Concern About Appearance on Instagram and Facebook: Measurement and Links With Eating Disorders

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Abstract

Appearance-related use of Social Networks (SNs) exhibits a clear relationship with the risk of eating disorders (ED). To determine which components of appearance-related use are most important for the detection and prediction of ED, it is necessary to measure concern about appearance on SNs in detail. The two main objectives of this study are to develop and validate the Concern about appearance on SNs scale (CONAPP), and to analyze the relationships between concern about appearance on SNs and the risk of ED. A total of 576 Spanish women over 18 years old, with an average age of 28.88 (SD = 11.14), participated in an online survey. We evaluated the use of the two most-commonly used SNs (Facebook and Instagram), concern about appearance on SNs, and eating attitudes (the latter through the Eating Attitudes Test-26). The psychometric properties of the CONAPP questionnaire were excellent. Strong positive correlations were found between concern about appearance on SNs and risk of ED. The pattern differed between users of Facebook and Instagram. Instagram users were younger, demonstrated higher risk of EDs and higher scores in the CONAPP questionnaire. The implications of the results for the prevention of ED are discussed.

Keywords: Eating disorders risk; social media; appearance comparison; body image; Facebook use; Instagram use

Introduction

The internet and social networks (SNs) are widely used. There are an estimated 4.388 billion internet users around the world, representing 57% of the total population, and 3.484 billion SN users (Global Digital Report, 2019). The most widely-used SN is Facebook (FB), which is generally used by all ages (Smith & Anderson, 2018). However, Instagram (IG) is the most widely-used highly-visual social media (Global Digital Report, 2019), and is particularly popular with 18 to 25 year-olds (Smith & Anderson, 2018). Although these SNs have similar structures, IG places more importance on images in its publications, while FB emphasizes text. Thus, IG can be considered highly-visual social media (Marengo et al., 2018).

The widespread use and implementation of SNs has triggered interest from behavioral researchers. Eating disorders (ED) are one of the most widely-studied disorders related to SNs due to appearance comparison factors (Burnell et al., 2019; Fardouly & Vartanian, 2015). Appearance comparison on SNs is often accompanied by feedback (i.e., comments or likes), which may be positive or negative (Burnell et al., 2019; Fardouly & Vartanian, 2015). It is this negative feedback that is related to the risk of EDs (Hummel & Smith, 2015; Tiggemann & Barbato, 2018).

Most studies confirm that there is a relationship between ED risk and SN use, but the strength of this relationship depends largely on how SN use is measured. To date, research evaluating this relationship has focused on frequency of use rather than motives for use. This may be a problem because frequency of use alone is not a reliable predictor of ED, whereas photo-based behaviors are. The present study will attempt to overcome this problem, designing a new specific measuring instrument for the evaluation of concern about appearance on SNs. The instrument will be validated initially only with women, as they have a higher prevalence of ED (Striegel-Moore et al., 2009). Within this context, the general objective of the present study is to analyze the relationship between concern about appearance on SNs and the risk of ED. This general objective is broken down into two more specific objectives. The first focuses on the development of a new measuring instrument to assess concern about appearance on SNs. The second specific objective is to study the relationships between concern about appearance on SNs and the risk of eating disorders in detail. We expect this relationship to be positive, in line with previous studies (Mingoia et al., 2017).

Concern About Appearance on SNS

Appearance comparison has been studied in connection with traditional media and the thin ideal-body it shows, which has caused body dissatisfaction (Grabe et al., 2008). However, SNs have been proven to produce more body dissatisfaction and higher risks of ED than traditional media (Cohen & Blaszczynski, 2015). The use of SNs in relation to the risk of EDs has been measured in various ways. Most studies, according to Holland and Tiggemann (2016), have measured overall use as frequency of use, which is an insufficiently detailed measure. This is because frequency of use is not a faithful reflection of how SNs have been used. For example, knowing that someone used SNs for one hour does not tell us whether they have published a retouched photo, or the reasons for publishing it. In order to determine whether someone's use of SNs is maladaptive, we need questionnaires that are more specific about that use.

In this regard, appearance-related use on SNs are those activities that are specifically related to appearance (e.g., looking at photographs) (Mingoia et al., 2017). The difference between *appearance-related use* and *concern about appearance on SNs* is in the consequences of the use. Appearance-related use of SNs is inherent in the use of SNs, as much of the functionality is based on exposure to photos and numerical indicators of social acceptance (e.g., likes). However, the problem arises when that use begins to cause excessive worry. In short, concern about appearance on SNs is defined as preoccupation about physical appearance (e.g., how I look in a photograph) or social appearance (e.g., having more likes than other photos do) on SNs which has negative consequences on a person's life. As far as we are aware, ours is the first questionnaire to evaluate this.

One questionnaire that does partly evaluate appearance-related use is the Facebook Questionnaire (FBQ) from Meier and Gray (2014), focused on the use of images. This questionnaire, besides asking about overall FB use, asks eight specific questions about photo-based activity (e.g., updating profile photos, viewing friends' photos of themselves or commenting on friend's photos). This questionnaire assesses appearance-related use, or photo-based activity on SNs, but it does not address concern about appearance, because it does not assess whether that photo-based activity is the cause of preoccupation, which would be concern about appearance. The FBQ was used by Cohen et al. (2017) to measure both overall use and appearance-related use. They found that appearance-related use on SNs rather than overall use was associated with body dissatisfaction and thin ideal internalization. Another study that included a subscale on appearance-related use on SNs was McLean et al. (2015), which, in addition to measuring active FB use, included items about the frequency of taking selfies, sharing selfies, photo investment, and photo manipulation. This questionnaire is closer to concern about appearance on SNs as it includes the subscales *Photo investment* and *Photo manipulation* which include the use of filters and people's emotional investment in SNs. However, it does not include other aspects of concern about appearance on SNs such as planning photos or concern about feedback.

In summary, the use of SNs has been measured in various ways, and appearance-related use is most closely related with ED risk. In this study, we suggest that appearance-related use is inherent in SNs and is not negative in itself, which is why we developed the concept of concern about appearance on SNs. Based on the literature, we differentiate four areas, that will be captured in the CONAPP scale we developed. These are *Photo Preparation*, *Social Comparison*, *Strong concern about social media presence,* and *Influence of SN involvement in day-to-day life*. These four areas may seem different, but they refer to the same construct, as they all involve behaviors of concern

about appearance on SNs. Because of this, and despite theorizing the existence of these four areas that might be possible to interpret independently, they continue to be parts of a single unidimensional reality, which is concern about appearance on SNs.

Photo Preparation

This refers to the most obvious of the behaviors related to concern about appearance on SNs: the care taken over photographs. *Photo Preparation* on SNs can be through internally photographic means (filters, programs, image quality, etc.), which are correlated with ED risk (McLean et al., 2015; Tiggemann et al., 2020), or external means (makeup, choice of location, lighting, etc.) which are also related to ED risk (Chua & Chang, 2016; Cohen et al., 2018; McLean et al., 2015; Yellowlees et al., 2019). Other questionnaires have addressed elements in this area, such as Cohen et al. (2018), who found that *Photo Investment* in selfies was related to the risk of ED. Another aspect of care taken over photographs, not addressed by *Photo Investment* in McLean et al. (2015), is meticulous planning and preparation. The women taking part in the qualitative study by Chua and Chang (2016) reported that rather than spend a lot of time choosing a photograph, they would instead plan it meticulously. This level of preparation was also clear in the study by Yellowlees et al. (2019), in which the number of offline or attempted selfies was related to severe ED symptoms. Care over photos can also be taken by using various technologies for manipulation (McLean et al., 2015; Tiggemann et al., 2020).

Social Comparison

This area attempts to evaluate social comparison on SNs related to ED (Saiphoo & Vahedi, 2019). Comparisons on SNs can be with celebrities or influencers, as well as with peers, the latter being a particularly important group in relation to the risk of ED (Fardouly & Vartanian, 2015). In their experimental work on IG, Jin et al. (2018) found that people who tended to make social comparisons did so regardless of the type of photo (selfie, group selfie, or photos taken by others), and this comparison was much more common between peers. This result was confirmed in the study by Hogue and Mills (2019) which used FB and IG profiles. One form of comparison that is specific to SNs is the possibility of having feedback on what is posted via the number of *likes*. According to Tiggemann et al. (2018) being preoccupied by the number of *likes* is closely related to the risk of ED. The importance that SN users place on numerical indicators, either *likes* or the number of followers, was also identified in the study by Chua and Chang (2016), who found that women saw them as a form of social recognition and recognition of their physical appearance.

Strong Concern About Social Media Presence

This area avoids assessing concern about the absolute number of followers (or friends on FB), which has produced conflicting results in previous studies (Holland & Tiggemann, 2016). The aim is to assess the concern about getting more followers regardless of the current number. This area is important as it is an indicator of social prestige and may be used for comparisons (e.g., "I have more followers than someone else"). In addition, it may indirectly increase the impact of images: the more followers a person has, the greater the chances of having interactions via those photos.

Influence of SN Involvement in Day-To-Day Life

The aim of this area is to evaluate the impact on people's routines of two uses of SNs: Problematic use of SNs and the consequences of concern about appearance on SNs. Problematic use of SNs has consequences, including lack of control, loss of a sense of time, concern about the excessive use of SNs, and general neglect of other activities (Boursier et al., 2020; Charlton & Danforth, 2007; Van den Eijnden et al., 2016), it has also been related to ED risk (Kamal & Kamal, 2018). It is also possible to analyze the consequences of concern about appearance on SNs on aspects of people's daily lives, such as spending more time than wanted on the preparation of photos (Chua & Chang, 2016).

Concern About Appearance on SNs and ED Risk

The use of SNs has been linked to ED risk on multiple occasions. In order to better understand this relationship, it is necessary to explain how EDs are conceptualized in this study. The Statistical Manual of Mental Disorders, 5th edition (DSM-5) includes the following disorders in the entry on EDs: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge-Eating Disorder (BED), Other Specified Feeding or Eating Disorders (OSFED), and Unspecified Feeding or Eating Disorders (American Psychiatric Association, 2013). These disorders make up a continuum that people move along depending on the point in their lives (Fairburn & Harrison, 2003). According to Herpertz-Dahlmann (2015), most EDs can be characterized (particularly AN, BN, and some OSFED) by fear of putting on weight and a pathological worry about physical appearance and weight. Although there are significant differences between the types of ED, they have one very important risk factor in common, body dissatisfaction (Stice et al., 2011). In fact, this variable has been widely used in studies examining the relationship between appearance-related SN use (no study to date has assessed concern about appearance on SNs) and ED risk.

Holland and Tiggemann (2016) analyzed 20 studies that related SN use with body image concerns and the risk of ED, finding that this relationship existed especially in activities such as uploading photos and seeking negative feedback via status updates. They also found that in experimental studies, FB use caused greater appearance comparison than magazines and other appearance-neutral websites (Fardouly et al., 2015). In addition, this appearance comparison on FB had more negative effects on body satisfaction if comparisons were made with more attractive people (Haferkamp & Krämer, 2011) or people who weighed less (Lee et al., 2013). In addition, the experimental studies also indicated that FB use was linked to the maintenance of concerns about shape (Mabe et al., 2014). The meta-analysis by Mingoia et al. (2017) found a greater positive correlation between ED risk and appearance-related use of SNs than between ED risk and overall use of SNs.

In short, many studies have linked body dissatisfaction with the appearance-related use of SNs. The theoretical underpinning of why concern about appearance on SNs is related to risk of ED is the exposure to unrealistic images of an ideal of beauty which leads to dissatisfaction with the body (Meier & Gray, 2014). This effect has already been identified in traditional media such as magazines. However, on SNs there are an almost limitless number of images to compare oneself with (Perloff, 2014), as well as the possibility of modifying images (Hancock & Toma, 2009; Toma & Hancock, 2010), of being connected at any time (Tiggemann & Miller, 2010), and of getting feedback (Moreno & Koff, 2016).

Given that concern about appearance on SNs is a concept that is related to appearance-related use, we expect that the relationship between concern about appearance on SNs and body dissatisfaction will also be positive. Similarly, we expect the ED risk questionnaire used in this study, the Eating Attitudes Test-26 (EAT-26), to have a positive relationship with concern about appearance on SNs (both the subscales and the overall score). This is because ED risk, evaluated as body dissatisfaction in previous studies, has already been shown to be associated with appearance-related use. In addition, we also differentiate between the EAT-26 subscales in the analysis because, despite not distinguishing between disorders (Mintz & O'Halloran, 2000), it does differentiate between different risk behaviors, and it will be interesting to determine the relationship of those risk areas with concern about appearance on SNs.

Finally, it is worth highlighting the differences between SNs. Studies about SNs have focused mainly on overall FB use. However, IG is a SN with particular significance for ED risk because it is so image-focused (Fardouly & Vartanian, 2016). Numerous studies have found relationships between overall IG use and concerns about body image (Fardouly et al., 2017; Feltman & Szymanski, 2018; Hendrickse et al., 2017), with this relationship being more pronounced with appearance-related use (Jin et al., 2018), and stronger than on FB (Marengo et al., 2018). Therefore, we expect a stronger relationship between ED and concern about appearance on SNs with IG than with FB due to its focus on images, and the fact that it is used more by young people.

Method

Participants

Data collection was during October 2018. The sample comprised 576 women, aged between 18 and 62 years old (*M* = 28.88, *SD* = 11.14). Snowball sampling selection, a non-probability method, was used to obtain the sample. Participants who did not have or did not use FB and IG were removed from the study. The vast majority were of Spanish nationality (94.1%). In terms of education, 67.9% of the participants had university-level qualifications, 13.7% vocational training, 13.9% baccalaureate, 2.3% compulsory secondary education, 1.7% primary, and 0.5% other qualifications.

Measuring Instruments

Eating Attitudes Test-26 (EAT-26)

The EAT-26 assesses ED risk (Garner et al., 1982). We used the Spanish version by Gandarillas et al. (2003) in the present study. The EAT-26 consists of 26 Likert items with a range from 1 ("never") to 6 ("always"). The items are divided into three subscales: Dieting, Bulimia, and Food Preoccupation and Oral Control, with a total score also being obtained. The *Dieting* subscale has 13 items about behavior avoiding fattening foods and concerns about thinness (e.g., "I know how many calories there are in the foods I eat"). The *Bulimia and Food Preoccupation* subscale has 6 items about bulimic behaviors and thoughts about food (e.g., "I vomit after eating"). Finally, the *Oral Control* subscale has 7 items about self-control of eating and pressure from others to gain weight (e.g., "I try not to eat even if I'm hungry"). The internal consistency (Cronbach's α) is .88 for the total scale,.88 for the Dieting subscale, .77 for Bulimia and Food Preoccupation, and .79 for Oral Control (Gandarillas et al., 2003). We assessed scores for the three subscales, as they were part of the validation by the authors. We also considered a total score as the scores for the three subscales were correlated with each other.

Concern About Appearance in Social Networks (CONAPP)

The CONAPP questionnaire was developed specifically for this study, and its objective is the evaluation of concern about appearance on SNs. Until now, there has been no measuring instrument for evaluating this construct, so it was necessary to develop a new one. We followed the recommendations in current psychometric literature in constructing it (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 2014; Downing, 2006; Downing & Haladyna, 2006; Drasgow, 2016; Irwing et al., 2018; Lane et al., 2015; Linn, 2011; Muñiz & Fonseca-Pedrero, 2019; Van der Linden, 2017). To that end, the first step was to define the variable to be measured. We performed a literature review and developed four theoretical areas for concern about appearance on SNs. These content areas were intended to thoroughly sample the construct being evaluated to ensure content validity. At no time were they considered as possible factors or dimensions because the aim was to produce an essentially unidimensional scale, which would allow the production of a global score for the individuals being evaluated (Calderón et al., 2019).

The next step was the construction of a sufficiently broad bank of 52 items to address these theoretical areas. Those items were assessed via two strategies: expert assessment and psychometric analysis. The items were evaluated by an expert in SNs and three experts in psychometry. They used a judgmental approach, evaluating aspects related to the appropriate formulation of items, and their knowledge and expertise, attempting to avoid any kind of ambiguity that items might produce in the participants. If there were doubts raised about any items, they were eliminated. This led to 11 items being removed. With the 41 remaining items, we calculated various psychometric indicators, discarding 10 items with low discriminative power (discrimination indices below .40) and with lower factorial loadings. The final scale comprised 31 items.

The questionnaire was presented to the participants in Spanish. The items had 6 Likert-type response options, 1 being "Never" and 6 "Always." No reversed items were included to avoid the biases that these may produce (Suárez-Alvarez et al., 2018). The formulation of the items was such that it can be used for any SN that has photographic component similar to IG and FB, which is a clear advantage over other SN-use questionnaires that

have focused solely on FB. The theoretical areas and the final items in each area are: *Photo Preparation* (items: 7, 12, 4, 13, 14, 23, 3, 28, and 21)*, Strong concern about social media presence* (items: 10, 24 and 15)*, Social comparison* (items: 22, 26, 8, 11, 29, 31, 5, 25, 30 and 18)*,* and *Influence of SN involvement in day-to-day life* (items: 20, 16, 19, 9, 17, 1, 2, 6, 27).

A short version (CONAPP-S) was created to be used where limitations of time prevent the full scale from being a practical option. It is made up of the ten items with the highest factor loadings: 6, 8, 10, 12, 15, 16, 21, 24, 25, 27 (Table 1).

Table 1. *Questionnaire for Assessing Concern About Appearance on Social Networks (CONAPP).*

1	When I participate in a social activity, I feel the need to take a picture
2	I get myself ready depending on whether I'm going to take a picture [or not]
3	I use photographic programs to edit my photographs
4	I go to specific places to take pictures of myself and upload them
5	I like to be alone in profile pictures
6	I buy clothes thinking about the photographs I'm going to take wearing them
7	Immediately after taking a picture of myself I zoom in to see how I look
8	I compare the *likes* I receive with those other people receive
9	People close to me complain that I use social networks too much
10	I'm worried about how to get more followers
11	If someone stops *liking* me, I also stop *liking* them
12	I check if I came out well before uploading a photo
13	I use elements that may pleasing to people in order to have more *likes*
14	I hide certain parts of my body in photographs
15	I plan the moment of uploading photographs to have more *likes*
16	I spend more time than I should taking, editing, and uploading pictures
17	When I am with other people, I look at social networks
18	I worry about being uglier in person than in pictures
19	I look frequently to see if I have any news in social networks
20	I have lost track of time using social networks
21	I take several photographs until I think I look good
22	If I see the pictures of a friend or acquaintance that I think is more beautiful than me, I feel bad about myself
23	I take pictures only if I have got myself ready
24	When the number of *likes* I get on a picture is low, I worry
25	I aim for my number of followers to be greater than the number that I follow
26	I look at the physical appearance of influencers
27	When I have uploaded a photograph, I am tense thinking about how many *likes* I have
28	I use filters on photographs
29	I have pictures of myself in the usual poses on the Internet
30	I check who *likes* my photographs
31	I feel alone when I see the social activities of other people on the net

Overall Use of Social Networks

The assessment of overall use of SNs was carried out using the same question for each of the SNs studied: How much time do you spend looking at FB on any given day? How much time do you spend looking at Instagram on any given day? The question has six categories: I don't have it or I don't use it, Very little time, Some time, Quite a lot of time, A lot of time, And Too much time. For the analyses, scores from 1 to 6 were assigned to each of the categories of the scale.

Procedure

The participants completed the online survey anonymously and voluntarily, giving their informed consent before starting. Participants were initially contacted through various SN pages and sites.

Data Analysis

The psychometric properties of the tests used were analyzed, both from the perspective of classical theory and item response theory (Muñiz, 2018). We used exploratory factor analysis (EFA) to study the internal structure using unweighted least squares (Lloret-Segura et al., 2014). We chose EFA because in this first validation study for the instrument, the authors believed it was a risk to pose strict hypotheses about the dimensionality of the instrument, as a CFA would require. We used a Polychoric Correlation Matrix between items because the items were Likert type and the distribution did not exhitit normality. The procedure for determining the number of factors was the optimal implementation of parallel analysis (PA) (Timmerman & Lorenzo-Seva, 2011). We estimated reliability using the Cronbach (1951) α coefficient, and McDonald's (1999) ω coefficient. Within the item response theory (IRT) framework, we estimated reliability using the information function.

We used Pearson correlations to examine the relationship between concern about appearance on SNs and ED risk, and performed stepwise multiple linear regression taking the scores in EAT-26 as the criterion variable and using age, FB use, IG use, and CONAPP as predictor variables. Partial correlations were calculated between IG and FB use and ED risk, controlling for the effect of CONAPP. For the IRT analyses, we used Samejima's (1997) Graded Response Model. The EFA was carried out using the FACTOR program (10.10.01 version) (Lorenzo-Seva & Ferrando, 2006). The IRTPRO (4.2 version) (Muraki & Bock, 2003) was used for the IRT analyses. The other analyses were performed using the SPSS statistical package (version 22.0).

Results

Psychometric Properties of the CONAPP Questionnaire

Table 2 shows the descriptive statistics of the CONAPP test items. All the discrimination indices (DI) were above .40 since the original items with lower values were eliminated in order to enhance the unidimensionality of the questionnaire, and thus allow a global score to be produced. IRT-a parameter values ranged from .88 to 2.36.

Figure 1. *Information Function of the CONAPP Questionnaire*.
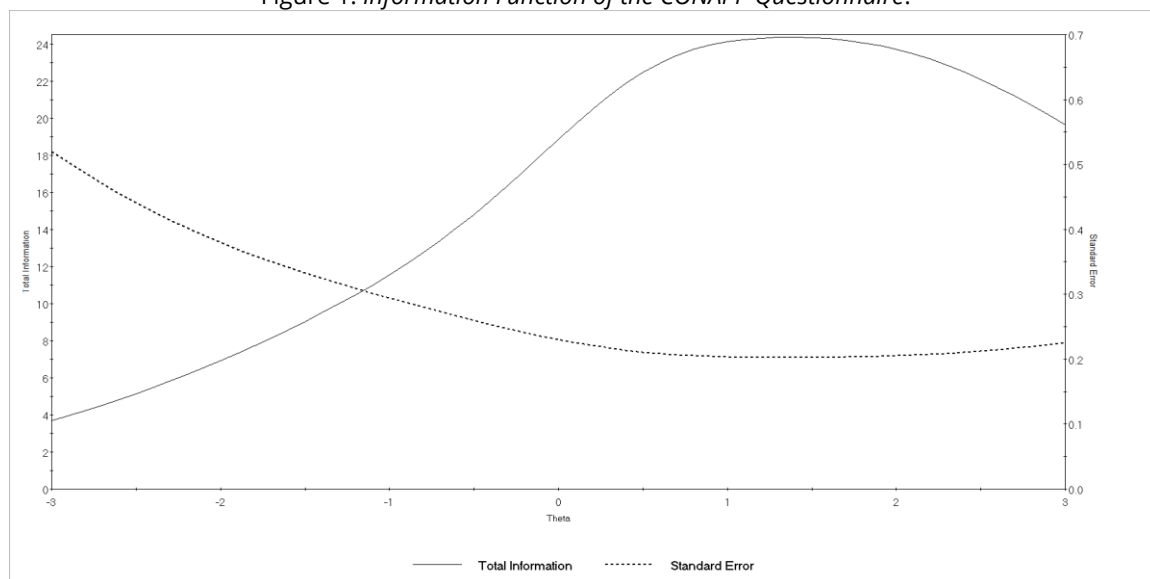
The suitability of the data for factor analysis of the CONAPP scale items was tested with the KMO test (KMO = .94) and the Bartlett test ($p \leq .001$). The PA (Calderón et al., 2019; Timmerman & Lorenzo-Seva, 2011) suggested the presence of a single factor. This result was supported by the GFI indicators (.96), which were greater than .95, indicating a good fit (Ferrando & Anguiano-Carrasco, 2010); the explained variance (42.06%); and the RMSR (.08),

indicating an acceptable fit (Ferrando & Anguiano-Carrasco, 2010). The factor loadings, shown in Table 2, ranged between .47 and .76. All these results indicate that the test can be understood as essentially unidimensional (Calderón et al., 2019).

In terms of reliability, the CONAPP had an alpha coefficient of α = .95 (Cronbach, 1951), and an omega coefficient of ω = .95 (McDonald, 1999), which can be considered optimal values according to the European model of test quality assessment (Muñiz, 2018). On the other hand, the information function indicates that the CONAPP questionnaire is more accurate for relatively high levels of the trait evaluated (above Θ = -1), as Figure 1 shows.

Table 2. *Descriptive Statistics and Factor Analysis of the Items of the CONAPP Questionnaire.*

Items	M	SD	Skewness	Kurtosis	Discrimination Index	a	Factor loadings
1	2.65	1.16	0.39	-0.30	0.55	1.32	0.60
2	2.24	1.33	0.98	0.25	0.57	1.45	0.64
3	2.34	1.63	1.08	-0.02	0.55	1.45	0.63
4	1.76	1.12	1.70	2.78	0.55	1.62	0.66
5	3.09	1.51	0.43	-0.68	0.42	1.04	0.47
6	1.23	0.66	3.36	12.43	0.45	1.94	**0.67**
7	3.65	1.56	-0.05	-0.95	0.52	1.24	0.55
8	1.76	1.12	1.60	2.24	0.59	1.85	**0.71**
9	1.89	1.10	1.26	1.21	0.40	0.88	0.48
10	1.43	0.83	2.17	4.89	0.54	1.92	**0.70**
11	1.77	1.13	1.71	2.79	0.46	1.25	0.56
12	4.46	1.69	-0.70	-0.83	0.60	1.74	**0.69**
13	1.81	1.07	1.48	2.12	0.53	1-42	0.62
14	2.41	1.42	0.84	-0.04	0.43	0.97	0.47
15	2.02	1.49	1.30	0.52	0.66	2.31	**0.77**
16	1.39	0.83	2.40	6.72	0.58	2.36	**0.76**
17	2.79	1.05	0.62	0.54	0.49	1.08	0.52
18	1.82	1.34	1.80	2.44	0.46	1.36	0.58
19	3.34	1.28	0.06	-0.60	0.61	1.50	0.65
20	2.65	1.31	0.48	-0.50	0.53	1.20	0.58
21	3.26	1.59	0.17	-1.01	0.69	1.93	**0.74**
22	1.70	1.14	1.86	3.18	0.48	1.37	0.59
23	2.20	1.33	1.08	0.55	0.50	1.26	0.57
24	1.50	0.89	2.14	5.11	0.61	2.30	**0.76**
25	1.79	1.48	1.87	2.29	0.52	1.78	**0.68**
26	2.38	1.59	0.8	-0.48	0.59	1.36	0.62
27	1.57	1.02	2.10	4.45	0.58	2.04	**0.71**
28	2.82	1.55	0.49	-0.76	0.61	1.58	0.65
29	1.89	1.16	1.3	1.14	0.58	1.62	0.66
30	2.77	1.52	0.55	-0.60	0.44	1.06	0.49
31	1.78	1.18	1.61	2.12	0.46	1.20	0.54

Note. Items in bold make up the short version of the scale (CONAPP-S); a = IRT Discrimination parameter.

Psychometric Properties of the Short Version CONAPP-S Questionnaire

The adequacy of the data for factor analysis of the CONAPP-S scale items was tested with the KMO test (KMO = .90) and the Bartlett test ($p \leq .001$). The PA (Calderón et al., 2019; Timmerman & Lorenzo-Seva, 2011) suggested the presence of a single factor. This result was supported by the GFI indicators (.99), which were greater than .95, indicating a good fit (Ferrando & Anguiano-Carrasco, 2010); the explained variance (57.4%); and the RMSR (.06), indicating an acceptable fit (Ferrando & Anguiano-Carrasco, 2010). The factor loadings ranged between .62 and

.79. All these results indicated that the test can be understood as essentially unidimensional (Calderón et al., 2019). The reliability of the CONAPP-S was excellent, giving an alpha coefficient of α = 92 (Cronbach, 1951), and an omega coefficient of ω = .92 (McDonald, 1999), which are both excellent values according to the European model of test quality assessment (Muñiz, 2018). The Pearson correlation between CONAPP and CONAPP-S was .91 ($p \leq$ .001, N = 576).

Concern About Appearance on SNs and ED Risk

Correlations were calculated between the scores of the participants in the CONAPP test, the total score and sub-scores of the EAT-26, the level of overall FB use, the level of overall IG use, and age (Table 3). The highest correlation was between EAT-TOTAL and CONAPP (r = .38, $p \leq$ .001); the subscale with the highest correlation was Bulimia and Food Preoccupation and CONAPP (r = .33, $p \leq$ .001); the next was Dieting and CONAPP (r = .33, $p \leq$ .001), and the lowest correlation was found between Oral Control and CONAPP (r = .21, $p \leq$ .001).

The correlation between CONAPP scores and overall IG use was high (r = .64, $p \leq$ .001), while the correlation of CONAPP with overall FB use was low and negative (r = -.11, p = .008). The same tendency occurred to a lesser degree with the EAT-TOTAL score, the IG correlation being low and positive (r = .13, p = .002) and the correlation with FB being negative and very low (r = -.05, p = .275). The subscales followed the same trend. On the other hand, the correlation of EAT-TOTAL with IG was positive on all scales, but rather low: Bulimia and Food Preoccupation (r = .15, $p \leq$ .001) and Dieting (r = .10, p = .017). Finally, another relationship of interest is the negative correlation that was found, albeit weak, between IG use and FB use (r = -.11, p = .010).

Age was found to be negatively correlated with CONAPP (r = -.54, $p \leq$ .001), and to a lesser extent with EAT-TOTAL (r = -.13, p = .002). In addition, negative correlations were found with all EAT-TOTAL subscales, highlighting the correlation with Bulimia and Food Preoccupation (r = -.13, p = .002) and Oral Control (r = -.14, p = .001). Finally, there was a positive correlation of age with overall FB use (r = .32, $p \leq$ .001), and a strong, negative correlation with overall IG use (r = -.61, $p \leq$ .001).

Table 3. *Pearson Correlations Between CONAPP Scores, CONAPP-S Scores, the EAT-26 Questionnaire, Facebook Use, Instagram Use, and Age.*

	CONAPP	CONAPP-S	EAT TOTAL	Dieting	Bulimia	Oral Control	FB	IG	Age
CONAPP									
CONAPP-S	.91**								
EAT TOTAL	.38**	.31**							
Dieting	.33**	.25**	.94**						
Bulimia	.33**	.27**	.86**	.78**					
Oral Control	.21**	.19**	.50**	.26**	.23				
FB	-.11**	-.19**	-.05	-.01	-.03	-.12**			
IG	.64**	.59**	.13**	.10*	.15**	.06	-.11**		
Age	-.54**	-.54**	-.13**	-.06	-.13**	-.14**	.32**	-.61**	
M	70.19	20.43	54.06	27.19	10.62	13.58	2.62	3.20	28.88
SD	22.65	7.91	17.57	10.33	5.01	4.76	1.22	1.55	11.14
N	576	576	576	576	576	576	576	576	576
α	.95	.92	.89	.87	.81	.63			

Note: EAT TOTAL = EAT Total Score; Dieting = Dieting Subscale; Bulimia = Bulimia and Food Preoccupation Subscale; Oral Control = Oral Control Subscale; CONAPP =Total score of CONAPP; CONAPP-S = Total score of CONAPP-S; FB = Facebook Use; IG = Instagram Use.
*$p \leq$ .050, **$p \leq$ .010.

In order to more deeply explore the data in Table 4, we performed a multiple regression analysis, taking the overall EAT-26 scores as the criterion variable and FB use, IG use, age, and concern about appearance on SNs (CONAPP) as predictor variables. The two variables with the greatest weight in the regression model were CONAPP (β = .50) and IG use (β = -.18), which explained 40.4% of the differences in ED risk.

Table 4. *Values of the Stepwise Regression Equation for the Prediction Measured With the EAT-26 Scale*.

	R^2	F	B	B (95% CI)	SE	β	t
Model 1 EAT TOTAL	.40	55.99					
CONAPP			0.38	[0.31, 0.46]	.04	.50	10.01**
IG use			-2.08	[-3.18, 0.98]	.56	-.18	-3.71**

Note: EAT TOTAL = EAT Total Score; CONAPP = Total score of CONAPP; IG = Instagram Use.
*p ≤ .050, **p ≤ .010.

To examine the mediating role of CONAPP in the relationships between FB and IG use and ED risk we calculated the partial correlations between those variables, eliminating the effect of CONAPP. We performed this analysis in order to determine whether people's scores in CONAPP could explain part of the variance of the relationships between IG, FB, and ED risk. The correlation between FB use and ED risk (once the influence of CONAPP was removed) was practically null ($r = -.004$, $p = .922$). This practically-null correlation had already been found without controlling for the effect of CONAPP. For IG the correlation was a little stronger ($r = -.15$, $p < .001$). This correlation between IG use and ED risk without controlling for the effect of CONAPP was positive, but when we controlled for the effect of CONAPP, IG use was negatively correlated with ED risk. Thus, the variance explained by CONAPP was so large that without it there was practically no relationship between IG use and ED risk, this effect was less stark for FB use.

Discussion

The main objective of this study was to examine the relationships between concern about appearance on SNs and ED risk. This general objective was broken down into two more specific objectives. The first was the development and psychometric analysis of a new measuring instrument to assess concern about appearance on SNs (CONAPP) and the second analyzed the relationships between concern about appearance on SNs and the ED risk.

Concern About Appearance on SNs

With respect to the first objective, the psychometric properties of the questionnaire developed (CONAPP) were adequate: the reliability was excellent, showing an essentially unidimensional structure. Following this first study, it would be useful for future studies to perform confirmatory factor analysis with larger samples. Below, we discuss how the four areas theorized in the final version of CONAPP and CONAPP-S were represented. Following that, we discuss the differences between CONAPP and CONAPP-S in more general terms.

In the final version of CONAPP, the theorized area which was reduced the most was "Strong concern about social media presence". In addition, within the area "Influence of SN involvement on day-to-day life", the items referring to problematic SN use were not very discriminatory. In contrast, the items about consequences of concern about appearance on SNs such as item 16 "I spend more time than I should taking, editing, and uploading photographs" exhibited high discriminatory power. Within the "Photo preparation" area, there was good discriminatory power shown by the item about the use of filters (item 28) and the item about taking various shots before achieving the desired photo (item 21). These behaviors were highlighted in the study by Chua and Chang (2016). However, it is important to note that it is possible that in time, assessing the use of filters will no longer make any sense as they become ubiquitous. The items we retained in the "Social comparison" area indicate the importance of numerical indicators (such as "likes"), as noted in previous studies on the relationship with ED risk (Tiggemann et al., 2018). The shorter CONAPP-S scale, made up of the items with the highest factorial loading, evaluates the four theorized areas with a similar number of items in each one.

Generally, the less discriminating items referred to very specific actions to achieve certain objectives (i.e., item 14, about hiding certain parts of the body). Those with the highest discriminatory power were 15, 21 and 24, all related to the photographic component and to the number of *likes*, confirming results found by other authors (Haferkamp & Krämer, 2011; Tiggemann et al., 2018). This was repeated in the CONAPP-S in which almost half of the items were about *likes* and many of the remaining items referred to activities related to photos, except for two which were about the numbers of followers. This again highlights the importance of physical comparison via images on SN which has been noted by other studies (Fardouly & Vartanian, 2015), along with the numerical indicators such

as *likes* (Mabe et al., 2014). It may seem that the two items about numbers of followers are unconnected to images and *likes.* However, it is another form of social prestige (Chua & Chang, 2016) which could indirectly affect the number of *likes* (the more followers one has, the more likely that one's photos will be seen).

In short, the new instrument and its short version allow for reliable, valid assessment of concern about appearance, which will be of great help for the development of future research and for the formulation of prevention programs. The CONAPP questionnaire has the advantage over other questionnaires of analyzing concern about appearance on SNs more thoroughly and considering all of the behaviors that might be part of this construct. Other questionnaires include *The Facebook Questionnaire* (Meier & Gray, 2014), which focuses on more specific photographic activities and the questionnaire from McLean et al. (2015), which includes the *Photo Investment* scale (effort made in choosing photos) and *Photo Manipulation* (technological manipulation of images). Both the short and long CONAPP questionnaires demonstrated adequate properties. The difference between them is that the long form allows a more thorough exploration of concern about appearance on SNs, whereas the short version would be recommended when there is not enough time available for a more detailed evaluation.

Concern About Appearance on SNs and ED Risk

The second objective was to examine the relationship between concern about appearance on SNs, evaluated through the CONAPP questionnaire and ED risk, estimated using the EAT-26 questionnaire. We begin by explaining the relationship between concern about appearance on SNs and ED risk, which is the principal result. Following that, we discuss the relationships between the general use of IG and FB, concern about appearance on SNs, ED risk, and age.

We found that people with a high concern about appearance on SNs tended to have a higher risk of ED. We also saw that concern about appearance explained part of the relationship between IG use and ED risk, as the association between IG use and ED risk disappears once the effect of CONAPP is controlled for. This effect only occurred with IG, not with FB. The relationship between FB use and ED risk was practically null, whether the effect of CONAPP was controlled for or not. This may be because FB use has no relationship with ED risk as it is a less image-focused SN (Marengo et al., 2018) and has older users (Global Digital Report, 2019), whereas IG use is related to ED risk because it is more image focused (Marengo et al., 2018) and its users tend to be younger (Global Digital Report, 2019). This is in line with previous research (Cohen et al., 2018), although it is worth noting that in our study, we used a stricter measure of ED risk compared to other studies which used body dissatisfaction (Saiphoo & Vahedi, 2019). This positive relationship indicates that preventive programs should be aimed at SNs behaviors that are pathologically focused on the image, rather than the time of use, which is complicated to estimate (Junco, 2013). To better understand this relationship between concern about appearance on SNs and risk of ED, it would be interesting for future studies to combine data from questionnaires with data directly extracted from SNs, as is starting to be done with the analysis of content in SNs (Ramiandrisoa, & Mothe, 2020).

We also examined the relationships between the general use of IG and FB in relation to concern about appearance on SNs, risk of ED, and age. The main conclusion that we can draw is that, compared to FB, IG is used by younger people, with greater ED risk, and with more concern about appearance on SNs. However, this result should be taken with caution owing to the way FB and IG use was measured, based on subjective estimated time ("I spend little time on it") rather than on an objective measure of time spent using it. These results are in line with previous studies which have noted that young women, who have a higher ED risk, tend to use more image-focused SNs (Kim & Chock, 2015; Striegel-Moore et al., 2003; Taylor et al., 2006).

The fact that younger women use IG more and their body image is more affected may be due to the age of the ideal women presented in these SNs. On IG, the images of ideal women are images of young women, so it is younger women who find an ideal to compare themselves with, provoking body dissatisfaction. This effect has been confirmed in traditional media such as magazines (Bessenoff & Del Priore, 2007). Another possible reason for young women using IG more and having greater risks of ED is that they are within the onset age for ED which is approximately 18 years old (Volpe et al., 2016). In short, this result indicates that there is a clear at-risk population defined in a specific SN context: highly-visual SNs such as IG. Therefore, future studies and prevention strategies for inappropriate use of SNs should focus on this population and context of SN use.

Limitations

These results should be interpreted in the light of a number of limitations. Future studies should address following accounts on SNs related to sports or food, as that is related to ED risk (Cohen et al., 2017). It would also be interesting in future research to include more indicators on influencers, since this is a widespread phenomenon and has already been shown to correlate with ED risk (Cohen et al., 2017). In addition, no men were included in the sample, however, it would be useful to include them in future research, as there are already data indicating that men's use of SNs is also related to ED risk (De Vries et al., 2016). It is also possible that the relationships we found were weakened by the strict measurement of ED outcomes, as we used an ED screening questionnaire (EAT-26). In addition, the measures of general use of FB and IG may be distorted as it was measured based on subjective estimated time ("I spend little time on it").

Conclusions

A new questionnaire has been developed to assess concern about appearance on social networks (SNs). The new instrument consists of 31 Likert-type items and shows an essentially unidimensional structure and excellent reliability. Clear relationships were found between the level of concern about appearance on SNs shown by the participants and eating disorder (ED) risk. The results indicate that people with a high concern about appearance on SNs, measured via the Concern About Appearance Questionnaire (CONAPP), tend to have a higher risk of ED. Younger people have more concern about appearance on SNs, with IG use being more prominent than FB use. In fact, FB and IG work very differently, IG is used by younger people, with a higher probability of ED risk and higher concern about appearance on SNs. In contrast, FB is used by older people, with a lower probability of ED risk and a lower concern about appearance on SNs. These results are important for future research and the design of preventive programs, which should focus on IG or highly-visual SNs, younger people, and maladaptive behaviors in SN use, rather than simply attempting to reduce the overall use of SNs.

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