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Impact of Social Media on Social Anxiety: A Systematic Review

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Additional information is available at the end of the chapter

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Abstract

Introduction: Online social networking sites are being used all around the world. However, only recently researchers have started to investigate their relationship with mental health. Evidence coming from literature suggests that they have both advantages and disadvantages for individuals. The aim of this study is to critically review the existent research conducted on the relationship between online social networking and social anxiety.

Method: According to PRISMA guidelines, comprehensive systematic searches of electronic databases were conducted (PsychInfo, Cochrane, PubMed, Scopus, Web of Science). Terms related to online social networking were combined with social anxiety terms. After identifying relevant papers, the relationship between social media networking and social anxiety as well as limitations of each study were presented. All of the papers included were cross-sectional, relying on self-report assessments.

Conclusion: There are several papers published on the relationship between social media and social anxiety; however, more research needs to be done in order to clarify the influence of one variable over the other. Rigorous experimental studies need to be conducted with different time-point assessments, and bidirectionality should be investigated. Important mediators and moderators have to be considered in order to explain the relationship between social media networking and social anxiety.

Keywords: social media, social anxiety, online social networking, Facebook

1. Introduction

Social networking sites have become part of twenty-first century people's lives. From all online social networking sites, Facebook is the most widely used. According to a recent report published by Facebook regarding data for the second quarter of 2016, there is a considerable increase (17% in comparison with last year) in the number of both daily and monthly active users, with 1.13 billion daily active Facebook users for June 2016 and approximately 1.71 billion monthly active Facebook users for 30 June 2016 [1].

2. Online social networking

2.1. Benefits of online social networking

Online social networking sites may have a useful role in mental health research (for a comprehensive review of the use of Facebook in social science see Ref. [2]). For instance, Facebook, the most widespread form of online social networking site, can easily be used as a great clinical research tool, as it can provide the recruitment of patients and involve them in programmes [3]. Also, it can be used to guide interventions and in treatment monitoring (e.g. in physical activity or overweight programs [4, 5]). So far, several studies have investigated the role of social media in people with serious illness, and research shows that it is a promising approach in patients with schizophrenia [6].

Social media is a valuable resource for receiving peer-to-peer support. Facebook, Twitter or YouTube can be used by people with several conditions in order to find support or advice from others and to share personal experiences. Naslund et al. [7] proposed a model that illustrated potential benefits for people with serious mental illness, which they can have in an online community on online social networking sites (overcome stigma, seek professional help, receive adequate treatment).

Regarding mental health interventions delivered via Facebook, research is only starting to emerge. In an online randomized controlled experiment, a depression awareness campaign delivered via Facebook for adults was associated with enhanced mental health literacy [8]. Facebook allows for establishing and maintaining connections with others, and studies show that there is a positive relation between Facebook use and social capital, with greater advantages for people with low self-esteem and life satisfaction [9]. According to a review on the applications of social media in medicine and healthcare services, it seems that social networking is a promising approach. However, much uncertainty exists in terms of ethics and safety [10]. Furthermore, social media seemed to be an effective method to promote health-related behaviours [11].

There are studies showing that online social networking sites are important factors in youths' social lives, as in a large sample ($N = 3,068$) of adolescents (aged 11–14), there were significant positive associations between the use of online social networking sites and several friendship-

related variables (friendship quality, face-to-face interaction, bridging/bonding social capital) [12].

Online social networking sites can have benefits in terms of cognitive abilities for older healthy adults [13], as it was shown in a study involving older adults (mean age comprised between 78 and 80), in which participants were randomly assigned into three groups: Facebook training, online diary website and waiting list. The Facebook intervention was delivered over 8 weeks and older adults received weekly training in how to use Facebook.

2.2. Disadvantages of online social networking

Recent research has associated social media networking with several negative outcomes, both in adolescent populations and in adults.

2.2.1. Adolescent literature

According to a report published by the Pew Research Center, adolescents are avid users of online social networking sites, with approximately 71% of them using more than one online social networking site [14] in 2015, and the most widely used online social networking site was Facebook (41%). Frequency of using social networking sites expressed as the amount of time spent on online social networking sites was associated with mental health problems in children and adolescents [15]. Namely, the same study shows that spending more than 2 h per day on online social networking sites is associated with higher psychological distress, poor self-rated mental health, suicidal ideation and an unmet need for mental health support. In another study conducted on a large sample of adolescents ($N = 5.126$), there were significant positive associations between the use of online social networking sites, psychological distress, suicide ideation and suicide attempts [16]. In this study, cyberbullying victimization served as a full mediator in the relationship between the use of online social networking sites and psychological distress/suicide attempts and acted as a partial mediator in the relationship between the use of online social networking sites and suicidal ideation.

“Facebook depression” [17] is a term introduced in a report of the American Academy of Pediatrics to describe the impact of social media on youths’ mental health, according to which depression arises as a consequence of youths spending a large amount of time on social media [18]. When it comes to mechanisms explaining why the use of online social networking sites is associated with negative mental health outcomes, one study shows that negative comparison on Facebook is related with adolescents’ life satisfaction [19]; negative comparison on Facebook predicts life satisfaction, but the opposite relationship is also significant.

Research regarding problematic online social networking sites in adolescents is scarce, and very few studies have investigated the relationship between Facebook addiction and youths’ mental health problems. In a study conducted with adolescents, both personality traits and social influence processes emerged as significant predictors of problematic Facebook use and Facebook use frequency. Problematic Facebook use was predicted by emotional stability, extraversion, conscientiousness and norms, while the frequency of Facebook use was predicted by gender, group norms and social identity [20].

2.2.2. Adult studies

With the rapid emergence of technology, the term “iDisorders” was introduced to define mental health problems related to technology usage. In a meta-analysis including eighteen papers on the relationship between Facebook use and loneliness, it resulted that the two variables were significantly associated and that loneliness predicted Facebook use and not the other way around [21]. Facebook use had a significant contribution to mental health, with Facebook use, impression management and friends predicting mood disorders, with different contributions across disorders (having more friends is negatively associated with major depression and dysthymia, while positively predicting mania) [22]. Social media, operationalized as the total time spent per day, visits per day and global frequency of visits on social media, was associated with depression in a large sample of U.S. young adults [23]. Facebook intrusiveness was correlated with obsessive-compulsive disorder severity and with obsessive beliefs in a sample of young adults (aged 18–24) [24].

There is ample literature on the role of online social networking sites, and Facebook in particular, in mental health outcomes. However, there is high heterogeneity in what online social networking sites and Facebook mean. Facebook is conceptualized and measured differently across studies, given that while several studies investigate Facebook use, others investigate either the number of friends, Facebook disclosure, Facebook activities, Facebook motives or Facebook addiction/intrusiveness/problematic use.

Despite the fact that no diagnostic manual recognizes Facebook addiction as a diagnostic category, more and more research focuses on pathological uses of online social networking sites, and Facebook in particular (see Ref. [25] for a complex review of online social networking sites addiction). Online social networking sites addiction is related to deficits in emotion regulation and susceptibility to drug and alcohol addictions [26], somatic symptoms, anxiety, insomnia, social dysfunction and depression [27].

3. Social media and social anxiety

Online social networking sites, and Facebook in particular, can offer great opportunities, in terms of interaction with others, for individuals with social anxiety. Two different hypotheses have been proposed in order to explain why socially anxious individuals use computers [28], which can easily be applicable to online social networking sites. The first hypothesis proposed is the social *compensation hypothesis* [29], according to which individuals use online social networking sites in order to compensate for deficits in social skills or discomfort in face-to-face situations. The second theory, opposed to the first, is called the social enhancement hypothesis. According to this hypothesis, socially skilled individuals use online social networking sites to find additional opportunities to interact with others. In the existent literature on the relationship between online social networking sites and social anxiety, there is mixed evidence regarding the two hypotheses, as both have received support.

In an experimental study, Rauch et al. [30] investigated whether previous exposure to Facebook attenuates or augments physiological arousal during face-to-face interaction in a sample

composed exclusively of adult female students. Participants were randomly assigned to four groups: Facebook exposure only, face-to-face exposure only, Facebook exposure first plus face-to-face exposure second and face-to-face exposure first plus Facebook exposure second. The results indicated that participants who only had seen the stimulus on Facebook had less physiological arousal than participants who had seen the stimulus face-to-face. However, regarding the combined conditions, physiological arousal was higher when seeing the person face-to-face when this preceded seeing the person on Facebook. Social anxiety moderated the relationship between physiological arousal and Facebook exposure so that exposing an individual to a stimulus person on Facebook is related with increased arousal in a face-to-face meeting with that person, and this, moreover, appears in highly social anxious persons.

No systematic approach has been conducted so far investigating the relationship between social anxiety and online social networking sites, or Facebook in particular, despite growing evidence on how socially individuals use online social networking sites. Therefore, the main aim of the current paper is to offer a comprehensive review of the state of the art of existent studies on the relationship between online social networking sites and social anxiety.

4. Methods

The current systematic review has been conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [31].

4.1. Inclusion and exclusion criteria

In order to be included, studies had to:

- (a) involve participants with social anxiety symptoms/disorder;
- (b) include online social networking assessments;
- (c) include social anxiety assessments;
- (d) be published in peer-reviewed journals;
- (e) be published in English.

There were no age constraint criteria applied and no year of publication limitation.

Studies were excluded if there was no assessment of social networking and social anxiety, and they were not published in English.

4.2. Search strategy

Electronic databases (PsychInfo, PubMed, Scopus, Web of Science) were consulted by two independent assessors up to 20th June 2016. Several terms related to social networking were

combined with terms related to social anxiety. No additional records were identified through the manual search in the references of the articles published and meta-analyses related to the subject. The reference lists of relevant papers and meta-analyses related to the subject were screened in order to identify potentially relevant articles. We repeated the search on 25th July 2016 to double-check and identify whether new articles had been published since the first search. The search terms were as follows:

1. Social network* OR Facebook OR LinkedIn OR Tweeter OR Instagram OR Youtube* OR Myspace OR Social Network Sites OR social media*
2. Social phobia OR social anx* OR social phobi* OR social* anxious* OR generalised social anx* OR generalized social anx*
3. 1 AND 2

5. Results

5.1. Literature search

The flowchart describing the inclusion of studies is described in **Figure 1**. The literature search yielded 673 articles, of which 98 were duplicates. After removing duplicates, the titles and abstracts of 575 articles were screened. Thirty-eight relevant papers were selected for full-text reading. Of these papers, 18 were excluded based on the following reasons: no social anxiety assessments ($n = 20$), not peer-reviewed articles ($n = 2$), not published in English ($n = 1$), no measure on social networking ($n = 1$), and theoretical reviews or meta-analyses ($n = 2$). This left a total number of 20 articles to be included in the systematic review.

5.2. Information extracted

The following information was extracted from each of the studies included:

- (a) authors and year of publication;
- (b) sample characteristics (number of participants, mean age, age range, proportion of female participants, type of sample);
- (c) amount of time spent using social networking sites per day;
- (d) online social networking conceptualization;
- (e) concepts assessed in the study;
- (f) information regarding the association between online social networking and social anxiety.

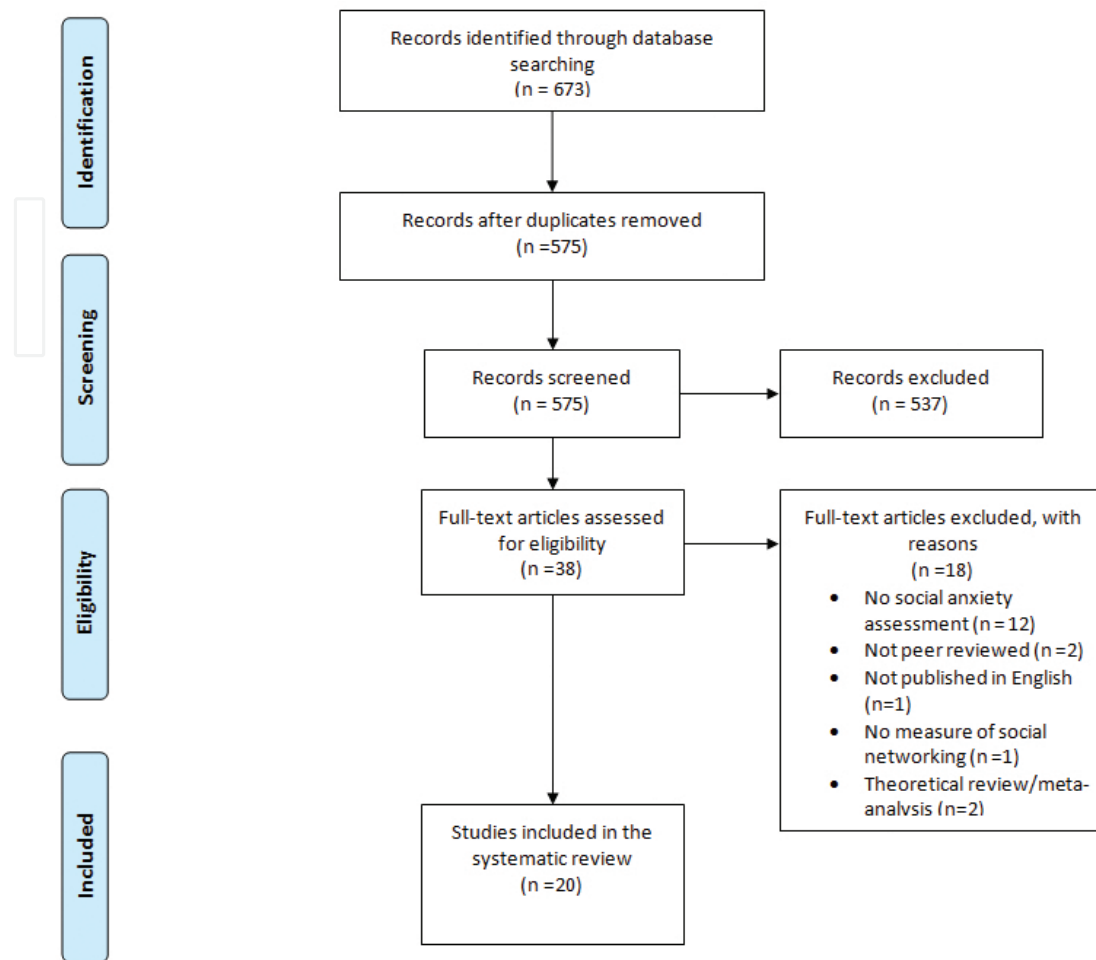


Figure 1. Flow diagram of study selection process.

5.3. Characteristics of the studies included

A summary of the characteristics of the studies included (number of participants, age, online social networking sites conceptualization, primary results) is described in **Table 1**.

Study name	N (% F)	M_{age} (SD) Age range	Sample	Time spent in social media per day (SD)	SNSs construct	Measures	Primary results
Aladwani and Almarzouq [45]	407 (54%)	20.04 (1.16)	Students	1.86 h (0.99)	Compulsive SM use	Interaction anxiousness Self-esteem Problematic learning Media complementarity	Significant positive associations between compulsive SM use and SA $r = 0.26, p < 0.05$
Antheunis et al. [12]	3,068 (53.7%)	13.46 (0.56) 11–14	Adolescents	7.27 h (8.54)	SNSs use intensity	Social anxiety Quality of friendships	Significant negative associations between SNS and SA

Study name	N (% F)	M _{age} (SD) Age range	Sample	Time spent in social media per day (SD)	SNSs construct	Measures	Primary results
						Bridging social capital Bonding social capital Offline interaction with friends	$r = -0.08, p < 0.001$
Bodroža and Jovanović [32]	804 1st phase (79.1%) 445 2nd phase (79.4%)	26.95 (6.35) 15–62 21.29 (2.96) 18–44	Students and general population	Combined sample: ½ of the sample uses FB 1–3 h/day, 27% <1 h, 15% 3–5 h and 8% >5 h Student sample: FB 1–3 h/day, 35% <1 h, 11% 3–5 h, 3% >5 h a day.	Psycho-social aspects of Facebook use (PSAFU): Compensation Self-presentation Socialization FB addiction Virtual self	Social anxiety personality Sensation seeking	Significant positive associations between FB and SA r between 0.11 and 0.58, $p < 0.001$ and 0.05 in both samples Significant positive associations between FBA and SA $r = 0.19, p < 0.001$ (FB users sample) $r = 0.17, p < 0.001$ (Student sample)
Casale and Fioravanti [46]	400 (51.8%)	22.45 (2.09)	Students	Not reported	Generalized problematic Internet use	Social anxiety Satisfaction with the needs through SNS: -The need to belong-The need for self-presentation -The need for assertiveness	Significant positive associations between problematic Internet use and SA $r = 0.22, p < 0.001$
Clayton et al. [39]	229 (74.3%)	18.19 (0.43) 18–21	Students	30 min to 1 h	Emotional connectedness to FB Facebook connection strategies	Anxiousness-social anxiety subscale Loneliness Alcohol use Marijuana use	Significant positive associations between emotional connectedness to Facebook and anxiousness $r = 0.18, p < 0.001$ Significant positive associations between Facebook connection strategies and anxiousness $r = 0.23, p < 0.001$
Davidson and Farquhar [49]	336 (70%)	Not reported	Students	Not reported	Facebook intensity Facebook anxiety	Social anxiety number of unique groups Role conflict Self-monitoring Religious activities	Non-significant positive associations between FB Intensity and SA $r = 0.05, p = ns$ Significant positive associations between FB anxiety and SA $r = 0.66, p < 0.001$
Fernandez et al. [29]	62 (63%)	19 (1.05)	Students	Not reported	Facebook usage	Social anxiety Depression Personality	Significant negative associations between FB friends and SA $r = -0.45, p < 0.001$

Study name	N (% F)	M_{age} (SD) Age range	Sample	Time spent in social media per day (SD)	SNSs construct	Measures	Primary results
							Significant positive associations between FB usage and SA r between 0.27 and 0.50, $p < 0.001$ (i.e., number of lines in about me, number of TV shows, number of music interests) Non-significant associations between SA and number of activities, self-reported time spent on FB, No. of status updates, No. of posts by friends, and no of posts by self.
Green et al. [43]	306 (65.69%)	20.52 (1.45)	Online participants from all around the world	2.44 h (2.82)/day	FB self-disclosure (public and private)	Social anxiety Controllability Reduced cues Disinhibition Offline self-disclosure	Non-significant associations between FB self-disclosure public and SA $r = 0.05$, $p = ns$ Non-significant associations between FB self-disclosure private and SA $r = 0.00$, $p = ns$ Non-significant associations between time spent on FB and SA $b = 0.11$, $p = ns$
große Deters et al. [33]	1st study 153 (60.78%) 2nd study 209 (88.52%)	1st study 20.18 (3.24) 2nd study 23.50 (3.24)	1st study Students 2nd study General population	Not reported	Status updates, No. of likes received per status update No. of individual commenters per status update	Social anxiety personality (extraversion)	SA did not predict no. status updates, No. of likes received per status update, No. of individual commenters per status update $p = ns$
Hong et al. [40]	230 (31.7%)	Not reported	Students	34.3% spent < 1 h; 30.9% spent 1–2 h; 17.4% 2–4 h; 17.4% >4 h	Continuance intention to interact with others on FB Online social anxiety	General social anxiety Belief in dangerous virtual communities	Significant negative associations between FB continuance intention and SA $r = -0.48$, $p < 0.001$ Significant positive associations between OSA and SA $r = 0.38$, $p < 0.001$
Indian and Grieve [41]	299 (85.95%)	28.35 (10.88)	Recruited from Facebook	30–60 min, 14% with daily usage >3 h	Facebook social support items	Social anxiety Offline social support Subjective well-being	No difference in perceptions of Facebook social support in high and low socially anxious, $t(297) = 0.14$, $p = 0.89$ FB social support explained a significant amount of additional

Study name	N (% F)	M _{age} (SD) Age range	Sample	Time spent in social media per day (SD)	SNSs construct	Measures	Primary results
Landoll et al. [34]	1st study: 216 (63%) 2nd study: 214 (54%)	19.06 (1.28) 15.72 (1.22)	Adolescents and young adults	Not reported	Aversive social networking peer experiences	Social anxiety Internet use Social Peer victimization Depression	variance in subjective well-being over and above offline social support for the high social anxiety group Significant positive associations between negative SNSs experiences and SA $r = 0.37, p < 0.001$
Lee [47]	304 (56%)	22.45 (6.10) 17–55	College students	Not reported	Facebook addiction	Social anxiety Smartphone addiction Personality traits Multitasking	Significant positive associations between FBA and SA $r = 0.25, p < 0.01$
Lee-Won [35]	243 (71.6%)	19.69 (1.12)	College students	Assessed but not reported	Amount of FB use Problematic Facebook use	Social anxiety Personality Need for social assurance	Non-significant negative associations between FB use and SA $r = -0.03, p = ns$ Significant positive associations between FBA and SA $r = 0.45, p < 0.001$
Liu et al. [44]	780 (50.9%)	13.94 (0.90) 13–18	Adolescents	Not reported	Personally identifiable information (PII) disclosure	Social anxiety Privacy concern Parental mediation Narcissism	Non-significant negative associations between PII and SA $r = -0.07, p = ns$ SA indirectly decreases PII disclosure by increasing privacy concern.
McCord et al. [38]	216 (85.64 %)	32.2 (12.43) 18–69	31.5% undergraduate students, 12.0% graduate students, and 55.6% were not students	Not reported	FB use FB social interaction anxiety	Social anxiety	Non-significant associations between FB use and SA $r = 0.01, p = ns$ Significant positive associations between FB SA and SA $r = 0.64, p < 0.001$
Ramirez et al. [42]	244 (51%)	34.59 (11.19)	Facebook users	Not reported	FB reconnection	Social anxiety Information seeking Uncertainty predicted outcome value Sociability	Marginal significant negative associations between SA and FB reconnect $b = 0.14, p = 0.05$
Rizvi [48]	150 (75%)	18–27	Different educational institution	46% <30 min 32.7% 30 min to 1 h 11.3% 1–2 h 10% > 2 h	Excessive FB use (log in)	Social anxiety Personality	Non-significant negative associations between excessive FB use and SA $r = -0.02, p = ns$
Shaw et al. [36]	75 (55.2%)	19.2 (1.27)	Students	2.04 (1.13) Range 1–5	FB time passive FB use	Rumination	Significant positive associations between

Study name	N (% F)	M _{age} (SD) Age range	Sample	Time spent in social media per day (SD)	SNSs construct	Measures	Primary results
					FB content production Interactive FB communication	Depressive symptoms Mood and anxiety symptoms Content production Interactive communication Social anxiety	time spent on FB and SA $r = 0.33, p < 0.01$ Significant positive associations between passive FB use and SA $r = 0.32, p < 0.01$ Non-significant associations between content production on FB $r = 0.23, p = ns$ Non-significant associations between interactive FB communication and SA $r = 0.21, p = ns$
Weidman and Levinson [37]	77 (77%)	18.91 (1.05)	Students	Not reported	Facebook profile (no. friends, no. photographs, no. videos, photo albums, relationship status, people in profile picture, status update, quote) Social activity Social inactivity Close relationship quality Self-disclosure	Social interaction anxiety	Significant negative associations between no. friends and SA $r = -0.21, p < 0.05$ Significant negative associations between FB quote length and SA $r = -0.38, p < 0.05$

Note: *N* = number of participants; %*F* = percentage of female participants; *M*_{age} = mean age; SD = standard deviation; SNSs = social networking site; SM = social media; SA= Social anxiety; FB= Facebook; FBA= Facebook addiction; OSA = online social anxiety; ns= non-significant; no. = number; h = hours; min = minutes.

Table 1. Characteristics of the included studies.

We included 20 papers in the systematic review, of which three papers [32–34] consisted of two studies/phases each. Most of the studies included were conducted with adults ($n = 14$), recruited either from university (students), or from the general populations, while several papers were conducted with adolescents ($n = 3$), and some studies did not report the age of the participants ($n = 2$). Nine of the papers included reported the time spent on Facebook; one study also assessed this indicator but did not report it, and the rest of the studies did not include reports on the time spent on Facebook. Social media was operationalized differently in the papers included and while few studies reported social media variables, most of the papers included referred specifically to Facebook.

With respect to the manner in which online social networking sites or Facebook were conceptualized in these studies, we have encountered several approaches:

- *Facebook use* ($n = 7$), which in turn can be conceptualized as the amount of time spent on online social networking sites, passive use of Facebook or using interactive Facebook features (updates, comments, likes);
- *Psychosocial aspects of Facebook use* ($n = 6$), which can also mean Facebook connection strategies, Facebook continuance intention, Facebook reconnection decision, Facebook social support, aversive Facebook experiences or cybervictimization;
- *Personal disclosure on Facebook* ($n = 3$), which can also mean private or public disclosure, personal identifiable information (profile information and privacy settings) and status/quote update/length;
- *Problematic use of online social networking sites* ($n = 6$), which can be found as Internet addiction, compulsive social media use, Facebook addiction or Facebook intrusiveness;
- *Facebook anxiety* ($n = 3$), with different terms such as Facebook-specific anxiety, Facebook interaction anxiety or online anxiety.

Most of the papers included found a significant association between social networking (Facebook) and social anxiety ($n = 16$), while the rest of the studies included found no significant relationship between social media and social anxiety.

5.4. Online social networking and social anxiety

5.4.1. Usage of online social networking sites and social anxiety

There are mixed findings regarding the relationship between online social networking and social anxiety. On the one hand, there are studies reporting significant associations between the two variables. For example, Antheunis et al. [12] showed that Facebook use was negatively associated with social anxiety in a large sample of adolescents. Lee-Won [35] found evidence that Facebook use, defined as the amount of time participants spend on Facebook on an average day, was associated with social anxiety. Shaw et al. [36] found a significant relationship between the time spent on Facebook and social anxiety in a sample of undergraduate students. The same study found a significant association between passive Facebook use, defined as passive content consumption (e.g. passively viewing one's Facebook profile) and social anxiety. The relationship between passive Facebook use and social anxiety was significant even after checking for depressive and anxiety symptoms. Weidman and Levinson [37] considered both offline (self-reported indicators) and online indicators (using the profiles of coders for Facebook) of social anxiety. Results on self-reported social anxiety and objective Facebook use indicated significant negative relationships between the two variables, with number of friends, number of photographs and quotes length being negatively related to social anxiety. Regarding the rated social anxiety symptoms observed and objective Facebook signs, there were significant negative associations between social activity composite (number of friends, photographs, videos, photo albums), the number of people in profile pictures and social anxiety.

On the other hand, there are several research papers that show no association between Facebook use and social anxiety. große Deters et al. [33] found no significant relationship between social anxiety and different parameters of Facebook use (status updates, number of likes or individual commenters per like), and none of the prediction models investigated, in which social anxiety was used as a predictor and Facebook as a criterion, were significant. McCord et al. [38] found no significant relationship between general Facebook use, defined as the frequency of using the socially interactive features of Facebook (sending messages, using chat, writing on events/friends walls, sending friend requests, posting comments, updating status) and social anxiety. Fernandez et al. [29] did not find a positive association between the frequency of Facebook usage, operationalized as time spent on Facebook, status updates, number of posts by friends/self and social anxiety, in a sample of students. In this study, several independent coders rated each participant's level of social anxiety based on viewing their Facebook profiles and associated it with participants' self-rated social anxiety symptoms. Social anxiety was not associated with an increased frequency of Facebook use, either based on self-report data or based on coders' reports. However, there were positive associations between profile information sections and social anxiety. The number of activities was not associated with social anxiety. Using multiple regression, the results indicated that social anxiety had a unique contribution, apart from depression and neuroticism, to profile information (excepting the number of movies and activities).

5.4.2. Psychosocial aspects of Facebook use and social anxiety

Bodroža and Jovanović [32] constructed a scale in order to measure several psychosocial aspects of Facebook use. Five factors emerged for the structure of the scale, namely: compensation (use Facebook in order to compensate for personal insecurity/inadequacy), self-presentation (concern related to impression on others), socialization (striving to acquaint new friends/intimate partners), Facebook addiction and virtual self (Facebook adequately represents one's personality). Social anxiety had positive associations with each of these factors. Clayton et al. [39] found a positive relationship between anxiousness (public and private self-consciousness, social anxiety), emotional connectedness to Facebook (integration of Facebook in one's daily life) and Facebook connection strategies (reasons to use Facebook, use Facebook to learn more information about people, to maintain current relationships). Anxiousness was a significant predictor of both emotional connectedness to Facebook and Facebook connection strategies. Hong et al. [40] investigated the relationship between the continuance intention to interact with other people on Facebook and social anxiety and found a significant negative relationship between them. Social anxiety predicted the continuance intention to interact with other people on Facebook and, together with online social anxiety, accounted for 44% of the continuance intention. Indian and Grieve [41] found no differences between low and high socially anxious individuals in Facebook social support. There were significant association in both groups between Facebook social support and subjective well-being, as well as between Facebook social support and offline social support. Finally, Facebook social support was a significant individual predictor of subjective well-being for highly social anxious individuals. Landoll et al. [34] developed an instrument that assesses negative peer experiences on social networking sites. There were significant associations between negative online peer experiences

and social anxiety and depression. Ramirez et al. [42] investigated factors related to the decision to reconnect on Facebook with a past contact in a sample group of adult participants. Using hierarchical logistic regression, they found several predictors that accounted for almost 40% of the variance of the decision to reconnect on Facebook, in which social anxiety was also included and has a marginally negative contribution to it. There were other factors (e.g. relational factors and information seeking factors) that have a greater contribution to the decision to reconnect than social anxiety.

5.4.3. Personal disclosure on Facebook and social anxiety

There was no significant evidence stemming from the papers included of an association between Facebook disclosure and social anxiety. Green et al. [43] found no relationship between Facebook self-disclosure (public and private) and social anxiety. Two hypothesized pathways from social anxiety to Facebook self-disclosure considered online attributes (reduced cues, controllability) and feelings of disinhibition. Results showed that the model accounted for 23% of the variance in Facebook private self-disclosure and 7% of the variance in Facebook public self-disclosure. Liu et al. [44] did not find any relationship between Facebook disclosure and social anxiety in a sample group of adolescents aged between 13 and 18. Disclosure in this study referred to personally identifiable information, a composite score computed by adding a measure for attitudinal information disclosure (profile information on Facebook page and personal photographs) and a scale assessing behavioural information disclosure (items actually posted on Facebook and privacy regarding photographs). There was only an indirect relationship between social anxiety and Facebook disclosure through the role of privacy concern, defined as concern related to the security of the personal information presented online. Namely, by increasing privacy concern, social anxiety indirectly decreases disclosure. Using a path analysis approach, parental mediation had only an indirect effect on disclosure through privacy concern, and no direct effect. Self-disclosure, defined as the presence or absence of status update/quote and length of status update/quote, was also considered in Weidman and Levinson [37] as a measure of social inactivity. Status update was unrelated to social anxiety in both self-reported and observer-rated social anxiety and objective Facebook signs, while the length of the quote was related to social anxiety only in self-reported and not in observer-rated social anxiety.

5.4.4. Problematic social media use/Facebook addiction and social anxiety

Most of the papers included sustained the relationship between problematic use of online social networking sites or online social networking sites addiction and social anxiety. For instance, Aladwani and Almarzouq [45] found a significant positive association between interaction anxiousness and compulsive social media used, which finally has a significant effect on learning outcomes. Bodroža and Jovanović [32] found a significant relationship between social addiction and social anxiety both in a sample of Facebook users recruited online and in a sample of students. Casale and Fioravanti [46] considered the Self-Determination Theory in the context of Facebook use and proposed that the satisfaction for unmet needs through social networking sites should be a viable candidate in the development of

problematic use of Internet communicative services. Results showed that social anxiety had a significant effect on generally problematic Internet use for both women and men, in a sample group of undergraduate students. They also considered several needs for using social networking sites, such as the need to belong, self-presentation and assertiveness. Problematic use of Internet communicative services was significantly associated with all the three needs considered. However, only the need for self-presentation was a significant mediator in the relationship between social anxiety and problematic Internet use only in the case of males. Lee [47] investigated the relationship between Facebook addiction and social anxiety in a sample group of African American students and found a significant positive relationship between the two variables. Using hierarchical multiple regression, the results showed that approximately 19% of the variance of Facebook addiction was explained by eight predictors, of which age, social interaction anxiety and multitasking were the most related to Facebook addiction. Finally, Facebook addiction was significantly associated with smartphone addiction. Lee-Won [35] found a significant association between problematic Facebook use and social anxiety, with the latter being a noteworthy predictor for problematic Facebook use. Furthermore, the results indicated that a significant moderator in the relationship between problematic Facebook use and social anxiety was the need for social assurance. Rizi [48] found no relationship between social anxiety and excessive Facebook use in a sample of 150 young adults; there were no differences in Facebook use according to high vs. low social anxiety levels. However, the majority of the participants from this study logged on to their Facebook accounts few times a day (47%) and spent less than 30 min on Facebook (46%). The only parameter regarding Facebook usage that was considered in this study for the association with social anxiety was the frequency with which participants log onto Facebook, with no other variables considered.

5.4.5. Facebook anxiety and social anxiety

Three of the studies included that assessed online social networking sites anxiety indicated significant positive relationships with social anxiety. Davidson and Farquhar [49] investigated the relationship between social anxiety, religion and Facebook. They developed a Facebook-specific anxiety scale, an adaptation of a social anxiety scale related to Facebook and found a strong association with social anxiety. Online social anxiety and social anxiety were positively associated in Hong et al. [40], with general social anxiety being a significant predictor of online social anxiety. McCord et al. [38] used a Facebook social interaction scale and found a significant association with social anxiety in an adult sample group. Using multiple regression results indicated that social anxiety and anxiety on Facebook predicted Facebook social use. There was a significant interaction between social anxiety and Facebook social anxiety, which is in line with the social compensation theory. According to this theory, highly socially anxious individuals tend to use Facebook in order to compensate for the discomfort associated with face-to-face communication. A second regression model was also significant, with anxiety on Facebook and social Facebook use predicting social anxiety; again, there was a significant interaction between the two predictors.

6. Discussion

Online social networking sites are widespread means through which people can interact with others. There are many advantages of online social networking sites; however, recent research focuses mainly on the negative impact they have on mental health. Terms like “iDisorders”, “Facebook depression” and “Facebook addiction” abound in the literature on online social networking sites and mental health, proposing new disorders that are determined by the use of online social networking sites/Facebook. Moreover, their particularities in terms of manifestations make some advocate their inclusion in current diagnostic nosologies.

The present review aims to synthetically present the existing literature on the relationship between social anxiety and social networking. Twenty studies met our inclusion criteria. Most of these studies referred to a particular online social networking site, Facebook, and assessed different related parameters. Overall, most of the papers reported significant associations between online social networking and social anxiety, with four papers reporting no relationship between the two variables. There were mixed results on the relationship between Facebook use and social anxiety, as there were both studies sustaining a significant positive association between the two variables and those that found no association. Several psychosocial aspects of Facebook use were significantly related, both positively and negatively, to social anxiety. There was no relationship between Facebook disclosure and social anxiety in any of the papers included that assessed this construct. With one exception, there was a significant positive relationship between online social networking sites addiction/problematic use and social anxiety. There was evidence of a significant association between Facebook anxiety and social anxiety.

This results should be interpreted in the light of the fact that there was a high heterogeneity of Facebook conceptualizations, as in several studies, the amount of time spent on Facebook was assessed, while other studies assessed Facebook/ Internet/ social networking problematic use/intrusiveness/addiction, or psychosocial aspects related to Facebook use, or Facebook disclosure, and in fewer studies, Facebook anxiety was considered. Therefore, one cannot conclude that online social networking sites have a negative or a positive effect on social anxiety without carefully taking into consideration what they mean. An important limitation of the current review was the fact that although we aimed to investigate the relationship between social media and social anxiety, most of the papers included referred only to social networking sites such as Facebook and we cannot generate findings pertaining to other social networking sites, such as Instagram, Tweeter, Youtube, LinkedIn or Myspace. Future studies should also investigate the role of these other social networking sites in mental health problems and in social anxiety per se. Another limitation of this paper refers to the sample groups. As most of the participants included were students, this does not enable us to extend our to other populations. Involving more heterogeneous samples of participants, adolescents, young and older adults can help us to find significant moderators in the relationship between social networking and social anxiety. As all the studies included were

cross-sectional, we cannot conclude that there is causality between social networking media, namely Facebook, and social anxiety. Does social media (time spent, pathological use, number of friends, activities) contribute to social anxiety symptomatology or do socially anxious individuals tend to use more social media? According to what we currently know, no directionality can be assumed. However, much like in the meta-analysis on Facebook and loneliness [21], in this case, social anxiety can predict social media use rather than the other way around.

Future experimental studies manipulating independent variables would be useful in order to draw more conclusions on the relationship between social networking and social anxiety. Longitudinal studies would allow us to test bidirectional relationships between the two variables and investigate time-related patterns in social networking use and social anxiety. Up to this moment, it remains unclear whether social anxiety leads to more online social networking use, or whether the relationship is opposite, with more use of online social networking predicting social anxiety. Bidirectionality between the variables could also be an important aspect to investigate, as there is preliminary evidence for both directions.

The findings of the current review have important clinical implications regarding social networking use for individuals with social anxiety. The benefits/advantages of online social networking sites should be used and investigated in order to overcome existing barriers in clinical practice. Testing interventions delivered over social networking sites in randomized controlled trials would have great implications on the development of evidence-based remote interventions.

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