Fear of missing out (FoMO) among social media users: a systematic literature review, synthesis and framework for future research

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Abstract

Purpose – Research examining the "fear of missing out" (FoMO) is increasingly prominent, with a growing number of studies exploring this phenomenon. Despite the increased academic interest, no attempts have been made to synthesize extant knowledge on FoMO. There is limited holistic understanding of its conceptualization and operationalization. To address this gap, an exhaustive systematic literature review (SLR) on FoMO is presented.

Design/methodology/approach – Systematic review protocols and content analysis was used to analyze and synthesize insights from 58 empirical studies obtained from four academic databases: Scopus, Web of Science, PubMed and PsycINFO.

Findings – Significant diversity in prior research on FoMO was encapsulated in four themes. There are significant limitations in conceptualization of FoMO, along with narrow focus on geographic, methodological and contextual foci of prior studies. The authors propose a comprehensive framework and extensive gap-specific research directions to aid future research.

Research limitations/implications – The SLR is limited in its consideration of empirical studies published in academic journal articles obtained from four databases.

Social implications – The authors imply the critical need to ascertain motives for individuals' excessive engagement with social media and the subsequent impact on well-being indicators (e.g. sleep quality) and functional impairments (e.g. addiction).

Originality/value – This study magnifies and expands the intellectual boundaries of FoMO and suggests the adoption of a multidisciplinary perspective for further investigation. The use of novel theoretical lenses can further ascertain FoMO's effect on different cultures and social media users.

1. Introduction
The use of smartphones, social media platforms and other Internet-based platforms is ubiquitous in everyday life. Recent statistics indicate that the average daily time spent accessing mobile Internet has increased from 32 min in 2011 to expected 155 min by 2021 (Statista, 2019). The daily amount of time spent on social media platforms has concurrently grown from 96 min in 2012 to approximately 135 min in 2018 (Kemp, 2019). Multifunctional smartphone applications and consistent Internet access have been acknowledged as significant reasons for increased, and even excessive, use of social media platforms (Chotpitayasunondh and Douglas, 2016), which can become compulsive or problematic if not moderated (Chai et al., 2019). Negative issues related to social media use, collectively referred to as the "dark side" of social media, have garnered much scholarly attention (see Dhir et al., 2019; Stead and Bibby, 2017; Salo et al., 2018; Talwar et al., 2020; Tandon et al., 2020; Wolniewicz et al., 2018). Scholars have acknowledged the "Fear of Missing Out" (FoMO) as a critical and emergent aspect of the dark side of social media (Oberst et al., 2017; Tandon et al., 2020).

FoMO has been seminally defined as an individual's high degree of anxiety toward absence from meaningful, pleasurable or momentous experiences enjoyed by their contemporaries (Przybylski et al., 2013). There has been a rapid and proliferate growth of studies on FoMO, but existing knowledge is significantly diverse and fragmented, thereby presenting a gap in a comprehensive and holistic view (Alt, 2017; Dempsey et al., 2019; Tomczyk and Selmanagic-Lizde, 2018). Scholars are cognizant of this gap and have recently called for novel research approaches to advance conceptual and operational understanding of FoMO (Tomczyk and Selmanagic-Lizde, 2018; Wang et al., 2018). The current study answers this call by mapping the boundaries and intellectual structure of current empirical knowledge on FoMO through a systematic literature review (SLR).

SLRs synthesize prevailing evidence on a topic to derive valuable, robust and comprehensive information (Aznoli and Navimipour, 2017; Mallett et al., 2012). The present SLR answers three key research questions (RQs):

RQ1. What is the status of the research profile on existing FoMO literature?

RQ2. What are the different research themes that have been investigated in prior literature on FoMO?

RQ3. What are the research gaps, limitations and recommendations for scholars and practitioners with respect to future FoMO research?

To answer these RQs, the current study follows a rigorous protocol suggested by Behera et al. (2019). In response to RQ1, descriptive statistics are utilized to identify, summarize and describe a contemporary profile of existing research where we present investigative contexts, theoretical frameworks, variables and measures associated with FoMO's characterization and evolution. RQ2 is answered by synthesizing extant evidence on different research themes examined in prior FoMO literature. To answer RQ3, different research gaps and limitations suggested by previous studies are critically discussed. Further, possible avenues for future research and a state-of-the-art framework are proposed based on existing research and the insights derived from this SLR.

The rest of the manuscript is organized as follows: first, section two presents a brief background of FoMO. Section three briefly profiles prior FoMO research and details the

methodological processes to execute the present SLR. Next, section four discusses extant gaps and thematic classification of topical issues addressed by prior research. Section five subsequently presents emergent recommendations and a research framework to encapsulate existing knowledge gaps that may be addressed by future researchers. Lastly, section six presents the concluding remarks, implications (theoretical, practical and social) and study limitations.

2. Background and motivation for the study

FoMO has been seminally operationalized as the deficiencies pertaining to inherent needs for relatedness, competence and autonomy (Przybylski et al., 2013). The desire to fulfill innate needs, such as interpersonal attachment (Błachnio and Przepiórka, 2018), belonging (Wang et al., 2018) and popularity (Beyens et al., 2016; Vernon, 2016), drives social media users' high engagement with social media platforms as they may be intrinsically motivated to stay continually connected with these platforms (Hadlington and Scase, 2018; Przybylski et al., 2013). Subsequently, any perceived (or actual) discontinuity of communication may evoke a sense of social exclusion or estrangement in an individual and may also act as a precursor to FoMO (Elhai et al., 2018; Wang et al., 2018, 2019; Przybylski et al., 2013). Thus, FoMO is posited as a state of deficit of innate needs that may drive an individual to enact specific behaviors (Przybylski et al., 2013).

Scholars have utilized theories and frameworks from different disciplines such as psychology, communication and information systems to understand the conceptualization and operationalization of FoMO better. Examples include social comparison theory (Reer et al., 2019), the stressor–strain–outcome (SSO) model (Dhir et al., 2018; Malik et al., 2020) and compensatory Internet use theory (Dempsey et al., 2019), among others. The extant literature on FoMO, though prolific, offers a fragmented view of this phenomenon, its antecedents and its consequences. Tomczyk and Selmanagic-Lizde (2018) posit the absence of unified measures makes an objective evaluation of FoMO symptoms difficult. The situation is exacerbated by discrepancies (in terms of empirical findings and implications) in prior literature. For example, Alt (2017) suggests that FoMO actually assists students in overcoming barriers to learn in a classroom, although it may drive college maladjustment (Alt, 2018). Alt and Boniel-Nissim (2018a, b) also associate FoMO with problematic Internet use.

It is further argued that FoMO may increase the development of negative emotions and affectivity associated with social deficiencies, such as envy (James et al., 2017), rumination (Dempsey et al., 2019) and decreased self-image (Shujaat et al., 2019). Prior studies also indicated that these negative emotions are the consequences of problematic social media use (Blackwell et al., 2017; Elhai et al., 2016) and Internet use (Tomczyk and Selmanagic-Lizde, 2018). This leads to the argument that a reciprocal relationship exists between FoMO and problematic social media as well as Internet use, which may lead to significant detriments to individual well-being (Buglass et al., 2017). This conjecture has instigated significant concerns about FoMO's effects among multiple stakeholders, including academics, parents, educators and therapists (Baker et al., 2016).

3. Research methods

The merits of the SLR approach are its capacity to enable scholars to present a systematic, transparent and reproducible synthesis of prior literature (Tranfield et al., 2003). Following the protocol established by Behera et al. (2019), this SLR was conducted in two phases: planning and execution, followed by an assimilated presentation of results (see Figure 1). In the first phase, appropriate search criteria, selection criteria, research objectives and relevant databases were established. The review plan was executed by conducting a search wherein both direct citations and feedback loops were incorporated. In the second phase, following strict protocols, a state-of-the-art research profile of prior FoMO literature is presented. Review findings are summarized and discussed to present a comprehensive, structured synopsis of extant knowledge (Mehta and Pandit, 2018).

Figure 1.
Review process
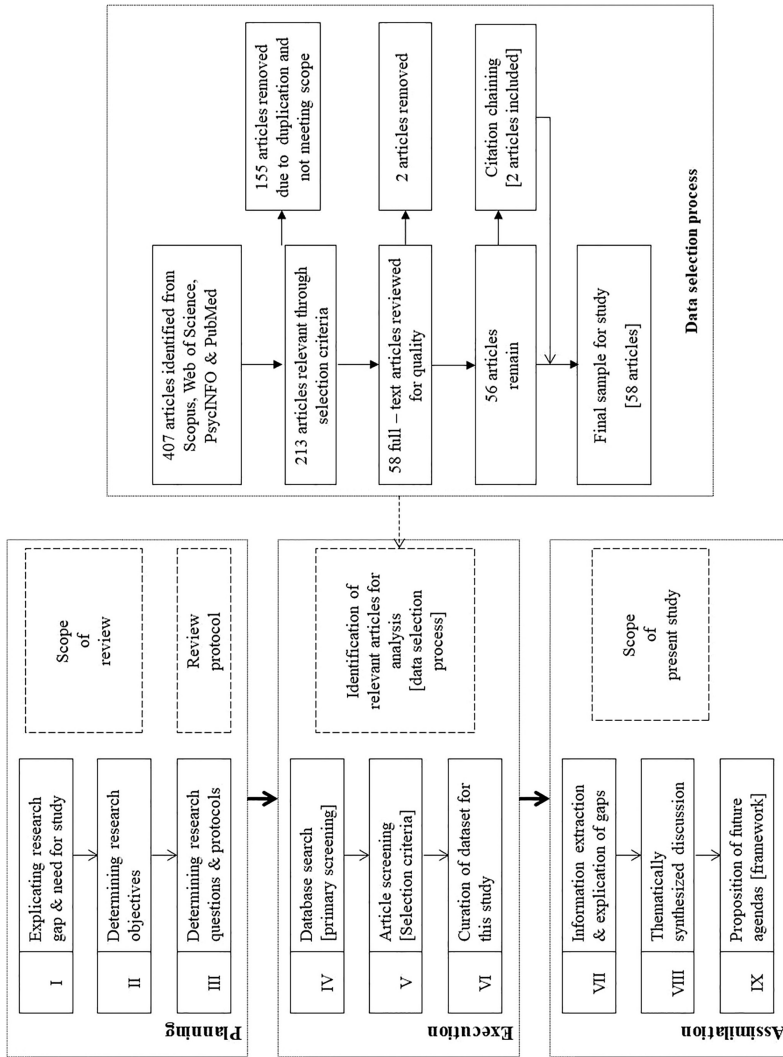
Note(s): The solid lines represent the specific steps followed for the SLR and the dotted lines represent the SLR stage at which the review was performed as well as the scope of the study addressed by the indicated steps

Data selection process

407 articles identified from Scopus, Web of Science, PsycINFO & PubMed

155 articles removed due to duplication and not meeting scope

213 articles relevant through selection criteria

58 full – text articles reviewed for quality

2 articles removed

56 articles remain

Citation chaining [2 articles included]

Final sample for study [58 articles]

Planning

I   Explicating research gap & need for study

II   Determining research objectives

III Determining research questions & protocols

Scope of review

Review protocol

Execution

IV   Database search [primary screening]

V   Article screening [Selection criteria]

VI   Curation of dataset for this study

Identification of relevant articles for analysis [data selection process]

Assimilation

VII Information extraction & explication of gaps

VIII Thematically synthesized discussion

IX   Proposition of future agendas [framework]

Scope of present study

3.1 Review process

FoMO has garnered attention from various disciplines, including education (Alt, 2015), management (Stead and Bibby, 2017) and psychology (Appel *et al.*, 2019). Therefore, to ensure the current review reflected its multidisciplinary nature, four different databases (Scopus, PubMed, Web of Science and PsycINFO) were used to search relevant literature and select appropriate studies. The reasons for choosing these databases were twofold: first, the concept of FoMO inherently pertains to an individual's psychological state; secondly, FoMO's link to pertinent issues in the fields of psychology and consumer behavior evidently presents multidisciplinary connotations within the digital environment. PsycINFO and PubMed were hence used to cover key literature on FoMO in psychiatry, psychology and biomedicine (Duffy *et al.*, 2016; Williamson and Minter, 2019). Scopus and Web of Science were chosen due to their status as comprehensive and leading databases of peer-reviewed literature (Fahimnia *et al.*, 2015; Sigerson and Cheng, 2018). The use of these four databases, together with the citation chaining process, safeguard against the risk of excluding relevant studies for review.

To commence the review, a preliminary search was conducted on Google Scholar using the keyword string "fear of missing out." This was done to ascertain the best possible keyword combinations for a comprehensive database search. The search resulted in 5,630 documents; the most relevant 100 texts were perused to find other frequently used keywords that could represent the original search string (Khanra and Joseph, 2019). The acronym "FoMO" was found as the most representative alternate. Therefore, the current study utilized two-keyword-combination syntax, namely, "fear of missing out" OR "FoMO," to execute the search process in August 2019. The search protocol (adapted from Ahmad *et al.*, 2018) is detailed in Figure 1, which maps out the entire review and data collection process for the present study.

The term FoMO was operationalized in 2013 (Przybylski *et al.*, 2013); therefore, the studies that were selected were available from 2013 onward. The first search resulted in a total of 407 studies. The title, abstract and keywords of these results were then screened, and a total of 213 abstracts were preliminarily deemed relevant. Later, all 213 shortlisted studies were downloaded and examined in light of the different inclusion and exclusion criteria adapted from Behera *et al.* (2019). These specific selection criteria (see Table 1) were implemented to

Inclusion criteria (IC)		Exclusion criteria (EC)	
IC#1	Articles only	EC#1	Abstract, title or keywords do not include FoMO
IC#2	Published between 2013 and 2019	EC#2	Study irrelevant for study objective (does not focus on FoMO)
IC#3	Empirical analysis inclusive of FoMO	EC#3	Exclude studies related to conceptual, qualitative and psychometric measurement scales
IC#4	Studies published in the English language	EC#4	Exclude conference papers, reviews, book chapters, magazine articles and dissertations
IC#5	Studies published in peer-reviewed journals		

Quality evaluation (QE) criteria	QE#	Scoring
Do the research topic and findings address FoMO?	QE1	Completely agree: +1
Is the context of the research clear in terms of contributing to the knowledge of FoMO?	QE2	Partially agree: +0.5
		Do not agree: 0
Does the research adequately delineate the methodology?	QE3	High quality: 4–5
Is the data collection procedure adequately explained?	QE4	Medium quality: 2.5–3.5
Is the approach used for data analysis appropriately explained in the research?	QE5	Low quality: < 2.5 (excluded)

Table 1.
Selection (inclusion and exclusion) and quality evaluation criteria for the study

ensure the relevance and robustness of search results and to maintain transparency in the SLR process (Savino *et al.*, 2017).

The reviewed search result was considered for inclusion if it (a) was published in a peer-reviewed journal, (b) included either of the search terms in the keywords or abstract and (c) included FoMO in its empirical analysis. Search results were excluded if (a) FoMO was not investigated empirically in the article; (b) article was published as a conference paper, review, thesis, book/chapter, dissertation, in a magazine or trade journal or (c) article was published in a language other than English. After the removal of duplicate articles, a final sample of 58 articles remained. The review process ended with conducting forward as well as backward citation searches to complete feedback loops and confirm that appropriate studies were included in the final SLR sample (Webster and Watson, 2002).

The review process was performed by two authors independently to ensure a robust and unbiased sample (Behera *et al.*, 2019; Mehta and Pandit, 2018). Both authors used quality evaluation (QE) criteria adopted from previous SLRs (Ain *et al.*, 2019; Behera *et al.*, 2019). Studies were assigned scores based on QE criteria, and two studies that did not meet the threshold of 2.5 (50% of the total score of 5) were removed from further consideration. In case of disagreements between the two initial coders on an article's suitability, a third author reviewed the QE. Discussions were held to reach a consensus on the inclusion or exclusion of reviewed articles and strong interrater reliability was achieved (Fleiss' kappa value of 0.89) in the QE assessment (Landis and Koch, 1977).

3.2 Research profile
Different types of descriptive statistics are reported for the selected studies to present the profile of prior literature on FoMO, such as articles with the highest number of citations, geolocations of the organizations to which first authors of the selected articles are affiliated and the geographic scope of prior investigations. Among the publishers, Elsevier emerges as the most popular source of publication, followed by Springer. These two publishing houses have contributed close to 72% of the reviewed articles of this study.

Yearly publishing trends of selected studies indicate that academic interest in FoMO has exponentially increased over the past five years (see Figure 2). In terms of author productivity, a review of the selected studies suggests that J.D. Elhai (the USA) and D. Alt (Israel) have contributed the greatest number of articles (see Figure 3), which are also among the five most popular and cited articles in this research domain (see Table 2).

An analysis of first author affiliations (by geolocation) suggests that the USA (*n* = 12), the United Kingdom (*n* = 8) and China (*n* = 10) account for 52% of the total sample (see Figure 4).
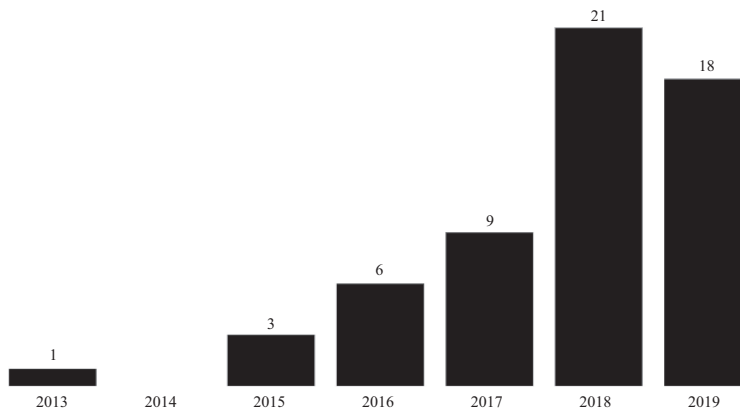

Figure 2.
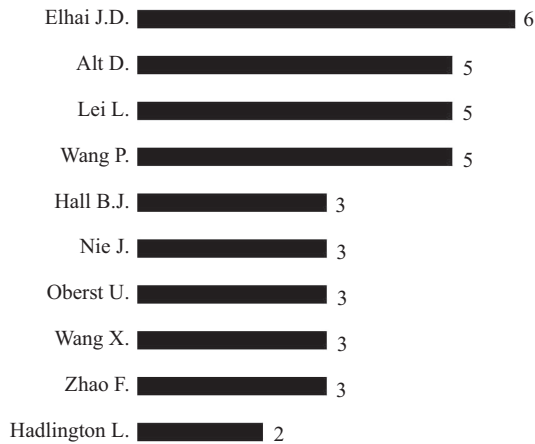Yearly publication trend (article count)

Elhai J.D. — 6
Alt D. — 5
Lei L. — 5
Wang P. — 5
Hall B.J. — 3
Nie J. — 3
Oberst U. — 3
Wang X. — 3
Zhao F. — 3
Hadlington L. — 2

Figure 3.
Most productive
authors

Note(s): Figure indicates publication count for each
author, Wang X. = Wang, Xingchao

Author (year)	Citation count*	Journal
Przybylski *et al.* (2013)	314	*Computers in Human Behavior*
Elhai *et al.* (2016)	95	*Computers in Human Behavior*
Oberst *et al.* (2017)	77	*Journal of Adolescence*
Chotpitayasunondh and Douglas (2016)	68	*Computers in Human Behavior*
Alt (2015)	68	*Computers in Human Behavior*

Note(s): *Reflects global citations, which is the total number of citations that the publication has received, as per the Scopus database

Table 2.
Top five articles
according to
citation rank

Furthermore, these three countries account for the most thoroughly investigated study contexts (about 44% of the reviewed sample; see Figure 4).

Despite the fact that the sample is primarily nonclinical in nature, it is also limited in its consideration of parents, peer groups and educators. Instead, prior literature has a clear focus on adolescents and younger respondents. Similarly, significant skewness in terms of gender was also observed, where only 16% of reviewed studies reported a balanced representation of male and female respondents. In total, 70% of the studies reported female-dominated samples and only 14% were male dominated. In terms of methodological approaches, the current study suggests that 88% of studies considered cross-sectional surveys, while approximately 3% adopted experimental research. In addition, in terms of statistical analysis (see Table 3), 49 studies utilized multivariate methods such as regression, confirmatory factor analysis (CFA) and structural equation modeling (SEM).

Prior literature has considered a diverse group of dependent variables or DVs (see Table 4). These DVs are preliminarily posited to reflect measures of compulsive media use and well-being, key focal themes examined in prior research.

To gain insights into the intellectual structure of FoMO literature, word or tag clouds were created using keywords (see Figure 5a) and titles of the selected studies (Figure 5b). Popular keywords included *problematic*, *smartphone*, *addiction*, *adolescent* and *social*.
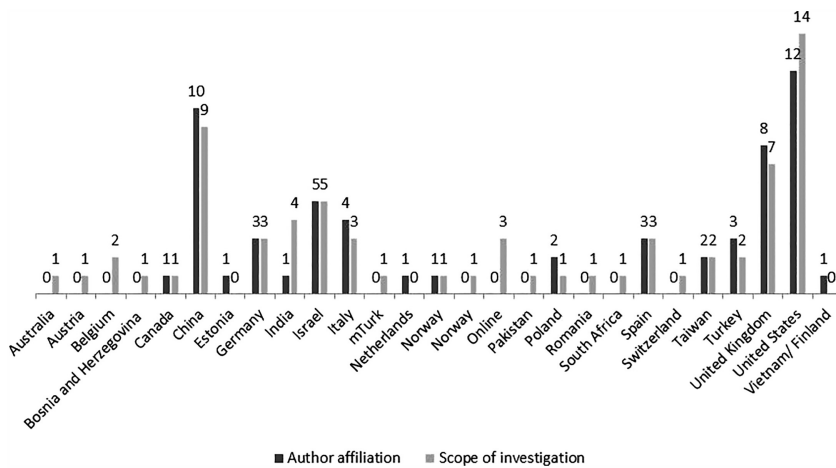
Note(s): The figure indicates affiliation count for each reviewed study and the number of studies conducted in the context of each country. Online refers to the use of online platforms for data collection. Some studies have collected data from multiple countries (i.e., scope of investigation) due to which the count may exceed total number of studies in the SLR

4. Discussion

The review indicates that a multitude of variables (as antecedents or consequences) have been studied in regard to FoMO. Figure 6 presents a graphical illustration of the associations among prior constructs. We posit that FoMO and specific social media platforms (e.g. Facebook, WhatsApp, Snapchat, etc.) are part of the social media environment that is affected by involved individuals and familial/peer groups. Specific consequences of interactions between these individuals and their peer/familial groups have been investigated (see Table 4 for details). Based on the review, we posit the greatest attention has been given to individual users' psychological profiles and relatively less focus has been paid to the influence of familial and peer groups. We thus argue for the need to reduce such gaps and fragmentation in prior research.

4.1 Themes

Content analysis, a popular technique to examine a large corpus of qualitative data, was utilized to systematically gather, analyze and discuss insights derived from an interpretive assessment of prior literature on FoMO (Hsieh and Shannon, 2005). It involves three main steps: identification of useful information, grouping and coding insights and reorganizing derived findings into different themes (Palvia *et al.*, 2007). A total of three researchers systematically examined the pool of studies included in the review to extract the key insights and themes and independently performed the three stages of content analysis. After the first round of identification, coding and regrouping, themes were delineated, and intercoder reliability was evaluated for consensus on the themes. Fleiss' kappa was 0.85, which indicated that the intercoder reliability was appropriately achieved (Landis and Koch, 1977).

4.1.1 Conceptualization and evolution of FoMO. Przybylski *et al.* (2013) developed a ten-item scale on FoMO that is still the most popular measure of this construct in the literature on social media platforms. However, in the recent past, scholars have become increasingly

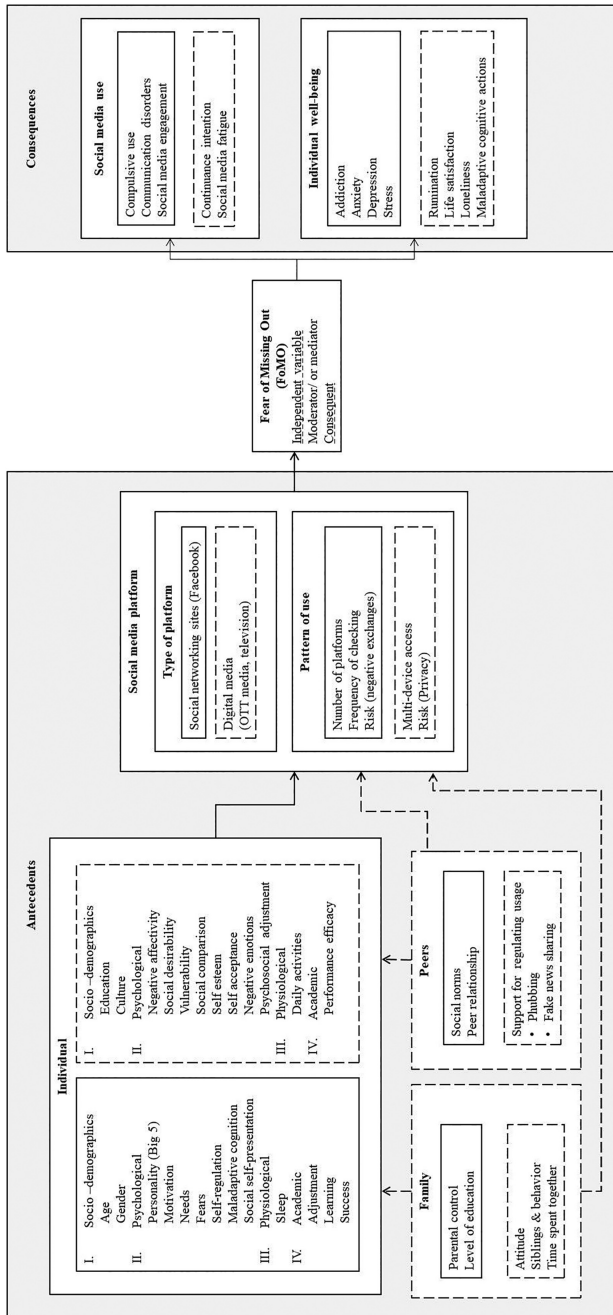| Research design	Percentage (%)	Gender distribution	Percentage (%)	Sample focus (participant type)	Percentage (%)	Data analysis method*	Count
Survey	88	Female	70	Student	64	Univariate	19
Mixed method	9	Male	14	General	34	Multivariate	49
Experimental	3	Balanced	16	Parent–adolescent dyad	2	others	4

Note(s): *The table details the number (count) of data analysis methods. Some studies used multiple methods of data analysis due to which count exceeds a total number of studies. Multivariate analyses include regression, principal components analysis, factor analysis, confirmatory factor analysis (CFA) and structural equation modeling (SEM), whereas univariate analyses include correlation and t-tests. Others refer to the use of descriptive statistics, event-related potentials (ERP's), sLORETA analyses and linear mixed model analysis

Table 3.
Profile of prior studies
(sample and research
design)

Variable	No. of studies
Compulsive media use	22
(1) Problematic media use (Internet, social media, smartphone)	
(2) Internet communication disorder	
(3) Smartphone/WhatsApp use disorder	
(4) Online social network – obsessive compulsive disorder	
(5) Addiction	
(6) State of being permanently online	
Well-being	11
(1) Life satisfaction	
(2) Negative affect	
(3) Negative consequence of using online social media through mobile (CERM)	
(4) Perceived stress	
(5) Frustration and negative emotions (responses to failure of digital technology)	
Social media engagement	5
Phubbing	3
Sleep-related disorders	2
Social media fatigue	2
Unsafe behavior	2
(1) Online risky behavior	
(2) Negative social exchange	
Intention to use	2
(1) Continuance intention	
(2) Media consumption and sharing	
Daily activity disruption	2
Online self-presentation	1
Fake news	1

Note(s): Few studies have considered multiple dependent variables. Well-being represents both positive and negative connotations experienced by social media users

interested in FoMO from a conceptual and measurement point of view. As it is a multidimensional construct (Przybylski *et al.*, 2013), there is a rising need to study its evolution (Dogan, 2019) and refine conceptual knowledge on FoMO (Chai *et al.*, 2019). In this regard, some attempts have been made to ascertain whether the development of FoMO may be attributed to the use of platforms not directed at socialization, such as news and advertising channels (Wolniewicz *et al.*, 2018). Attempts have also been made to study FoMO as a social need fulfillment variable (Elhai *et al.*, 2016), its association with transdiagnostic measures (Dempsey *et al.*, 2019), self-construal issues (Dogan, 2019) and its neurobiological correlates (Lai *et al.*, 2016). We argue for the need to understand if, and how, FoMO has also evolved in terms of differences that can be attributed to context specificity.

4.1.2 Study contexts. A total of three subthemes of platform-specific research on FoMO can be ascertained. First, prior research has attempted to explore the effect of FoMO on social media users with a focus on specific social media platforms such as Facebook (Błachnio and Przepiórka, 2018), WhatsApp (Sha *et al.*, 2019) and Instagram (Hunt *et al.*, 2018). Franchina *et al.* (2018) found that an individual experiencing an advanced degree of FoMO may use a greater number of social media platforms and suffer from distress due to problematic use. Fuster *et al.* (2017) suggested FoMO as a driving force for social media engagement, and Dempsey *et al.* (2019) found it to predict the severity of Facebook use. In addition to these

(a)

(b)

studies, Franchina *et al.* (2018) also suggested that FoMO plays a stronger role in increasing the use of private social media platforms (e.g. Facebook) compared to public channels (Twitter).

Secondly, Sha *et al.* (2019) suggest that FoMO may be specific to disorders pertaining to the Internet and social media communication (e.g. WhatsApp and Facebook) and smartphone use. Similarly, Alt and Boniel-Nissim (2018b) posit that ready access to Internet-abled devices, such as smartphones, may cause communication issues and problematic Internet and smartphone use.

Thirdly, Elhai *et al.* (2020) and Rozgonjuk *et al.* (2019) discussed that FoMO could enable individuals' heightened use of mobile applications that serve to fulfill both social and

Note(s): OTT is Over-the-top media services. The solid lines and arrows represent the well-investigated variables/relationships whereas the dotted lines and arrows represent the less-investigated variables/relationships

Figure 6.
Investigated variables
and associations in
prior literature

utilitarian functions. Due to FoMO, an individual may remain in a state of a permanent connection to virtual networks through mobile applications (Zhou, 2019).

Increasing Internet and social media dependence in daily activities (Rozgonjuk *et al.*, 2019) has also encouraged researchers to investigate FoMO in other contexts (Alt, 2015, 2017). For example, FoMO has been studied with respect to academic environments to determine its role in surface learning (Rozgonjuk *et al.*, 2019), motivational states (Alt, 2015) and overcoming study barriers (Hetz *et al.*, 2015). New studies have further linked FoMO to contemporary issues such as distracted walking in urban environments (Appel *et al.*, 2019), fake news propagation (Talwar *et al.*, 2019) and media consumption (Conlin *et al.*, 2016).

4.1.3 Antecedents and consequences of FoMO. The third emerging theme pertains to the different antecedents and consequences of FoMO. Prior literature has focused on multiple negative consequences, such as dissatisfaction with life (Elhai *et al.*, 2016; Błachnio and Przepiórka, 2018). Chotpitayasunondh and Douglas (2016) posit that FoMO and excessive use of online social media and smartphones may be attributed to the development of normative behaviors such as phubbing (Elhai *et al.*, 2018). Barry *et al.* (2017) argue that FoMO may contribute to an individual's development of internalized problems, which may lead to diminished emotional well-being (see Stead and Bibby, 2017). Talwar *et al.* (2019) found FoMO affected fake news sharing and could encourage gossip-sharing on social media. Recent studies have also started to focus on the association between FoMO and sleep quality as well as duration (Milyavskaya *et al.*, 2018; Scott and Woods, 2018). Overall, prior literature has concluded that FoMO is linked to many different psychopathological symptoms, such as anxiety (Elhai *et al.*, 2018), depression (Tsai *et al.*, 2019), diminished well-being (Milyavskaya *et al.*, 2018), dissatisfaction with life (Stead and Bibby, 2017), compulsive social media use (Eide *et al.*, 2018), social media fatigue (Dhir *et al.*, 2018) and sleep disturbances (Scott and Woods, 2018).

FoMO is defined as a state of limbo that may arise from deficiencies in psychological needs (competence, relatedness, autonomy), which are integral components of self-determination (Przybylski *et al.*, 2013; Zhou, 2019). In light of this, recent literature has examined the following: (a) FoMO's association with the need for relatedness (Conlin *et al.*, 2016; Dogan, 2019) and the role competence and autonomy play in reducing FoMO (Xie *et al.*, 2018); (b) psychological deficits such as loneliness (Alt, 2018) and depression (Wegmann *et al.*, 2017) that induce FoMO and motivate excessive social media engagement (see also Dhir *et al.*, 2018; Reer *et al.*, 2019; Yin *et al.*, 2019); (c) lack of self-regulation of needs as an antecedent of FoMO (Alt and Boniel-Nissim, 2018a; Hunt *et al.*, 2018; James *et al.*, 2017; Wegmann *et al.*, 2017) and (d) FoMO's potential association with accelerated use of digital technology to keep up with fast-paced life and multifunctionality of smartphones that can lead to a permanent state of being online (Coskun and Muslu, 2019; Zhou, 2019).

Besides examining the antecedents and consequences, relatively few empirical studies have examined the mediating and moderating influence of FoMO. Wolniewicz *et al.* (2018) suggest that FoMO exerts a mediational influence on the relationship between fear of evaluation and problematic smartphone use. Oberst *et al.* (2017) found FoMO mediates psychopathology and the negative consequences of accessing social media platforms through mobile phones. In terms of moderating influence, Chai *et al.* (2019) found FoMO to moderate the effect of social overload on social media use and well-being.

4.1.4 Individual differences. Seminal literature suggests that FoMO may be dependent on individual differences and personality traits (Przybylski *et al.*, 2013). Scholars have carried out empirical investigations on individual differences (classified into two groups: age and gender). Appel *et al.* (2019) studied age and gender differences in the association between FoMO and an individual's engagement with virtual social interactions while walking in urban environments. They found that FoMO could cause distracted walking; this relationship was negatively correlated to age and unrelated to gender. Servidio (2019) and

Milyavskaya *et al.* (2018) found a similar absence of gender differences with respect to FoMO in their studies. However, Oberst *et al.* (2017) found significant gender differences in individuals' experience of FoMO and also emphasized a dearth of gender-specific studies that examine this phenomenon.

In terms of psychological differences, Stead and Bibby (2017) found that specific dimensions of personality, conscientiousness and emotional stability were negatively correlated with FoMO. Milyavskaya *et al.* (2018) and Yin *et al.* (2015) suggest that FoMO is closely linked to an individual's emotions and mood. Reer *et al.* (2019) suggest that individual differences in psychological traits contribute to the development of FoMO, while Casale *et al.* (2018) suggest the need to consider FoMO as a state of metacognition. Furthermore, Franchina *et al.* (2018) and Fuster *et al.* (2017) propose the need to consider FoMO as an interpersonal trait in itself. Despite these existing studies, there is a gap in existing literature in terms of FoMO and its examination with respect to platforms and methodologies.

4.2 Gaps and limitations
4.2.1 Platform-specific studies. Recent studies suggest that the customer base of social media platforms other than Facebook (e.g. Instagram, Snapchat, WhatsApp, Tinder, LinkedIn, etc.) is rapidly increasing (Sha *et al.*, 2019; Zhou, 2019). However, most of the selected studies on FoMO are platform specific to Facebook users (Błachnio and Przepiórka, 2018; Blanca and Bendayan, 2018). Therefore, only a limited understanding of FoMO exists with reference to the other social media platforms.

4.2.2 Conceptual challenges. The existing literature has primarily focused on exploring the antecedents and consequences of FoMO within the contexts of the Internet (Alt and Boniel-Nissim, 2018a; Hadlington and Scase, 2018), instant messenger programs (Tsai *et al.*, 2019), social media platforms (James *et al.*, 2017; Pontes *et al.*, 2018; Rogers and Barber, 2019) and smartphone usage (Sha *et al.*, 2019; Wolniewicz *et al.*, 2018). However, most studies are centered on consequences pertaining to well-being or psychosocial issues. It is important to focus on a broader category of antecedents and consequences in order to stimulate conceptual advancements. This is especially critical in the light of recently uncovered links that research has established for FoMO and various contemporary issues such as fake news sharing (Talwar *et al.*, 2019), media consumption (Conlin *et al.*, 2016) and daily activity disruption (Appel *et al.*, 2019).

4.2.3 Lack of geographic focus. In Asia, South America and Africa, recent statistics suggest that social media penetration is higher than the global average (Kemp, 2019; see Figure 4). Yet, these countries have not received much academic investigation in the context of FoMO. Instead, the highest number of reviewed studies have included participants from the USA ($n = 14$), China ($n = 9$), the United Kingdom ($n = 7$), Israel ($n = 5$) and India ($n = 4$). This is a significant gap in current research, as Baker *et al.* (2016) posit FoMO as a culturally universal phenomenon. However, communication patterns vary across cultures and countries due to differential norms that guide social exchanges, and it may be argued that geographic and cultural contexts have an impact on the development, effect and magnitude of an individual's FoMO. Only five selected studies had a culturally or geographically diverse sample, whereas 53 of the reviewed studies – approximately 91% – were in a narrow geographic context. Therefore, despite increased focus on FoMO, there is also a critical lack of geographically diverse studies that could help cross validate the current conceptualization and operationalization of FoMO.

4.2.4 Lack of emphasis on demographic variables. Prior social media literature has shown significant age and gender differences in social media use (e.g. Kemp, 2019; Popovac and Hadlington, 2020; Wolniewicz *et al.*, 2018), but the literature on FoMO has paid limited attention to these differences. This problem can be seen from several angles. First, the effects

of age and gender differences were not well addressed through empirical evaluation. Second, sample populations in prior literature on FoMO were limited in age and gender distributions – for example, the current SLR suggests 69% of prior studies had female-dominant samples. Similarly, more than 60% of the selected studies in this SLR have focused on samples comprised predominantly of adolescents and young adults, including students enrolled in schools or colleges. However, approximately 30% of individuals who use social media are adults aged 35–64 years (Kemp, 2019). They may hold five to seven social media accounts that exhibit different levels of engagement with each (Kemp, 2019). Third, the impacts of these demographic variables, such as age and gender, have been found to be different in the reviewed studies (see Appel *et al.*, 2019; Błachnio and Przepiórka, 2018; Coskun and Muslu, 2019; Oberst *et al.*, 2017). Thus, we argue that more empirical knowledge on the universal, or contextual, effects of such demographic variables is needed before a consensus may be reached on their association with FoMO.

4.2.5 Methodological challenges.

(1) *Focus on self-reports and cross-sectional surveys*: Prior literature has overwhelmingly focused on self-reports (close to 88% of studies), which are prone to respondents' biases (Fuster *et al.*, 2017) and memory lapses (Rogers and Barber, 2019) and may result in common method variance (Podsakoff *et al.*, 2003). Cross-sectional surveys provide only limited inferences and do not address causality among the examined associations (Stead and Bibby, 2017).

(2) *Sampling issues*: A majority of the selected studies focused on sampling nonrepresentative populations (Barry *et al.*, 2017) through nonprobability (Zhou, 2019) and convenience sampling techniques (Błachnio and Przepiórka, 2018). The sampling problems inherent in these techniques can limit the understanding of findings (Scott and Woods, 2018) in terms of limited generalizability and derivation of causal inferences. Other sampling issues include homogeneity (Oberst *et al.*, 2017), size limitations (Barry *et al.*, 2017), skewness in gender representation with predominantly female (see Baker *et al.*, 2016; Chotpitayasunondh and Douglas, 2016; Scott and Woods, 2018) or male samples (Dhir *et al.*, 2018; Yin *et al.*, 2015) and similarity of use patterns (Baker *et al.*, 2016). These issues have the potential to affect the magnitude of examined associations and the insights derived from the respective studies.

(3) *Small effect size*: The small effect sizes in the studied associations were also a limitation (Chai *et al.*, 2019; Elhai *et al.*, 2018; Rozgonjuk *et al.*, 2019) as they limit the degree of explanation that may be drawn for the DV under examination.

(4) *Data analysis*: Prior literature has indicated inappropriateness in utilized analytical techniques (Zhou, 2019), which has a significant effect on reliability, both temporally and contextually (Hunt *et al.*, 2018). This includes inadequate fit for indices (Dempsey *et al.*, 2019), lack of power for complex analysis (Buglass *et al.*, 2017) and modeling of constructs (Elhai *et al.*, 2020).

(5) *Data collection and participants*: Prior literature has reported various methodological challenges related to the data collection and recruitment of participants. These are survey fatigue (Bright and Logan, 2018), potential loss of information (Buglass *et al.*, 2017), the bias in participant selection (Eide *et al.*, 2018; Stead and Bibby, 2017) and attrition (Hunt *et al.*, 2018).

(6) *Measurement*: Prior selected studies raised concerns related to the objective measurement of FoMO (Milyavskaya *et al.*, 2018; Stead and Bibby, 2017;

Wolniewicz *et al.*, 2018). Scholars have argued for greater construct reliability (Franchina *et al.*, 2018; Xie *et al.*, 2018), as well as stability of constructs over time (Rogers and Barber, 2019) and across different contexts (Przybylski *et al.*, 2013). Furthermore, prior research has considered a measurement of FoMO from a single point of access – smartphones (Hunt *et al.*, 2018). However, with the integration of Internet of Things (IoT) devices, multiple points of access to digital platforms (e.g. tablets, smartwatches and virtual assistants like Alexa) are increasingly evident (Dogan, 2019; Eide *et al.*, 2018). We argue that the nonconsideration of such multiple points of access while measuring FoMO presents a limitation in the current literature.

Based on the gaps and limitations derived from the SLR, we have mapped out key research agendas and associated implications that may further enrich this field of research and are further elucidated in the following sections (Table 5).

5. Future research agendas: recommendations and framework

5.1 Diversity of approach: social media users and stakeholders

Prior literature has narrowly focused on young social media users (Dempsey *et al.*, 2019; Elhai *et al.*, 2020; Gezgin, 2018) and nonclinical samples in terms of age, gender, use frequency and culture. We argue that even though FoMO is an experience perceived at an individual level, its effects transcend individual boundaries to affect other stakeholders. Such stakeholders may include familial and peer group members as well as the clinicians and educators who engage with them. These stakeholders may be in a unique position to offer information regarding the consequential effects of FoMO on individuals' lives and relationships. Future studies need to adopt a multistakeholder perspective for their inclusion (Chai *et al.*, 2019). Such an approach would generate pertinent insights that may aid the development of a holistic perspective of FoMO. There is an urgent need for an inclusive and representative sample that ensures a balance of stakeholders and the demographic traits of individuals. In this regard, our recommendations are

(1) Recruit a diverse group of social media users (through a platform like MTurk) to reflect a significant range in terms of age, gender, cultural affiliation, social media platforms used and level of social media engagement.

(2) Include parents and peer group members while considering reports on behavioral patterns of individuals experiencing FoMO. This would aid in generating more holistic perspectives on FoMO's effect on individual users.

(3) Include more clinical samples to gain insights from therapists, psychologists and psychiatrists. This may help to understand and to substantiate the mechanism of effect through which FoMO engenders physical and psychopathological symptoms.

(4) Focus on comparing the usage frequency and behavioral patterns of users with different levels of engagement with social media platforms, that is, heavy versus light users.

5.2 Methodological advancement

Based on the review, we argue that future research would benefit from the use of sophisticated research designs and methodological approaches to conduct further investigation on FoMO. For example, scholars may focus on probabilistic approaches such as stratified random sampling to ensure sample representativeness (Buglass *et al.*, 2017) and increase generalizability (Yin *et al.*, 2019). Further, scholars may also consider prolonged time periods for collection (Reer *et al.*, 2019) and objective measurement of responses (Sha *et al.*, 2019) to test causal relationships of FoMO with existing antecedents and

Gap	Future research agendas	Implications
Less focus on social media platforms apart from Facebook	(1) Is the effect of FoMO similar or divergent across different social media platforms? (2) Does the basic function (utilitarian/hedonic hybrid) of a platform affect the development of FoMO? (3) Does FoMO influence users of professional networking sites such as LinkedIn? (4) Is FoMO associated with other, nonsocial reasons for using social media platforms such as marketplace transactions?	(1) The impact of platform function may allow managers to develop features that counteract or diminish FoMO. (2) Investigate the possible evolution of FoMO is an affectual factor for organizational and professional communication (3) Augmentation of the scope of the investigation to examine FoMO as a societal phenomenon
Linkage with contemporaneous digital/ traditional media consumption behavior	(1) Does FoMO affect consumers' consumption patterns for digital media products such as movies, music, etc.? (2) To what extent is FoMO associated with or responsible for the promulgation of negative behavioral outcomes such as trolling, social media surveillance, fake news sharing, etc.?	(1) The potential transcendence of FoMO into a digital media phenomenon calls for the adoption of a more holistic perspective of the concept (2) The study of FOMO's relationship with other phenomena associated with the dark side of social media may provide deeper insights into users' negative digital behaviors (3) Insights may allow social media platform managers to improve checkpoints for negative behavioral outcomes
Limited geographic and cultural scope	(1) Do antecedents and consequences of FoMO show significant differences across differently developed economies? (2) How do cultural norms for communication and social behavior impact cross-national experience of FoMO?	(1) Cross-nationally and cross-culturally comparative investigations can advance current understanding (2) Insights may allow the development of more nuanced context-specific interventions to induce positive digital behavior to diminish FoMO. (3) Integration of cultural and social norms for individual and group communication in online communities
Investigation of demographic variables	(1) How do social media users from different age cohorts and genders process FoMO? (2) Do other demographic variables such as education and occupation affect users' experience of FoMO?	(1) The literature would benefit from an empirical examination of influence exerted by less studied demographic variables, especially education (2) Comparative age- and gender-based studies to determine cohort-specific cognitive, affective and conative outcomes to develop interventions (3) Insights could aid in determining the prevalence of FoMO as a societal phenomenon affecting the digitally oriented generation

(continued)

Table 5.
Mapping gaps, potential research agendas and implications

Gap	Future research agendas	Implications
Robustness of adopted methodologies	Sophisticated methodological approaches adoption to ensure (1) Balanced representativeness of the sample (2) Inclusion of familial and peer reports on users' social media behavior (3) Accounting of contextual and temporal aspects (4) Preserving the integrity of the data collection process by counteracting challenges such as attrition and survey fatigue (5) Adoption of techniques that help in determining causality	(1) Attempts may be directed at developing more contemporary and holistic measures by: • Integrating multiple access points for social media such as smart devices • Encouraging qualitative investigation of FoMO to identify hitherto unknown or lesser-known correlates (2) Managers may receive deeper, more valid insights (3) Insights could also aid in developing practically grounded interventions to deal with the consequences

Table 5.

consequences. Furthermore, scholars can utilize complex inferential statistical tools (e.g. nonparceled SEM) and adopt relevant analytical approaches from allied fields (e.g. neuroscience or neurobiology to examine FoMO antecedents and consequences (Lai *et al.*, 2016). These initiatives permit a more comprehensive understanding of FoMO from a phenomenological perspective.

Future research would thus benefit from methodological advancements in research designs. For instance, researchers may consider adopting longitudinal surveys, experimental designs, real-time data logging studies and qualitative designs (open-ended essays, sentence completion exercises and focus discussions). Scholars should also consider targeting the same sample at multiple instances over a predetermined time period to measure the temporal stability of FoMO and its associated constructs.

5.3 Theoretical advancements

The theoretical foundations of prior literature on FoMO are not yet strong, which may be due to the nascence of this concept (investigated only since 2013). Our review suggests that scholars have relied on self-determination theory (Alt, 2015; Przybylski *et al.*, 2013; Xie *et al.*, 2018), self-construal theory (Dogan, 2019) and social comparison theory (Reer *et al.*, 2019; Talwar *et al.*, 2019). We recommend that researchers may further develop FoMO's theoretical foundations by applying seminal and contemporary theories from disciplines of psychology, media and communication, sociology, information systems and marketing. Some possible alternates are behavioral reasoning theory (Westaby, 2005), social cognitive theory (Bandura, 1986) or the strength of weak ties network theory (Granovetter, 1973), among others.

5.4 Conceptual and operational advancements

5.4.1 Expand the possible antecedents and consequences of FoMO. Based on the review, we suggest that future studies should focus on exploring, identifying and substantiating other possible antecedents of FoMO, such as dark personality traits, negative emotions and psychopathological predispositions (see Figure 7). Additionally, FoMO may be investigated for influencing individuals' degree of separation anxiety (Clayton *et al.*, 2015), social isolation, desire for social detachment ("joy of missing out") and cessation of technology use (Salo *et al.*, 2019). Other possible directions include examining the effects of FoMO on employee productivity, workplace relationships, professional achievements, etc. (e.g. Budnick *et al.*, 2020). Scholars may utilize qualitative research designs to uncover viable constructs and subsequently test them through empirical means for validating their contextual strength and stability.

Furthermore, FoMO may be mediated or moderated by other variables, such as perceived relative deprivation (Xie *et al.*, 2018) and socially driven motives, like the need to belong (Yin *et al.*, 2019). The current study emphasizes the need to introduce an extensive set of control, moderator and mediator variables in future FoMO studies. Possible variables that may be examined could include (a) sociodemographic variables (e.g. education, income, access to and ownership of smart devices, availability of technological infrastructure, culture-based communication norms) and (b) psychological variables (e.g. need for affiliation, perceived peer pressure, personality traits). Such examinations will help scholars to develop a more nuanced understanding of FoMO and elucidate the relative strength of its effects.

5.4.2 Expand conceptual and operational characterization of FoMO. We posit that the original conceptualization and operationalization of FoMO needs to evolve in tandem with individuals' increasing access to and dependence on technology, including diverse social media platforms. The existing understanding of FoMO is primarily centered on a few social media platforms and the scope of understanding needs to be expanded to platforms for nonsocial use (e.g. LinkedIn). Further, though research on FoMO and associated phenomena is escalating, almost all the reviewed studies have used Przybylski's *et al.* (2013) original
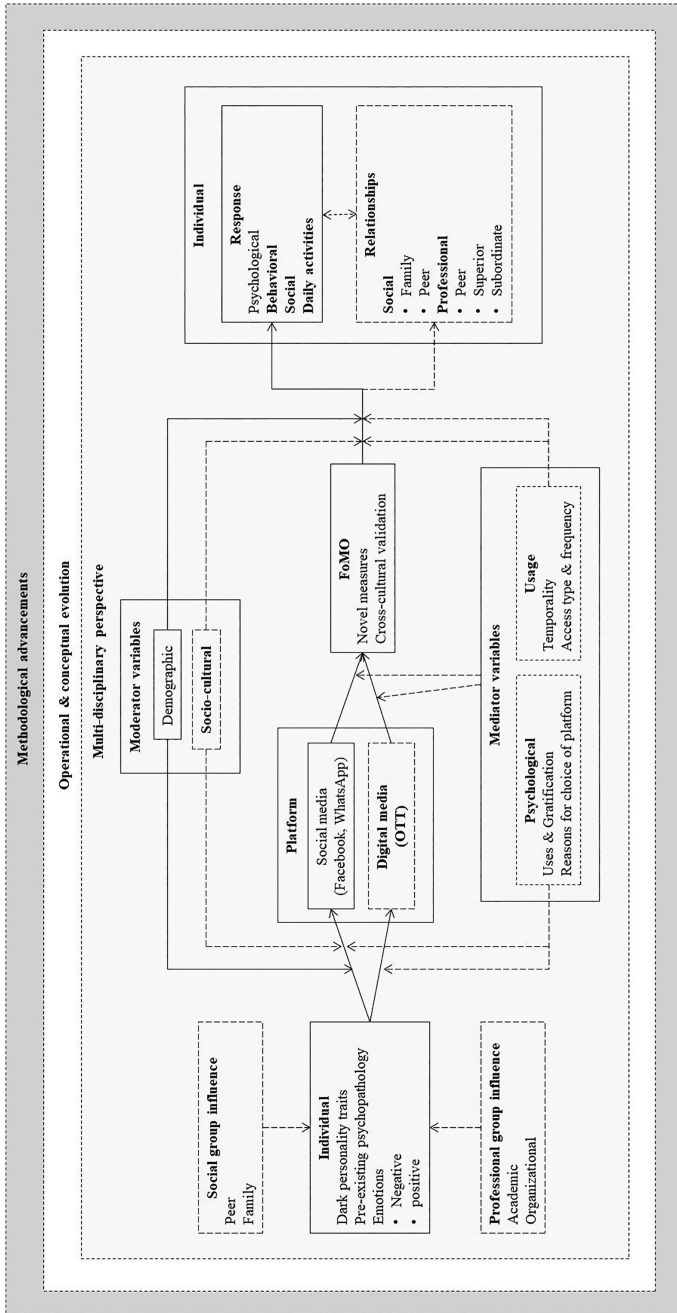
Note(s): Dashed arrows and text marked in bold denote less-investigated associations and variables, respectively

Figure 7.
A research framework

measure. There is a critical need to investigate newer constructs that could aid the conceptual evolution of FoMO in light of its purported multifaceted nature. For instance, Wegmann *et al.* (2017) explore two dimensions of FoMO that refer to its nature as (a) a characteristic trait (i.e. trait FoMO) and (b) a specific manifestation of Internet-related communication (i.e. state FoMO). In line with this approach, future studies may also explore additional manifestations, dimensions and measures of FoMO. Scholars may also focus on inclusion, cross-cultural validation and empirical investigation of context-specific measures in order to expand the original FoMO scale.

5.4.3 Take a holistic perspective. FoMO is transforming into a phenomenon with a broader scope than its original conceptualization. FoMO now has connotations for users of digital media and technology (Hadlington and Scase, 2018; Steele *et al.*, 2020) rather than social media users alone. Scholars may thus attempt to study FoMO from a more holistic (i.e. digital) perspective. For example, individuals may fear that disrupted digital presence or communication will lead them to miss professional or social connections (Budnick *et al.*, 2020). Such fear may also be experienced for missing notifications pertaining to digital content perceived as important such as social events and broadcasts. Additionally, FoMO may be investigated through a marketing lens wherein individuals desire to avoid missing out on promotional offers, retail sales and discounts.

Further research may thus be advanced by examining FoMO across other multifunctional digital applications, including monitoring of health or news, dating, shopping, content sharing, gaming or ride-sharing. For example, the investigation of platforms such as Tinder, OkCupid, LINE, Snapchat, Instagram and PUBG might be instrumental in developing knowledge of FoMO as a multidimensional phenomenon (Alt, 2015).

5.5 Multidisciplinary connotations

Research conducted in the fields of medicine, psychology and psychiatry already examines well-known associations of FoMO, such as sleep, psychopathology and diminished well-being. The consideration of such findings while conceptualizing future research frameworks may provide a new clinical perspective that could aid in the development of more scientifically grounded measures and constructs of FoMO. A multidisciplinary approach may also aid in the development of experiment-based research protocols to assist researchers in overcoming present methodological challenges (e.g. objective measurement, self-reporting or social desirability bias). Furthermore, such protocols may allow researchers to utilize noninvasive medical technology, such as electroencephalograms (EEGs) and electrocardiograms (ECGs), to understand the cognitive processing of social media communiqué as well as the physical manifestation of symptoms of FoMO and problematic social media use.

5.6 Research framework

In Figure 7, the proposed framework corresponds to the ecosystem within which FoMO originated, which is continuously evolving. We argue for the need to adopt a multidisciplinary approach to examine this ecosystem. Focusing on advancing intellectual boundaries of the concept of FoMO, the framework explicates underinvestigated potential antecedents, consequences and indirect influences (i.e. mediators/moderators) of FoMO. We argue that it is imperative for future scholars to include familial, social and professional peer groups from individual social media platforms as viable sources of information for FoMO investigation.

5.6.1 Antecedents.

(1) Platforms

These include social media platforms and digital media – over-the-top (OTT) services such as Netflix and Prime – with which users actively engage. While some social media platforms have been prolifically investigated in prior research, there is potential to expand the focus on digital media.

(2) Influencers

We argue that an individual's use of different platforms may be affected by the influence exerted by social (i.e. family and peers) and professional (e.g. academic, corporate) groups, contingent to individual's prioritization of communications received from. There is a need to study how FoMO affects individuals' interaction with members of the latter group including superiors as well as subordinates.

5.6.2 Mediators and moderators. Future research can consider the inclusion of sociodemographic variables (e.g. education, income, occupation and cultural communication norms) as potential mediators, as discussed in the preceding sections. Further, based on the findings of the review, we posit the need to study the mediating effect of two factors – psychological and usage – on the associations between individuals' use of platforms, the experience of FoMO and subsequent outcomes.

Scholars may examine psychological influencers, such as the mediating influence of reasons due to which individuals choose a specific social media platform and the gratifications they might derive from its usage. There is also a need to examine factors associated with platform usage, such as the temporal effect of social media usage on individuals' experience of FoMO. We argue for the consideration of the potential influence of the medium (smartphones, laptops, smartwatches, etc.) and frequency of access on an individual's degree of FoMO as well as the strength of its associations with antecedents and consequences.

5.6.3 Outcomes. Based on the findings, we posit the need to consider the twofold effect of FoMO on an individual (which corresponds with the effect on relationships with other stakeholders in the ecosystem).

(1) Responses

While emotional responses to FoMO (e.g. addiction, depression and anxiety) have been investigated, future research may focus on other possible outcomes in terms of behavior (e.g. usage cessation), social fatigue and disruption of daily activities, including sleep habits.

(2) Relationships

Future research can focus on investigating whether and how FoMO affects an individual's relationship with their social and professional group members. Such knowledge will help develop conceptual and operational knowledge of FoMO's effects on society and incumbent relationships.

This framework can be used by scholars to further develop the concept of FoMO and its operational constructs, along with examining other variables that may initiate, amplify or diminish FoMO's effects. This framework thus offers support to research efforts aimed at exploring FoMO as a consequence of maladaptive use of technology platforms.

6. Conclusions, implications and limitations

The current study adopted the SLR methodology to curate and assimilate extant research on FoMO. A rigorous article search protocol was utilized to include relevant studies from four different databases, namely Scopus, Web of Science, PsycINFO and PubMed. A total of 58 empirical studies on FoMO were shortlisted (see Table 6) on the basis of specific article selection and QE criteria (see Table 1).

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Przybylski et al. (2013)	$N1 = 2{,}079$, 50% male, mean age $= 43.21$ years (SD $= 11.49$); $N2 = 87$; 77% female, mean age $= 20$ years (SD $= 2.96$)	Mixed method (survey and interviews)	Univariate, multivariate	FoMO	SME	Computers in Human Behavior	Elsevier
Alt (2015)	$N = 296$, 85.3% female; mean age $= 25.4$ years	Survey	Multivariate	Academic motivation, FoMO, student characteristics, SME	SME	Computers in Human Behavior	Elsevier
Hetz et al. (2015)	$N1 = 22$, 77% female, mean age $= 20.6$ years; $N2 = 19$, 73.7% female	Mixed method (survey + qualitative)	Descriptive statistics	Social media use, social media intensity, FoMO	–	Journal of Research on Technology in Education	Routledge
Yin et al. (2015)	$N = 629$, 59.8% male, 44.5% aged 30–39 years	Survey	Multivariate	FoMO, enjoyment, negative affect, perceived information risk, perceived usefulness, continuance intention	Continuance intention	Technological Forecasting and Social Change	Elsevier
Baker et al. (2016)**	$N = 386$, 80.84% female, mean age $= 21.98$ years (SD $= 5.22$), ethnically diverse	Survey	Univariate, multivariate	Well-being [physical symptoms, depressive symptoms] mindful attention, FoMO, social media time, age, gender	Well-being	Translational Issues in Psychological Science	Others (American Psychology Association)
Beyens et al. (2016)	$N = 402$, 57% female, average age $= 16.41$ years (SD $= 1.43$)	Survey	Multivariate	Age, gender, FoMO, need to belong, need for popularity, perceived stress	Facebook use, perceived stress (popularity and belongingness)	Computers in Human Behavior	Elsevier
Chotpitayasunondh and Douglas (2016)	$N = 251$, 62.9% female, mean age $= 27.70$ years (SD $= 9.59$), 57.37% Caucasian	Survey	Multivariate	Internet addiction, FoMO, self-control, smartphone addiction, phubbing, social norms of phubbing, gender (moderator)	Phubbing	Computers in Human Behavior	Elsevier
Conlin et al. (2016)	$N = 160$ (51.2% male), mean age $= 35.23$ years (SD $= 10.13$), 80% Caucasian	Survey	Multivariate	FoMO, social media posts, one-time events (entertainment events, sports event, political events, awards shows)	Media consumption/SM sharing	Communication and Society	Others

(continued)

Table 6.
Comprehensive overview of prior literature on FoMO

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Elhai et al. (2016)	N = 306, 53.6% male, mean age = 33.15 years (SD = 10.21), 82.1% White (Caucasian), 27.3% household income between 50–80,000 US$ per annum	Survey	Multivariate	Age, gender, depression, anxiety, behavioral activation for depression scale, emotional regulation questionnaire, need for touch, smartphone addiction, SUF	Problematic smartphone use (PSU)	*Computers in Human Behavior*	Elsevier
Lai et al. (2016)	N = 20, 55% male, mean age = 24.1 years (SD = 2.8)	Survey	Event-related potentials (ERPs), sLORETA analyses	FoMO, SME, attachment style, EEG	FoMO	*Computers in Human Behavior*	Elsevier
Alt (2017)	N = 279, 83% female, mean age = 24.43 years (SD = 4.27), 65.3% Jewish	Mixed method	Qualitative and multivariate	Student characteristics, SME, news engagement, commercial engagement, cultural group, FoMO	SME	*Journal of Computing in Higher Education*	Springer
Barry et al. (2017)	N = 226 (113 dyads), adolescents 48.7% male, mean age = 15.27 years (SD = 1.02), 81.4% Caucasian; parents 63.7% female, median household income of 60,000 US$ per annum	Survey	Univariate, multivariate	FoMO, loneliness, demographics, psychosocial adjustment, frequency of checking, no. of accounts (parents and teens)	Well-being	*Journal of Adolescence*	Elsevier
Blackwell et al. (2017)	N = 207, 74.8% female, mean age = 22.15 years (SD = 7.38), 79.2% Caucasian	Survey	Univariate, multivariate	Age, extraversion, neuroticism, avoidance, anxiety, FoMO, social media engagement, social media (SM) addiction	SM use, SM addiction	*Personality and Individual Differences*	Elsevier
Buglass et al. (2017)	N1 = 489, 50.5% male, mean age = 20.6 years (SD = 9.1), N2 = 175, mean age = 20.5 years (SD = 10)	Mixed method	Univariate, multivariate	Psychological well-being, online vulnerability, increased reported exposure, online self-promotion	Well-being	*Computers in Human Behavior*	Elsevier

Table 6.

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Fuster *et al.* (2017)	N = 5,280, 76.18% female, mean age = 15.47 years (SD = 6.1)	Survey	Latent profile analysis	Age, no. of SM platforms, SME, mobile phone addiction, social network access, SM intensity	Correlations and latent profile identification only	*Aloma*	Others (Ramon Llull University)
James *et al.* (2017)	N = 798, 68% female, 44% aged 25–35 years	Survey	Multivariate	OSN belongingness, control, personality big five factors, OSN - obsessive-compulsive disorders, OSN negative emotions, OSN uses and gratifications	Online social networking obsessive compulsive disorder (maladaptive use)	*Journal of Management Information Systems*	Taylor and Francis
Oberst *et al.* (2017)	N = 1,468, 74.3% female, mean age = 16.59 years (SD = 0.62)	Survey	Multivariate	CERM, psychopathological symptoms, FoMO, social networking intensity (SNI)	CERM (the negative consequence of using social media through mobile)	*Journal of Adolescence*	Elsevier
Stead and Bibby (2017)	N = 495, 69% female, mean age = 20.62 years (SD = 1.6)	Survey	Multivariate	Sex, age, emotional sensitivity, extraversion, conscientiousness, agreeableness, openness, FoMO, PIU	Well-being	*Computers in Human Behavior*	Elsevier
Wegmann *et al.* (2017)	N = 270, 70.3% female, mean age = 23.43 years (SD = 4.02)	Survey	Multivariate	ICD, specific cognition (state FoMO, Internet use expectancies), trait FoMO, depression, psychopathological symptoms, interpersonal sensitivity	Internet-communication disorder (ICD)	*Addictive Behaviors Reports*	Elsevier
Alt and Boniel-Nissim (2018b) #	N = 216, 51% male, age range = 13–18 years	Survey	Multivariate	PIU, FoMO, surface learning, deep learning	PIU	*Internet Interventions*	Elsevier
Alt and Boniel-Nissim (2018a)	N = 270, 51% male, age range = 13–18 years, 54.5% aged 15.5–19 years	Survey	Multivariate	Gender, age, parents' communication, FoMO, PIU	PIU	*Journal of Family Issues*	Sage
Alt (2018)	N = 290, 85% female, mean age = 24.1 years (SD = 6.5), 67% Jewish	Survey	Multivariate	Adjustment to college, student characteristics, FoMO, SME	SME	*Current Psychology*	Springer

Table 6.

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Błachnio and Przepiórka (2018)	N = 360, 64% female, mean age = 22.22 years (SD = 6.84)	Survey	Univariate, multivariate	Narcissism, FoMO, Facebook intrusion, life satisfaction	Facebook intrusion, life satisfaction	*Psychiatry Research*	Elsevier
Blanca and Bendayan (2018)*	N = 759, 58% female, 70.9% aged 18–30 years	Survey	Univariate, multivariate	Phubbing , FoMO, Facebook intrusion, Internet addiction	Phubbing	*Psicothema*	Others
Bright and Logan (2018)	N = 518, 53.1% female, 55.2% aged 18–40 years, 68% Caucasian, 60% household income per annum > 50,000 US$	Survey	Univariate, multivariate	Attitude toward brands, advertising intrusiveness, privacy concerns, FoMO, SMF	Social media fatigue (SMF)	*Internet Research*	Emerald
Casale *et al.* (2018)	N = 579, 54.6% female; mean age = 22.39 years (SD = 2.82)	Survey	Univariate, multivariate	Fear of negative evaluation, FoMO, self-presentation skills, positive metacognition, problematic social media use	Problematic social media use	*Addictive Behaviors*	Elsevier
Dhir *et al.* (2018)	N1 = 1,554, 54.5% male, mean age = 14.63 years (SD = 1.73); N2 = 1,144, 56% male, mean age = 14.88 years (SD = 1.41)	Survey	Multivariate	Compulsive social media use, FoMO, social media fatigue, depression and anxiety	SMF	*International Journal of Information Management*	Elsevier
Eide *et al.* (2018)	N = 172, 72.4% female, mean age = 25 years (SD = 4.5)	Experiment	Linear mixed model analysis	Demography, smartphone use and frequency, smartphone restriction and withdrawal, FoMO, positive and negative affect schedule	FoMO	*Frontiers in Psychology*	Others (Frontiers media)
Elhai *et al.* (2018)	N = 305, 76.7% female, mean age = 19.44 years (SD = 2.16), 79.3% Caucasian	survey	Multivariate	Negative affectivity (depression, anxiety, boredom, rumination, stress), social smartphone use, smartphone use frequency (SUF), PSU	Negative affectivity, problematic smartphone use	*Computers in Human Behavior*	Elsevier

(continued)

Table 6.

Table 6.

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Franchina et al. (2018)	N = 2,663, 57.1% female, mean age = 14.87 years (SD = 1.67)	Survey	Multivariate	Age, gender, control (control) FoMO, phubbing, PSMU	Problematic social media use, phubbing	International Journal of Environmental Research and Public Health	Others (MDPI)
Gezgin (2018) #	N = 161, 58.4% male, mean age = 16.22 years (SD = 0.99)	Survey	Univariate, multivariate	Age, duration of smartphone use, duration of smartphone ownership, social media checking frequency, FoMO, smartphone addiction	Smartphone addiction	Cypriot Journal of Educational Sciences	Others
Hadlington and Scase (2018)*	N = 630, 50% female, mean age = 41.41 years (SD = 14.18)	Survey	Univariate, multivariate	Responses to failure in digital technology (RFDT), FoMO, online cognition, personality factors (big 5), age	RFDT	Heliyon	Elsevier
Hunt et al. (2018)	N = 143, 75.5% female, age not reported	Experimental	Univariate	Subjective well-being, social support, loneliness, anxiety, depression, self-esteem, autonomy, self-acceptance, limited use (self-regulation)	Well-being	Journal of Social and Clinical Psychology	Others (Guilford Publication)
Milyavskaya et al. (2018)	$N1$ = 159, 72% female, mean age = 18 years (SD = 1.04); $N2$ = 304, 63.5% male, mean age = 30.8 years (SD = 11.8)	Survey	Univariate, multivariate	The positive effect, negative effect, missing out, type of activity, the proportion of experience of FoMO by time and activity	$N1$ = negative affect, stress, decreased sleep; $N2$= FoMO	Motivation and Emotion	Springer

(continued)

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Pontes et al. (2018)*	N = 511, 64.6% female, 58.1% aged 20–35 years	Survey	Multivariate	Social media addiction, sociodemographics and social media use patterns (control) FoMO, dysfunctional emotional regulation, general psychiatric distress, online social interaction, maladaptive cognitions	Social media addiction	Cyberpsychology, Behavior, and Social Networking	Others (Mary Ann Libert)
Scott and Woods (2018)	N = 101, 66% female, mean age = 14 years	Survey	Multivariate	Sleep duration, FoMO, night time social media use, presleep cognitive arousal, sleep onset latency, bedtime (habits)	Night time social media use, sleep duration	Journal of Adolescence	Elsevier
Tomczyk and Selmanagic-Lizde (2018)	N = 717, 52.7 % female, mean age = 13 years (SD = 5.59)	Survey	Multivariate	FoMO, social media intensity, SM usage urges, SM use summary, Facebook addiction, parental control	Problematic use of the Internet	Children and Youth Services Review	Elsevier
Wang et al. (2018)	N = 832, 52 % male, mean age = 16.43 years (SD = 0.93)	Survey	Multivariate	Need to belong, authentic self-presentation, FoMO, perceived social support	Authentic self-presentation social media	Personality and Individual Differences	Elsevier
Wolniewicz et al. (2018)	N = 296, 57.1% female, mean age = 20 years (SD = 3.02), 74.3% Caucasian	Survey	Multivariate	Age, gender, fear of negative evaluation, fear of positive evaluation, FoMO, social smartphone use, smartphone addiction	Problematic smartphone use	Psychiatry Research	Elsevier
Xie et al. (2018)	N = 815, 51.2% male, mean age = 19.03 years (SD = 1.13)	Survey	Multivariate	Basic psychological needs satisfaction, friend support, demographics, individual relative deprivation, FoMO	FoMO	Psychiatry Research	Elsevier

Table 6.

Table 6.

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Appel et al. (2019)	N = 272, 54.4% female, mean age 37.87 years (SD = 13.66)	Survey	Multivariate	Age group, gender, social desirability, virtual social interaction, FoMO, distracted walking, dangerous incidents	Distracted walking	*Journal of Environmental Psychology*	Elsevier
Chai et al. (2019)	N = 1,319, 53.3% female, mean age = 14.03 years (SD = 1.52)	Survey	Multivariate	Social media use, FoMO, social overload, subjective well-being	Well-being	*Computers in Human Behavior*	Elsevier
Coskun and Muslu (2019)	N = 1,630, 55% female, 58.7% aged 15–16 years	Survey	Multivariate	Gender, age, mother's education, the number of siblings, parents' education level, family attitude, school success, devices of use, frequency of checking, time spent with family, time spent daily	Problematic mobile phone use (PU)	*Community Mental Health Journal*	Springer
Dempsey et al. (2019)	N = 296, 57.6% female, mean age = 20.03 years (SD = 3.06),73.9% Caucasian	Survey	Multivariate	FoMO, rumination anxiety, depression, PFU severity, use frequency, age, gender, life satisfaction, social anxiety	Problematic FB use (PFU)	*Addictive Behaviors Reports*	Elsevier
Dogan (2019)	N1 = 566, 56.3% male, mean age = 36.69 years (SD = 9.17); N2 = 188, 51.9% male, mean age = 38.79 years (SD = 10.34)	Mixed method (survey and experiments)	Univariate	FoMO, independent self-construal, interdependent self-construal, age, gender	FoMO	*Journal of Cross-Cultural Psychology*	Sage
Elhai et al. (2020)	N = 1,034, 65.3% female, mean age = 19.34 years, (SD = 1.61), 90.8% Chinese Han ethnicity	College students	Multivariate	Depression, anxiety, smartphone use frequency, FoMO, PSU, age, sex	PSU	*Addictive Behaviors*	Elsevier

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Popovac and Hadlington (2020)	N = 1,184, 54% female, mean age = 15.02 years (SD = 1.62)	Survey	Univariate, multivariate	Child and adolescent security (online risk behavior), age, omnipotence, personal uniqueness, invulnerability, imaginary audience, FoMO	Online risk-taking behavior	International Journal of Adolescence and Youth	Routledge
Reer et al. (2019)	N = 1865, 51.5% female, mean age = 27.65 years (SD = 6.85)	Survey	Univariate, multivariate	Psychosocial well- being, FoMO, social comparison orientation (SCO), SME	SME	New Media and Society	Sage
Rogers and Barber (2019)	N = 97; 62% female, mean age = 19.81 (SD = 2.55), 38% White/Caucasian	Survey	Univariate, multivariate	Telepressure, FoMO, poor sleep hygiene, ICT use before sleep and during sleep, intervention conditions (STEPS-TECH)	Tech engagement before/ during sleep; poor sleep hygiene, social media use	Computers in Human Behavior	Elsevier
Rozgonjuk et al. (2019)	N = 316, 68.6% female, mean age = 19.21 years (SD = 1.74), 75.3% Caucasian	Survey	Univariate, multivariate	FoMO, interruptive notification frequency, daily disrupted activities, surface learning, age, sex	Interruptive notifications, surface learning, daily activity disruption	Computers and Education	Elsevier
Servidio (2019)	N = 405, 77.11% female, mean age = 22.11 years (SD = 3.80)	Survey	Multivariate	Self-control, smartphone use pattern, FoMO, PSU	Problematic smartphone use (PSU), smartphone use patterns	Current Psychology	Springer
Sha et al. (2019)	N = 2,299; 60.8% male, mean age = 30.33 years (SD = 9.80)	Survey	Multivariate	Life satisfaction, SUD, WhatsApp use disorder, Facebook use disorder, FoMO	Social media use disorder, smartphone use disorder	Addictive Behaviors Reports	Elsevier
Talwar et al. (2019)	N = 1,022, 73.7% female, mean age = 22.19 years (SD = 3.05)	Survey	Multivariate	Self-disclosure, online trust, social comparison, FoMO, social media fatigue, sharing fake news, authenticating fake news	Fake news sharing	Journal of Retailing and Consumer Services	Elsevier

(continued)

Table 6.

Table 6.

Author	Sample characteristics	Study design	Data analysis	Study measures	DV	Journal	Publisher
Tsai et al. (2019)	N = 187, 64% male, median age = 39 years	Survey	Multivariate	Age, gender, usage, engagement, FoMO, depression, loneliness, social support, insensitive SM exchange	Negative social exchange	*Computers in Human Behavior*	Elsevier
Wang et al. (2019a)	N = 724, 56.9% female, mean age = 16.79 years (SD = 0.91)	Survey	Multivariate	Envy, student relationships, FoMO, PSU	Problematic smartphone use	*Personality and Individual Differences*	Elsevier
Wang et al. (2019b)	N = 794, 55% female, mean age = 16.80 years (SD = 0.73)	Survey	Multivariate	Smartphone addiction, sensation seeking, FoMO, procrastination	Smartphone addiction	*International Journal of Mental Health and Addiction*	Springer
Yin et al. (2019)	N = 704, 57.2% female, mean age = 16.80 years (SD = 0.92)	Survey	Multivariate	Social media addiction, FoMO, envy, need to belong	FoMO	*Current Psychology*	Springer
Zhou (2019)	N = 687, demographic profile not reported	Survey	Multivariate	Frequency of mobile application use, degree of being permanently online, FoMO, fear of acceleration, demographics	State of being permanently online, frequency of use	*Chinese Journal of Communication*	Routledge

Note(s): Articles identified through #citation chain, *PubMed ** PsycINFO; we referred to the online proof for Popovac and Hadlington (2020); Elhai et al., 2020) which was available online in 2019 but has been published in a specific volume of the journal in 2020. Accordingly, we have updated the year of publication as 2020; the acronyms used in the table include DV: dependent variable, FoMO: fear of missing out, PIU: problematic use of the Internet, PSU: problematic use of smartphones, PU: problematic use of mobile phone, SME: social media engagement, SM: social media, SUF: smartphone use frequency, SUD: smartphone use disorder, OSN: online social network, SCO: social comparison orientation, ICT: Internet communication technology, ICD: Internet communication disorder; multivariate analyses include regression, principal components analysis, factor analysis, CFA and SEM, whereas univariate analyses include correlation and t-tests

Search strings and limiting criteria:

(1) Scopus: (TITLE-ABS-KEY (fear AND of AND missing AND out) OR TITLE-ABS-KEY (fomo)) AND DOCTYPE (ar) AND PUBYEAR > 2012 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (SUBJAREA , "PSYC") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "COMP") OR LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "HEAL") OR LIMIT-TO (SUBJAREA , "MULT"))

(2) PubMed: (fear of missing out AND Journal Article[ptyp] AND free full text[sb] AND ("2013/01/01"[PDat] : "2019/12/31"[PDat] AND Humans[Mesh] AND English[lang])

(3) PsycINFO: fear of missing out OR Any Field: FoMO AND Document Type: Journal Article AND APA Full-Text Only AND Peer-Reviewed Journals only AND Year: 2013 To 2019

(4) Web of Science: TOPIC: (fear of missing out) OR TOPIC: (FoMO). Refined by: LANGUAGES: (ENGLISH) AND DOCUMENT TYPES: (ARTICLE) AND LANGUAGES: (ENGLISH). Timespan: 2013-2019. Indexes: SCI-EXPANDED, SSCI, A&HCI, ESCI

To present a contemporaneous summary of the current status of research on FoMO and address RQ1, preliminary descriptive statistics were used to assess yearly trends of publications, the most cited publications, most productive authors and publishers and characteristics of the reviewed studies in terms of methodologies, geolocations, respondents and variables. In line with prior SLRs (e.g. Afrooz and Navimipour, 2017), specific modules were created to effectively address RQ2 and RQ3, which were answered by presenting a synthesized summary of (a) application contexts and investigated roles of FoMO, (b) principal findings and implications of prior studies, (c) extant research gaps, focal limitations and future avenues discussed in the literature and (d) gaps and promising insights ascertained from the SLR.

This study provides a valuable foundation for scholars and practitioners interested in the contemporary dark side of social media use, specifically FoMO. Despite the fact that FoMO was only conceptualized in 2013, this SLR suggests exponentially increased academic interest in FoMO over the past five years. Yet, despite this clear surge in empirical studies, almost no attempt has been made to present a critical review and synthesis of emerging literature. The current study bridges this gap through an SLR.

This SLR provides an unprecedented profile of selected empirical studies. The current knowledge structure of prior research on FoMO has been elucidated by our discussion of different research themes, gaps and limitations. Findings suggest that the investigative focus on FoMO has been constrained in understanding its residual effects in virtual environments and the effect of problematic or maladaptive use of social media platforms, the Internet and smartphones on the daily activities individuals pursue in real life. Subsequently, distinct recommendations and emergent themes for advancing the research on FoMO are outlined to aid diversification of future research to expand current intellectual boundaries.

6.1 Study implications
6.1.1 Theoretical implications. The SLR advances current theoretical knowledge through four key contributions. First, although prior research has focused on FoMO as a variable associated with the social media environment, the findings highlight that FoMO may be a phenomenon associated with technology-enabled digital media and communication platforms that can manifest in offline or real-life scenarios as well. Thus, this SLR and its findings advance prior understanding of FoMO's conceptualization and extent of its emergence in the digital environment.

Secondly, our study synthesizes extant knowledge and provides a comprehensive foundation for examining FoMO as a phenomenon. Our findings benefit researchers through a dual-fold approach: (a) by delineating understudied and unexplored mechanisms that link FoMO to other negative digital phenomena such as phubbing and social media fatigue and (b) by highlighting specific and thematically oriented gaps that affect the generalizability and applicability of prior research. Our comprehensive findings for FoMO advance prior knowledge on its effect and associations.

Third, we contribute to the literature by developing a holistic framework that represents a digital ecosystem wherein FoMO may originate. For example, we highlight a less-investigated set of consequences of FoMO, e.g. the effect of FoMO on offline relationships, from a multistakeholder perspective that transcends the knowledge boundaries of extant research on FoMO. Thus, we go beyond the purview adopted by prior scholars, and our findings have the potential to advance current operational knowledge on FoMO in terms of its potential antecedents, consequents and indirect influencers.

Lastly, our findings highlight the hitherto underinvestigated influence of social groups such as familial, professional and personal peer groups on individuals who experience or are at risk of experiencing FoMO. These groups have seen limited attention in past research, and

our findings benefit scholars by calling attention to the mechanisms through which the effect of such social groups may manifest and influence the temporal degree of FoMO experienced by individual social media users.

6.1.2 Practical implications. The study presents four significant implications for clinical practitioners, such as psychiatrists, counselors and clinical psychologists, who assist individuals experiencing the negative effects of FoMO, as well as for managers associated with social media platforms. First, by consolidating the fragmented knowledge on precursory influences and consequences of FoMO, we present practitioners with a detailed list of factors that can be used to monitor (a) individuals presenting with FoMO and (b) vulnerable sections of society (e.g. adolescents) who are posited by the literature to be at increased risk for experiencing FoMO and its negative consequences. For example, psychologists and counselors associated with schools and colleges may introduce the concept of "peer advocates" to encourage safe and healthy use of social media within their digital peer groups. These "peer advocates" could support members of their virtual social groups to dedicate specific times for social interactions on social media platforms and reduce compulsive or excessive usage. Such attempts for establishing peer advocates may also be supported by social media platforms by acknowledging these advocates and their contributions toward the safe use of social media through specific communication on the platforms themselves.

Second, our findings highlight the potential for managers of social media platforms to develop features that can preemptively identify negative digital behaviors (e.g. intensely frequent checking one's own or another's social media profile or spending an excessive amount of time on a platform). The development of features to induce self-regulation among users would be an additional positive outcome; for example, social media platforms could notify users to schedule downtime activity after three continuous hours of login. Additionally, the factors identified through this study may be used to draft appropriate guidelines for self-regulation of smartphone, the Internet and social media use by social media platforms, educators as well as clinicians.

Third, we urge clinical practitioners to focus on understanding the physical symptoms and physiological impairments experienced by an individual affected by FoMO. This would assist in the development of a more holistic understanding of FoMO's effects on social media users and also help other civic stakeholders (e.g. parents, educators, peers) to proactively identify and offer support to individual social media users affected by FoMO. Moreover, clinical practitioners may use the antecedents of FoMO, as identified in this study (e.g. diminished psychological needs and lack of self-regulation), to design informational content that could be used to increase general awareness of FoMO and its adverse consequences. The findings may also be used by clinical practitioners to develop protocols for managing functional impairments that may occur due to such maladaptive engagement and FoMO.

Lastly, as FoMO's consequences affect individuals' psychological as well as physiological health, the findings show the need to create multidisciplinary research groups. Professionals from diverse fields (academia, management and medicine, among others) may collaborate on developing novel protocols, scales, experiments and methodologies to enhance current knowledge on FoMO. Such groups would allow for the development of a practical and managerial orientation toward a more nuanced study of FoMO that incorporates perspectives from diverse fields such as information systems science, human–computer interactions and psychology.

6.1.3 Social implications. There are several social implications to this study for parents and educators as the effects of FoMO transcend societal boundaries and have the potential to create problematic long-term effects on societal communication and well-being. Firstly, the study implies that parents and educators need to monitor the social media usage of vulnerable sections of society, such as adolescents and young adults, in order to preempt their excessive engagement with digital media and social media platforms, which have been linked

to detrimental effects on communication methods, patterns and subsequently create psychological disorders, e.g. Internet use disorder and problematic Facebook use.

Secondly, the study implies the need for the adoption of a collective perspective toward the regulation of FoMO by addressing problematic use behavior among social media users through increased awareness of civic stakeholders, including clinical practitioners, educators and peer group members.

Thirdly, prior studies have implied that social media platforms may foster aspects of addiction, similar to gaming or substance abuse. Thus, the findings of this study may be used to create guidelines for parents and educators that can assist them in helping vulnerable adolescents and young adults in managing their social media usage patterns and potential withdrawal symptoms from maladaptive social media engagement. Such efforts would aid in the development of communally driven interventions to limit the adverse effects of FoMO and its allied phenomena.

Lastly, FoMO has been linked with increasing incidences of sleep-related issues (Milyavskaya *et al.*, 2018), depression and stress (Barber and Santuzzi, 2017) – especially among young adults (Scott and Woods, 2018; Woods and Scott, 2016). The SLR suggests that FoMO is a societal problem and a public health issue that can impact both physiological and mental health at a communal level (Scott *et al.*, 2019; Talwar *et al.*, 2019). Our study's findings imply the need to raise awareness of such consequences that can impact society as a whole.

6.2 The study's limitations
This SLR study has three main limitations. First, the search for relevant studies was limited to four digital databases. Second, the SLR considered only empirical studies published in peer-reviewed international journals. Studies published in other important databases such as ProQuest and MEDLINE were thus ignored as well as conference papers, qualitative reviews and thesis publications. Future SLRs should include additional databases' results and articles other than those published in journals. The current study also did not account for practitioner journals and trade articles that discussed FoMO. More practice-oriented research would benefit specific interventions to target FoMO. Despite these limitations, the current study presents an organized, comprehensive and state-of-the-art knowledge structure for FoMO by assimilating findings from 58 empirical investigations. The subsequent research framework may act as a significant guide for future research on FoMO.

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