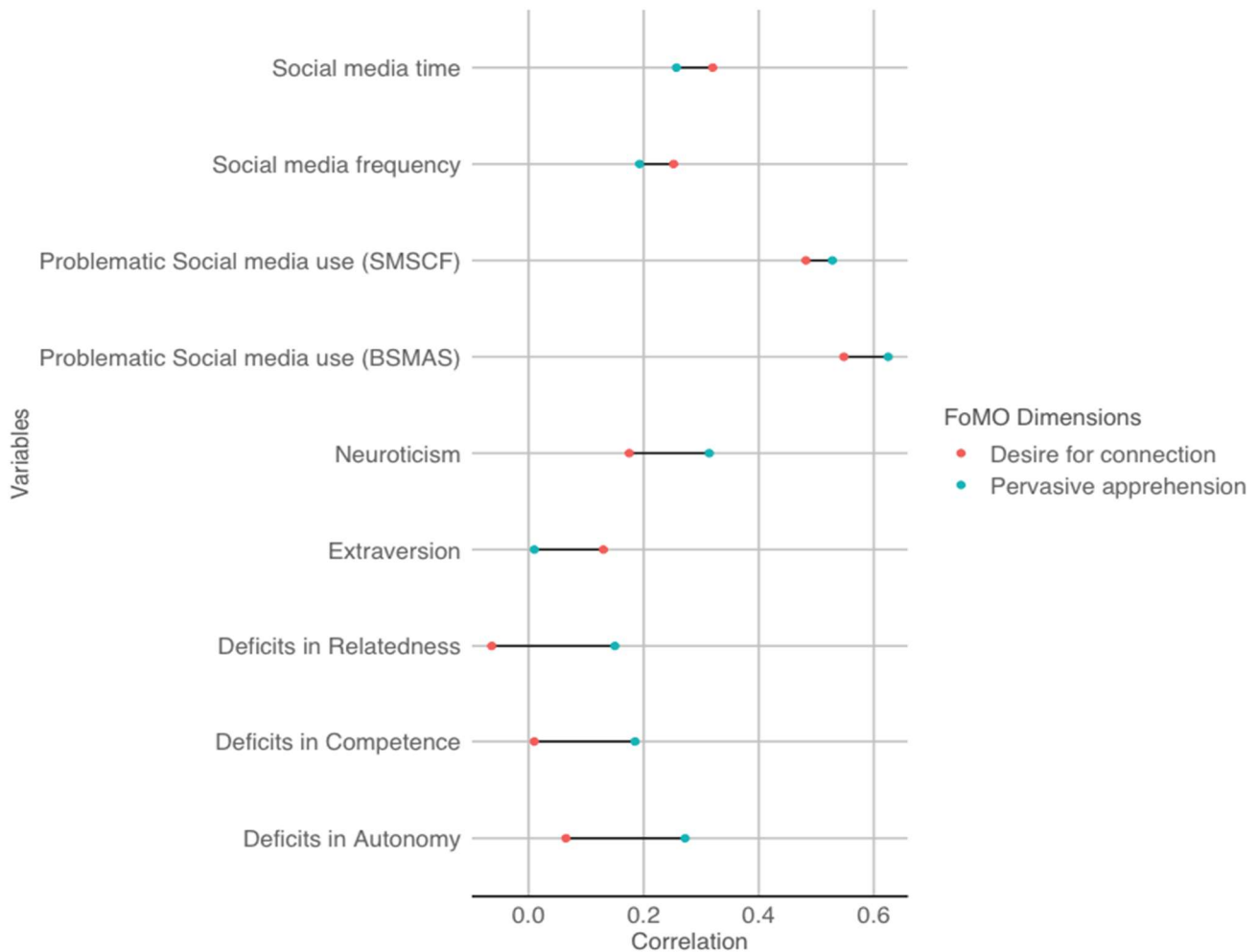
Furthermore, looking through the lens of human motivation theories (e.g., Elliot & Church, 1997; Higgins, 1998), we also hypothesized that the different dimensions underlying FoMO (if any) could produce different correlations with variables that have been put forward in the literature as key variables of FoMO (i.e., deficits in needs satisfaction, (problematic) social media use and personality; e.g., Can & Satici, 2019; Dempsey et al., 2019; Przybylski et al., 2013; Rozgonjuk et al., 2021; Stead & Bibby, 2017). This was supported by our data. Problematic social media use (BSMAS, but not SMSCF), deficits in needs satisfaction (relatedness, autonomy, and competence), and the personality trait neuroticism showed stronger correlations with "pervasive apprehension" than with "desire for connection". This is in line with previous findings that show that these variables tap into personal traits and behaviors that are associated with ruminative thoughts and fears in people (Casale & Fioravanti, 2020). In contrast, "desire for connection" showed a somewhat stronger association with social media use as well as a stronger association with a trait that makes people more likely to desire for social connection, i.e., the personality trait extraversion.

Two variables demonstrated differential correlations with the two dimensions, but in opposite directions than expected. First, we assumed that problematic social media use was more strongly associated with "desire for connection" than with "pervasive apprehension" (H2a). Problematic social media use as measured by BSMAS and SMSCF, correlated strongly with both FoMO dimensions, but in contrast to expectations, significantly more so with "pervasive apprehension" than with "desire for connection", although the observed differences in correlation strength are relatively small. This finding may be explained by research on social media addiction which shows

that, although problematic social media use is linked with desire, it is also linked with impulsive behavior and withdrawal symptoms such as anxiety, which can be experienced when people do not use social media and thus miss out on social events (Bányai et al., 2017; Zahrai et al., 2022). In line with the latter finding, several studies show a direct link between FoMO and anxiety (e.g., Elhai et al., 2021a), as well as between anxiety and problematic social media use (measured by BSMAS in Wong et al., 2020). Moreover, research also suggests that people may experience anxiety derived from SMSCF (Y. Liu et al., 2023). The finding that BSMAS and SMSCF were more strongly related with "pervasive apprehension" than with "desire for connection", instead of vice versa, does point at our general expectation that the two dimensions demonstrate differential correlations with problematic social media use. Future research should further validate this finding.

Second, we hypothesized that deficits in relatedness needs would correlate more strongly with "desire for connection" than with "pervasive apprehension" (H2b). Our expectations follow from SDT which was put forward by Przybylski et al. (2013) as the theoretical underpinning of FoMO (Ryan & Deci, 2002). This theoretical argument suggests that a situational or chronic deficiency of one or more of the three needs (i.e., autonomy, relatedness, and competence), would cause a state of limbo in which one experiences a higher level of anxiety, as a result of worrying over rewarding experiences that one may be missing out on, as well as a strong drive to seek continuous connection with others to satisfy unmet need (Przybylski et al., 2013). This desire for connection would most likely emerge in case of thwarted relatedness needs as they involve an inherent need to be connected to others (cf. Przybylski et al., 2013; Sheldon et al., 2011). Although deficits in relatedness needs were positively related with "pervasive apprehension", no such positive correlation was found for "desire for connection". Instead, deficits in relatedness needs were negatively correlated with desire for connection. The more people experienced unmet relatedness needs, the less likely people were to desire continuous connection.

Taken together, these results provide several important contributions that enhance our understanding of FoMO and its implications for future research. First, the present study is the first to explicitly focus and investigate in detail the structure of FoMO as a construct. By assessing several comparatively nested models, this study provides a first step to clear up the conceptual and empirical confusion that has emerged since FoMO was introduced in the literature. Indeed, Przybylski et al. (2013), who were the first to coin the concept, conceptualized FoMO as a construct with two defining components; (1) "a pervasive apprehension that others might be having rewarding experiences from which one is absent", and (2) "the desire to stay continually connected with what others are doing". In the research that followed, FoMO was mostly examined as a one-dimensional construct (see overview: Elhai et al., 2021a, 2021b), although a handful of studies suggested a two-factor structure based on exploratory analyses (e.g., Casale & Fioravanti, 2020; Li et al., 2021). By establishing that FoMO can be viewed as a second-order construct with two underlying dimensions—one dimension referred to as "pervasive apprehension" and one dimension referred to as "desire for connection"—the current study provides an alignment between the definition, conceptualization, and measurement of FoMO and thereby a solid foundation for future research.

Second, the current study provides guidance on how to measure FoMO effectively, i.e., emphasizing its multidimensional nature. As our study shows, FoMO operates as an overarching motivational force, consisting of an apprehensive feeling driving people away from an undesirable state, i.e., missed social opportunities, and a desire moving people towards a rewarding state, i.e., continuous connection. This suggests that researchers should be mindful in making inferences on FoMO when they restrict their studies to examining one of the dimensions only. In attempts to shorten FoMO's ten-item scale, a substantial number of scholars drop items resulting in unbalanced scales, in favor of the pervasive apprehension dimension. As shown in Table 1, scholars mostly drop items that reflect the "desire for connection", thereby focusing on the "pervasive apprehension" dimension of FoMO, and to a lesser degree vice versa. For instance, Franchina and colleagues used 4-items from the original FoMOs (Przybylski et al., 2013) that according to the authors "reflect the diversity of the original scale items well" (Franchina et al., 2018, p. 9). This study shows that FoMO cannot be captured by including the items of one dimension only. Doing so might lead to the underestimation or overestimation of FoMO effects, since these dimensions were found to demonstrate differential relations with FoMO's correlates. For example, "pervasive apprehension" showed a positive correlation with neuroticism, which was significantly stronger than the weak correlation that was found with "desire for connection". Hence, when studies only include items of "pervasive apprehension" (vs. desire for connection) and claiming such a measurement to be an operationalization of FoMO, the effect of FoMO on neuroticism could be overestimated (vs. underestimated).

Finally, we contribute to the theoretical understanding of FoMO by shedding light on the differential relationships between its dimensions and various correlates. The current study shows that although FoMO consists of two dimensions, "pervasive apprehension" and "desire for connection", variables that have been proposed in the

literature as correlates of FoMO, were primarily linked with "pervasive apprehension". Since the results show that the two dimensions loaded equally well on the general factor, the finding that examined variables primarily show a stronger relationship with pervasive apprehension may thus be explained by how FoMO has been embedded in the literature so far. The findings advocate for an expansion of FoMO's theoretical foundation, by incorporating theories that could explain the driving forces behind "desire for connection" and its consequences. The theoretical foundation of prior literature on FoMO is currently embedded within the SDT literature, pointing specifically to one of the three needs addressed by SDT, i.e., relatedness needs (e.g., Elhai et al., 2021b; Zhou, 2019) to gain an understanding of FoMO. Our finding that deficits in relatedness needs seem to foster more anxiety about missing out on social experiences (pervasive apprehension), rather than "desire for connection"—same as for deficits in autonomy and competence needs—emphasize our recommendation that future research should provide theoretical explanations for found effects beyond SDT. Our study encourages scholars to broaden the theoretical scope of FoMO research, moving beyond SDT to gain a deeper understanding of this complex phenomenon and its implications.

Limitations

We examined the dimensionality of FoMO in relation to variables that have been theoretically linked with FoMO in previous studies (Fioravanti et al., 2021). However, we recognize several potential avenues for future research to further validate the second-order factor structure of FoMO. Specifically, exploring associations with other indicators of social media use and personality traits might be valuable in future research. This could include examining passive/active social media use, social comparison orientation, maximizing tendency, and regret tendency (e.g., S.-C. Lin & Jian, 2022; Mao & Zhang, 2023). Moreover, it would be worthwhile to investigate its associations with psychological well-being indicators, such as stress and anxiety (e.g., Elhai et al., 2021a). Additional research in these areas could provide a more comprehensive understanding of the complex relationships involving FoMO.

Due to the cross-sectional nature of our data, we could not fully establish the predictive validity of the two dimensions regarding the examined variables. Future research is advised to examine the causal links. In addition, our sample consisted of participants between 18 and 70 years. Given that some research argues that FoMO is especially prevalent among young people (e.g., Dempsey et al., 2019; Elhai et al., 2021b), future research may want to investigate the measurement structure of FoMO among participants younger than 18, to test the generalizability of our results. Confirming or refuting evidence using diverse populations may facilitate firmer measurement recommendations as well as conceptual and theoretical advances in this area. An important question for future research to explore is thus whether the second-order two-factor structure of FoMO can reliably produce similar results across subpopulations.

In conclusion, the present research provides direct empirical support for the theorized conceptualization of FoMO, showing that this psychological phenomenon consists of two dimensions with different relations with variables that have been previously linked with FoMO's. Herewith, this study contributes to future research as it offers a new perspective on the FoMO construct by showing the importance of giving adequate consideration (statistically and conceptually) to the structure of the construct and how the two dimensions relate to other constructs of interest.

Footnotes

[1] This study is part of a larger study on FoMO.

[2] The quality check item is a standard procedure of the market and opinion research institute. It involves verifying respondents' details, such as age, date of birth, or zip code, to confirm their identities and prevent unauthorized participation, such as by family members using the same email account.

Conflict of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Ellen Groenestein: conceptualization, data curation, formal analysis, investigation, methodology, resources, visualization, writing—original draft. **Lotte Willemsen:** conceptualization, formal analysis, methodology, supervision, writing—review & editing. **Guido van Koningsbruggen:** conceptualization, methodology, supervision, writing—review & editing**. Peter Kerkhof:** conceptualization, methodology, supervision, writing—review & editing.

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