

The use of social networking sites, body image dissatisfaction and Body Dysmorphic Disorder: A systematic review of psychological research

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Abstract

The escalation of social networking site (SNS) usage has led to much research examining both the positive and negative implications SNS can have on well-being. However, whilst many studies have investigated the relationship between SNS usage and body image, there remains a paucity of research in regards to SNS usage and Body Dysmorphic Disorder (BDD). A systematic search was undertaken using Web of Science, PsychInfo and PubMed databases to identify SNS usage and patterns, SNS features and mediating factors contributing towards body image dissatisfaction, resulting in 40 studies meeting specific inclusion criteria. Findings identified passive SNS use and appearance-focused SNS use as particularly influential. Appearance-based comparisons were also found to be a strong mediator between SNS use and body image dissatisfaction. Using the current knowledge, parallels were highlighted in terms of body image dissatisfaction and BDD symptomatology, suggesting frequent SNS usage as a potential risk factor in the development of BDD symptoms.

Keywords: Social networking sites; Body image; Body dysmorphic disorder

Public significance statement

Using social networking sites to engage in appearance comparisons may drive the development and maintenance of Body Dysmorphic Disorder symptoms, and should be

considered as a risk factor in the development of the disorder. This paper highlights that if social networking site research and recommendations aim to extend into being used in clinical assessment, a standardised definition of excessive social networking and social networking site frequency needs to be determined to allow for consistency in both research and clinical practice.

Introduction

Through the proliferation of smartphones and improved internet connectivity, the use of social networking sites (SNS) has become an integral part of individual's lives (Ho, Lwin & Lee, 2017). Indeed, recent research has indicated that the average time spent on SNS, such as Facebook, is approximately two hours per day (Fardouly & Vartanian, 2015), compared to the average time of 45 minutes per day reported almost a decade ago (Tiggemann & Miller, 2010). It has been indicated that 88% of 18-29 year olds use SNS, in comparison to 78% for those aged 30-49, 64% among those aged 50-64 and 37% for Americans aged 65 and older (Smith & Anderson, 2018), indicating that young adults are the most active users on SNS. As a result, there has been increasing concern in the rise of both excessive SNS use and problematic SNS use, indicating an increased amount of time spent on SNS, preoccupation with SNS, as well as the inability to control SNS use, which results in a detrimental impact on the users' life (Kuss & Griffiths, 2017; Ho, Lwin & Lee, 2017).

Currently, much research documents SNS quantitatively in terms of prevalence, such as minutes spent online daily, or frequency of checking SNS (Scott, Bay-Cheng, Prince, Nochajski & Collins, 2017), which arguably may not reflect the subjective meaning of SNS use for individuals. That is, the way individuals engage on SNS is a dimension of SNS that is important to understand, particularly with the design of SNS enabling a diversity of modes of engagement, such as responding to others content, and uploading personal content (Scott et

al., 2017). Indeed, the flexibility of engagement on SNS has been shown to play an important role in well-being (Chen, Fan, Liu, Zhou & Xie, 2016), indicating the importance of distinguishing SNS engagement from SNS frequency, including the distinction between active and passive use, in relation to the impact it may have on users (Young, Kuss, Griffiths & Howard, 2017).

It has been demonstrated that active use, where SNS users engage and communicate with other online users through the commenting and liking of posts, is more likely to have a positive effect on psychological well-being (Ghosh & Dasgupta, 2015). The supportive interactions that can be maintained through SNS can lead to enhanced feelings of belongingness and increased self-esteem (Oh, Ozkaya & LaRose, 2014) as it supports social connectedness and identity expression (Ghosh & Dasgupta, 2015; Weinstein, 2017). In contrast however, passive use, such as scrolling through profiles, has been demonstrated to be particularly detrimental to well-being, as often the content encountered through browsing constitutes the favourable self-presentations of others (Lup, Trub & Rosenthal, 2015; Weinstein, 2017). It has been demonstrated that individuals who view attractive images on Facebook are more likely to be dissatisfied with their own body image, in addition to feeling more negative emotions afterwards (Haferkamp & Krämer, 2011; Ridolfi, Myer, Crowther & Ciesla, 2011). Such negative comparison has been found to increase the risk of rumination in individuals, leading to maladaptive cognitions, such as self-criticism and dysfunctional attitudes (Nolen-Hoeksema, Wisco & Lyubomirsky, 2008), decreased self-esteem and experiencing symptoms of depression and addiction (Donnelly & Kuss, 2016), indicating that the differential outcomes of well-being are dependent on the way SNS users engage with SNS platforms when online.

One psychological impact of increased SNS use is body image dissatisfaction; the negative evaluation of one's physical appearance (Cohen & Blaszczynski, 2015). Previous research

has consistently demonstrated that exposure to media images of the thin ideal in traditional forms of media (i.e., television and magazines) results in body image concerns and eating disturbances in women, in addition to body dissatisfaction in men (Daniel & Bridges, 2010; Tiggemann & Slater, 2013). More recently however, research has investigated the role of SNS and its relationship with body image dissatisfaction. In particular, with the multidimensional factors of photo sharing, peer interactions and mobile technology accessibility, there are many platforms online that promote body image ideals due to the highly visual environment of SNS (Holland & Tiggemann, 2016). Indeed, a review by Holland and Tiggemann (2016) investigated the relationship between SNS, body image and disordered eating, providing evidence that SNS use, in particular appearance-based SNS use, is associated with increased body dissatisfaction and disordered eating. Many studies exploring this relationship are correlational however (Smith, Hames & Joiner, 2013; Kim & Chock, 2015), therefore due to the cross-sectional nature of these studies, causal inferences cannot be drawn and it is likely that a bidirectional relationship exists between SNS engagement and body image dissatisfaction. Whilst experimental studies have demonstrated that exposure to the SNS Instagram images results in greater body dissatisfaction (Tiggemann & Zaccardo, 2015), this indicates that further longitudinal studies and experimental research are needed to examine this relationship. Nevertheless, such research indicates that SNS provide users with the probability to engage in increased appearance comparisons, internalisation of the thin ideal and self-objectification, leading to body dissatisfaction (Chen, Newton-John & Slater, 2017).

Following this, appearance comparison is one mechanism that has been highly implicated in the development of body image dissatisfaction. In terms of SNS usage, it has been demonstrated that women are more likely motivated to use SNS to compare themselves with others to adapt and develop their own self-image and self-presentation (Haferkamp, Eimler,

Papadakis & Kruck, 2012). Indeed, research has shown that appearance comparisons in general mediate the relationship between Facebook use and body image dissatisfaction in females (Fardouly & Varanian, 2015), indicating that SNS use may facilitate the development of body image concerns. However, it has been highlighted that the direction of comparison plays a role in mediating body image concerns. Upward comparisons in particular (comparing oneself with individuals perceived to hold superior positive characteristics) have been shown to be associated with greater body image dissatisfaction as opposed to downward comparisons (comparisons to those perceived as inferior to oneself) (Ridolfi, Crowther & Ciesla, 2011; Kim & Chock, 2015), as individuals are less likely to be satisfied with themselves when comparing their appearance with perceived ideals (Kim & Chock, 2015). Furthermore, passive SNS use has also been related to upward social comparison, which is consequently associated with lower self-evaluation and subjective well-being (Wang, Wang, Gaskin & Hawk, 2017), as this provides greater opportunities for comparison when viewing others' images and posts (Kim & Chock, 2015). Such research surrounding body image concerns and comparisons however has focussed predominantly on females (Daniel & Bridges, 2009), and it has been suggested that young women in particular may be more likely to engage in photo-based activities on SNS, which may consequently reinforce body image concerns (Perloff, 2014). Exposure to SNS trends surrounding "fitspiration" and "thinspiration" (whereby images surround the promotion of thinness [losing weight] and fitness [exercise and health], respectively) have been demonstrated to lead to greater body image dissatisfaction (Tiggenann & Zaccardo, 2015) and greater internalisation of the thin ideal (Fardouly, Willburger & Vartanian, 2017), which may be attributed to using these image types as aspirational targets for thin and more toned body ideals for comparison. However, it has also been demonstrated that SNS use predicts an increase in male appearance comparisons (Rousseau, Eggermont & Frison, 2017). Whilst further research is needed to

capture the male experience of body image disturbance on SNS, it has been shown that men are more likely to have greater internalisation of the muscular ideal when viewing content associated with fitspiration as opposed to the thin ideal, resulting in greater appearance comparisons and poorer body satisfaction in comparison to women (Fatt, Fardouly & Rapee, 2019). Such literature suggests that while there may be gender differences in the perception of idealised body type, the nature of engagement and the features of SNS use may be associated in the development and maintenance of body image dissatisfaction.

Whilst a number of studies investigate the relationship between SNS use and body image dissatisfaction, there remains a paucity of research surrounding SNS usage and Body Dysmorphic Disorder (BDD). BDD is currently classified within the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V, American Psychiatric Association, 2013) as an obsessive compulsive disorder, characterised by excessive concern about physical appearance, specifically a persistent preoccupation with a perceived defect, which results in significant distress and the impairment of interpersonal situations (Bartsch, 2007). Symptoms include safety behaviours, such as seeking reassurance from others and comparison to others in response to appearance concerns (Kelly, Darymple, Zimmerman & Phillips, 2013). Such symptomatology is also parallel with the behaviour individuals with high body dissatisfaction exhibit, which has consequently been shown to lead to further negative appearance evaluation (Lambrou, Veale & Wilson, 2012). In relation to SNS, this suggests that those who engage in appearance comparisons online may experience an increase in negative appearance evaluation and therefore the likelihood of developing BDD symptomatology through frequent and repetitive SNS use. Moreover, research has indicated there to be an association between the overuse of SNS and obsessive compulsive disorder (OCD; Andreassen, Billieux, Griffiths, Kuss, Demetrovics & Mazzoni, 2016), and it has been suggested that the addictive behaviours displayed in those presenting OCD symptomatology

can be conceptualised as a coping mechanism for the symptoms expressed (Lieb, 2015), which may be likened to the safety behaviours exhibited in BDD. However, although BDD is dominantly conceptualised as an obsessive compulsive disorder, there is a dearth of literature that specifically explores SNS and BDD. This highlights the need for further research in the relationship between SNS usage and the development of BDD symptomatology.

The present paper aims to systematically review the research that has investigated the influence of SNS use on body image dissatisfaction. In particular, it seeks to advance upon Holland and Tiggeman's (2016) systematic review, taking a focus on the impact of excessive SNS use on body image dissatisfaction and how this may lead to the development and presentation of BDD symptomatology. The paper also aims to review studies investigating features of SNS (passive and/or active) and the relationship with body image. Furthermore, since much research has focussed on body image dissatisfaction in general, it is arguable that this prohibits the specific awareness and potential diagnosis of BDD, which may consequently affect prevalence rates. To provide further insight into this issue, this review also aims to investigate (i) SNS usage frequency and patterns, (ii) the features of SNS that may contribute to the development of body image dissatisfaction, and (iii) the mediating factors that may facilitate and maintain body image concerns, to provide further understanding of the factors of SNS that may result in differential outcomes for well-being, body image concerns and BDD symptomatology.

Method

The review process was conducted in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (PRISMA; Moher, Liberati, Tetzlaff & Altman, 2009). To identify papers for review, an extensive search was performed using Web of Science, PsychInfo and PubMed databases. These databases were searched using a

combination of the following search terms: social networking sites, social media, body image, comparison, self-esteem, body dysmorphic disorder, Facebook, Instagram and body dissatisfaction. References of collected articles were also scanned for additional studies. Studies were included if they (i) included empirical data, made reference to at least one measure of (ii) SNS use (either general or specific SNS), (iii) features of SNS use (active/passive), as well as at least one measure of (iv) body image and (v) body dysmorphic disorder. Since the primary focus of this review was on body image dissatisfaction, articles that addressed other well-being constructs (e.g. anxiety and self-esteem) were only included if they also made specific reference to body image. Studies were excluded if they were written in languages other than English. Reviews, commentaries, book chapters, published abstracts and articles that have not been peer reviewed (e.g. dissertations) were also excluded. The title and abstract of each study was screened for eligibility. Full texts of potentially relevant studies were consequently retrieved and examined for eligibility. The search strategy is detailed in Figure 1.

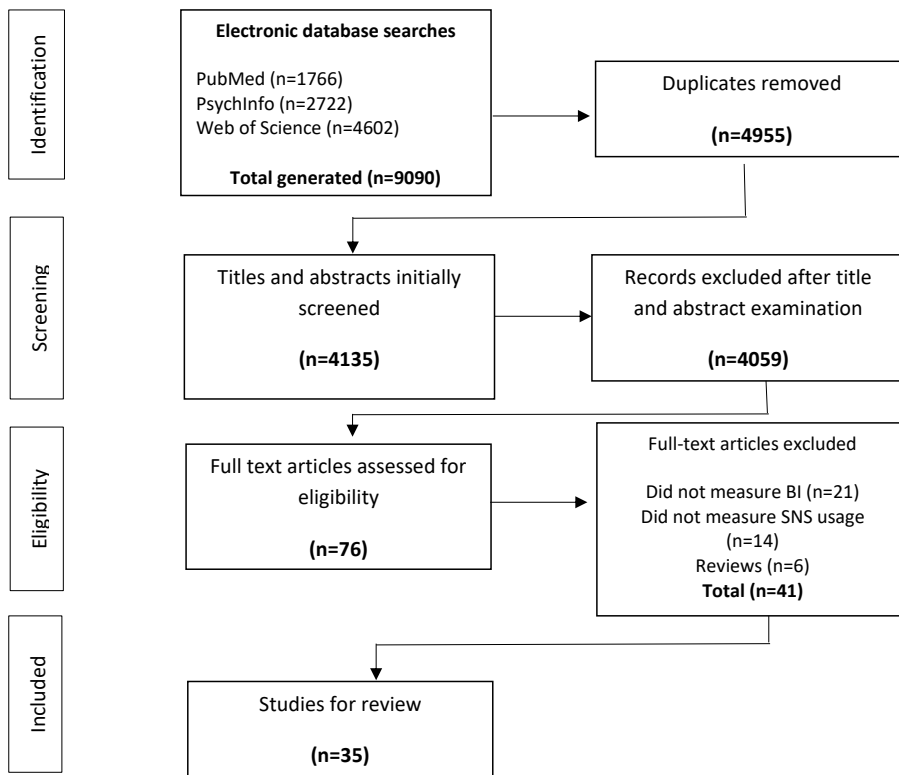


Figure 1. Search strategy.

Results

A total of 9095 studies (PubMed $n=1766$; PsychInfo $n=2722$; Web of Science $n=4607$) were initially identified. Identified duplicates were removed ($n=4955$), leaving 4140 studies for evaluation. The title and abstracts of these papers were screened, resulting in the exclusion of 4059 that were of no relevance, and a total of 81 studies which were eligible for further review. A further 41 papers were consequently excluded as they did not contain a

measurement for body image ($N=21$), did not measure social networking site usage ($n=14$), or they were review papers ($n=6$). Information that was extracted from each study focussed primarily on (i) sample characteristics (e.g. study size, age, sex and geographical location), (ii) methodology used, including measures implemented (e.g. measures of SNS use and body image) and (iii) underlying processes mediating the relationship between variables (e.g. comparison and self-esteem). A total of 40 studies were consequently identified as relevant from the literature. These studies are presented in Table 1.

Current SNS usage rates will be presented within the first section of the results, in particular highlighting the average time spent online, in addition to outlining excessive and addictive SNS usage. Following this, the relationship between SNS use and body image concerns will be summarised, in addition to the features of SNS that have been found to mediate the relationship between SNS usage and levels of body image dissatisfaction. Further mediating factors in the relationship between SNS use and body image dissatisfaction will be outlined in the final section.

Table 1. Overview of included studies.

Author	Design and Sample	Measures	Aims	Findings
Choukas-Bradley, Nesi, Widman & Higgins (2018)	Within subjects design; survey. N=339 females in a south eastern United States university (mean age 18.35)	Self-report on time spent on social media. Items developed to examine ASMC. Body surveillance subscale of the objectified body conscious scale. Body Comparison Orientation Scale of the Body, Eating and Exercise Comparison Orientation Scale of the Body, Eating and Exercise Comparison Orientation Measure. Body Esteem Scale for Adolescents and Adults (BESAA). 13 Item Short Mood and Feelings Questionnaire (for depressive symptoms).	To examine how frequently women engage in Appearance- related social media consciousness (ASMC).	Women endorsed high levels of ASMC, which was also associated with higher body surveillance, body comparison, low self-esteem and time spent on social media.
Cohen & Blaszczynski (2015)	2x2 mixed design. Between group factor was type of exposure, within group factor was pre- and post-exposure. Dependent variables were appearance comparison and body image dissatisfaction.	Facebook stimuli: mock profile images. Conventional media stimuli: thin ideal commercial images of models/celebrities with themes matched to those in the Facebook profiles. Self-report on type of Facebook use and time spent on Facebook.	To determine whether the relationship between appearance comparison and body image dissatisfaction would be stronger for those exposed to social media images compared to conventional media images.	Type of exposure was not found to moderate the relationship between appearance comparison and body image. Facebook was found to predict higher baseline body image dissatisfaction.

	<i>N</i> =193 female university students from University of Sydney (mean age=19.32, <i>SD</i> = 3.47)	<p>7 item pressure subscale from SATAQ-V3 used to assess pressure from media to attain thin ideal.</p> <p>Rosenberg Self Esteem Scale.</p> <p>The Body Areas Satisfaction Scale (BASS).</p> <p>3 Item Extent Thoughts Questionnaire used for appearance comparison.</p> <p>The Eating Attitudes Test-26 used for ED risk.</p>		
Cohen, Newton-John & Slater (2017)	<p>Within subjects design; survey.</p> <p><i>N</i>=259 Australian women (mean age 22.97, <i>SD</i>=3.89)</p>	<p>The Facebook Questionnaire.</p> <p>The Internalisation-General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-Version 3 to measure thin ideal internalisation.</p> <p>The Physical Appearance Comparison Scale.</p> <p>The Appearance Evaluation subscale of the Multidimensional Body Self-Relations Questionnaire Appearance Scales</p> <p>The Body surveillance Subscale of the Objectified Body Consciousness Scale.</p> <p>The Drive for Thinness Subscale of the Eating Disorder Inventory-3.</p>	To identify the specific SNS features that relate to body image concerns in young women.	<p>Appearance focussed SNS use, rather than overall SNS use was related to body image concerns in young women. Greater engagement in photo activities on Facebook, but not general Facebook use was associated with greater thin ideal internalisation and body surveillance. Instagram was associated with thin ideal internalisation, body surveillance and drive for thinness, whereas appearance neutral accounts was not associated with any body image outcomes.</p>

Daniel & Bridges (2010)	Within subjects design; survey. <i>N</i> =244 male college students from Southern US (mean age 21.35, <i>SD</i> =3.81)	Sociocultural Attitudes Towards Appearance Questionnaire. Self-Objectification Questionnaire Objectified Body Consciousness Scale Drive for Muscularity Scale.	To examine the applicability of objectification theory to men, taking account internalisation of media standards and its effects on male body image, in terms of male drive for muscularity	Internalisation of media ideal was the strongest predictor for the drive for muscularity and BMI
Eckler, Kalyango, Yusuf & Paasch (2017)	Cross sectional study; within subjects design. <i>N</i> =770 women from Midwestern university in the US (mean age 23.83, <i>SD</i> =7.26)	Self-report on time spent on Facebook and activities on Facebook. Self-report on history of eating behaviour. Comparison was measured by questions asking about comparison on own body to those of friends. Attention to physical appearance-asked how much attention paid to dress and body. Body Shape Questionnaire. 26 Item Eating Attitudes Test.	To examine the relationship between time spent on Facebook and body image, using the social comparison theory.	More time on Facebook was relate to more frequent body and weight comparisons, more attention to the physical appearance of others and more negative feelings about their bodies.
Fardouly & Vartanian (2015)	Survey; within subjects design. <i>N</i> =227 young adult females from	2 questions regarding time spent during the day, and amount of time checking Facebook were used to assess Facebook usage.	To investigate the relationship between the frequency of Facebook usage and body image concerns among female university students, and to examine whether	Frequency of Facebook usage showed a positive association with body image concerns, which was mediated by appearance comparisons in general.

	<p>Australian university (mean age 19.13, <i>SD</i>=2.21)</p>	<p>3 statements from Physical Appearance Comparison Scale (modified for comparison on Facebook).</p> <p>Frequency and direction of appearance comparisons measured on likert scale of 5 and 6 respectively.</p> <p>2 subscales of the Eating Disorder Inventory were used to assess individuals concerns with body weight and shape: the body dissatisfaction subscale and drive for thinness subscale.</p>	<p>appearance comparisons in general or to target groups on Facebook account for this relationship.</p>	
<p>Fardouly, Deiedrichs, Vartanian & Halliwell (2015)</p>	<p>2 part study with between subjects experimental design.</p> <p>Time 1 participants randomly assigned to one of 3 conditions of which they were asked to browse one of the following websites for 10 mins: their own FB account, a fashion magazine website or an appearance neutral control website.</p>	<p>Computer based visual analogue scales (VAS) used to measure state negative mood and body dissatisfaction both before and immediately after browsing assigned website.</p> <p>State version of self-discrepancy index (SDI) used to measure weight and shape related appearance discrepancy, as well as face, hair and skin related appearance.</p> <p>The Upward and Downward Appearance Comparison Scale.</p> <p>*Naturalistic study.</p>	<p>To investigate the effect of Facebook usage on women's mood and body image, and whether these effects differ from an online fashion magazine, and whether appearance comparison moderates these effects.</p>	<p>Individuals who spent more time on Facebook reported more negative mood than those who spent time on the control website. Women high in appearance comparison tendency reported more facial, hair and skin related discrepancies after Facebook exposure.</p>

Time 2 participants completed an online survey containing a trait measure of appearance comparison tendency.

N= 112 female and staff members from UK university (mean age 20.46, *SD*= 1.71)

Fardouly, Dierichs, Vartanian & Hallowell (2015)	Cross-sectional design with online questionnaire. <i>N</i> =150 female university students and staff in the UK (mean age 20.52, <i>SD</i> = 1.73)	Participant asked to report how often they use a variety of different media types (e.g. Facebook; TV). The Upward and Downward Appearance Comparison Participants asked how often they compared their appearance to female target groups when looking at images on Facebook. The Self-Objectification Questionnaire.	To examine the relationship between the usage of different media types (online and traditional) and self-objectification; whether appearance comparison tendencies in general mediated any observed relationships; whether appearance comparisons to specific types of women on Facebook mediated any relationship between Facebook usage and self-objectification.	Facebook usage and magazine usage were positively correlated with self-objectification and these relationships were mediated by appearance comparisons in general. The relationship between Facebook use and self-objectification was mediated by comparisons to one's peers on Facebook.
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Ghosh & Dagupta (2015)	<p>Survey; Within subjects design.</p> <p><i>N</i>=120 Hindu participants from Kolkata (18-35 years; 50% female)</p> <p>Both Facebook users and non-users: those with Facebook were included if they had used it for 1+years and was of high-average use</p>	<p>General Health Questionnaire</p> <p>Facebook Intensity Scale; measures active engagement and emotional connection</p> <p>NEO Five-Factor Inventory; brief measure of the five domains of personality.</p> <p>Relationship Scales Questionnaire</p> <p>Social Interaction Anxiety Scale</p> <p>Rosenberg Self-Esteem Scale</p>	<p>To examine the difference between Facebook users and non-users with respect to personality, attachment style, social interaction anxiety and self-esteem to explore the type of people who are more likely to use Facebook.</p>	<p>Facebook users were more extravert and open, while non-users were more conscientious. Facebook users also had high self-esteem and low interaction anxiety than non-users.</p>
Haferkamp, Eimler, Papadakis & Kruck (2012).	<p>Within subjects; survey</p> <p><i>N</i>=106 members of SNS StudiVZ (German equivalent of Facebook)(mean age23.12, <i>SD</i>=3.12; 49% female)</p>	<p>23 items were selected based on the uses and gratifications scale, with a focus on SNS use.</p> <p>Motivations to join SNS groups were measure by an 18 item self-constructed scale.</p> <p>Participants asked about perception of other people's profiles using 17 items with 5 point likert scale.</p>	<p>To assess user's motives for participating in SNS in general and their use of specific profile elements or self-presentation in particular.</p>	<p>Women tend to be more likely to use SNS for comparing themselves with others and for searching for information, whilst men are more likely to look at other people's profiles to find friends, Women also tend to use group names for self-presentation and prefer adding portrait photos to their profiles, in comparison to men who choose full-body shots.</p>

Hanna, Ward, Seabrook, Jerald, Reed, Giaccardi & Lippman (2017)	Within subjects design; survey N=1167 University students from Michigan (mean age 19.27; 718 females)	Self-report on amount of time spent using Facebook. Passive and Active Facebook use assessed via scale between 0-5. Surveillance subscale of the Objectified Body Conscious Scale-Youth. Enjoyment of Sexualisation Scale. Sexual Appeal self-worth scale. State Self Esteem Scale Iowa Netherlands Comparison Orientation Measure. Brief Symptom Inventory (BSI) for depression and anxiety.	To examine social comparison and self-objectification as mediators between Facebook use and depressive symptoms, anxiety, body shame and self-esteem.	Social comparison and self-objectification mediate the relationship between Facebook use and self-esteem, mental health and body shame.
Hawi & Samaha, 2017	Within subjects; survey N= 364 university students in Lebanon (mean age = 21.1, SD= 2.3; 52.2% male)	Social Media Addiction (derived from Facebook Intrusion Questionnaire) Questionnaire Rosenberg Self-Esteem Scale Satisfaction with Life Scale	To examine addictive use of social media in relation to self-esteem and satisfaction with life.	Addictive use of social media had a negative association with self-esteem, whilst self-esteem had a positive association with satisfaction with life. Self-esteem also mediated the effect of social media addiction on satisfaction with life.
Hawi & Samaha, 2018	Within subjects; correlational; survey	Internet Addition Test (IAT) Social Media Addiction Questionnaire (SMAQ)	To investigate the relationships between personality characteristics and both IA and SM addictions, to identify	Commonalities outnumbered differences, which is in line with the significant high correlation between IA and SMA. SE, agreeableness, conscientiousness, openness to

	N= 512 university students, Lebanon (mean age = 21.23, SD= 2.47; 55.8% male)	Rosenberg Self Esteem Scale (RSES) The Satisfaction with Life Scale (SwLS) The Ten Item Personality Inventory (TIPI) The Self-Constraint Scale (SCS)	similarities and differences between the 2 addictions	experiences, emotional stability, Internet usage and SM predicted both types of addiction. Gender predicted SM but not IA
Hendrickse, Apran, Clayton & Ridgway (2017)	Survey; within subjects design. N=185 young females from United States (mean age 21.04, SD=3.55)	Instagram photo activity index (adapted from Meier and Gray) to assess extent to which users are exposed to ideal images of others whilst on Instagram. 3 items (adapted) from the Physical Appearance Comparison Scale. Intrasexual Competition Scale. Eating Disorder Inventory (one subscale used to measure drive for thinness and another for body dissatisfaction).	To examine the potential association between the appearance related comparisons made on Instagram and college women's body image, and to determine whether individual differences moderates the influence of Instagram photo based activity on appearance related comparisons in the prediction of body dissatisfaction.	Engaging in appearance related comparisons on Instagram was associated with a more intense drive towards thinness and greater body dissatisfaction. However, photo related activities on Instagram were not positively associated with outcome variables (but related <i>through</i> appearance comparisons).
Jang, Park & Song (2016)	Survey; within subjects design N=313 college students from private university in Seoul (mean age 21.17,	Facebook use measured using questions surrounding frequency of posting/looking at post and usage. Iowa Netherlands Comparison Orientation Measure used to measure SCOF. Perceived social support measured by statements surrounding help from friends.	To examine the associations among Facebook use, social comparison orientation on Facebook (SCOF) and psychological outcomes represented by perceived	There was a positive association between Facebook use and SCOF and perceive social support, but not significantly associated with mental health. There was a negative association between SCOF and mental health, and self-esteem and impression management

	<i>SD</i> = 1.95; 70% female)	RAND Mental Health Inventory used to assess mental health. Rosenberg Self Esteem Scale Impression management measured using statements derived from measures of self-promotion and ingratiation self-impression management scale	social support and mental health.	were both positively associated with SCOF.
Kalpidou, Costin & Morris (2011)	Within subjects design; survey <i>N</i> = 70 undergraduate students from Catholic, liberal arts institution in northeast America (mean age 19.61; 67% female)	Facebook Intensity Scale. Number of Facebook friends reported. 5-statement to assess how Facebook is used to make new connection. Rosenberg's Self-Esteem Scale. Student Adaption to College Questionnaire	To investigate how Facebook use and attitudes relate to self-esteem and college adjustment.	Number of Facebook friends hinders academic adjustment, and spending a lot of time on Facebook is related to low self-esteem. Number of Facebook friends is negatively associated with emotional and academics adjustment in first year students.
Marengo, Longobardi, Fabris & Settanni (2017)	Within subject design; survey <i>N</i> =523 adolescents between grades 6-11 from two secondary schools in Northern Italy (mean age	Self-report on daily use of Facebook and HVSM. Body Shape Questionnaire (Italian version). Strength and Difficulties Questionnaire to assess internalising symptoms (Italian version).	To investigate the association between time spent on Highly Visual Social Media, body image concerns and internalising symptoms.	Individuals reporting frequent use of HVSM (>2h/day) reported significantly higher body image concerns and internalising symptoms than peers reporting no use of HVSM. There was also a positive link between use of HVSM and internalising symptoms to be mediated by participants body image concerns.

		14.82, <i>SD</i> =1.52; 54% female)		
Meier & Gray (2014)	Within subjects design; survey N=103 adolescent female students from public high school in New York State (mean age 15.4)	Facebook Questionnaire (FBQ). 5 Item Sociocultural Internalisation of the Appearance Questionnaire for Adolescents (SIAQ-A). Physical Appearance Comparison (PACS). 8 item Weight Satisfaction subscale of the body esteem scale for Adolescents and Adults. The 7 Item Drive for thinness subscale of the eating disorder inventory. The 10 tem self-objectification Questionnaire. Total Internet and Facebook use was measure by the FBQ developed by authors. This also assessed the frequency of user activity on specific FB features	To identify specific Facebook features that are associated with body image disturbances in girls	It is not the total time spent on FB or the internet, but rather amount of FB time allocated to photo activity that is associated with greater thin ideal internalisation, self-objectification, weight dissatisfaction and drive for thinness. Higher overall Fb use did not correlate with higher body image disturbance.
Muench, Hayes, Kuerbis & Shao (2015)	Within subjects design; survey N=489 participants recruited through Amazon MTurk system- based in	Time spent on Facebook and tome accessing Facebook assessed using self-report item specific to last 30 days. Brief Fear of Negative Evaluation Subscale used to measure fear of negative evaluations. Rosenberg Self-Esteem Scale.	To examine the independent relationship of a brief Facebook addiction scale, time spent on Facebook, and Facebook checking on positive and negative social domains, while	Neither time spent on Facebook, nor Facebook checking was significantly associated with either self-esteem, fear of negative social evaluation or social comparison, whilst SNS addiction symptoms were each independently associated with Facebook usage. Neither time spent on Facebook nor SNS

	U.S.A (modal age 23-29; 66% female)	Social Comparison and FOMO measures. Facebook Addiction Scale (adapted with 3 additional items) surrounding interference in social life and activities, and difficulty controlling usage.	controlling for self-esteem and social desirability	addiction symptoms were associated with positive social relationships.
Murray, Maras & Goldfield (2016)	Within subjects design; survey <i>N</i> = 383 undergraduate university students from University of Ottawa (mean age 23.08; 70.2% female; <i>SD</i> =3.09)	Generalised Problematic Internet Use Scale. Dutch Eating Behaviour Questionnaire. Body Esteem Scale for Adolescents and Adults.	To examine the degree to which body image concerns mediate the relationship between excessive time on SNS and disordered eating behaviours.	Body esteem indicators mediate the relationship between SNS use. Greater use of SNS was associated with more severe weight and appearance dissatisfaction.
Ridolfi, Myer, Crowther & Ciesla (2011)	Within subjects design. <i>N</i> = 93 females from a large Midwestern university (mean age 19.51, <i>SD</i> =3.31)	Personal Data Assistant (PDA) was used to notify participants to complete questionnaires and to complete diary entry (over 5 days). Assessment of Body Image Cognitive Distortions. The Body Shape Questionnaire. The State Self-Esteem Scale (SSES). The Positive and Negative Affect Schedule-Expanded Form (to measure emotions).	To examine the association between young women's naturally occurring appearance focused social comparisons to peers and media images and body image dissatisfaction and body checking.	The process of making appearance focused social comparisons is associated with disturbed body image and affect in a variety of domains. Social comparisons to media images and peers were associated with more frequent body checking and more negative feeling. Generally however, not found to increase body dissatisfaction.

		Following data collection, participants were asked to rate to what degree completing questionnaire about social comparisons made them more aware of these behaviours throughout the day.		When analysis focused on upward comparison, appearance focused cognitive distortions appearance focused cognitive distortions moderated the relationships between media/peer comparisons and body checking.
Rodgers & Chabrol (2010)	Survey (all questionnaires in French Translation); within subjects design N= 200 female students from France (mean age 21.7, SD= 2.0)	Body Shape Questionnaire used to assess body dissatisfaction. The Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-3) used to assess media influences on appearance. Rosenberg Self Esteem Scale Hospital Anxiety and Depression Scale. The Social Phobia Inventory to assess social anxiety. BMI calculated and participants asked about ideal weight	To explore the moderating effect of self-esteem, anxiety and social phobia on media pressure on media pressure and body dissatisfaction	Media pressure, anxiety and self-esteem revealed direct effects in the prediction of body dissatisfaction. However, only the interaction between social phobia and media pressure was a significant predictor of body dissatisfaction.
Rousseau, Eggermont & Frison (2017)	2 wave panel data with an interval of 6 months. Data was from larger longitudinal panel study on Facebook use and well-being.	Self-report on average Facebook use. Satisfaction with Life Scale to assess life satisfaction. Passive Facebook Use Subscale of the Multidimensional Scale of Facebook Use.	To examine the relationships between passive Facebook use, social comparison and body dissatisfaction.	Passive Facebook use predicted an increase in boys' comparisons. Comparison was also associated with higher body dissatisfaction. Body dissatisfaction also increased comparison on Facebook, and comparison was also related to more

	<i>N</i> time1=1621 participants, randomly selected from 15 high schools in northern Belgium (mean age 14.76, <i>SD</i> =1.41)	Comparison on Face as assessed by question “I often compare myself with other on Facebook when I am reading news feeds or checking others’ photos”. The Body Dissatisfaction Subscale of the Body Attitude Test		passive use on Facebook, but less passive use over time.
Rutledge, Gillmore & Gillen (2013)	Within subjects design; survey. <i>N</i> =255 students from northeaster United States (mean age 19.27, <i>SD</i> = 1.35; 54% female)	Facebook Intensity Scale; separate items as opposed to composite scale. Body image: 2 subscales from Multidimensional Body Self Relations Questionnaire: Appearance orientation subscale and Appearance evaluation subscales.	To examine the link between Facebook friends, emotional investment in Facebook and time spent on Facebook with body image.	Individuals more connected to the site more emotionally were more oriented towards their appearance. However also found that individuals who spent less time on Facebook were more concerned with their looks. No connection between time on Facebook and evaluation of appearance.
Sherlock & Wagstaff (2018)	Within subjects. Consisting of 2 parts. P1- correlational design P2 2X4 mixed method	P1: The 20 item Centre for Epidemiologic Studies Depression Scale. The Heatherton Self-Esteem Scale- measures state self-esteem. The State Trait Anxiety Inventory for general anxiety. The Physical Appearance State and Trait Anxiety Scale	To address the link between Instagram use and range of psychological variables including depressive symptoms, self-esteem, general anxiety, physical attractiveness, body dissatisfaction and	Instagram correlated with psychological well-being outcomes. Social comparison had a mediating effect on relationship between Instagram use, depressive symptoms, general anxiety, physical appearance anxiety, self-esteem and body image disturbance.

	<p><i>N</i> = 129 women who currently used Instagram (mean age 24.60, <i>SD</i> = 4.54)</p>	<p>P2: Instagram stimuli selected from public accounts in relation to beauty, fitness and travel.</p> <p>Measures from P1 were then completed again in randomised order.</p>	<p>physical appearance anxiety.</p> <p>Self-rated physical attractiveness was rated by 2 questions: perception of own physical attractiveness compared to same sex peers and perception of own physical attractiveness compared to general population.</p> <p>The Body Image Disturbance Questionnaire.</p> <p>Iowa-Netherlands Comparison Orientation Scale.</p> <p>Instagram use measured using questions derived by researchers</p>	
Stapleton, Luiz & Chatwin (2017)	<p>Non-experimental survey sample; within subjects design.</p>	<p>11 item Iowa-Netherlands Comparison Orientation Measure.</p> <p>Facebook Intensity Scale adapted for Instagram (by replacing term “Facebook”).</p>	<p>To examine the impact of exposure to social media-based social comparison information on self-esteem</p>	<p>Social comparison on Instagram mediated the relationship between contingent self-worth and self-esteem.</p> <p>Self-worth contingent on approval from other moderated the relationship</p>

	<i>N</i> =237 young adults recruited through Facebook (mean age 23.12, <i>SD</i> =2.17; 60% female).	Rosenberg Self Esteem Scale. 35 item Contingencies of Self Worth Scale		between intensity of Instagram use and social comparison on Instagram.
Stratton, Donovan, Bramwell & Loxton (2015)	Within subjects design. 3 exercise groups: Cardiovascular trainers Weight trainers Low level exercisers <i>N</i> =307 Australian males (mean age 27.05, <i>SD</i> = 6.25)	Media subscale from Perceived Sociocultural Influences on Body Image and Body Change Questionnaire to measure media influence. Male friends subscale of SICCCQ used to measure influence of male peers. The Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) modified for males- more emphasis on muscularity than thinness. Body Comparison Scale. The Somatomorphic Matrix used to provide ratings of muscle dissatisfaction (modified). The Behaviours subscale of the 15 item Drive for Muscularity Scale used to measure behaviours aimed at increasing muscularity	To examine the Tripartite Influence Model in understanding male body image issues and drive for muscularity. Also to examine the influence of media in body image issues and muscularity.	Strong relationship between body comparisons and drive for muscularity behaviours through muscle dissatisfaction. Media influence was positively related to muscular ideal internalisation and indirectly related to muscle dissatisfaction through internalisation.
Stronge, Greaves, Milojev, West-Newman, Barlow & Sibley (2015)	Within subjects- focused on cross sectional data collected in 2012.	Body satisfaction assessed by single item developed for longitudinal study. Also asked if they had a Facebook profile, and time spent online.	To examine the link between Facebook usage and body dissatisfaction.	For both men and women, Facebook users reported significantly lower body dissatisfaction than non-users- particularly middle aged women.

				Men reported higher body satisfaction than women.
	<i>N</i> =11,017 sampled from New Zealand electoral roll (mean age 49.23, <i>SD</i> =15.12; 62% female)			
Tiggeman & Zaccardo (2015)	<p>Between subjects with 2 levels of the independent variable image type (fitspiration/travel).</p> <p>Dependent variables: mood and body dissatisfaction, state appearance self-esteem and comparison.</p> <p><i>N</i>= 130 female undergraduate students in South Australia (mean age = 19.91, <i>SD</i> = 2.80).</p>	<p>Stimulus constructed containing Instagram images (fitspiration and travel sets) sourced from public profiles.</p> <p>Participants asked general questions to establish SNS use.</p> <p>Visual analogue scales to measure mood and body dissatisfaction.</p> <p>State Self Esteem Scales (SESS).</p> <p>Inspirational goals assessed by 3 item construction.</p> <p>State appearance comparison scale</p> <p>Physical appearance comparison scale.</p>	To investigate the effect of exposure to fitspiration images on women's body image.	Exposure to fitspiration images resulted in greater body dissatisfaction and lower appearance self-esteem than control (travel images).

Tiggemann & Miller (2010)	Within subjects; survey. <i>N</i> = 156 adolescent female high school students from South Australia (mean age=14.87, <i>SD</i> =1.39)	List of magazines to rate, and frequency of watching TV programmes. Questions were developed to measure internet appearance exposure; participants asked how long on average they spent on the internet each day, what they use the internet for, and to rank in order what they spent most time on. Internalisation of thin ideal was measured by the Sociocultural Internalisation of Appearance Questionnaire-Adolescents. Appearance comparison measured by PACS. Weight satisfaction measured by the Weight Satisfaction Subscale of the Body Esteem Scale for Adolescents. Drive for Thinness subscale of the Eating Disorder Inventory.	To examine the relationship between media exposure and body image in adolescent girls	Internet appearance exposure was associated with weight dissatisfaction and drive for thinness. Modal time spent on internet was 2-3hours a day. It was indicated 40% Facebook members spent around 45 min per day there
Tiggemann & Slater (2013)	Within subjects design. <i>N</i> =1087 adolescent girls recruited from 18 schools in South	Self-report on average time spent on the internet daily. Attitudes Toward Appearance Questionnaire. Objectified Body Consciousness Scale-Youth.	To examine the relationship between internet exposure and body image concern in adolescent girls	Internet exposure was associated with internalisation of thin deal, body surveillance and drive for thinness.

Australia (mean age 13.7, <i>SD</i> =0.7)				
Tiggemann & Slater (2013)	Survey; within subjects design <i>N</i> =189 females in primary school in South Australia (mean age 11.5, <i>SD</i> =0.5)	Magazines and television programmes listed; likert scale to measure the frequency of which they read/watched media. Questions were developed to measure internet exposure, which included time spent on the Internet, and websites used including specific questions on MySpace and Facebook usage. Sociocultural Internalisation of Media Ideals Scale to measure internalisation of ideals. Body surveillance Scale of the Objectified Body Consciousness Scale-Youth. Body Esteem Scale for Children. Questions also asked in regards to dieting behaviour.	To investigate the relationship between internet exposure and body image concerns in a group of primary school aged girls. **This age is too young for a Facebook account, yet was found despite this it was still used.	Internet exposure was associated with internalisation of the thin ideal, body surveillance, dieting and reduced body esteem. Facebook users scored significantly higher on all indicators of body image concern than non-users. Time spent of both Facebook and MySpace were associated with higher levels of internalisation of the thin ideal, body surveillance, dieting and lower body self-esteem.
Tiggemann & Slater (2017)	Longitudinal study; within subjects design. Participants were a subset of a larger cross-sectional sectional study.	Self-report on how much time they spent on Facebook and "friends" they had. Sociocultural Attitudes Towards Appearance Questionnaire. Objectified Body Consciousness Scale-Youth. Drive for Thinness Scale of the Eating Disorder Inventory.	To examine the relationship across time between Facebook use and body image concern in adolescent girls	Facebook involvement increased substantially over the two year time period. Body image concerns also increased. Internalisation and body surveillance predicted the number of Facebook friends.

Questionnaires
completed again 2
years later (Time 2)

N=438 girls from
South Australia
(mean age 13.6 *SD*=
0.7)

Wang, Wang, Gaskin & Hawk, 2017	Within subjects correlational; survey. N=696 Qzone and WeChat users (mean age=19.43, <i>SD</i> =1.65; 77% female)	Passive SNS use measured by 3 questions surrounding viewing: other's photos, updates and comments. Social Comparison Orientation Scale to measure social comparison Upward comparison was measured by the Negative Social Comparison Affect Scale Self-esteem was measured by the Rosenberg Self-Esteem Scale (Chinese version) Subjective well-being measured by summing standardised scores of life satisfaction and positive effect, and then subtracting a standardised score of negative effect. Life satisfaction was assessed by the Satisfaction with Life Scale. Positive and negative effect	To examine whether upward social comparison and self-esteem mediate the association between SNS usage and user's subjective well-being, and whether the association between SNS use and upward social comparison is moderated by users' social comparison orientation.	Social comparison orientation moderated the association between passive SNS use and user's upward social comparison, and more specifically, social comparison orientation strengthened the association between passive SNS usage and upward social comparison.
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		was measured by the Chinese version of the Positive and Negative Affect Scale.		
Won Kim & Chock (2015)	Within subjects design. <i>N</i> = 186 young adults from Northeastern university (64% female; mean age 19.75, <i>SD</i> =2.06)	Facebook use for social grooming measured by revised version of SNS for grooming scale-modified for Facebook features. Facebook exposure measured by time spent of Facebook per day. Physical Appearance Comparison Scale. Drive for Thinness 7-item subscale of Eating Disorder Inventory. Drive for Muscularity Scale.	To examine the relationship between the drives for thinness and muscularity (body image concerns) in young men and women's Facebook use.	Higher levels of social grooming behaviours on Facebook were positively associated with greater drive for thinness and appearance comparison. Grooming behaviours associated with body image concern, but not overall Facebook exposure was not.

Social Networking Site Usage

Time spent on SNS was identified in 17 studies (Tiggemann & Miller, 2010; Kalpidou, Costin & Morris, 2011; Rutledge, Gillmore & Gillen, 2013; Tiggemann & Slater, 2013; Meier & Gray, 2014; Cohen & Blaszczynski, 2015; Fardouly, Deiedrichs, Vartanian & Halliwell, 2015; Fardouly & Vartanian, 2015; Muench, Hayes, Kuerbis & Shao, 2015; Jang, Park & Song, 2016; Murray, Maras & Goldfield, 2016; Eckler, Kalyango, Yusuf & Paasch, 2017; Hawi & Samaha, 2017; Marengo, Longobardi, Fabris & Settanni, 2017; Tiggemann & Slater, 2017; Choukas-Bradley, Nesi, Widman & Higgins, 2018; Hawi & Samaha, 2018).

Time spent online was mainly measured through general self-report questions asking to indicate the number of minutes or hours spent on SNS (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013; Cohen & Blaszczynski, 2015; Fardouly & Vartanian, 2015; Muench et al., 2015; Jang, Park & Song, 2016; Eckler et al., 2017; Marengo et al., 2017; Tiggemann & Slater, 2017; Choukas-Bradley et al., 2018). Five studies used psychometric tools which included the Facebook Questionnaire (FBQ; Meier & Gray, 2014), the Facebook Intensity Scale (FIS; Kalpidou, Costin & Morris, 2011; Rutledge, Gillmore & Gillen, 2013), the Generalised Problematic Internet Use Scale and the Excessive Time Online subscale (GPIUS; Murray, Maras & Goldfield, 2016), in addition to the Social Media Addiction Questionnaire (SMAQ; Hawi & Samaha, 2017). Average time spent on SNS was between 1.5-2 hours per day (Tiggemann & Slater, 2013; Cohen & Blaszczynski, 2015; Fardouly & Vartanian, 2015; Muench et al., 2015; Eckler et al., 2017; Marengo et al., 2017; Choukas-Bradley et al., 2018), with one study reporting a time of 45 minutes spent on Facebook (Tiggemann & Miller, 2010). Additionally, it was noted that one study also included participants who reported their daily time spent on social media as exceeding 11 hours (Choukas-Bradley et al., 2018). It was indicated that on Facebook, reading newsfeed was the

most popular activity, followed by viewing photos and messaging on a typical visit to the site (Eckler et al., 2017).

Findings indicated an increase in the frequency of SNS use within the last decade. Results by Tiggemann and Miller (2010), in a study that consisted of 156 adolescent female high school students, indicated that the modal time spent on the internet generally was 2-3 hours per day, with 40% of this sample spending 45 minutes per day on Facebook. More recent studies however have demonstrated an increase in the amount of time spent on SNS. Results by Muench et al. (2015) found that 94% of respondents reported being on Facebook at least once a day, with 80.8% being on Facebook for more than 15 minutes per day, and 20% spending more than two hours a day on Facebook. This was further supported by Fardouly and Vartanian (2015) who also demonstrated a modal time of two hours spent on Facebook using a young Australian female sample.

Two studies directly measured excessive and addictive SNS use. A study by Choukas-Bradley et al. (2018) used the Excessive Time Online subscale of the Generalized Problematic Internet Use Scale, with higher scores indicating more problematic social networking. It was found that females reported significantly more perceived time on SNS as opposed to males. Similarly, Hawi and Samaha (2017) used the Social Media Addiction Questionnaire on a sample of 396 university students in Lebanon. Scores indicated a moderate level of addictive social media use overall, with females reporting higher levels of social media use (mean score 26.2) than males (mean score 22.8). Furthermore, whilst many of the presented studies indicate an average of two hours a day, Marengo et al. (2018) implemented a two hour cut-off in the identification of high social media use. Findings demonstrated 29.1% of respondents used highly visual social media (HVSM), such as Instagram and Snapchat, for more than 2 hours a day, which resulted in higher levels of emotional symptoms among HVSM users (Marengo et al., 2018). Following this, it was highlighted within the study by Choukas-

Bradley et al. (2018) that four respondents reported a daily time spent on social media to exceed eleven hours, pointing towards excessive and addictive SNS tendencies.

It has also been suggested that gender may predict excessive SNS use. This was indicated in one study using the GPIUS which found that females reported they spent significantly higher excessive time on SNS a week (mean score 13.79) than males (mean score 11.71), which was also associated with increased weight and appearance dissatisfaction (Murray, Maras & Goldfield, 2016). In a more recent study that compared both social media and internet addiction, it was demonstrated that gender predicted social media addiction, but not internet addiction (Hawi & Samaha, 2018). It was speculated by the authors that this may be because male respondents had internet gaming in mind whilst completing the IAT, whilst female respondents were thinking about social media use, and therefore the effects of the two genders may have cancelled each other out in the results for internet addiction and social media addiction (Hawi & Samaha, 2018).

The present studies demonstrate that frequency of SNS use has increased in recent years, with an average of two hours a day being spent online. However, the majority of the studies implemented self-report measures in terms of respondents' perceived time online, which may be subject to social desirability and recall bias. In addition to this, whilst no specific time was indicated as a baseline for the indication of addictive use, it has been suggested that more than two hours a day may point towards excessive SNS usage (Marengo et al., 2018). However, the motives for SNS use and usage patterns are not the same across all types of SNS, and cannot be applied across all SNS platforms and contexts (Jang, Park & Song, 2016). Consequently, further research is needed in terms of generalizability of findings and objective investigation.

Body Image and Concerns

The relationship between SNS and body image concerns was measured with a variety of psychometric tools. Five studies included the Physical Appearance Comparison Scale (PACS; Meier & Gray, 2014; Fardouly & Vartanian, 2015; Tiggemann & Zaccardo, 2015; Hendrickse, Apran, Clayton & Ridgway, 2017; Cohen, Newton-John & Slater, 2017) for the measurement of body dissatisfaction in female adolescents and young adults aged 15-21 years (Meier & Gray, 2014; Hendricke et al., 2017), with sample sizes ranging from 103-259 (Meier & Gray, 2014; Cohen et al., 2017). The Body Shape Questionnaire was also implemented in a number of studies to assess body dissatisfaction (BSQ; Rodgers & Chabrol, 2010; Ridolfi, Myer, Crowther & Ciesla, 2011; Marengo, Longobardi, Fabris & Settanni, 2017). It was noted that one study also included a Personal Data Assistant (PDA) to notify participants to complete the psychometric tests used in the study over a period of five days (Ridolfi, Myer, Crowther & Ciesla, 2011). Furthermore, a total of five studies used an experimental design, with the majority of these studies focussing on Instagram images as the variable stimuli (Cohen & Blazczynski, 2015; Fardouly, Diedrichs, Vartanian & Halliwell, 2015; Tiggemann & Zaccardo, 2015; Sherlock & Wagstaff, 2018; Tiggemann & Barbato, 2018) to investigate exposure to SNS images and body dissatisfaction.

Much of the research suggested that frequent use of SNS is associated with increased body image concern and dissatisfaction, with many studies in particular surrounding Facebook. One study by Tiggemann and Slater (2013) investigated this relationship with a sample of 189 girls aged 10-12 years. Whilst this sample was too young to own their own Facebook profile (under 13 years), findings indicated that internet exposure was associated with body surveillance and reduced body esteem, whilst Facebook users scored significantly higher on all indicators of body image concern. Research with an older sample of young females (mean age 19.13) also produced similar findings by showing a positive association between the

frequency of Facebook usage and body image concerns, which were mediated by appearance comparisons in general (Fardouly & Vartanian, 2015).

Arguably, much of the research regarding SNS and body image concerns surrounds the drive for thinness and weight. Indeed, the findings of a survey using 383 undergraduate students found that greater SNS use was associated with both weight and appearance dissatisfaction (Murray, Maras & Goldfield, 2016). More specifically, it was found that lower weight and appearance esteem mediated the relationship between excessive time on SNS, in addition to restrained eating in males and females (Murray et al., 2016). In addition to this, a study by Cohen, Newton-John and Slater (2017) found that photo-based activities on Facebook were associated with greater thin ideal internalisation and body surveillance, whilst Instagram use was associated with greater thin ideal internalisation, body surveillance and drive for thinness. Likewise, Hendrickse, Apran, Clayton and Ridgeway (2017) examined the association between appearance-related comparisons made on Instagram and body image. Results reported that individuals experienced a more intense drive towards thinness and had greater body dissatisfaction, particularly if they found themselves frequently engaging in comparisons with others. These findings suggest that women who engage in appearance-related comparisons may be particularly susceptible to body image concerns; however, comparisons did not completely explain the relationship between Instagram and body image concerns (Hendrickse et al., 2017), suggesting that further research should consider other potential mechanisms that may contribute to these outcomes.

Body image concerns also surrounded drive for muscularity and muscle dissatisfaction, particularly in studies comprising male samples. A study by Stratton, Donovan, Bramwell and Loxton (2015) comprised 307 males who described their exercise patterns as either being regular cardiovascular trainers, low level exercisers or weight trainers. Findings presented a strong relationship between body comparisons and drive for muscularity, whilst there was

also a positive influence between media and muscle dissatisfaction, and muscular ideals. A study by Daniel and Bridges (2010) also found that internalisation of media ideals, in addition to body mass index (BMI), were the strongest predictors for the drive for muscularity. However, although it appeared that body type ideals for men do impact body image, it is not wholly clear how this relationship is established and how this consequently leads to increased drive for muscularity (Daniel & Bridges, 2010), indicating the need for further research into this relationship.

Furthermore, one study examined the relationship between men and women's drive for muscularity and thinness, and found that passive use of Facebook was associated with a higher drive for thinness in both sexes, however Facebook use was not associated with drive for muscularity for either males or females (Kim & Chock, 2015). It was speculated that the type and nature of the images shared by peers on social media may have influenced concerns about thinness as opposed to muscularity, thus indicating that future research needs to investigate the differences between the two types of body image concerns and their relationship to passive SNS use (Kim & Chock, 2015).

Arguably however, a study by Fardouly et al. (2015) using a two-part study with a between subjects experimental design found that exposure to Facebook did not have a direct effect on young women's satisfaction with their body, or on their desire to change their weight or shape. Instead, findings highlighted that for women who were high in appearance comparisons, Facebook usage was related to a greater desire to change their face, hair and skin-related features (Fardouly et al., 2015). The differential findings of this study may be explained by women being more likely to upload more portrait pictures, as opposed to full body pictures, which could provide more opportunities to make facial, skin and hair-related comparisons than body comparisons (Haferkamp, Eimler, Papadakis & Kruck, 2012).

Overall, whilst the findings of the current studies highlight the relationship between SNS use and body image concerns, it is noted that there is a lack of longitudinal designs presented within the research. Indeed, due to the correlational nature of much of the presented research, it has been suggested that there likely exists a bidirectional relationship between SNS engagement and body image outcomes (Cohen, Newton-John & Slater, 2017), and because of this, no causal inferences can be drawn as to whether SNS use is the causal factor for body image dissatisfaction and concerns. Further experimental research is therefore needed to measure pre-existing trait body image concerns to examine if such pre-existing traits modify the effect of SNS usage on body image dissatisfaction (Fardouly & Vartanan, 2015).

SNS Features

Various features of SNS have been highlighted to mediate the relationship between body image concerns and SNS use in total of ten studies (Rutledge, Gillmore & Gillen, 2013; Tiggemann & Slater, 2013; Meier and Gray, 2014; Tiggemann and Zaccardo, 2015; Stronge, Greaves, Milojev, West-Newman, Barlow & Sibley, 2015; Eckler, Kalyango, Yusuf & Paasch, 2017; Rousseau, Eggermont & Frison, 2017; Cohen et al., 2017; Marengo, Longobardi, Fabri & Settanni, 2017; Brichacek, Neill & Murray, 2018). Features of SNS use were predominantly assessed using a number of self-report methods, including the Instagram Photo Activity Index (Meier & Gray, 2014), the Passive Facebook Use Subscale of the Multidimensional Scale of Facebook Use (Rousseau, 2017), the Facebook Questionnaire (Cohen et al., 2017) and items from the Facebook Intensity Scale (Rutledge, Gillmore & Gillen, 2013). In one study, the impact of SNS features was also measured through experimental manipulation of image types (Tiggemann & Zaccardo, 2015). The studies identified consisted of sample sizes ranging from 103-11,017 (Meier & Gray, 2014; Stronge et al., 2015), with longitudinal studies including larger samples of participants. Ages ranged

between 11.5-23.83 years (Tiggemann & Slater, 2013; Eckler, Kalyango, Yusuf & Paasch, 2017) and participants were predominantly female across all studies.

Whilst many studies highlight that SNS usage frequency and exposure is linked with body image concerns (Tiggemann & Slater, 2013; Stronge et al., 2015; Eckler, Kalyango, Yusuf & Paasch, 2017), it was indicated that the way individuals engage on SNS has been shown to also play an important role in the mediation of body image concerns and well-being (Rousseau, Eggermont & Frison (2017), demonstrating that passive Facebook use predicted an increase in male appearance comparisons and increased body dissatisfaction. However, in contrast to previous research, findings also indicated that passive Facebook use did not predict female comparisons and consequent body dissatisfaction (Rousseau et al., 2017). To explain these results, it was suggested that females may implement avoidant coping strategies, such as minimising social comparisons, to cope with increased actual-ideal body image discrepancies that may occur through appearance comparisons.

Furthermore, a study by Meier and Gray (2014) also argued it is not the total time spent on Facebook, but rather the amount of Facebook time that is allocated on photo-based activity that facilitates body image disturbance, through internalisation of ideals. Findings by Cohen, Newton-John and Slater (2017) also supported this, by demonstrating that it was appearance-focussed SNS use, rather than overall SNS use that was related to body image concerns in young women. Additionally, the results also indicated that greater engagement in photo activities on Facebook, as opposed to general Facebook use was associated with greater thin ideal internalisation and body surveillance (Cohen, Newton-John & Slater, 2017).

The emphasis of appearance-focussed SNS use was further highlighted in the results of a survey comprising of 598 adolescents. It was demonstrated that participants who reported using Highly Visual Social Media (HVSM) such as Instagram or Snapchat more frequently

also reported having significantly higher body image concerns than individuals who reported no use of HVSM (Marengo, Longobardi, Fabri & Settanni, 2017). Similarly, Tiggemann and Zaccardo (2015) more specifically looked at exposure to fitspiration images in comparison to control (travel) images on Instagram and found that exposure to fitspiration images resulted in greater body dissatisfaction and lower appearance self-esteem than the control images, an effect that was mediated by appearance comparison processing. This was further supported by Brichacek, Neill and Murray (2018) in an experimental study with Facebook, which demonstrated that viewing Facebook images that depicted body image ideal resulted in lower body image satisfaction.

In contrast however, findings by Rutledge, Gillmore and Gillen (2013), did not support the relationship between time spent on Facebook and body image concerns, although it was indicated that individuals who were more emotionally connected to Facebook tended to be more oriented towards their appearance. It was speculated that this may be because user's tend to know their friends on Facebook; therefore viewing their own and friends images may not affect their own evaluation as they are able to distinguish between their online selves and real selves (Rutledge, Gillmore & Gillen, 2013).

Whilst a number of studies examine general SNS usage (Tiggemann & Slater 2013; Stronge et al., 2015), the current studies indicate that photo-based SNS activity and passive SNS use are strongly associated with body image concerns through the mediation of appearance comparisons. Indeed, it has been suggested that individuals may use SNS content as a source of information on how to improve their physical appearance, and it may be that self-improvement desires motivate individuals to seek comparison targets on SNS to evaluate and compare their appearance to (Rousseau, Eggermont & Frison, 2017). Active SNS use on the other hand has been indicated to have a positive effect on psychological well-being, through the ability for individuals to communicate and engage with each other (for example through

commenting or liking posts) (Ghosh & Dasgupta, 2015). Consequently, it may be that such findings indicate towards a cycle of SNS use and body dissatisfaction, in which passive SNS use positively influences comparison and body dissatisfaction, and that these behaviours and cognitions positively influence passive SNS use (Rousseau, Eggermont & Frison, 2017).

Mediating Factors

A total of 12 studies were highlighted to identify mediating factors (Ridolfi, Myer, Crowther & Ciesla, 2011; Tiggemann & Slater, 2013; Fardouly & Varanian, 2015; Hanna, Ward, Seabrook, Jeralds, Reed, Giacardi & Lippman, 2017; Hendrickse et al., 2017; Rousseau, Eggermont & Frison, 2017; Stapleton, Luiz & Chatwin, 2017; Wang, Wang, Gaskin & Hawk, 2017; Choukas, Bradley, Nesi, Widman & Higgins 2018; Fardouly, Willburger & Vartanian, 2018; Feltman & Szymanski, 2018; Sherlock & Wagstaff, 2018). These studies comprised of predominantly female participants and included a samples from primary school (Tiggemann & Slater, 2013), university (Fardouly & Vartanian, 2015; Chouckas et al., 2018), in addition to Ozone and WeChat users (Wang, Wang, Gaskin & Hawk, 2017) and Instagram users (Sherlock & Wagstaff, 2018). Mediating factors included internalisation of the thin ideal, appearance comparisons and self-esteem, measured using a variety of psychometric tests, including the Sociocultural Internalisation of Media Ideals Scale (Tiggemann & Slater, 2013), the Iowa Netherlands Comparison Orientation Measure (Hanna et al., 2017; Stapleton, Luiz & Chatwin, 2017), items from the Physical Appearance Comparison Scale (Hendrickse et al., 2017), the Appearance Comparison Scale (modified for comparison on Facebook) (Fardouly & Vartanian, 2015), the Heatherton Self-Esteem Scale (Sherlock & Wagstaff, 2018) and the Rosenberg Self Esteem Scale (Stapleton, Luiz & Chatwin, 2017).

In regards to shape and weight concerns in particular, the internalisation of thin ideals was highlighted as a strong mediating factor in the drive for negative body image, thinness and weight dissatisfaction in a number of studies. A recent study found that engaging in appearance-related comparisons on Instagram was associated with a more intense drive towards thinness and body dissatisfaction (Hendrickse et al., 2017). However, it was highlighted that photo related activities on Instagram were not directly associated with body image dissatisfaction, but that they were related through both internalisation and appearance comparisons (Hendricke et al., 2017; Fardouly, Willburger & Vartanian, 2018). It was posited that this may be due to salience of societal beauty ideals available through the platform (Fardouly, Willburger & Vartanian, 2018) and was further supported by Feltman and Szymanski (2018), who found that the internalisation of cultural standards of beauty, in addition to engaging in appearance comparisons, mediated the link between Instagram usage, body surveillance and self-objectification.

Similarly, Tiggemann and Slater (2013) conducted a study using a survey with 1087 adolescent females to examine the relationship between internet exposure and body image concerns. Findings indicated that internet exposure was associated with internalisation of the thin ideal, drive for thinness and body surveillance. Facebook users in particular were highlighted as scoring significantly higher on all indicators of body image concern, and it was suggested that this may have been facilitated through the speed and ease in which individuals can connect with their peers online, providing the opportunity for multiple social comparisons, and consequential body image dissatisfaction (Tiggemann & Slater, 2013).

Appearance and social comparisons were also highlighted in a number of studies as a strong mediator in body image dissatisfaction. One study investigating the relationship between Facebook usage and body image concerns among female university students tested whether it was appearance comparisons in general or comparisons to specific target groups that

mediated this relationship. Findings indicated that frequency of Facebook usage was positively associated with body image concerns, which were mediated by appearance comparisons in general (Fardouly & Varanian, 2015). Similarly, a recent study by Choukas, Bradley, Nesi, Widman and Higgins (2018) investigated a construct related to women's experiences with SNS, appearance related social media consciousness (ASMC); the extent to which an individual's thoughts and behaviours reflect an on-going awareness of their attractiveness to a social media audience. It was found that higher levels of ASMC were positively associated with increased body comparison, in addition to higher body surveillance and lower self-esteem (Choukas et al., 2018). One longitudinal study also indicated that passive Facebook use has been shown to predict an increase in young boys' appearance social comparisons, which was subsequently associated with higher body dissatisfaction (Rousseau, Eggermont & Frison, 2017), whilst a recent study by Hanna, Ward, Seabrook, Jeralds, Reed, Giaccardi and Lippman (2017) demonstrated that social comparison and self-objectification mediate the relationship between body shame, Facebook use, self-esteem and mental health.

It has been emphasised that the direction of comparison plays a role in mediation. Ridolfi, Myer, Crowther and Ciesla (2011) showed that whilst social comparisons to media images and peers were associated with more frequent body checking in regards to weight and shape, the focus on upward comparisons was associated with greater body dissatisfaction and body checking, and comparisons to social media images and peers in general were not associated with an increase in body dissatisfaction. In addition to this, the findings of a recent survey demonstrated that passive SNS usage was also related to upward social comparison, which was consequently associated with users' lower self-evaluation (Wang, Wang, Gaskin & Hawk, 2017). Furthermore, the results also demonstrated that upward social comparisons mediate the relationship between passive SNS usage and subjective well-being, further indicating that upwards social comparison is an important variable associated with negative

psychological outcomes for individuals after using SNS (Wang, Wang, Gaskin & Hawk, 2017).

In addition to internalisation of ideals and appearance comparisons, self-esteem was also found as a mediator in body image dissatisfaction, and was often a co-mediator with comparison. A recent study by Sherlock and Wagstaff (2018) was conducted in two parts, consisting of both a correlational design and a mixed design. It demonstrated that heavier Instagram use was positively correlated with a range of psychological outcomes including lower self-esteem, body image disturbance and physical appearance anxiety, which was mediated by social comparison. These findings were also parallel with results of Hanna, Ward, Seabrook, Jerald, Reed, Goaccardi and Lippman (2017), who demonstrated that Facebook use was associated with both increased social comparison and self-objectification, which was subsequently associated with lower self-esteem, in addition to greater body shame and poorer mental health. In relation to this, it has been indicated that social comparison on Instagram also mediated the relationship between self-worth, dependent on the approval of others (Stapleton, Luiz & Chatwin, 2017). Although initial findings did not observe a direct association between Instagram use and self-esteem, the domain of self-worth in this study suggests that the intensity of Instagram use is influential, particularly when an individual's self-worth is contingent on approval from others online (Stapleton, Luiz & Chatwin, 2017). These findings highlight social comparison as a mediator across various dimensions of well-being, including self-esteem and body image dissatisfaction, indicating comparison on SNS as a strong factor in body image concerns.

The findings of the current studies demonstrate a number of mediating factors in the relationship between SNS use and body image concern. Whilst self-esteem and internalisation of ideals contribute to body dissatisfaction, comparisons with others whilst using SNS is a predominant factor in the development and maintenance of body image

concerns, particularly if such comparisons are upward in direction (Ridolfi et al., 2011). Additionally, it is suggested that high social comparison orientation SNS users are more likely to engage in upward social comparisons, and therefore face more detrimental effects in regards to self-evaluations and well-being (Wang et al., 2017). Such findings support the need for further exploration in potential body image and media literacy interventions to educate individuals about the impact of comparisons on SNS and well-being (Fardouly et al., 2015).

Discussion

The present systematic literature review aimed to provide an overview of the research available focussing on the influence of SNS usage on body image dissatisfaction. A total of 40 empirical studies were identified, with a focus on SNS usage frequency, SNS features and mediating variables that may contribute to the facilitation of body image concerns. Factors including SNS features and appearance comparison online were found to contribute to body image dissatisfaction. Parallels between body image dissatisfaction and BDD symptoms are also discussed, in addition to implications for future research.

Although problematic SNS use is not acknowledged as a diagnosis, there has been substantial research on excessive SNS use. From the studies presented, the lack of consensus in establishing the baseline between normal SNS use, excessive use and addictive use is highlighted. A majority of the studies use the number of hours spent on SNS or frequency of checking SNS as being indicative of excessive SNS use (e.g., Cohen & Blaszczynski, 2015; Fardouly & Vartanian, 2015; Choukas-Bradley, Nesi, Widman & Higgins, 2018). It has been suggested (in regards to Facebook usage) that using a broader concept of time allows for all activities and length of exposure on Facebook to be taken into account, in addition to their

potential joint influence on body image (Eckeler, Petya, Kalyango & Paasch, 2017). However, usage patterns are not the same across all SNS platforms (Jang, Park & Song, 2016), thus assessing total exposure time may not be comprehensive enough in understanding body image behaviour on SNS (Kim & Chock, 2015). This may be further implicated in that many studies focus only on Facebook, which arguably confines findings of SNS usage and subjective well-being outcomes to this particular site. Other studies included dimensional scales, such as the SMAQ (Hawi & Samaha, 2017) that assess use, SNS addiction and activities in all forms of social media, which are beneficial in that they provide a multidimensional perspective to understanding SNS use (Casale, Primi & Fioravanti, 2015). However, self-report measures that assess engagement with SNS tend to use high scores to correlate SNS use with negative outcomes (e.g., Boumolesh & Jalouk, 2017; Choukas-Bradley et al., 2018), in addition to relying on conscious and retrospective reports on usage, which cannot assess for specific behavioural activity on certain SNS platforms, such as type of engagement with images (Ellis, Kaye, Wilcockson & Ryding, 2018), making it difficult to pinpoint the extent to which specific appearance-based SNS use impacts body image satisfaction. Subsequently, if SNS research aims to extend into clinical assessment, a standardised baseline regarding SNS usage time needs to be implemented to allow for comprehensive comparison across findings, in addition to distinguishing between excessive and problematic SNS use. Indeed, it should be noted that one study within the present review determined a two hour cut-off for time on SNS as an indication for excessive use (Marengo, Longobardi, Fabris & Settanni, 2017), whilst another indicated moderate SNS use as between 30-60 minutes a day (Hanna et al., 2017). Studies that suggest spending two hours online may therefore be considered a recommended cut-off time in establishing frequent SNS use. In addition to this, methods that utilise objective assessment, whereby data are collected directly through the smartphone, can allow for the monitoring of user behaviour on SNS sites in real

time and provide further insight into specific appearance-based usage and user engagement on SNS platforms (Miller, 2012; Tossell, Kortum, Shepard, Rahmati & Zhong, 2015).

Nevertheless, the importance of clinical utility in the use of assessment scales is highlighted, and should be established in terms of presentation within clinical assessment.

In terms of gender, females endorsed a significantly higher time on SNS in comparison to males, which was also associated with appearance dissatisfaction. Findings suggest that females are more likely to spend an increased amount of time on SNS, resulting in higher weight and appearance concerns (Murray, Maras & Goldfield, 2016), and it may be argued that this is attributed to the motivations of SNS use. That is, findings demonstrate that women are more likely to use SNS to search for information and compare themselves to others as opposed to males (Haferkamp et al., 2012). This may be reflected in the higher levels of SNS use, suggesting that women actively go online more frequently to seek and obtain certain gratification in regards to appearance comparison (Scott et al., 2017). This was further supported by Marengo, Longobardi, Fabris and Settanni (2018), who found that females are more likely to use highly visual SNS as opposed to males, which consequently leads to greater body image dissatisfaction; such effects were stronger when SNS usage was above two hours a day. Arguably, it was highlighted in this review that 20 studies were conducted with young female samples, with a lack of male inclusion, which may not accurately reflect SNS usage and gender differences wholly; indeed, findings were shown to be contradictory in studies that did include male samples (Haferkamp et al., 2012; Rousseau, Eggermont & Frison, 2017). Whilst more recent research is beginning to include male-focussed samples (Stratton et al., 2015; Abbas & Karadavut, 2017), further research is needed to capture SNS usage and well-being outcomes in males.

Whilst the studies in the present review supported the relationship between SNS use and body image concerns, differential body image concerns were also highlighted. In parallel to

previous research on traditional forms of media, much research focussed on body image concerns considering the drive for thinness and weight. Indeed, internalising ideals was a strong mediating factor in the drive for both weight and muscle dissatisfaction in a number of studies (e.g. Daniel & Bridges, 2010; Tiggemann & Slater, 2013; Cohen, Newton-John & Slater, 2017), and it could be suggested that individuals reinforce their self-concept and self-perceptions of attractiveness through selectively attending media content, which subsequently produces a drive for self-improvement (Rousseau, Eggermont & Frison, 2017). In comparison, one study found that Facebook use had no direct effect on body satisfaction, or the desire to change weight or shape (Fardouly et al., 2015). Rather, for women high in appearance comparisons, Facebook usage was associated with greater desire to change face, hair and skin related features (Fardouly et al., 2015). It has been indicated that women are more likely to upload portrait pictures onto SNS, as opposed to full body pictures, which may provide increased opportunities for facial, skin and hair related comparisons (Haferkamp et al., 2012), which may have contributed to the differential findings of this study. It was noted, that many of the measures used to assess body image concerns within this review included the PACS and BSQ, which focus on weight and body shape comparisons. This may have subsequently biased findings towards weight-related body dissatisfaction. Indeed, the popularity of selfies (self-portrait pictures) has dramatically increased (Chae, 2017); research has shown that individuals are more likely to have an idealised virtual self-image when editing their own selfies (Halpern, Katz & Carril, 2017), whilst those exposed to others' edited selfies are more likely to experience an increased desire to change facial appearance, through reduced self-esteem (Borges, 2011). Such findings suggest that increased pressure about appearance concerns may therefore be contextually changing towards facial dissatisfaction, and indicates that measures focussing on facial dissatisfaction, such as the FACE-Q, which assesses overall satisfaction with facial appearance (Pusic, Klassen Scott &

Cano, 2013), may be advantageous to use in future research, either solely or in conjunction with body shape measures. Nevertheless, it is important to consider the impact of SNS in terms of broader appearance constructs, beyond a focus of weight and shape body dissatisfaction.

Furthermore, it was demonstrated that various features of SNS mediated the relationship between body image dissatisfaction and SNS use. In particular, appearance-focussed SNS use and passive SNS use were associated with the facilitation of body image dissatisfaction (Meier & Gray, 2014; Tiggemann & Zaccardo, 2015), emphasised through the mediation of appearance comparisons. Indeed, longitudinal research has indicated that passive Facebook use predicts an increase in individuals' appearance comparisons, which was consequently associated with higher body dissatisfaction (Rousseau, Eggermont & Frison, 2017). It could be suggested that individuals' use SNS as a source of information to improve physical appearance may consequently motivate users to seek comparison targets to evaluate and compare their appearance to (Rousseau, Eggermont & Frison, 2017). This may therefore lead to increased passive SNS use, photo-based SNS activity and higher body image dissatisfaction. However, in regards to appearance-focussed SNS activity, other studies highlighted it correlated with some body image measures (e.g., thin ideal internalisation), but not others (e.g., appearance evaluation) (Meier & Gray 2014; Cohen, Newton-John & Slater, 2017), indicating that not all SNS features relate to body image concerns in the same way. Arguably, it was noted that these studies focussed on Facebook, which also includes an array of activities surrounding news, games and events, in addition to photo-based features (Horzum & Demirhan, 2017), and so it may be that the context of appearance-focussed use was implicated by other features specific to Facebook. Platforms such as Instagram, which focus on a highly image-based environment, may have a stronger association with body image dissatisfaction. This indicates that measures chosen to assess such constructs may not

be adequately sensitive to different SNS environments and suggests that the development of body image measures specific to differential SNS environments would be beneficial for future research.

The role of comparison was highlighted as a predominant mediating factor in the relationship between SNS and body image dissatisfaction. Upward comparisons in particular were demonstrated to be most detrimental, leading to stronger appearance-focussed cognitive distortions (Ridolfi et al., 2011). This remains consistent with prior research that demonstrated negative comparison leads to maladaptive cognitions (Nolen et al., 2008). Indeed, SNS tend to exhibit idealised photos and information, usually altered and exaggerated by users who upload them (Tiggemann & Ziccardo, 2015), and it is therefore likely that individuals who are exposed to such information may feel more personally inadequate in their appearance. Findings reflected this; it was demonstrated that comparisons mediated levels of self-esteem, with increased comparison being associated with lower self-esteem, subsequently leading to greater body shame (Hanna et al., 2017). However, due to the cross-sectional nature of many studies, causal inferences cannot be drawn in terms of comparison processes. For example, it has also been suggested that individuals who already experience distorted appearance-focused cognitions may place higher value on aesthetic appearance and therefore are more likely to evaluate themselves physically through comparison targets online (Ridolfi et al., 2011). Causality should therefore be supported directly through experimental studies, or further informed by longitudinal design. Nevertheless, it is highlighted that appearance comparisons are a strong mediator across dimensions of well-being, including body image dissatisfaction and self-esteem.

Following this, although BDD was not explicitly compared with body image dissatisfaction and SNS use within any of the presented studies, parallels between BDD and body image behaviours and concerns are highlighted. The role of comparison is perhaps the most

predominant feature shared between individuals with body image dissatisfaction and BDD. Indeed, symptoms of BDD include the performance of repetitive behaviours, such as reassurance-seeking and comparison (Kelly et al., 2013), strong mediators in body image dissatisfaction and SNS use. More specifically, prior research has shown that BDD individuals report increased levels of comparison when comparison targets are high in both overall attractiveness and in the attractiveness of specific features the BDD individual was concerned about (Anson, Veale & Miles, 2015). It has been proposed that such upward comparison may contribute to the maintenance of BDD symptoms through (i) amplifying appearance-related focus and preoccupation, (ii) reinforcing selective focus on their specific body part, subsequently heightening awareness in the perceived defect, and (iii) contributing to the biased view of the appearance of others as a whole (Anson, Velae & Miles, 2015). This is consistent with the studies in the present review, which indicate that higher frequency of upward comparisons is associated with increased negative evaluation and body image dissatisfaction, and suggests that high frequency of appearance comparisons on SNS may facilitate the development and maintenance of BDD symptoms.

Furthermore, as many of the present studies suggest, body image dissatisfaction associated with SNS was largely related to weight and shape concerns. Prior research has suggested that individuals with BDD weight concerns tend to exhibit a wider range of body preoccupations and higher level of symptom severity, which are not necessarily attributed to the presence of weight concerns (Kittler, Menard & Phillips, 2007). That is, people with BDD tend to focus on specific body parts, with the skin, hair and nose being the most reported body areas of concern (Phillips, Menard, Fay & Weisberg, 2005), and it could be suggested that this was reflected in the differential results of Fardouly et al. (2015). Further supporting this, a recent case report by Khanna and Sharma (2017) highlighted that excessive selfie use was used as a safety behaviour to manage the distress related to BDD, with appearance concerns of the

client focussing on the nose, complexion and hair, with further assessment of the client revealing the presence of problematic internet use, in addition to excessive levels of mobile and Facebook use (Khanna & Sharma, 2017). This indicates that SNS may play a role in the maintenance of BDD and further emphasises the need increased awareness of SNS use within clinical assessment. However, concerns related to body shape and weight can characterise patients with BDD, in addition to those with Muscle Dysmorphia (MD), a subtype of BDD that is characterised by not being satisfactorily muscular or lean (Klimek, Murray, Brown, Gonzales & Blashill, 2018). Gender differences may be attributed to differential body image concerns, which have been highlighted in the focus of aesthetic fixation between males and females in terms of BDD; women are more likely to focus on the face, weight, stomach and breasts, whereas men are more likely to focus on body build, hair and genitals (Phillips, Menard & Fay, 2006). Indeed, such concerns are found to be consistent with the findings in the present review, and were particularly emphasised in studies surrounding male samples, in which muscle dissatisfaction and drive for muscularity was highlighted (Daniel & Bridges, 2010; Stratton et al., 2015). This suggests that SNS comparisons and self-evaluation is not necessarily limited to facial and head preoccupations in terms of the development of BDD symptoms, and demonstrates an implication that should be considered in terms of future BDD research in the context of body ideals presented on SNS.

Similarities in prevalence were also highlighted in terms of SNS usage and BDD. Young adults have been indicated to be the most active users on SNS, with findings from the present study showing that females spend more time online (Murray, Maras & Goldfield, 2016; Smith & Anderson, 2018). Consistent with this, recent research has demonstrated that the prevalence of subthreshold BDD is significantly higher in older adolescents, in addition to being more predominant in females (Schneider, Mond, Turner & Hudson, 2017), indicating frequent SNS use as a potential risk factor in the development of BDD in consideration of

prevalence levels. It is noted however, that whilst subthreshold disorders do not meet full diagnostic criteria, they do involve the presence of core symptoms and impairment, which has been shown to predict clinical manifestations of the disorder (Wolitzky-Taylor, Dour, Zinbarg, Mineka, Vrshek-Schallhorn, Epstein et al., 2014). Therefore, it could be suggested that individuals who seek to use SNS to compare themselves to others (Scott et al., 2017), may present subthreshold BDD symptoms, making them vulnerable to the onset of the clinical manifestation of the disorder. Since subthreshold BDD does not represent an ordinary level of appearance concern (Schneider et al., 2017), future research should consider the identification of subthreshold BDD presentations in SNS use and body image research.

Limitations

The current systematic review is not without limitations. The terms social media and SNS are often used interchangeably, but they are not the same (Kuss & Griffiths, 2017). Social media encompasses a wide range of social applications which refer to the producing, sharing and collaborating online; therefore engaging in SNS regards a specific type of social media use (Kuss & Griffiths, 2017). Subsequently, the review included studies that did not specifically discern the definition of social media, in addition to including a range of different SNS platforms (e.g. Facebook, Instagram) as opposed to focussing on one specific platform, which may have implicated the conclusions drawn. Moreover, research in the area of SNS and body image is constantly growing, and it is likely that studies that are in the process of submission or that have been published since have not been included within the review.

Conclusion and Implications

Overall the type of engagement on SNS, in particular passive use and appearance-focussed SNS use, was found to be significantly associated with greater body image dissatisfaction. If SNS research aims to extend into clinical assessment, a standardised baseline needs to be established in terms of SNS frequency, to distinguish between normal, excessive and addictive SNS use, to allow for comprehensive comparison within findings. Additionally, in terms of SNS features, further attention needs to be paid towards platforms other than Facebook. Although Facebook contains an array of various activities, measures that have been chosen to assess appearance-based constructs may not be sufficiently sensitive to different online environments. It is suggested that the development of body image measures that are specific to differential SNS environments would be beneficial for future research, and would allow for more comprehensive insight into the specific features of SNS that contribute to body image disturbance. Furthermore, it is highlighted that parallels appear apparent between body image dissatisfaction and BDD symptomatology, particularly in terms of comparisons and prevalence of SNS usage. It is suggested that frequent SNS comparisons may mediate the onset of subthreshold BDD, leading to increased SNS usage and maintenance of BDD symptoms. Considering the detrimental impact clinical BDD can have, future research needs to extend to assess SNS as a risk factor in the development of BDD symptomatology.

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